

Article

A Qualitative Exploration of Food Security Among Collegiate Student-Athletes from the Perspective of Athletic Professionals

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Abstract

Though it has been well established that a subset of collegiate student-athletes in the United States (U.S.) are not food secure, efficacious solutions for mitigating this issue appear to be elusive. This study identified system-level barriers and enablers to food security among student-athletes through the lens of collegiate athletic professionals (athletic directors, athletic trainers, sports dietitians, and strength and conditioning coaches). Using a phenomenological-informed design and constructivist theoretical framework, researchers explored the experiences and insights of participants ($n = 27$, Division I, northwestern U.S.) via six online focus groups July–December 2023. Categorical themes for barriers to food security were finances, culture, and competing priorities; enablers were on-campus supplemental food assistance, referrals to community services, and educational programming. A gap analysis was performed; existing solutions enabling food security and aspirational solutions for addressing food insecurity were compared, and gaps identified. Based on the insights of athletic professionals, a lack of student-athlete-centric solutions to ensure food security emerged. The introduction of shared revenue programs in American college sports may address some of food security barriers; however, additional funds may not mitigate the contribution of competing priorities and scheduling issues experienced by student-athletes. System-level changes are required to enable food security among this population.

Keywords: food security; food insecurity; university student-athlete; nutrition; athletics



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1. Introduction

The United States Department of Agriculture (USDA) stratifies food security into four levels [1]. High food security is the consistent access to adequate quantities of nutritious food needed for an active and healthy life. In contrast, marginal food security is defined as experiencing periods of insufficient access to quality foods in adequate quantities. The final two levels—low food security (LFS) and very low food security (VLFS)—are also referred to as food insecurity (FI). LFS is defined as adequate quantity of food but reduced quality, variety, and desirability of options. VLFS is the reduced intake of food due to limited funds and resources [1].

College students in the United States (U.S.) experience FI at significantly higher rates than households (40–45% vs. 13.5%, respectively) [2–4]. FI prevalence rates among student-

athletes have also been shown to exceed those of the general student population. At a university in the northwestern U.S., FI rates were 42% for the general student population and 60% for student-athletes [5]. Zigmont confirmed this finding [6]. Though FI is a serious health and performance concern among collegiate student-athletes [7–11], research on this phenomenon is sparse. A 2024 scoping review on the prevalence and contributing factors of FI among collegiate student-athletes identified only eight peer-reviewed articles [12]. The paucity of research may be attributed to a misconception that collegiate student-athletes receive scholarship funds that support all their expenses, including food, and they are therefore not at risk for experiencing FI [13].

Research on food security among North American collegiate student-athletes often reports findings based on a school's competing "Division" [5–7]. In the U.S., Canada, and Puerto Rico, college athletics is governed by the National Collegiate Athletic Association (NCAA) [14]. To help promote fair competitions, NCAA regulations divide the 1100+ participating teams into three groups: Division I, II, and III. Schools with more generous funding for student scholarships and healthy athletic department budgets fall into Division I. Conversely, Division III schools cannot offer student-athlete scholarships, and athletic department budgets are more limited [15].

1.1. Research Among Student-Athletes

The first research on FI among U.S. collegiate student-athletes was conducted in 2016 [10]. Since that time, surveys of student-athletes have identified profound FI prevalence rates, ranging from 9.9% to 65%, with rates increasing at the end of the academic year [5,8–11,16–24]. The collective research represents the experiences of >5844 student-athletes from 70+ American universities in disparate geographic regions across the U.S. [5,8–12,16–22,24,25]. Participating student-athletes were primarily white and female, 68.9% and 54.7%, respectively [5,8–12,16–20,22,24,25]. Most studies were cross-sectional surveys of student-athletes that employed an online questionnaire; the USDA Household Food Security Survey Model (HFSSM), a validated tool for assessing level of food security (high, marginal, low, very low), was often utilized [5,8–11,16,18–21,23,25].

All but two studies reporting on the specific degree of food security found greater rates of VLFS than LFS among student-athletes [8–11,18,19,21,23,25]. One study classified marginal food security as FI [18]. A 2016 cross-sectional study ($n = 111$ male student-athletes, Division I, public university, southern U.S.) found that, of the 9.9% of food-insecure participants, 2.7% experienced LFS and 7.2% VLFS [10]. Goldrick-Rab et al. ($n = 3506$ student-athletes) found that 14% of Division I, 16% of Division II, and 11% of Division III student-athletes experienced VLFS [9]. A study of Division I student-athletes ($n = 45$, 69% white, 73% female, public university, northwestern U.S.) found 37% of food-insecure participants experienced VLFS [11]. Among a cohort of primarily white, male, football (American) players, 87% of those categorized as food insecure experienced VLFS [19]. Likewise, among a cohort of 404 student-athletes (two universities, southeastern U.S.), 45.6% were food insecure and 16.8% had VLFS [21]. Hsuan et al. found that 50.4% of Division II California student-athletes ($n = 256$) were food insecure; of those, 28.5% experienced VLFS [25]. In contrast, Douglas et al. found that 23.1% of student-athletes (rural Texas) experienced LFS; 9.0% were VLFS [8]. Additionally, in a small cohort of female student-athletes from a Historically Black College and University, 30% experienced LFS and 20% VLFS [23].

Subsets of collegiate student-athletes have been found to be at higher risk for FI [10,11,16,18]. In an observational study of 787 Division III student-athletes (81.5% white, 63.3% female), 14.7% were found to be food insecure; higher rates of FI were found among black (31%) and first generation (27.2%) student-athletes, as well as those without campus

meal plans (29.9%) [16]. FI rates were found to be higher among Division I sport teams with greater percentages of walk-on (non-scholarship) players, specifically, track and football teams [11]. Student-athletes who were food insecure before college have been found to be at higher risk for FI during college [10]. Lastly, student-athletes attending a rural North Carolina university were found to be at greater risk for FI than their counterparts at an urban Alabama university [18].

Adverse physical, mental, academic, and athletic performance consequences have been associated with LFS and VLFS among student-athletes [8–12,16,26–28]. Decreased kilocalorie intakes put student-athletes at risk for Relative Energy Deficiency in Sport (REDS), which can yield both physical and psychological health issues due to the inadequate consumption of the energy required to support bodily functions [12,29,30]. Poll et al. found that food-insecure football players ($n = 100\%$ male, southeastern U.S.) were at a higher risk for disordered eating behaviors [10]. Furthermore, food-insecure student-athletes are at greater risk for sports-related injuries [12]. To keep scholarship funds, student-athletes must meet academic achievement standards. In the Goldrick-Rab et al. study, about half of food-secure student-athletes stated that they earn As. In contrast, 40% of FI student-athletes reported earning A grades [9].

In a scoping review, Pacenta et al. concluded that 50% of studies identified limited student-athlete finances as the primary food security barrier [12]. The theme of limited student-athlete financial resources also precipitated in other studies as a food security barrier [9,11,27,28,31]. Misener found that 23.8% of student-athletes skipped meals due to running out of meal swipes; 29.7% reported not having the funds required to eat balanced meals [31]. Living off campus further exacerbated FI risk for student-athletes with limited incomes [11,16]. A survey of 3506 student-athletes (Divisions I, II, and III, community and 4-year colleges) found that more than 50% reduced their dietary intake by skipping meals or not eating for a full day due to limited finances [9,16]. In another study, student-athletes reported obtaining supplemental kilocalories by consuming inexpensive, low-nutrient-dense options such as fast foods and fried foods [11,12,32]. NCAA regulations restricting the provision of meals and snacks for Division III student-athletes also emerged as a barrier to food security [16].

Scheduling conflicts coupled with dining hall options not meeting student-athlete dietary needs for optimal athletic performance were common food security barriers [8,11,12,16,26,27,31,33]. A cohort of 10 student-athletes (90% white, 50% female) reported lack of time, special dietary needs, limited campus dining options, lack of healthy dining hall options coupled with limited kitchen access, and limited transportation access as FI contributing factors [33]. Brown et al. ($n = 787$, Division III, 81.5% white, 63.3% female) reported that nearly half (45.4%) of the participants reported conflicts between practice and game schedules and dining hall hours [16]. Reader et al. ($n = 45$, Division I, 69% white, 73% female) identified balancing academics and athletics and elevated energy needs as barriers to food security [11]. In Brown et al., 18% of the 787 participants said that the university meal plan did not adequately meet their daily energy needs [16]. Brauman et al.'s ($n = 169$, 72% female, 87% white/Caucasian) study findings echoed these findings [26].

Many colleges and universities have implemented campus FI solutions that serve all students, such as food pantries, meal swipe programs, gardens, dining programs, scholarship/emergency funds, and free-food alert systems [34,35]. However, multiple studies highlight the need for unique solutions that address the specific nutritional needs of student-athletes [8,17,28]. Douglas et al. found that solutions for the general student population have proven inadequate for student-athletes [8].

1.2. Research Among Other Stakeholders

Research is limited on the perspectives of collegiate athletic professionals (athletic directors, athletic trainers, sports dietitians, strength and conditioning coaches) regarding food security barriers and enablers among student-athletes, as well as potential solutions [36–38]. FI was identified as a negative health contributor in an investigation of athletic trainers' ($n = 23$, representing 20 colleges) knowledge about the social determinants of health [37]. Smith-Rockwell et al. surveyed 35 coaches and 18 athletic trainers (21 Division I sports, rural Virginia school) about their nutrition knowledge, opinions, and practices [38]. FI did not precipitate as a nutritional topic; however, 53% of participants noted student-athletes' dietary intakes were subpar due to financial limitations. Tangentially, institutional disparities have been identified as a food security barrier [36].

1.3. Study Aim

Though it has been well established that a subset of U.S. collegiate student-athletes are not food secure [8,10,16,29,33,39–41], efficacious solutions for mitigating this issue appear to be elusive. The current body of research has predominantly focused on the lived experiences of student-athletes. Studies exploring the insights of athletic professionals, who are better positioned to identify realistic solutions and spur change, are lacking. Nikolaus et al. identified the need for qualitative research on potential solutions for removing barriers to food security [42]. A recent report by Bodian et al. focused on strategies for overcoming student-athlete food security barriers but focused only on food access challenges (the ability to obtain nutritious food) [27].

The aim of this study was to collect the perspectives of athletic professionals on food security barriers and enablers among collegiate student-athletes in the U.S. In addition to exploring existing strategies aimed at improving the food security status of student-athletes, this study compiled aspirational system-level solutions for resolving FI. A gap analysis was performed; barriers not addressed by existing solutions were identified. This research was part of the Running on Empty Study [43], an investigation into the phenomenon of FI among student-athletes.

2. Materials and Methods

To glean the first-hand observations, perceptions, and insights of athletic professionals regarding the barriers, facilitators, and solutions for ensuring food security among student-athletes, a phenomenological-informed research design and constructivist theoretical framework were employed [44]. Phenomenology was used to amass the personal experiences of athletic professionals. The researchers sought to understand the perspective of each athletic professional. Descriptive phenomenology was used to collect information from athletic professionals on their personal observations about food security barriers and enablers. Interpretive phenomenology facilitated exploration beyond personal stories to tease out deeper insights. To gather participant observations and insights on how system-level policies and programs can impact the food security status of student-athletes, new phenomenology was utilized to probe how institutional and systems factors might shape the individual experiences of athletic professionals [44].

A reflexive thematic analysis method was used for data analysis, specifically, to identify, analyze, and interpret precipitating data patterns. A comprehensive description of the materials and methods employed for this research was previously published [43]. The Idaho State University Institutional Review Board approved the study protocol, and all participants provided informed consent.

2.1. Participant Recruitment

The participants ($n = 27$) were athletic professionals from 12 U.S. Division I schools, geographically located in the U.S. Mountain West (the states of California, Colorado, Idaho, Montana, Oregon, Utah, and Washington). Sample power was determined using the qualitative “information power” concept ($N = 106$, $n = 25\text{--}30$ provides sufficient power). Given the narrow scope of the study and specific population (athletic professionals) being studied, this theoretical saturation point was sufficient for power [45]. Thus, it was considered adequately large for drawing conclusions and understanding the phenomenon of food security among student-athletes.

Purposeful sampling ($N = 106$ athletic professionals, names and emails collected from athletic department websites of 14 Division I schools) and email communications were employed for participant recruitment. N.C., also a college athletic professional, emailed colleagues with a study description and an invitation to participate; up to three email invitations were sent to potential participants. Enrollment included a survey collecting demographic data on participant biological sex, years in profession, years in current position, former experience as a collegiate student-athlete, and nutrition-related job responsibilities. School profile data were collected from university websites [43].

2.2. Data Collection

A focus group moderator’s guide was developed to facilitate data collection on collective perceptions and identify points of consensus and opposing viewpoints [46]. The moderator’s guide followed best practices for conducting semi-structured focus group discussions [47]; specifically, open-ended questions were included to encourage participant discussion on their specific experiences, observations, and insights into the enablers and barriers to food security among their student-athletes. The guide included an aspirational solutions exercise which challenged participants to reexamine the efficacy of current FI mitigation strategies and imagine optimal solutions for the student-athlete population [48]. The USDA definitions of food security and FI were employed [49]. The moderator’s guide is included in the Supplementary Material.

Data were collected from July to December 2023 via six 90 min focus groups conducted using the Zoom platform. Utilizing the moderator’s guide, facilitators conducted semi-structured discussions.

2.3. Data Analysis

Qualitative data analysis involved transcribing the videos, removing identifiable data, and uploading the cleaned transcripts into Lumivero (v14, 2023, NVivo, Denver, CO, USA). Content analysis methods included both thematic analysis and incidence density [50]. Employing deductive and inductive coding, a hybrid thematic analysis using descriptive coding was implemented. Structural coding was utilized to facilitate the gap analysis of the existing vs. aspirational solutions. Saldaña recommends structural coding for research of this nature [51], for example, studies investigating a complex phenomenon with intertwining factors, data sets, and teams of researchers [51]. Interrater reliability was conducted to add rigor and build credibility; specifically, after triangulation by two of the authors, a third author provided a peer review of the interpretations. Furthermore, to validate the strength of themes, descriptive statistics were added [50,51].

A gap analysis was performed; existing solutions enabling food security and aspirational solutions to address persistent FI were compared, and gaps in addressing food security barriers identified. The approach drew from relevant sections of the Academy of Nutrition and Dietetics’ Prioritizing Food Security Solutions toolkit [52]. Enablers were categorized as improving food access, nutritional adequacy, dietary quality, and/or long-

term food security. Gaps were defined as the inability of existing solutions to ensure food security for the typical collegiate student-athlete. Gaps were inductively determined based on analysis of focus group data on barriers to student-athletes leveraging availability FI solutions. As a follow-up question, focus group participants were also asked to provide aspirational solutions, defined as ideal solutions that ensure the typical student-athlete is food secure. A thematic matrix was used to compare themes across categories; the matrix became the framework for the concept map.

Reflexive thematic analysis was employed to develop the concept map. Precipitating themes regarding needed system-level changes were reconfirmed by performing a second review of the dataset and confirming their relevance to the research question. Predominant food security enablers (existing solutions) were associated with applicable food security barriers. Ineffectual existing solutions were then mapped to potentially attainable aspirational solutions, and the barriers for implementation of those solutions noted. The emerging gaps for mitigating FI among student-athletes were deductively identified. One researcher created an initial draft of the concept map. All the researchers discussed the draft; edits were made based on mutually agreed-upon changes.

Excel® v. 2506, build 16.0.18925.20050 (Microsoft, Seattle, WA, USA), was used to calculate frequencies and percentages of responses. Statistical analysis to determine the significance of findings was not possible given the qualitative coding methodology employed. Findings are presented in compliance with the Consolidated criteria for reporting qualitative research (COREQ) protocol [53]; see Supplementary Table S1.

2.4. Ethical Considerations and Researcher Positionality

Four white, female registered-dietitian nutritionists conducted this study; one of the researchers was a formally trained focus group moderator. Three researchers were faculty members at a university in the northwestern U.S. (Ph.D., Ed.D., A.B.D.), and the fourth was a sports dietitian at a Division I school. The sports dietitian (N.C.) brought an understanding of the structure of collegiate athletic departments and was the primary recruiter for the study. B.G. and J.R. collaboratively developed the moderator's guide and moderated the focus groups. C.B. participated in the data analysis and manuscript preparation.

Given that food security is within the scope of practice of dietitians, and one was a collegiate sports dietitian, the researchers' professional backgrounds must be considered. They have previously studied FI among student-athletes. Thus, unconscious beliefs about food security concerns among this population may have influenced their moderation of the focus groups and/or interpretation of the data. A potential power dynamic also existed; specifically, in sharing their perspectives, study participants may have subconsciously deferred to dietitians as nutrition experts, given that both moderators were dietitians.

Potential insider-outsider dynamics between researchers and participants are another consideration. Recognizing that she was an athletics community insider, N.C. did not participate in the focus groups. She did, however, collaborate on the analysis of the blinded dataset and may have introduced assumptions based on her personal experiences with student-athletes and athletic professionals when interpreting the data. The moderating researchers were outsiders of the close-knit collegiate athletics community. Thus, participants may have cautiously gaged perspectives, and/or the moderators may have missed nuances of participant comments.

Peer debriefing and supervision discussions were employed to manage researcher reflexivity. These discussions helped all the researchers to reflect on how their positionality, and what innate assumptions, may have influenced their coding decisions and data analysis interpretations.

3. Results

Ninety percent (27/30, 90.0%) of the recruited participants attended a focus group. Participants represented 12 Mountain West U.S. Division I schools (100% public, 66.7% urban locations, 58.3% student body > 15,000). School athletic department budgets varied; however, in 2022, the budget for most schools (50.0%) ranged from \$10 to \$19 million. Most participants were athletic trainers (14/27, 51.9%). Other professions represented were sports dietitians (6/27, 22.2%), performance/strength and conditioning coaches (4/27, 14.8%), and athletic administrators (3/27, 11.1%). Details about the participants and their schools were published previously [11].

3.1. System-Level Barriers to Food Security for Student-Athletes

Three themes emerged regarding system-level food security barriers: limited budgets, school culture, and competing priorities. Most participants identified insufficient athletic department/team budgets as a barrier, specifically, lacking the finances to address the issue of FI among their student-athletes. The disparity of budgets across schools and teams also emerged. A school-level financial barrier was not investing the budget required to offer student-athletes appealing, high quality dining hall and food pantry options. Restricted finances also emerged as an obstacle to implementation of impactful food security solutions, specifically, lack of budget to sufficiently staff the athletic department. Participants also identified lack of access to a sports dietitian as a barrier for schools in providing educational programming, nutrition counseling, and other resources to improve food security status among student-athletes. One participant added staff turnover as a contributing factor; another noted that athletic professionals were not empowered to facilitate needed solutions because they did not determine budget allocations.

“...definitely the barriers are finances and not having the budget and resources.” (012)

“I would go... to whoever’s in charge of the budgeting and finance... athletic trainers, dietitians, strength coaches... can come up with the solutions to these problems, but none of us have the funding and the ability to control the funding to fix the problem.” (024)

Subthemes of system-level cultural factors included lack of awareness, insufficient leadership ownership, and school culture. Lack of awareness about FI was an issue, and the severity of FI among student-athletes was a cultural barrier. The belief that NCAA policymakers and school leaders must take ownership of this issue reinforced this finding. Participants expressed the sentiment that leadership support was required to resolve the issue. Furthermore, the lack of collaboration across school departments emerged as a barrier to a sustainable solution.

“...unfortunately, it [addressing food insecurity] is not a priority here [at my school].” (016)

“...and awareness. People understanding that because your athlete may be on scholarship and they are eating food, doesn’t necessarily mean that they’re maintaining a healthy lifestyle.” (021)

Two subthemes emerged under the competing priorities theme: eating is a low priority, and time. Three examples of not prioritizing nutrition and eating among student-athletes were scheduling conflicts between practice times and dining hall hours, balancing budget deficits by cutting food dollars, and coaching staff prioritizing executing a play correctly despite knowing it meant student-athletes would miss dining hall mealtimes. In addition, participants discussed the barrier of time. Some participants defined time as how long it took to get things done at their school; for others, it related to insufficient time to address the issues of food security status given the scope of their job responsibilities.

“Working women’s basketball last semester, if they don’t get that drill right, we’re staying until 7:30 PM and our dining hall closes at 6:45 p.m. . . .athletics does not have a time limit.” (029)

“... as budget cuts come around, food is the first thing to be cut from a team’s program. Whether it is the type of food or snacks they’re purchasing on the road, availability, and the type of food they get in the weight room, food is unfortunately the first thing to go. . .” (027)

Supplementary Table S2 provides a breakdown of the emerging themes and subthemes on barriers to food security among student-athletes, and representative participant quotes.

3.2. Enablers to Food Security for Student-Athletes

Food security enablers (strategies to address FI among student-athletes) were stratified by university-wide and athletic department approaches. Three themes emerged, including on-campus supplemental food assistance, referrals to community services, and educational programming. Of note, all three themes focused on existing programs and resources providing support for student-athletes on an individual basis versus implementing system-level changes.

3.2.1. On-Campus Supplemental Food Assistance

Food pantries (improved food access) emerged as one of the most consistently discussed university-level supports across focus groups for student-athletes, as well as the general school population. Participants expressed positive sentiments such as innovations to the traditional campus pantry models (food pantry ordering phone application and locker pickup, mobile pantry options, food trucks).

“... students can order groceries through an app and go into the student union and pick up the groceries at a locker. . . They do not have to go into the pantry. . .” (019)

“There’s a free food truck for students that is run through campus dining. . . There was a huge donation for it . . . they are potentially able to have one or two meals a day for free.” (005)

Negative sentiments also emerged; campus food pantries had “not super great” options (suboptimal nutritional adequacy and dietary quality) and complained to athletic professionals about pantry over use by student-athletes (limited food access). Participants also expressed that there was a lack of awareness about the campus pantry.

“We’ve gotten complaints from campus that some people are overusing it. . .” (028)

“... many student-athletes and students in general don’t know that it exists, or how to access it, or they’re afraid they’ll be stigmatized if they ask for that type of assistance. . .” (002)

Participants also provided examples of how athletic departments provided sources of free food (improved food access) for student-athletes, for example, via fueling stations, albeit some were more modest than others. Concerns that some student-athletes relied on fueling stations as a primary food source were also expressed.

“I refer to it as a pseudo-training table because I compare what we have with other institutions. . . Ours is just a shelf with snacks that have been vetted by our nutritionist. . .” (030)

“The fueling station is supposed to be for fueling, not addressing food insecurity. But . . . Sometimes, it’s their meal for the day.” (019)

Finally, free food at campus events (improved food access) was a practice among about one-quarter of the schools; this practice was cited for both university-wide events and athletics gatherings. Participants discussed meal-sharing programs, allowing students to share dining hall purchase credits (swipes) with other students. Another participant shared that their school also has an emergency swipes program for students identified with FI issues.

“At big events on campus and things like that, they always provide free meals like pizza or something like that. It’s not anything very nutritious, but it is a free meal.” (016)

“...students can donate swipes at the end of the quarter, and they are able to share swipes within teams. If students have extra, they’ll swipe in other students.” (005)

3.2.2. Referrals to Community Resources

Referrals to community services included help enrolling in state/federal food assistance programs and information about off-campus food pantries and other community resources (longer-term food security, potentially improved nutritional adequacy, and dietary quality). The Supplemental Nutrition Assistance Program (SNAP) was the most common community resource recommended to student-athletes. Nearly half of those schools provided services assisting students with the SNAP application process. One participant highlighted that SNAP is not an option for all student-athletes. Others discussed that, though student-athletes may qualify, they opt not to enroll in SNAP. Participants shared that their school also referred student-athletes to off-campus community food pantries, church groups, and other local resources.

“What I’ve seen is that there’s not as much of a stigma around SNAP anymore.” (023)

“...lots of times, but they don’t utilize it [SNAP].” (012)

3.2.3. Educational Programming

Both university-wide and athletic department-level educational programs on nutrition, grocery shopping, cooking skills, and budgeting were identified as food security enablers (longer-term food security, improved nutritional adequacy, and dietary quality). Nutrition education opportunities (non-academic coursework) were available at many schools. Offerings by the athletic departments exceeded those of the university-at-large for nutrition education and cooking skills programs. Life-skills-building programs offered at both the university- and athletic department-levels included grocery shopping and budgeting. An emerging negative sentiment was the comment that education does not always prompt behavior change.

“...education doesn’t always inspire behavior change. I’ll show our football team a sustainable meal that they can easily prep and eat that costs \$1.81 per meal. And it is...nutrient dense. [But they prefer]...easy convenience foods or just things that they’re used to.” (021)

“We designed an academic class that is just nutrition for the athlete...” (009)

The value of sports dietitians emerged (food access referrals, improved nutritional adequacy and dietary quality). Campus wellness centers and health promotion programs were identified as resources for addressing food-security-related challenges among student-athletes and other students, for example, by rewarding attendance at health and wellness events by providing a gift card (improved food access and potentially improved nutritional adequacy). The importance of collaboration with these university-wide service programs was also expressed.

“I know our sports dietitian meets with every team and provides them with the basic nutritional information that they need.” (006)

“I work in collaboration with our health promotion team and our dietitian on campus. They have information, and they do a lot of cooking classes and education about SNAP benefits.” (021)

Table 1 provides a breakdown of the emerging themes and subthemes on enablers to food security among student-athletes stratified by university and athletic department.

Table 1. Emerging themes and subthemes on system-level food security enablers for student-athletes stratified by university and athletic department.

Themes	University No. (%)	Athletic Dept. No. (%)
ON-CAMPUS SUPPLEMENTAL FOOD ASSISTANCE		
Campus food pantry	24/27 (88.9%)	--
Food provided by athletic department *	--	13/27 (48.2%)
Food at events *	7/27 (25.9%)	8/27 (29.6%)
Food truck/mobile pantry	7/27 (25.9%)	--
Meal sharing	2/27 (7.4%)	--
Corporate sponsor	--	2/27 (7.4%)
REFERRAL TO COMMUNITY RESOURCES		
Supplemental Nutrition Assistance Program	14/27 (51.9%)	--
Community food pantry and other resources	3/27 (11.1%)	--
EDUCATIONAL PROGRAMMING		
Nutrition education	4/27 (14.8%)	8/27 (29.6%)
Cooking skills	4/27 (14.8%)	5/27 (18.5%)
Grocery tours	3/27 (11.1%)	3/27 (11.1%)
Budgeting	3/27 (11.1%)	2/27 (7.4%)

* Food provided by athletic department = fueling stations/training tables, food in locker rooms, team meals, travel nutrition. Food at events (athletic department) = food/meals at athletic events/games and mandatory meetings.

3.3. Aspirational Solutions for Mitigating FI Among Student-Athletes

Five themes emerged in response to participants' "aspirational" solutions for mitigating FI among student-athletes, given they had no budgetary constraints: an athlete dining room in the athletic facility, improved food access tailored to student-athletes, sports dietitians, life skills, and precision nutrition. Notably, the need for solutions tailored not just to student-athletes but to specific school scenarios emerged.

“...there's not just one set solution...because every institution has different budgets, different financial means, different things already in place...a different infrastructure.” (028)

“When I worked with the top one tier sports, I learned finances are way different...” (014)

In the discussion about barriers, lack of budget was a dominant emerging theme for ensuring food security among student-athletes. In response to participant 002 saying “Money, buddy,” participant 003 said, “Yes definitely money.” Recognizing that budget was a prevailing barrier, the aspirational solutions were stratified into “likely unattainable” and “potentially attainable” categories based on budgetary requirements. Decision factors were based on participant insights on the cost of the various aspirational solutions.

3.3.1. Likely Unattainable Aspirational Solutions

Based on participant comments, likely unattainable aspirational solutions required considerable financial investments. Two aspirational solutions were, thus, categorized as likely unattainable due to budgetary considerations per the participants: a dedicated athletic dining hall and precision nutrition. The primary solution of a dining hall for athletes housed within the athletic facility (improved food access, nutritional adequacy, dietary quality, and long-term food security). The vision was for high-quality, nutrient-dense dining hall options tailored to optimal athletic performance. In addition to enhancing food availability (providing three meals per day and snacks), this concept was imagined as fostering strong relationships between administrators, athletic staff, and the student-athletes.

“... it would be a cafeteria that’s strictly for athletes, someone to manage the food that’s being offered (dietitian or a chef) that knows how to fuel athletes.” (007)

“Coaches and administrators and athletic trainers and strength coaches, and everyone comes during that window to get a bite to eat.” (019)

Participants introduced the topic of precision nutrition, the practice of evaluating medical markers to develop an individual eating plan (improved nutritional adequacy and dietary quality). Examples of evaluating nutrition-related medical markers included assessing the health of a student-athlete’s gut microbiome via blood and stool testing, diagnosing vitamin and mineral deficiencies with lab tests, and measuring body mass and body composition with DEXA scanning. The value of precision nutrition in helping to design optimal dietary interventions was discussed.

“And I would like to get back to DEXA scanning. . . It can allow us to really help them on their journey and ensure their diet is good.” (029)

“... doing blood and stool testing and looking at the genetic makeup of each athlete and their gut microbiome and seeing what their best food options are going to be. . .” (003)

3.3.2. Potentially Attainable Aspirational Solutions

Potentially attainable aspirational solutions were less expensive options and often the expansion of existing solutions. Dining options tailored to student-athletes (improved food access), hiring sports dietitians (food access referrals, improved nutritional adequacy, and dietary quality), and providing life skills education (improved nutritional adequacy, dietary quality, and long-term food security) were categorized as potentially attainable. Even among the schools who had fueling stations, the need for more robust facilities emerged. Another aspirational solution was more flexible hours for campus dining halls. One participant suggested having designated dining hall hours for student-athletes; during that time, the only activity scheduled for athletes would be eating. Lastly, guidance on how to make healthier selections on travel days was proposed by participants.

“We have our fueling center open from 6 a.m. to 6 p.m. right now, but if they could come in and grab whatever whenever, and also have access to unlimited snacks. . .” (004)

“I was at a university . . . if a team had a game, the dining hall would make a meal that would provide them with the best nutrition for their game day. . .” (006)

Full-time and multiple sports dietitians were “the dream” of nearly three-quarters of the participants. Participants identified these healthcare providers as essential for food security issues. Given the link between FI and athletic performance, dietitians were also discussed as the athletic professional tasked with helping student-athletes learn how to fuel for optimal performance, providing medical nutrition therapy, and designing individual eating plans for athletes with nutrition-related conditions.

"I feel like the dietitian is really the only one that can truly answer that one. We don't see that side of things a whole lot." (011)

"We need a performance dietitian. We need multiple performance dietitians." (019)

Though many schools offered nutrition and other educational programming, life skills emerged as an aspirational solution theme; the focus was on cooking classes and cooking demonstrations. Another participant suggested offering mandatory educational courses for athletes about nutrition. Participants supported providing an electronic benefits card with funds for food, instead of including food costs in the stipend, thereby passively teaching athletes about food and nutrition budgeting.

"...a kitchen to do cooking classes ... a place where athletes can come in and cook their own food that is fully stocked." (015)

"Why don't we make all our athletes take nutrition... and be more knowledgeable in those kinds of things that will help them... to be a better athlete?" (013)

Supplementary Table S3 details the emerging themes and subthemes on potentially attainable aspirational solutions for ending FI among student-athletes proposed by study participants, and representative participant quotes.

3.4. System-Level Gaps for Enabling Food Security Among Student-Athletes

The gap analysis compared how well the existing solutions mitigated the barriers to food security among student-athletes, compared with the potentially attainable aspirational solutions. Three system-level gaps emerged as likely contributors to the continued food security risk among this population: food access tailored to student-athletes, better access to nutrition counseling, and life-skills training.

The concept of NCAA-level policies governing required interventions to ensure food security among student-athletes precipitated because individual school culture barriers were challenging to overcome. To address these barriers, the need for leadership decisions to recognize the full extent of contributing factors was emphasized. In addition, overcoming the stigma that student-athletes have all they need financially and nutritionally is required, especially given the lack of awareness about the severity and scope of FI among student-athletes.

Food access tailored for student-athletes. The existing solutions fell short of completely addressing the competing priorities and cultural consideration barriers experienced by student-athletes. More robust fueling stations and training tables and expanded dining hall hours are needed to tailor food access to student-athlete needs. On a system level, change is required to address the competing priorities innate to being a collegiate student-athlete. University administrators and athletic departments must collaborate on ensuring better food access for student-athletes by addressing practice hours and dining hall hours. Furthermore, the need for athletic department flexibility regarding team practices/sporting events conflicting with mealtimes emerged as an area for practice/policy change. Collaboration with athletic professionals on dining hall hours could help address this challenge. In addition, engaging students in dining hall vendor selections may help address dissatisfaction with food options. Increasing meal card funding and stipends to address the additional kilocalorie needs of student-athletes, compared to the general college population, was an additional student-athlete-tailored food access subtheme. Ultimately, the participants discussed the vital need for all leaders and stakeholders to prioritize nutrition for student-athletes.

Better access to nutrition counseling (potentially improved nutritional adequacy and dietary quality, longer-term food security). Though many of the participating schools had access to a sports dietitian/nutritionist, the need for leadership commitment to additional budget for these health professionals emerged, for example, to help address student-athlete

misconceptions about healthy eating, counsel student-athletes on fueling for optional performance (at home and on the road) and provide medical nutrition therapy. The barrier of “no sports dietitian” and the assumption or expectation that others such as the athletic trainers had the expertise to address these needs was discussed. Participants expressed the need for the NCAA to provide best practices regarding hiring the optimal number of sports dietitians based on specific school athletic department needs.

“That’s a lot to put on athletic trainers. . . I think it’s outside the realm of the strength coach, so I don’t think we would be the ones. We don’t have a full-time dietitian, so who does [it]?” (024)

“...the Conference [NCAA] could help us. . . They should provide a guideline for the schools. . . The Conference should figure it out.” (014)

Life-skills training (improved nutritional adequacy and dietary quality, longer-term food security). Many schools shared existing life-skills training programs offered at university and/or athletic department-levels, such as nutrition education, cooking skills, grocery tours, and budgeting. Though this was an existing solution at some participant schools, it did not precipitate as a universal solution. Mandatory participation for such training was also discussed, as well as a curriculum tailored for student-athletes. The concept of passive nutrition education emerged vis-à-vis providing off-campus student-athletes with electronic benefit transfer (EBT) cards instead of cash stipends for food. By limiting the foods that can be purchased by these cards, students would passively learn how to make healthy choices. Figure 1 is a concept map illustrating the gap classification categories of existing solutions for enabling food security among student-athletes, as perceived by athletic professionals.

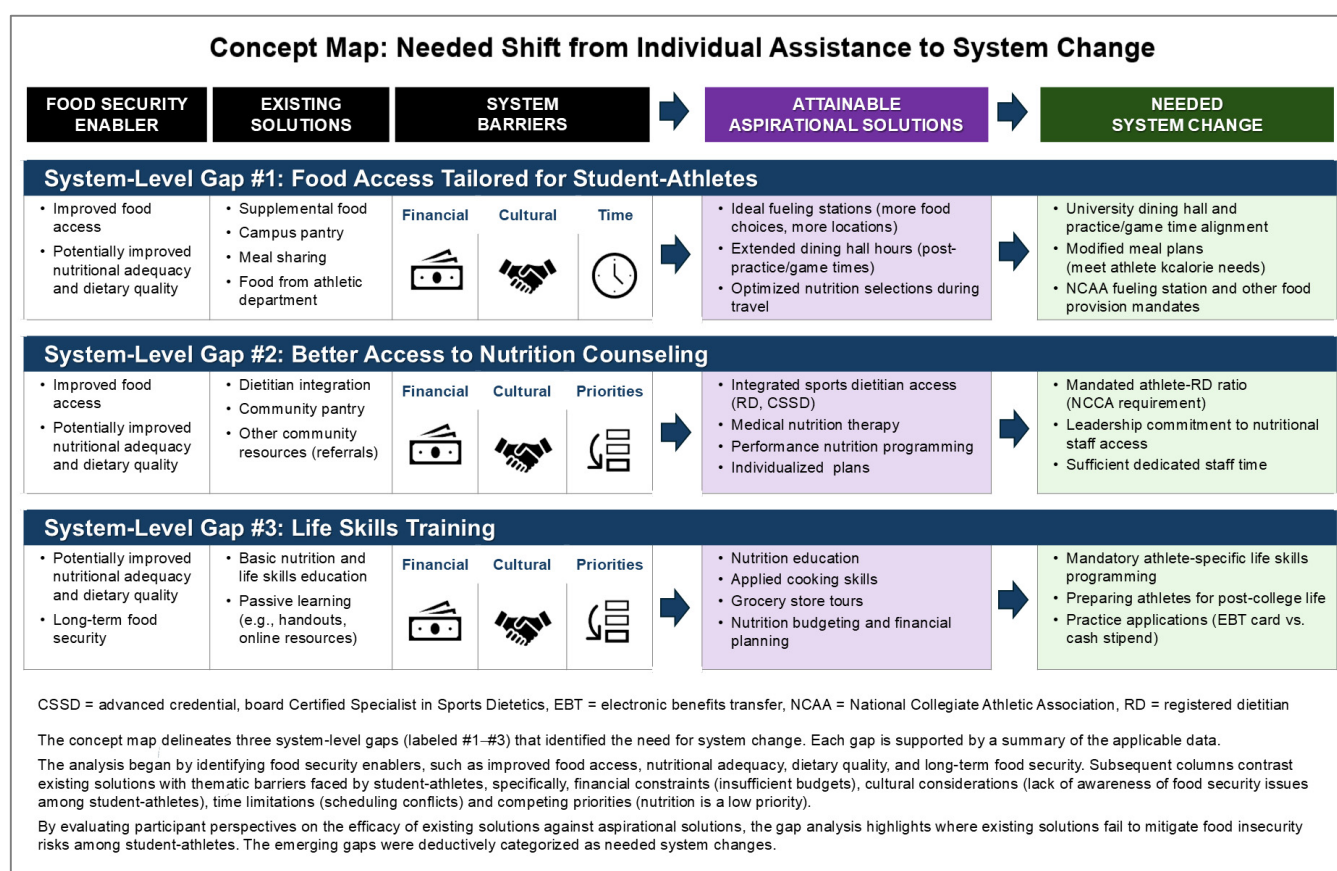


Figure 1. Concept map illustrating the system-level gaps of existing solutions for enabling food security among student-athletes, and needed system change, as perceived by athletic professionals.

4. Discussion

This study employed a phenomenological-informed design and constructivist theoretical framework to explore the experiences of athletic directors, athletic trainers, sports dietitians, and strength and conditioning coaches. Through a series of online focus groups, system-level barriers and enablers to food security among collegiate student-athletes were explored. Notably, the findings present a set of unique findings from athletic professionals; however, they represent the professional interpretations of the student-athlete experiences rather than the lived experiences of affected individuals. Based on the qualitative methodology protocol, data saturation was achieved; there appeared to be no additional insights beyond those collected [54].

In the U.S., the 2025 Name, Image, and Likeness (NIL) policy shift permits student-athletes to profit from the use of their personal brand [55]. After analyzing the NCAA NIL Assist Data Dashboard for calendar year 2024, Salzenstein found that male NIL endorsements were higher than those of females in every sport in the U.S. [55]. In addition, student-athletes in revenue-generating sports earned 4.5 times more in NIL funds than their counterparts in non-revenue-generating sports [55]. Given that FI has been reported among professional athletes [56], the North American revenue-sharing model will likely not mitigate FI among all collegiate student-athletes. Findings of a cross-sectional analysis of student-athletes at a public university in rural Texas ($n = 91$, 13 sports) support this supposition—FI prevalence among student-athletes who received scholarships and/or stipends was comparable to the general college population [17]. Thus, even with the introduction of the revenue-sharing model into college athletics, some FI will likely persist among student-athletes.

4.1. The Need for System-Level Change

This study identified system-level barriers to food security that increase FI risk among student-athletes. Four themes emerged: financial challenges, time, competing priorities, and cultural factors. Potentially attainable solutions identified to resolve system-level barriers and gaps with existing solutions included food access tailored to student-athletes, better access to nutrition counseling, and life-skills training. Of note, athletic professionals did not feel empowered to facilitate the potentially attainable solutions; the need for the NCAA and school leadership to spur change emerged. Participants noted that, to ensure food security for all student-athletes, college leadership must both recognize the severity of the problem and facilitate the school cultural shifts required to prioritize nutrition for this population. Sharples et al. reported similar findings, concluding that food security attainment among student-athletes required solutions that consider the unique time and nutrient considerations of student-athletes [56]. To address this challenge, Bodian et al. suggested building coalitions between athletic departments, campus dining contacts, and local community food banks to establish “satellite pantries” located within athletic facilities and offering more robust fueling stations (partially funded by allowing the use of meal swipes at these athletic facility supplemental food resources) [27]. The need for such collaborations was also expressed by the participants in this study.

System-level cultural factors in this study included a lack of awareness about the issue, insufficient leadership ownership of the issue, and school culture. In this study, lack of awareness stemmed from misconceptions that student-athletes received scholarship funds and/or stipends and thus had the resources needed for food. Of note, Hattangadi et al. described the “normalization” of FI illustrated by the “starving student lifestyle” as part of the college experience [57]. A mixed-methods study ($n = 778$ survey respondents, $n = 37$ interviews) also found the theme of normalization [58]. Might this norm be fueling the lack of awareness about FI as an issue for student-athletes? Will the revenue-sharing

model, which raises the athletic performance stakes for student-athletes, encourage student-athletes to create a new normal?

4.2. Unique Vulnerabilities of Student-Athletes

Bodian et al. advocate for solutions that address the unique FI vulnerabilities of student-athletes [27]. In this study, competing priorities emerged as a unique vulnerability. Other studies identified the barrier of competing priorities from the viewpoint of student-athletes [6,12,26,57]. Specific examples included schedules and restricted dining hall hours (food access issues), as well as balancing athletics and academic requirements [6,12,26]. Bodian et al. labeled this “time poverty” and defined it as the challenge of strict schedules for sport practice, team, travel, and academic expectations [27]. In this study, the systems-level manifestation of competing priorities was cutting team food budgets to accommodate department budget deficits (introducing food access, nutritional adequacy, and dietary quality issues), lack of consultation with athletic departments on dining hall hours (food access issues), and inadequate staff time to address FI as a student-athlete issue. Mental health research further defines competing priorities as structural vulnerabilities, specifically, balancing academics and athletics, juggling balance demanding schedules, managing the power dynamic with athletic professionals, and handling various stress-related social situations [59].

The top aspirational solution for ensuring optimal access to quality, athlete-centric options, in this study, was an athlete-only dining hall (improved food access, nutritional adequacy, dietary quality, and long-term food security). Construction costs to build an athlete-only dining hall range from \$5.56 million (Texas Tech University, TX, 2020) to \$15 million (University of Alabama, GA, 2018) to \$31 million (Penn State, PA, 2024); thus, this was not an attainable solution for the schools in this study [60–62]. Attainable solutions, however, did emerge around food access that is better tailored to the needs of student-athletes. For example, adjusting meal card funding and/or stipends to adequately meet the kilocalorie needs of student-athletes. Notably, an observational study of professional rugby players ($n = 28$) found that, despite nearly all the participants receiving scholarship support (86.1%) and utilizing meal plans (42.9%), 39.6% were food insecure [56]. Bodian et al. also identified this challenge, advocating that student-athletes require a higher level of kilocalories and thus needed increased funds for meals [27]. Offering unlimited swipes at the dining hall was identified as a food security enabler in another study that conducted semi-structured interviews with student-athletes ($n = 19$) [6]. Notably, the attainable solutions also address the institutional inequity of disparate team food budgets discussed by study participants.

4.3. Prioritizing Nutrition

Another systems-level attainable solution was better prioritizing student-athlete nutritional needs. The important role of sports dietitians in addressing FI and performance nutrition was a strong theme in this study (improved food access (via community referrals), nutritional adequacy, and dietary quality, and potentially longer-term food security). Research conducted by Vento et al. and Riviere et al. echoed this finding [28,63]. Vento et al. found that most NCAA athletes (65%) obtained nutrition information from dietitians [28]. Indeed, 91% of the participants in that study supported sports teams providing access to a dietitian [28]. A review ($n = 14$ studies) found that it was beneficial to include a sports dietitian on the student-athlete support team [63]. The requirement to provide access to a dietitian or nutritionist in the Big Sky Strategic Plan is an example of NCAA-level policy change illustrating leadership ownership of food security as an issue pertinent to student-athletes [64].

In this study, other athletic professionals expected sports dietitians to do more than nutrition counseling; sports dietitians were identified as the primary athletic professionals who addressed food security issues among student-athletes. Notably, this reflects the scope of practice for dietitians with expertise in sport and human performance nutrition [65–68]. Food security is a standard part of the sports dietitian client assessment protocol, and, based on the findings, referral to community resources to help mitigate FI follows. This reflects the finding in this study that sports dietitians were identified as key referral sources for supplemental food programs and other community resources. However, participants also noted that, despite access, student-athletes may not utilize supplemental food programs. This finding has been reported as a phenomenon among the general college population too [69]. El Zein et al. found a 38% food pantry usage rate among students identifying as food insecure [69]. Studies have highlighted a lack of awareness about campus resources and conflicts with pantry hours as reasons food-insecure students do not access these resources [58,69]. The need for the sports dietitian to bridge this gap was echoed by study participants.

Dissatisfaction with dining hall options impacted student-athlete dietary intake, according to participants in this study; satisfaction levels varied by school. Some dissatisfaction emerged around the misconception that eating healthily requires consumption of only organic foods. This sentiment has also been reported among the general college population [70]. A cross-sectional study of 446 university students found a preference for purchasing organic foods among college students; however, cost ultimately drove their actual purchasing patterns [70]. Sports dietitians were identified as vital in correcting such misconceptions and educating student-athletes on healthy options.

4.4. Potential Avenues for Future Research

Given the shift occurring in college student-athlete earning power, more research is warranted on potentially attainable solutions, given this dramatic change. Investigations on how the pivot to a revenue-sharing model might produce changes in student-athlete food security status are warranted. In addition, explorations on how the starving college student norm might yield a lack of awareness about FI among student-athletes are needed. It would be helpful to collect more robust statistical trends on which student-athletes and teams continue to be at risk. Evaluations of how existing solutions help mitigate FI among student-athletes are necessary, given the new landscape for collegiate student-athletes. Finally, investigation focusing on the attainability of those solutions, given the sharing of revenues, would offer helpful insights, as well as the perspectives of university leadership and administrative stakeholders on sustainable solutions tailored to their school's unique scenario. The relevance of these findings to collegiate student-athletes residing outside of the U.S. also requires further study.

4.5. Strengths and Limitations

This study implemented phenomenological-informed design. Though this qualitative methodology does not have the rigor of empirical study designs, it is effective for exploration of complex, intertwined phenomena [71]. To enhance rigor, interrater reliability and triangulation were employed [72].

The study findings offer unique insights into the barriers, enablers, and potentially attainable solutions for ensuring food security among student-athletes from the perspective of athletic department professionals. This strength is also a weakness, as some participants may not have been aware of university-wide programs to address FI on their campus. To overcome that weakness, probes were provided as examples for some questions. Notably, a limitation to this approach was the risk that it may have influenced participant responses.

Furthermore, the aim of this study was to obtain insights from athletic professionals; thus, perceptions from student-athletes were not collected.

The sample of this study was narrow; participants were Division I athletic professionals at public schools and predominantly athletic trainers. Thus, the transferability of the findings may be limited. For example, results may not be transferable to Division II and Division III institutions, private universities, smaller colleges with fewer resources, or athletic systems operating under different governance structures such as schools outside of the U.S., Canada, or Puerto Rico.

5. Conclusions

The perspective of athletic professionals was that ensuring food security among collegiate student-athletes in the U.S. requires system-level innovations. Addressing a gap in prior research, this study explored the unique perceptions of athletic professionals, whose proximity to student-athletes yielded insights into system-level barriers preventing resolution of the issue of FI among student-athletes. This cohort, however, identified the need for NCAA and school leadership engagement to facilitate sustainable solutions.

To address unique FI vulnerabilities and improve prioritization of nutrition for student-athletes, school-level cultural shifts are required. Proactive leadership facilitating university-wide collaborations is essential for spurring change. Mitigation of less-than-optimal food security among student-athletes requires both policy-level adjustments (expanding dining hall hours and improving meal options) and student-athlete-centric solutions (tailoring meal cards and stipend allocations to student-athlete energy needs and providing consistent access to sports dietitians).

The distinctive insights of athletic professionals helped explain the financial and policy complexities of implementing aspirational solutions and offered an understanding of the significant university-wide cultural shifts needed to mitigate this issue. Further research incorporating the perspectives of university leadership and administrative stakeholders is essential for developing realistic, sustainable solutions.

Supplementary Materials: The following supporting information can be downloaded at: <https://www.mdpi.com/article/10.3390/dietetics5030042/s1>, Document S1: Moderator's Guide; Table S1: Consolidated criteria for reporting qualitative studies (COREQ) 32-item checklist; Table S2: Emerging themes and subthemes on barriers to food security among student-athletes; Table S3: Emerging themes on potentially attainable aspirational solutions for ensuring food security among student-athletes proposed by athletic profession. References [43,53] are cited in the supplementary materials.

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Abbreviations

The following abbreviations are used in this manuscript:

USDA	United States Department of Agriculture
LFS	Low food security
VLFS	Very low food security
FI	Food insecurity
U.S.	United States
NCAA	National Collegiate Athletic Association
HFSSM	Household Food Security Survey Model
RED-S	Relative Energy Deficit in Sport

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