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Assessing access and use of nutrition support programs, food insecurity, and health status in urban Native American families with young children in Montana: A case study

Thomas McClure [a]
All Nations Health Center

Christian Goes-Ahead Lopez [d]
All Nations Health Center

Kim Gilchrist [b]
Farm Connect Montana

Cherith Smith [e]
All Nations Health Center and University of Montana

Alexandrea Erin Manuel [c]
University of Montana

Jonathan Graham,[f] Sarah Black,[g] and Blakely Brown [h] *
University of Montana

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Abstract

The purpose of this cross-sectional, mixed methods case study was to assess participation in, and use of, nutrition support programs (NSPs) and their impact on food insecurity and health status of American Indian and Alaska Native (AIAN) families with young children (ages 0–8) living in three urban areas in Montana. Convenience sampling was used to recruit urban AIANs to participate in a

[a] Thomas McClure, B.S., Health Promotion Coordinator, All Nations Health Center, Missoula, Montana, USA.

[b] Kim Gilchrist, M.S., Project Consultant, Farm Connect Montana, Missoula, Montana, USA.

[c] Alexandrea Erin Manuel, MPH, Research Associate, University of Montana;
https://orcid.org/0009-0000-4456-5263

[d] Christian Goes-Ahead Lopez, M.A., Director of Human Resources, All Nations Health Center, Missoula, Montana, USA.

[e] Cherith Smith, PharmD, Assistant Professor–Pharmacy Practice, University of Montana.

[f] Jonathan Graham, PhD, Professor–Department of Mathematics, University of Montana.

[g] Sarah Black, MPH, Research Associate, University of Montana.

[h] * *Corresponding author:* Blakely Brown, PhD, Professor, School of Public and Community Health Sciences, University of Montana; 32 Campus Drive; Missoula, Montana, 59812 USA; +1-406-546-2147; Blakely.brown@umontana.edu;
https://orcid.org/0000-0001-9036-9562

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Disclsoures

This project was approved by the Indian Health Service (IHS) National Institutional Review Board (NIRB), under project number N20-N-07. Project members completed necessary sections of the Online Research Ethics course developed through the Practical Ethics Center at the University of Montana with the Office of Research Integrity (ROI). The authors report there are no competing interests to declare.

survey that contained closed and open-ended questions. A final sample of 177 responses were included in the analysis. Fisher exact tests, Wilcoxon rank-sum tests, and analysis of variance was used to model program participation, access, use, health scores, and food insecurity status as a function of demographic measures. Standard logistic regression was used in models with binary responses such as food insecurity. Proportional odds logistic regression was used to compare the proportion of respondents in poor, fair, good, very good, and excellent health for each of the five ordinal health measures with respect to program participation, access, use, food insecurity, and changes in the amount and variety of fruits and vegetables consumed. All logistic models used a single predictor and thus are unadjusted for additional factors. Thematic analysis was conducted on the open-ended questions. Most respondents (N = 132) identified as AIAN and 54% of respondents were categorized as food insecure. Most respondents (56–94.8%) agreed that SNAP, WIC, and DSD were helpful for improving their diets. Participants described frustrations with the SNAP application process, including long call back or wait times and difficulties getting questions answered and scheduling required certification appointments. Participants also expressed feeling discriminated against by caseworkers and community members when accessing SNAP. Respondents reporting SNAP was "very easy" to access had significantly higher general health scores (Proportional odds regression, overall p = 0.004). Higher physical functioning scores were associated with being food secure (p = 0.077). The odds of "Very Good" or "Excellent" social functioning scores were 2.26 times larger for participants identified as food secure than for participants identified as food insecure (CI: 1.21–4.28). The odds of "Very Good" or "Excellent" mental health scores were 2.10 times larger for participants identified as food secure than for participants identified as food insecure (CI: 1.13–3.96). Although further research is needed to establish causal relationships between food security, health status, dietary quality, and NSP use, our results advance understanding of the lived experiences of urban AIANs who participate in these programs. These results also emphasize the need for policy changes that reduce administrative complexity, improve program visibility, and incorporate culturally tailored approaches to better serve historically underreported communities.

Keywords
food insecurity, health, nutrition support programs, American Indian/Alaska Native, Urban Indian Organizations, SNAP, WIC, nutrition incentive program

Introduction

Food security refers to consistent access to safe and nutritious foods in sufficient quantities necessary to sustain a healthy lifestyle and normal bodily functions (Bickel et al., 2000). An individual's food security status is influenced by various factors, including social determinants of health, household characteristics, and economic factors. Lacking access to a nutritious diet has direct and indirect consequences for health and well-being across the lifespan (Hartline-Grafton & Hassink, 2021). Children living in households with low to marginal food security are particularly vulnerable to adverse outcomes, such as increased health risks, impaired coping skills and emotional regulation, and lower academic performance (Ryu & Bartfeld, 2012; Shankar et al., 2017). Low food security is also associated with higher risk of chronic diseases such as Type 2 diabetes (Levi et al., 2023). In response to food insecurity, the U.S. government administers several nutrition support programs (NSPs) to improve food access and security among low-income households. The two largest NSPs are the Supplemental Nutrition Assistance Program (SNAP) and the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC), which have been shown to improve household and child food security (Ettinger de Cuba et al., 2019; Kreider et al., 2016; Mabli & Ohls, 2015).

National statistics on food security can provide a high-level understanding of food security; in 2023, 17.9% of all U.S. households (10.6% in Montana) with children under 18 were categorized as having low food security (U.S. Department of Agriculture Economic Research Service, 2024a, 2024b). However, aggregated statistics often mask the experience of many underreported populations,

including the estimated 9.7 million Americans identifying as American Indian/Alaskan Native (AIAN), alone or in combination with at least one other race (U.S. Census Bureau, 2020). While 22% of AIANs live on reservations or other trust lands, more than 70% live in urban areas (Urban Indian Health Institute, 2025). Food insecurity rates in tribal communities have been reported as high as 75% (Mullany et al., 2013; Tomayko et al., 2017). Food insecurity rates among AIANs are significantly higher compared to non-Hispanic Whites (NHWs), and urban AIANs are 1.4 times more likely to be food insecure than rural AIANs (Jernigan et al., 2017). Low-income AIAN families with young children are particularly vulnerable to food insecurity, with the reported prevalence of food insecurity significantly higher in urban households (80%) than rural (45%) (Tomayko et al., 2017). Additional research on urban AIAN experiences with food insecurity and how lack of healthy, safe foods influences health status is necessary for making well-informed decisions about NSP policies, which may improve health disparities in this population.

Background on Urban AIANs and the Federal Government

The federal government holds both a moral and legal obligation to uphold its "promise of all proper care and protection" to tribal nations, which includes protection of tribal rights, lands, and resources, as well as a duty to provide health care services (Warne & Frizzell, 2014, p. 263). But since 1953 the government has sought to shift its approach in tribal relations from self-governance to termination and assimilation (National Archives, 2024a). The Bureau of Indian Affairs established an urban relocation program to promote AIAN assimilation by promising housing and employment assistance for those relocating from reservations to urban centers (Hendrix, 2019; National Archives, 2024b). These program supports, however, were short-lived, and promises of financial stability went largely unfulfilled. Many AIANs thus have faced significant challenges adjusting to urban life, including discrimination, job insecurity, and loss of cultural connection to their tribal communities (Hendrix, 2019; National Archives, 2024b). In response, the Indian Health Service (IHS) was established to deliver health and educational assistance to federally recognized tribes (Warne & Frizzell, 2014). However, IHS programs have faced chronic underfunding and staffing shortages, leading to inadequate preventive and reactive care for AIAN clients (Frerichs et al., 2022). In addition, urban AIANs often have less access to IHS services, significantly limiting their healthcare options. Urban Indian Organizations (UIOs) were established to address the gap in healthcare and provide culturally inclusive services for urban AIANs.

In Montana, there are UIOs in five cities: Butte, Helena, Billings, Great Falls, and Missoula. Each organization serves clients affiliated with all 12 Montana tribes, and many AIAN clients who have moved to Montana cities from out of state. In these cities, urban AIANs experience higher rates of unemployment and mortality than other races (Urban Indian Health Institute, 2021a, 2021b, 2021c). An Urban Indian Health Institute analysis found that Montana urban AIANs have disproportionately higher incidence of disease, comorbidity, and mortality compared to NHWs, particularly among AIAN mothers (Urban Indian Health Institute, 2025). In Montana, NHW males tend to live 16 years longer than AIAN males and NHW women live 19 years longer than AIAN women (Montana Department of Public and Human Health Services (DPHHS), 2017).

Despite living away from their native lands, many urban AIANs remain resilient and continue to practice their cultural traditions, including customary food practices. Each tribe is distinct, with its own traditions and cultural identity. Cultural adaptations of health promotion programs that seek to improve food security for urban AIANs could modify both surface structures (social and behavioral characteristics) and deep structural levels (worldview, norms, beliefs, and values) to promote their acceptance and comprehension (Castro et al., 2004). Thus, in this study we were interested in exploring how food assistance programs can be culturally adapted to better serve urban AIAN populations. By understanding how urban AIANs participate in NSPs like SNAP and WIC, our research intends to inform NSP policies in order to improve program design and implementation. The research

could also help NSPs to be more culturally relevant, accessible, and effective for this underserved demographic, in turn decreasing food insecurity and health disparities in the urban AIAN population.

Urban AIAN and Nutrition Education, Access, and Services

The proportion of SNAP and WIC participation among AIAN households is significantly higher than NHW households. In three urban cities in Montana, from 2013–2017 SNAP participation for AIAN households was 4.5 times higher in Billings, 3.1 times higher in Great Falls, and 2.4 times higher in Missoula compared to NHW households in those cities (Urban Indian Health Institute, 2021a, 2021b, 2021c). Similarly for WIC participation AIAN households were 2.5, 2.2, and 2 times higher than NHW households, respectively (Urban Indian Health Institute, 2021a, 2021b, 2021c). These disparities in program use highlight the disproportionate burden of food insecurity in urban AIAN communities and underscore the critical role that NSPs play in supporting dietary needs.

A nutrition incentive program (NIP) is a type of NSP that offers matching funds to specifically purchase fruits and vegetables to improve food security and health outcomes for SNAP participants (County Health Rankings & Roadmaps, 2020; Durward et al., 2019). A recent national study of NIPs found that 53.9% of all NIP participants and 79% of AIANs self-reported as food insecure, with longer program participation associated with lower reported food-insecure rates (USDA National Institute of Food and Agriculture, 2023). Montana's NIP is called Double SNAP Dollars (DSD) and is offered in 40 state locations. However, participation rates and experiences of urban AIANs in Montana who are eligible to use the DSD program are not well known.

Purpose of Study

The purpose of this study was to assess participation in, and use of, SNAP, WIC, and DSD, and to assess the food insecurity and health status of AIAN families in three urban areas in Montana. The results could inform program processes and policies that shape how urban AIANs experience these programs and potentially strengthen urban AIAN participation in the programs, leading to improved food security and well-being.

Methods

Study Design

The project partnership consisted of staff from three Urban Indian Organizations (UIOs) in Montana, a DSD program director from a local nonprofit, and a project evaluation team from the University of Montana. The cross-sectional study used a mixed-method approach consisting of a survey and interviews. This paper describes the survey component and results; the interview study component will be reported in a future publication.

The project partnership was formed in 2020 and IRB approvals for the study were obtained in February 2021. Recruitment began in March 2021. Data collection and analysis was completed in December 2022. Three co-authors were involved in participant recruitment, implementing the survey, and conducting the interviews. Five of the co-authors were involved in data analysis.

Community-based Participatory Research and Survey Development

Our project employed Community-based Participatory Research (CBPR) approaches that engaged in long-term, equitable partnerships with the Montana urban AIAN communities and UIOs, creating a more balanced relationship between the scientific rigors of researcher-driven studies and community control while maintaining respect for local wisdom. These research practices helped to increase the likelihood of implementing effective and sustainable public health interventions (Israel et al., 1998, 2001). The CBPR approaches included an Equitable, Participatory Evaluation Toolkit, a Memorandum of Understanding that described the guiding principles for conducting the study, co-design of survey and interview data collection tools and dissemination materials, and research training opportunities for project partners and staff, students, and community members. These approaches helped to facilitate a collaborative community and academic partnership in all phases of the research and integrate knowledge and action for the mutual benefit

of all partners, two core principles of adapting a CBPR approach for Indigenous research (Laveaux & Christopher, 2009).

The survey was initially developed from validated food security and health status instruments (Bickel et al., 2000; McHorney et al., 1993; Ware et al., 1995). Existing literature specific to accessing and using federal NSPs such as WIC and SNAP also informed the development of the survey. The partnership reviewed and approved the initial survey instrument. Ten AIAN adults in one of the urban communities provided programmatic feedback about the survey. For example, they were asked if they understood the questions, if there were other ways the questions could be asked so that survey participants would better understand them, and if the questions were culturally appropriate. We revised the survey based on this input. These individuals did not participate in the final survey.

Survey Measures

The study evaluated food security status using the validated two-item food security measure (Hager et al., 2010). The partnership chose to use this instrument rather than the longer 10- and 18-item food security assessment modules due to concern about length and potential participant fatigue in completing the survey. The two food security measurement statements participants responded to were: (Question A) "Within the last 12 months I/we worried whether our food would run out before I/we got money to buy more," and (Question B) "Within the last 12 months the food I/we bought just didn't last and I/we didn't have money to get more."

Health status was evaluated for general health, physical functioning, mental health, bodily pain, social functioning, and vitality using the 12-item Short Form Survey Instrument (SF-12) (Ware et al., 1998). The SF-12 provides a brief, reliable measure of overall health status and has been widely used as a screening tool in population health surveys, and successfully used with AIAN communities (Brown et al., 2007). The SF-12 instrument calculates health status scores, ranging 0–100 in 25-point increments, corresponding to categories of Poor, Fair, Good, Very Good, and Excellent health.

The survey collected participant demographic and descriptive information (e.g., age, educational achievement, household income, number of children living in the household age 0–8, marital status, annual income, race, ethnicity, and gender).

Two questions assessed changes in participants' fruit and vegetable consumption. Using a six-point Likert scale, respondents were asked, "as a result of using nutrition support programs, the *amount* (or *variety)* of fruits and vegetables increased greatly, increased some, stayed the same, decreased some, decreased greatly, or doesn't apply." In the sections specific to an individual nutrition support program (e.g., SNAP, WIC and DSD), participants were asked: "How does <name of NSP> impact your family's diet?" Participants could respond, "We eat healthier than we normally would," "We eat as we normally would," or "We eat less healthy than we normally would." Participants who selected either "healthier" or "less healthy" were subsequently asked open-ended follow-up questions: "If you responded that you eat healthier than you normally would, how does <name of NSP> help your family eat healthier?" or "If you responded that you eat less healthy than you normally would, how does <name of NSP> prevent your family from eating healthier?"

Participants also responded to open-ended questions designed to explore perceived enhancers and barriers to accessing SNAP, WIC, and DSD. Questions included what their family liked about these programs, and how the programs could be improved so that they would be easier to access and use.

Sampling Approach

We used a convenience and snowball sampling approach to recruit AIAN families with children 0–8 that had participated in WIC, SNAP, DSD, or other NSPs within the last six months. The age range was limited to align with the project's funding purpose and participant inclusion criteria, which was to "build evidence about nutrition supports for low-income families with young children (0–8 years old)."

Eligible participants lived in one of three urban communities in Montana: Great Falls, Missoula, and Billings. Recruitment materials, including flyers

describing the study, were posted at each UIHO site and at public locations in each community (e.g., gas stations, convenience and grocery stores, etc.). We also recruited participants at local community events such as health fairs, pow-wows, and other cultural events.

Participants had the option to complete the survey in person using a paper survey and pen/pencil at a UIHO or community event, or online via Qualtrics. The survey content was identical across formats. Online participants had the option to exit the survey and return later to complete it. Participants chose the survey format that was most convenient for them.

Upon completion of the survey, participants received a $20 grocery store gift card and were given the option to enter a raffle for larger prizes. One of the co-authors manually entered paper survey data into Qualtrics. The online survey employed standard bot detection measures, including CAPTCHA scores through the Qualtrics bot flagging system.

Data Analysis

Survey data was entered into an Excel spreadsheet and proofed for accuracy with edit and logic checks to ensure data integrity. Three of the co-authors cross-checked the Qualtrics survey data and performed additional bot detection assessments, which consisted of applying a bot detection and decision matrix to the data. The matrix was developed by the partnership and was based on observations of clear data outliers (e.g., a city or country geographically distant from the study locations) coupled with published reports of typical bot activity (e.g., extremely brief survey completion time, contradictory responses, repetitive responses to open-ended questions, listed phone number was disconnected, and suspicious email addresses).

Descriptive and demographic data were analyzed for SNAP, WIC, and DSD participating households versus households that indicated they did not participate in the NSP and for food-insecure households versus food-secure households. These data included household size, number of children, household income, and head of household education level. Health measures were classified for respondents using an ordinal scale (excellent, very good, good, fair, and poor) for general health, physical function, mental health, social functioning, vitality, and bodily pain. Participants were identified as either food insecure or food secure based on how they answered the two food insecurity questions.

Fisher exact tests, Wilcoxon rank-sum tests, and analysis of variance modeled program participation, access, use, health measures, and food insecurity status as a function of demographic measures. Standard logistic regression was used in models with binary responses such as food insecurity. Proportional odds logistic regression compared the proportion of respondents in poor, fair, good, very good, and excellent health for each of the five ordinal health measures with respect to program participation, access, use, food insecurity, and changes in the amount and variety of fruits and vegetables consumed. All logistic models used a single predictor and thus are unadjusted for additional factors. Twelve participants were excluded from all analyses involving the five health measures because they indicated that extenuating circumstances affected their answers to the health questions. We conducted all quantitative analyses in R, version 4.1.2. We conducted thematic analysis on qualitative questions (Elo & Kyngäs, 2008).

Results

Eleven participants completed a paper survey, and 229 participants completed the survey online. Of the 240 surveys, 63 were eliminated during the final bot detection assessments, leaving 177 for final analysis. We used all available data for any given variable or analysis of several variables and omitted incomplete responses. All significant results assessing the relationship between a categorical response and an explanatory variable were derived from a proportional odds logistic regression model framework.

Demographics

The vast majority (94.3%) of the respondents identified as AIAN. Females comprised 82.4% of respondents, 63.4% of the sample were adults (30–59), and 46% had a college degree. Most respondents (56.98%) reported an annual household income below $30,000 (Table 1).

SNAP, WIC, and DSD Programs

Participation rates and accessibility ratings were calculated for each NSP (SNAP, WIC, and DSD), along with participant perceptions of whether the program helped their family eat healthier.

SNAP

Eighty-seven participants (52.7%) reported participating in SNAP (Table 1) and using a 4-point Likert scale (very easy, easy, difficult, and very difficult) rated their family's ability to access SNAP. Of these, 83.9% rated SNAP as either "very easy" or "easy" to access. Among 86 participants who rated SNAP's dietary impact, 55.8% (n = 48) responded that SNAP helps their family eat healthier than they normally would. Notably, participants who indicated SNAP access as "very easy" were significantly younger than those who rated SNAP access as "easy" (mean age = 32.39 vs. 41.25, p = 0.009).

WIC

Fifty-eight participants (34.3%) reported participation in WIC (Table 1) and on the 4-point Likert scale rated their family's ability to access WIC. Of

Table 1. Demographics and Survey Respondent Characteristics

	n (%)				
Characteristics	**All Respondents (*N* = 177)**	**WIC Participants (*n* = 58)**	**SNAP Participants (*n* = 87)**	**DSD Participants (*n* = 20)**	**Other Participants (*n* = 32)**
Gender					
Female	117 (82.4)	42 (87.5)	61 (84.7)	13 (76.5)	25 (86.2)
Male	24 (16.9)	6 (12.5)	11 (15.3)	4 (23.5)	4 (13.8)
Age					
< 20	7 (4.9)	3 (6.3)	3 (4.1)	0 (0.0)	1 (3.3)
20–29	36 (25.4)	17 (35.4)	20 (27.4)	3 (17.6)	7 (23.3)
30–39	62 (43.7)	20 (41.7)	31 (42.5)	9 (52.9)	9 (30.0)
40–49	20 (14.1)	3 (6.3)	8 (11.0)	0 (0.0)	9 (30.0)
50–59	8 (5.6)	3 (6.3)	5 (6.8)	3 (17.6)	3 (10.0)
60+	9 (6.3)	2 (4.2)	6 (8.2)	2 (11.8)	1 (3.3)
Race					
AIAN	132 (94.3)	44 (93.6)	70 (97.2)	16 (94.1)	28 (93.3)
White	17 (12.1)	4 (8.5)	4 (5.6)	2 (11.8)	6 (20.0)
Black	2 (1.4)	1 (2.1)	1 (1.4)	1 (5.9)	2 (6.7)
Prefer Not to Answer	1 (0.7)	0 (0)	1 (0.7)	0 (0)	0 (0)
Education					
High School or less	33 (23.4)	13 (27.1)	23 (31.5)	4 (23.5)	7 (24.1)
Some College	43 (30.5)	14 (29.2)	29 (39.7)	4 (23.5)	8 (27.6)
College Degree	49 (34.8)	17 (35.4)	18 (24.7)	5 (29.4)	9 (31.0)
Graduate Degree	16 (11.3)	4 (8.3)	3 (4.1)	4 (23.5)	5 (17.2)
Yearly Income					
<$10,001	34 (25.8)	19 (43.2)	26 (37.1)	3 (18.8)	7 (25.9)
$10,001–$30,000	41 (31.1)	13 (29.5)	27 (38.6)	6 (37.5)	6 (22.2)
$30,001–$50,000	29 (22.0)	10 (22.7)	11 (15.7)	4 (25.0)	10 (37.0)
$50,000+	28 (21.2)	2 (4.5)	6 (8.6)	3 (18.8)	4 (14.8)

Notes: Percentages were computed based on the number of respondents to each survey question. For example, there were 165 respondents to the question about SNAP participation, 87 of whom said they participated, yielding a percentage of 87/165 = 52.7%. Counts overlap between WIC, SNAP, DSD and Other categories because there were 34 participants in SNAP and WIC, 10 in WIC and DSD, 9 in WIC and Other, 15 in SNAP and Other, 6 in DSD and Other, and 17 in SNAP and DSD.

these, 98.3% rated WIC as either "very easy" or "easy" to access. Of the 55 participants who rated WIC's dietary impact, 58.2% (n = 32) responded that WIC helps their family eat healthier than they normally would.

DSD

Twenty participants (12.3%) reported participation in DSD and rated on the 4-point Likert scale their family's ability to access DSD. All participants (100%) rated access to DSD as either "very easy" or "easy." Of the 19 respondents who rated DSD's dietary impact, 94.8% (n = 18) responded that DSD helps their family eat healthier than they normally would.

Food Security Status

One hundred and forty-nine participants responded to both food security questions (A and B) (Hager et al., 2010). Of the 149 responses to question A, more than two-thirds indicated this was at least sometimes true (69.8%; n = 104). Of the 149 responses to question B, more than half indicated this was at least sometimes true (55%; n = 82). In total, 54.4% of respondents indicated that by both measures they were food insecure.

There were more children aged 0–8 years in food insecure households (mean number of children = 1.74 vs. 1.29, p = 0.037). The odds of food insecurity among urban AIAN participants who used SNAP was 4.11 times that of those who did not use SNAP (95% CI: 1.99–8.77, p = 0.0001) (Figure 1). Respondents reported lower food insecurity among lower-income households (Logistic model of food insecurity on income level, p = 0.003, Figure 2(e)).

Fruit and Vegetable Consumption

The majority of respondents (62%, n = 91) indicated eating 1–2 servings of fruits and vegetables per day, 22.6% (n = 33) ate 3–4 servings per day, and 2.1% (n = 3) ate 5 or more servings per day. Conversely, 13% (n = 19) of the sample consumed less than one serving per day of fruits and vegetables.

Health Status

Health status for each participant was scored for six domains of health: general, physical functioning, bodily pain, vitality, mental health, and social functioning. Scores were categorized on an ordinal scale: 0 (Poor), 25 (Fair), 50 (Good), 75 (Very Good), 100 (Excellent).

General Health

General health scores were calculated for 134 responses. The median score was 50 (Good), and 89% of respondents had a score of 25, 50, or 75. Respondents reporting that SNAP was "very easy"

Figure 1. Bar Graphs of Food Security Distributions by Program Participation

Results shown for Food Security Question B, where a household was identified as food insecure if they indicated that for both of the two food security questions.

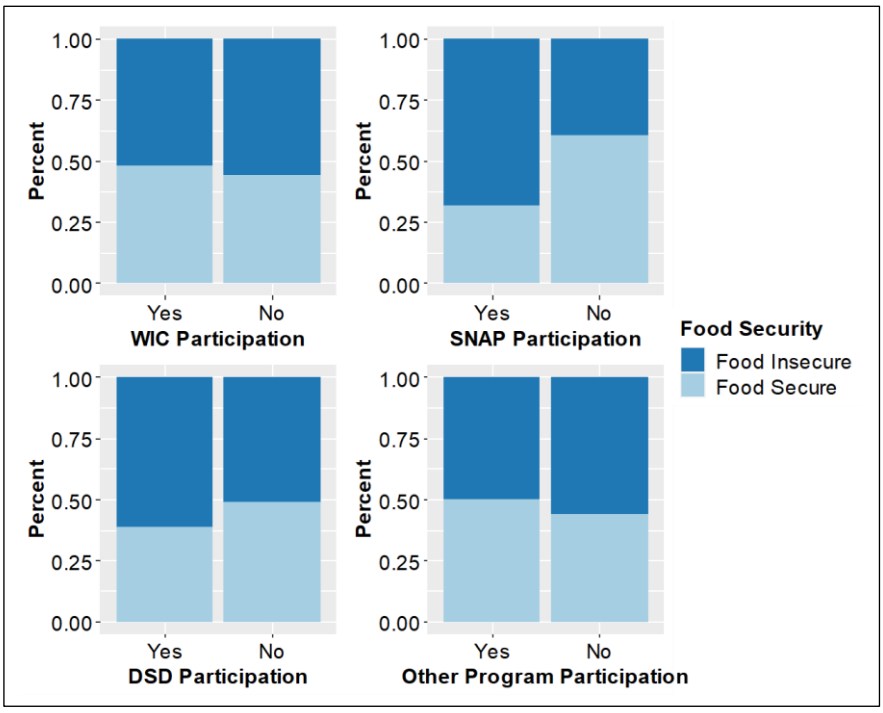
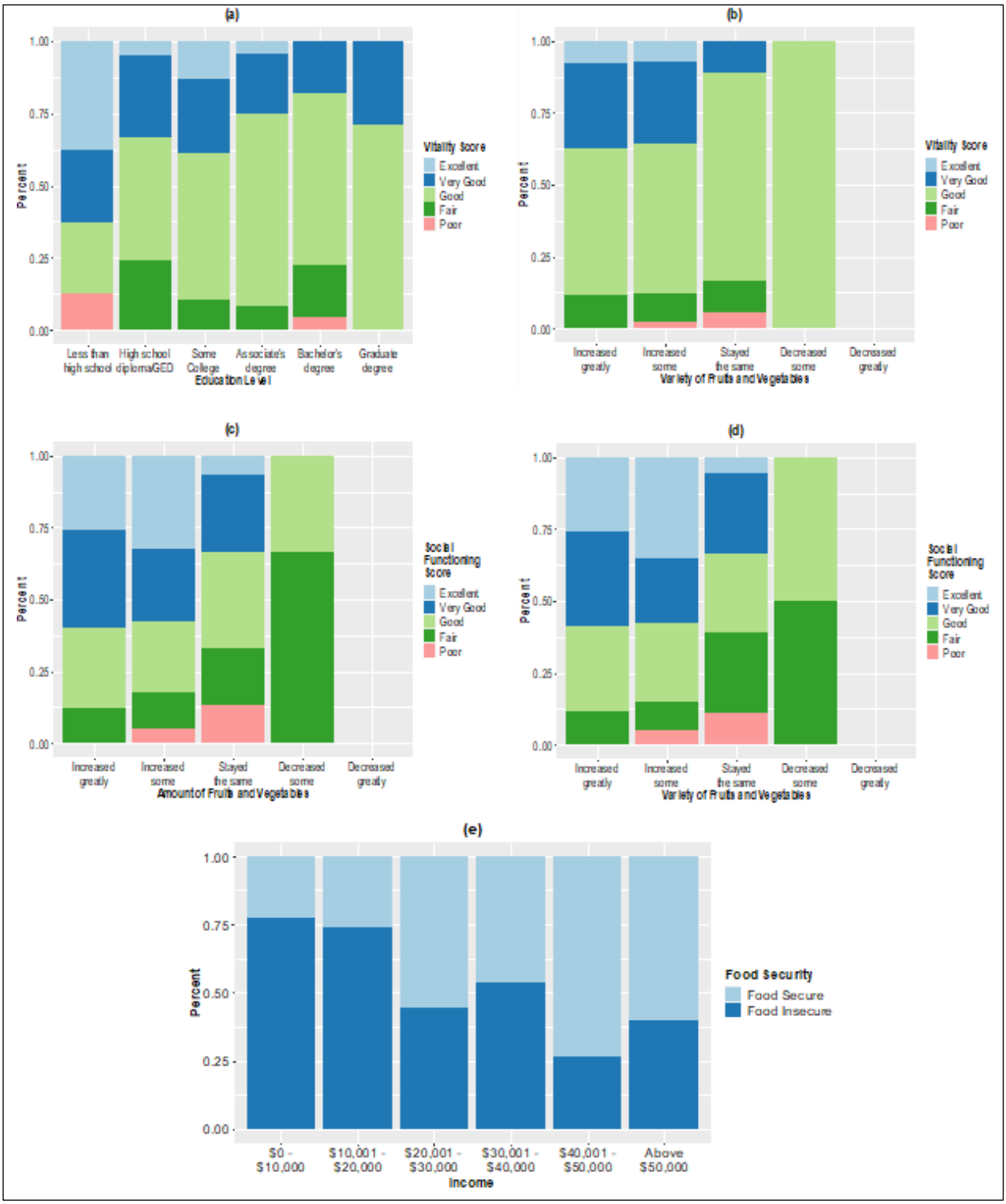


Figure 2. Bar Graphs of Health Score and Food Security Distributions by Educational, Fruit and Vegetable Intake, and Annual Income Variables



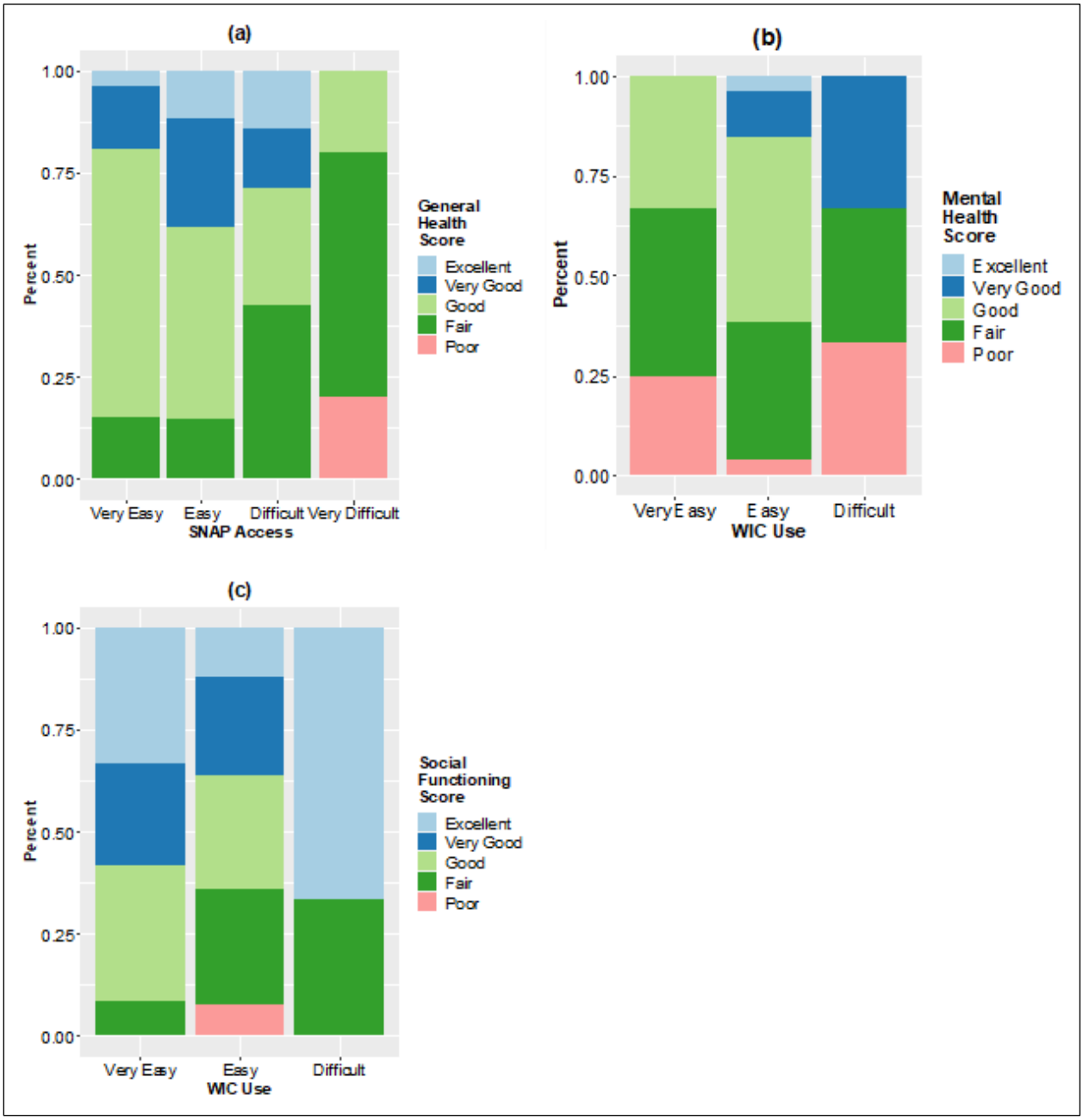
to access had significantly higher general health scores (Proportional odds regression, overall p = 0.004, Figure 3(a)).

Physical Functioning

Physical functioning scores were calculated for 133 responses. The median score was 100 (Excellent), with 55% of respondents scoring at this level.

Higher physical functioning scores were associated with being younger (p = 0.041, Figure 6(a)) and being food secure (p = 0.077, Figure 4). Specifically, the odds of a "Very Good" or "Excellent" physical functioning score decreased by 1.36 times for each 10-year increase in age (CI: 1.01–1.83); the same odds were 1.81 times as large for food insecure participants (CI: 0.94–3.54). SNAP and DSD

Figure 3. Bar Graphs of Health Score Distributions by Program Use/Access Relationships



participants generally had lower physical functioning scores ($p = 0.097$, $p = 0.097$, Figure 5(a, b)), with the odds of "Very Good" or "Excellent" physical functioning scores 1.76 times smaller for SNAP participants than non-participants (CI: 0.90–3.47) and 2.36 times smaller for DSD participants than non-participants (CI: 0.85–6.45).

Bodily Pain

Bodily pain scores were calculated for 134 responses. The median score was 100 (Excellent), with 51% scoring at this level. Higher bodily pain scores were strongly associated with being younger ($p = 1.1x10^{-5}$, Figure 6(b)). Specifically, the odds of "Very Good" or "Excellent" bodily pain scores decreased by 1.93 times per 10-year increase in age (CI: 1.44–2.64).

Vitality

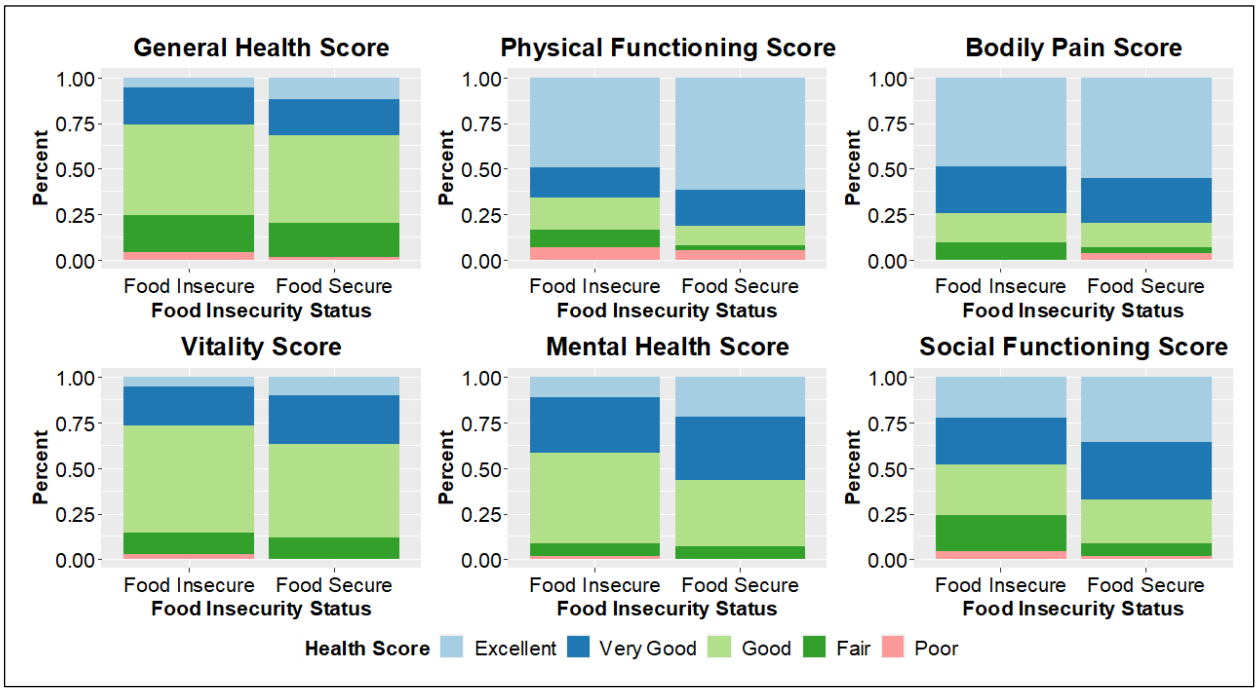
Vitality scores were calculated for 131 responses. The median score was 50 (Good), with 91% scoring 25, 50, or 75. Higher vitality scores were associated with being younger ($p = 0.046$, Figure 6(c)), and the odds of having "Very Good" or "Excellent" vitality scores decreased by 1.56 times per 10-year increase in age (CI: 1.06–2.42). Those with higher education levels tended to have lower scores ($p = 0.099$, Figure 2(a)), with the odds of "Very Good" or "Excellent" scores 10.33 times larger for those with less than a high school diploma compared to those with a college degree (CI: 1.89–57.98). Participants who reported that their fruit and vegetable intake "increased greatly" due to NSP tended to have better vitality scores ($p = 0.119$, Figure 2(b)) with the odds of "Very Good" or "Excellent" vitality scores 2.74 times larger for those who indicated that fruit and vegetable intake "increased greatly" compared to those who indicated that intake "stayed the same" (CI: 1.01–7.67).

Mental Health

Mental health scores were calculated for 132 responses. The median score was 50 (Good), with 83% scoring between 25 and 75. Food secure respondents had significantly higher mental health scores compared to food insecure participants (p=0.019, Figure 4), with the odds of having "Very

Figure 4. Bar Graphs of Health Score Distributions by Food Insecurity Status

Results shown for Food Security Question B, where a household was identified as food insecure if they indicated that for both two food security questions.

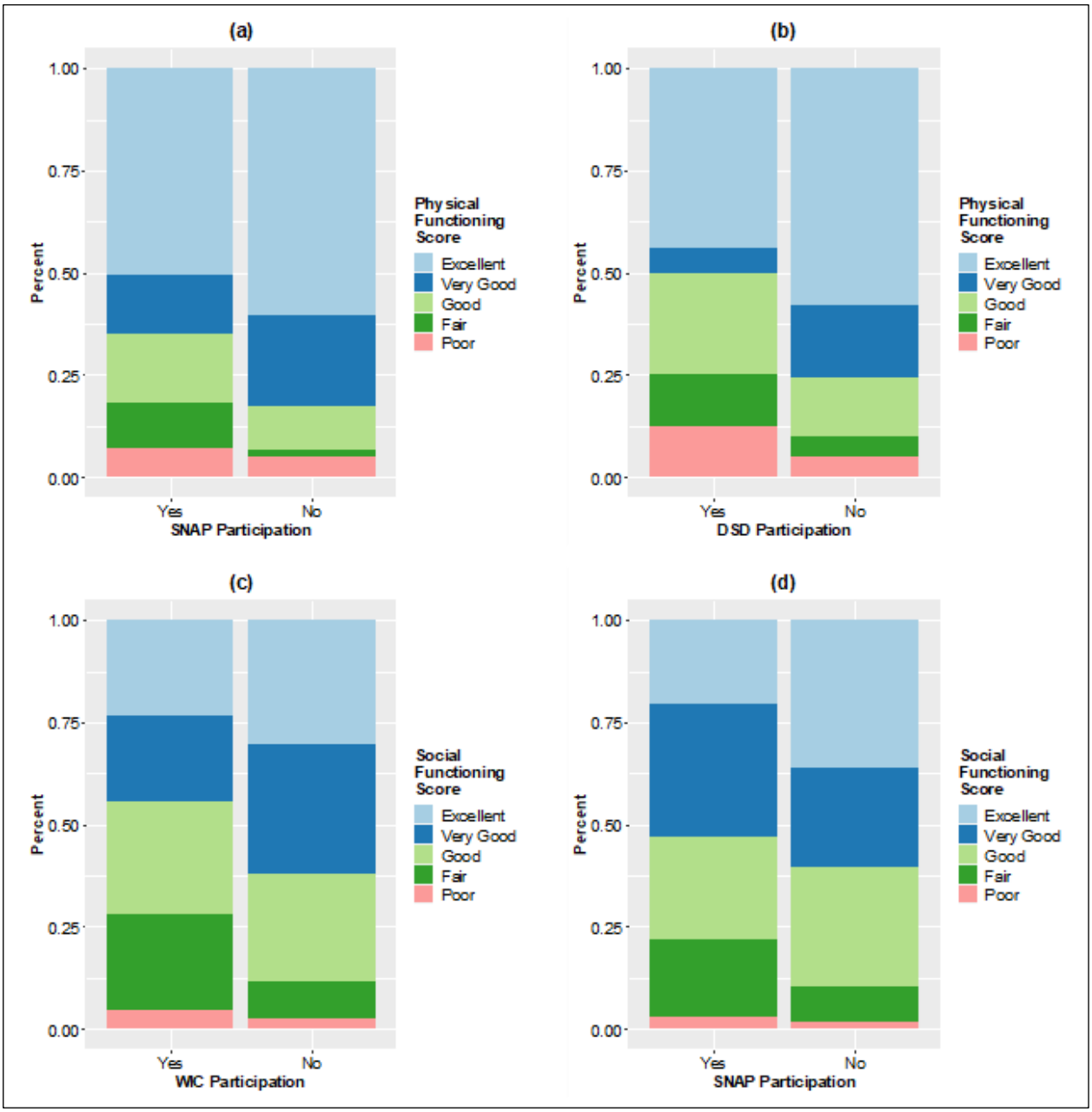


Good" or "Excellent" mental health scores 2.10 times larger for participants identified as food secure than for participants identified as food insecure (CI: 1.13–3.96). Younger participants also tended to have higher scores ($p = 0.017$, Figure 6(d)), with the odds of "Very Good" or "Excellent" mental health scores decreasing by 1.40 times per 10-year increase in age (CI: 1.06–1.87). Mental health scores tended to be higher for those who reported that WIC was "easy" to use, but this relationship was inconsistent ($p = 0.117$, Figure 3(b)).

Social Functioning

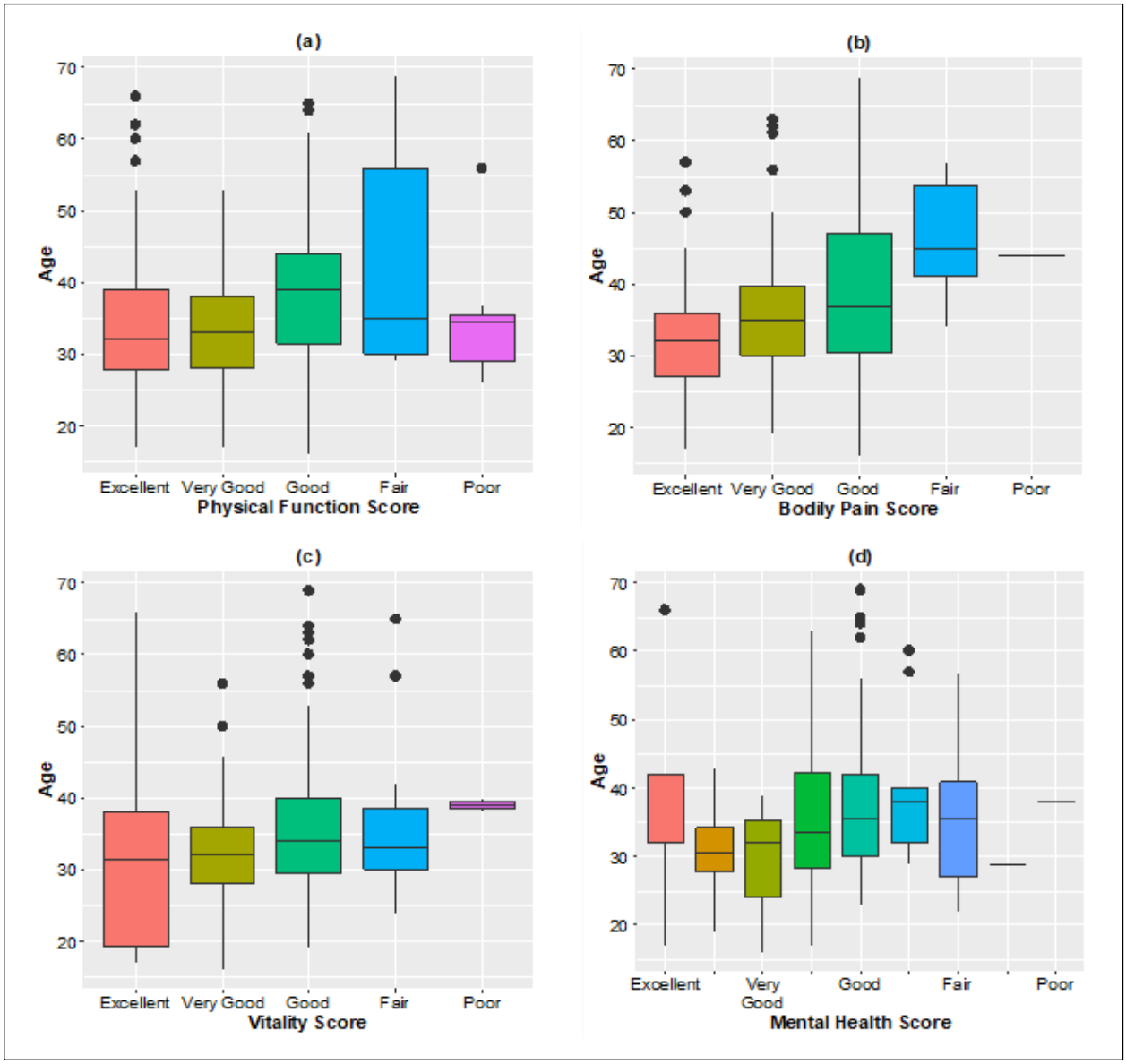
We calculated social functioning scores for 130 responses, with scores of 50, 75, and 100 distributed roughly evenly. Non-WIC and non-SNAP participants tended to have higher social functioning scores compared to WIC participants ($p =$

Figure 5. Bar Graphs of Health Score Distributions by Program Participation



0.040, $p = 0.071$, Figures 5(c,d)), with the odds of having "Very Good" or "Excellent" social functioning scores 2.03 times larger for non-WIC participants (CI: 1.03–4.01) and 1.79 times larger for non-SNAP participants (CI: 0.95–3.40). Food-secure respondents tended to have higher social functioning scores ($p = 0.011$, Figure 4), with the odds of "Very Good" or "Excellent" scores 2.26 times larger for participants identified as food secure than for participants identified as food insecure (CI: 1.21–4.28). Scores tended to be better for those who reported that the amount and variety of fruits and vegetables consumed "increased greatly" as a result of participating in a NSP ($p = 0.012$, 0.008, Figure 2(c, d)), with the odds of better scores 4.08 and 3.94 times larger for those reporting "increased greatly" than for those indicating the amount and variety "stayed the same" (CIs: 1.53–11.19, 1.54–10.44 respectively). Social functioning scores tended to be higher for those who found WIC "Very Easy" to use ($p = 0.100$, Figure 3(c)), with the odds of "Very Good" or "Excellent"

Figure 6. Boxplots of Age Distributions by Level of Health Scores



scores 2.75 times larger for participants who found WIC "Very Easy" to use (CI: 0.83–9.63).

Qualitative Results

After reporting their participation in SNAP, WIC, and DSD, participants were asked open-ended questions to further explore their experiences with the program.

SNAP Enhancers

Participants noted that SNAP allows them to buy more fresh produce, often more expensive than processed food, and helps them maintain an overall healthier diet. Others discussed convenience, as most stores accept SNAP benefits and store employees are familiar with the payment process. For example:

- "My family eats healthier."
- "We are not limited to buying processed foods to get by due to income."
- "I have the funds to buy fruits and veggies, which are more expensive than fast food."
- "Many stores accept EBT (SNAP Benefits) and assist you in using them."
- "More places accepting SNAP. There have been times when we have no cash, but we have a SNAP card and we're stuck at [name of hardware store] to buy a tool to fix something and the kids are thirsty for water or a small snack."

SNAP Barriers

Participants expressed frustrations with the SNAP application process and notable poor experiences with the Office of Public Assistance that oversees program enrollment. Common themes included long call back or wait times, difficulties reaching a real person to ask questions, and difficulties getting the appointments required to become certified for SNAP benefits. For example:

- "…wait times and interviews on the phone take longer than expected."
- "Difficult to get an appointment or reach a representative."
- "Make it easier to report income [for SNAP application] by speaking to a real person."

Other hinderances included feeling discriminated against or judged by community members or caseworkers for accessing SNAP. For example:

- "I honestly see racism as an issue when using SNAP. I had someone say 'wow wish I could get free money' ok yeah, I understand that but if I didn't have SNAP we'd all starve. I budget out our benefits."
- "…the caseworkers are judgmental"

WIC Enhancers

Participants generally had positive remarks about WIC. They liked how the program helped them afford healthier foods for their family, and overall, had a better experience working with the WIC office:

- "We are able to afford plenty of fresh produce and healthier alternatives."
- "By having strict yummy choices on cereal including milk (which my family didn't drink until we got WIC)."
- "[We] didn't have to go in the [WIC] building a simple call was all I needed unless it was a checkup for my child."
- "I can call WIC anytime I have questions."

WIC Barriers

The barriers described regarding WIC involved the program's food eligibility structure, which requires participants to know what foods are WIC-approved. Several participants suggested ways to help mitigate this issue and improve access. Other barriers included income limits preventing families that nevertheless need nutrition support from participating in the program. For example:

- "Lack of labeled foods in stores that apply to WIC so it can be hard to identify when searching for WIC items."
- "Broadening the approval of certain brands or foods so it's easier to obtain WIC approved foods."
- "When local store workers don't know how to do WIC transactions or know what's WIC approved."
- "Extending [WIC] to family in the middle class with two incomes by expanding

income guidelines."
- "Chat support [for WIC's online and app platform] would be helpful."

DSD Enhancers

Although very few respondents used the DSD program, comments about the program overall were positive. Participants liked how the DSD helped them afford fresh fruits and vegetables from farmers' markets, especially as the program facilitated teaching healthy eating habits to children:

- "They [DSD program] improve food security and offer us benefits that enable us to purchase healthier diets."
- "My family learn more about where food comes from and that helps my child learn the importance of respecting the earth and appreciate all that we receive as a blessing from the creator."
- "Promotes kids with habits of seeing and purchasing healthy produce."
- "You walk up, swipe. They take [US]$20 off and hand you [vouchers worth] [US]$40. So easy."

DSD Barriers

Perceived DSD program barriers were lack of signage identifying which vendors accept DSD and lack of knowledge that the program exists. Participants gave a few suggestions to improve awareness:

- "Booths could have clear signs that state they are participating in double snap dollars."
- "More advertisement [about DSD] on Facebook, radio, and TV."

Discussion

Sample and Demographics

To our knowledge, this is the first study to assess participation in and access to NSPs in relation to food security and health domains among urban AIANs. Survey recruitment was highly successful with 177 responses included in the final analysis. Although recruitment focused on AIANs from three Urban Indian Organizations (UIOs), only 94.3% (n = 132) of the participants self-identified as AIAN on the survey. Participants may have selected White (n = 17) or Black (n = 2) as their racial identity for several reasons, including multiracial backgrounds, personal or cultural identity preferences, and how they interpret survey questions about race. It is not uncommon for individuals with AIAN ancestry or connections to AIAN communities to identify with another racial group or to prioritize other aspects of their identity in certain contexts. Some individuals with AIAN ancestry may choose not to identify as such due to historical mistrust, concerns about how their data will be used, and fears of misclassification and miscounting, particularly involving research and organizations that have historically underrepresented or misrepresented Indigenous peoples. Additionally, some respondents may be non-AIAN UIO clients, possibly individuals with AIAN children/family members or community members who accessed services through the UIO and chose to participate in the survey, despite our AIAN-focused recruitment.

Food Security, Access, and Dietary Impacts

Fifty-four % of the survey participants were food insecure, with SNAP and DSD participants more likely to experience food insecurity. However, due to our cross-sectional study design, we cannot determine if participation in these NSPs impacted food insecurity among urban AIANs. This result contrasts with other research that has found a positive association between participating in SNAP and other NIPs and reduced food insecurity (Durward et al., 2019; Mabli & Ohls, 2015). Notably, these studies did not specifically examine AIAN households, which experience disproportionately higher rates of food insecurity and poverty than other minority groups (Jernigan et al., 2017; Shrider & Creamer, 2023).

There may be cultural barriers as well that are specific to AIANs that reduce their access to SNAP and DSD benefits, such as welfare stigma, a negative social perception of using public assistance (Stuber & Schlesinger, 2006). Research on welfare stigma has found that it may impact the effectiveness of programs and increase the food insecurity of SNAP participants (Hatton et al.,

2024). This concern emerged in our open-ended responses, in which several respondents expressed feelings of discrimination when accessing SNAP. Given the limited knowledge of urban AIAN participation and utilization of SNAP, WIC, and DSD programs, further research is needed to explore how these programs impact food insecurity in urban and rural AIAN communities. Such studies should use more rigorous methodologies, including longitudinal and prospective designs.

Most respondents (56–58%) agreed that SNAP and WIC programs were helpful for improving their diets. Among the 20 participants with experience using the DSD program, 94.8% agreed that it helped their families eat better. These findings are supported by the qualitative results, participants describing how NSP benefits helped them overcome financial barriers and afford healthier foods, particularly fruits and vegetables. These findings are consistent with other research, including a mixed-methods study that found SNAP and WIC participation improved diet quality among low-income households with young children (Vinitchagoon et al., 2025). Similarly, a pre- and post-evaluation of a NIP found that participants increased their fruit and vegetable intake from 2.85 to 3.29 times per day (Durward et al., 2019).

Overall, respondents reported high ease of access to the programs: 83.9% for SNAP, 98.3% for WIC, and 100% for DSD. Open-ended responses helped contextualize SNAP's lower rating, with participants noting long call wait times and difficulties with applications and managing eligibility. In contrast, WIC participants frequently reported positive experiences, highlighting friendly staff and easy appointment scheduling. These findings were echoed in a report on federal program customer service, which found that four in ten adults experienced at least one difficulty enrolling in SNAP, with enrollment challenges and mistreatment more commonly reported by minority groups and individuals with disabilities than by NHW adults (McDaniel et al., 2023). Although AIAN families were not directly surveyed in that report, our findings suggest similar barriers were experienced by SNAP-eligible AIAN households.

The majority of the respondents participating in DSD said it was easy to use and helpful for teaching young children about healthy food habits, local farmers, and the agricultural system. Other researchers have found that NIPs can improve food security in low-income households by increasing their ability to purchase fruits and vegetables; our results strengthen this assertion (Durward et al., 2019; Harvey et al., 2021; Savoie-Roskos et al., 2016). Despite high satisfaction among those who used the DSD program, overall awareness of the program was low. This is consistent with findings from other evaluations of NIPs, which frequently cite limited awareness as a barrier (Garner et al., 2020). This barrier suggests a need for broader and more effective outreach campaigns at both federal and local levels. Importantly, messaging strategies should be culturally relevant and community-informed to better engage AIAN households.

Health Scores

Our findings show positive correlations between food security and three of six health domains: physical functioning, social functioning, and mental health. Similarly, other studies show adults in food-insecure households to be significantly more likely to rate their health as poor/fair and to score significantly lower on physical and mental health (Stuff et al., 2004). Other studies report a connection between perceived health status and long-term participation in NSPs and NIPs (Miller & Morrissey, 2021; Parks et al., 2021).

For vitality, physical functioning, and bodily pain scores, younger participants tended to have higher scores. This suggests that potential confounders such as age may also influence health outcomes, which highlights a limitation of the cross-sectional design, that restricts our ability to determine causality between NSP participation and health impacts. Nevertheless, these results help identify potential associations between NSP participation and health among urban AIANs. For example, the vitality score tended to be better for those with higher fruit and vegetable intake and was significantly higher for those participating in an NSP. Participants who had better mental health scores thought WIC was "very easy" to use compared to other WIC participants. The social functioning score tended to be better for participants whose fruit and vegetable intake had significantly in-

creased and for participants who indicated that they found WIC "very easy" to use.

These exploratory findings are significant because they are the first to suggest potential connections between various health domains, food security, and use of SNAP and WIC in urban AIANs. More rigorous research methods, such as longitudinal or prospective studies, are needed to understand how NSPs influence health and to determine causal relationships. Nevertheless, our results could guide persuading more urban AIANs to participate in SNAP and WIC programs. For example, NSP program marketing materials tailored to urban AIANs could describe how participating in SNAP and WIC is associated with better health, social functioning, and vitality in the population.

Food Sovereignty and Systems

Our findings suggest access to and use of NSPs are strongly related to program participation, food security, and certain health measures. Another factor associated with low food security for AIAN families is decreased food sovereignty. Food sovereignty is the right of people, communities, and countries to define their own food and land policies, which includes the right to nutritious and culturally appropriate food and resources (Bell-Sheeter et al., 2014). Food sovereignty movements improve food access by shifting power to local people to build food systems that support cultural, social, economic, and environmental needs (Budd Nugent et al., 2022). A study found that increased calorie intake from traditional, culturally relevant foods was associated with diet quality improvements (Walch & Bersamin, 2020). Other studies have suggested that AIAN food security is intricately tied to their ability to participate in their tribe's culture (Nikolaus et al., 2022; Power, 2008). Further research, with community collaboration, is needed to understand how NSPs can be tailored to better support food sovereignty for urban AIANs households in Montana.

Strengths and Limitations

A strength of this study is that a large sample, 177 responses, was analyzed. While the cross-sectional and self-report design of this study is a limitation, nonetheless this sample provides valuable data about urban AIAN participation in NSPs and a NIP, a population that is underreported and has significant health disparities. Further research to understand barriers, enhancers, and impacts of NSP and NIP participation is needed in this population. Community participatory processes are recommended for future research, as these approaches develop deeper engagement, research knowledge, and skill capacity building with community partners and organizations such as UIOs. In addition, this process improves the likelihood of community buy-in, necessary for developing effective and culturally relevant interventions.

The generalizability of the study results is limited due to the participants' location in only three urban areas of one western state. Many participants were UIO clients, which may have introduced selection bias. Another limitation was the use of non-validated survey questions. However, all survey questions were vetted by local urban AIANs prior to administration, an important step in ensuring that the survey was culturally relative to this specific community.

Conclusion

This case study offers valuable insights into the experiences of urban AIAN families with nutrition support programs (NSPs), an area that research has largely overlooked. By noting barriers such as administrative burdens with SNAP, challenges navigating WIC-approved food lists, and low awareness of programs such as DSD, our findings help to fill a critical knowledge gap. Although further research is needed to establish causal relationships between these barriers and outcomes like food security, health status, and diet quality, our results advance understanding of the lived experiences of urban AIAN households. They also emphasize the need for policy changes that reduce administrative complexity, improve program visibility, and incorporate culturally tailored approaches in order to better serve historically underrepresented communities. This study represents an important step toward understanding how NSPs and NIPs influence food access and the ability to achieve and maintain a healthy lifestyle among urban AIANs.

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