Journal of Athletic Training 2024;59(4):394–402
doi: 10.4085/1062-6050-0327.23

www.natajournals.org

Original Research

Athletic Trainers' Observations of Social Determinants of Health in the Collegiate Setting: A Card Study

Kelsey J. Picha, PhD, ATC*†; Cailee E. Welch Bacon, PhD, ATC†‡; Cassidy Evans Windsor, DAT†§; Joy H. Lewis, DO, PhD||; Alison R. Snyder Valier, PhD, ATC†‡||

*Department of Interdisciplinary Health Sciences, A.T. Still University, Mesa, AZ; †Department of Athletic Training, A.T. Still University, Mesa, AZ; ‡School of Osteopathic Medicine in Arizona, A.T. Still University, Mesa; §Roswell High School, GA; ||Department of Research Support, A.T. Still University, Mesa, AZ

Context: Addressing social determinants of health (SDOH) in all populations improves patient outcomes, leading to better patient-centered care. Despite known influences of SDOH, little is known about the ability of athletic trainers (ATs) to observe SDOH in practice.

Objective: To explore ATs' observations of SDOH and describe actions taken at the point of care in collegiate and university settings.

Design: Descriptive via an observational card study.

Setting: Athletic training facilities.

Patients or Other Participants: Collegiate and university ATs (23 participants across 20 institutions).

Data Collection and Analysis: The ATs used a modified observation card to document observations of SDOH during patient encounters in the collegiate or university setting. The cards contained instructions for completion and a table with 4 columns: (1) a list of 19 predetermined SDOH, (2) a checkbox for observed SDOH, (3) a checkbox for the perceived negative influence of observed SDOH on patient health, and (4) an open box to write in what actions, if any, were taken to address the observed SDOH.

Results: Overall, 424 cards were collected. Of 725 observed SDOH, access to social media (153/725, 21.1%), academic stressors (131/725, 18.1%), and behavioral health issues (71/725, 9.8%) were the most commonly observed. Nearly 39% (281/725) had a perceived negative influence. Of those, academic stressors (49/281, 17.4%), behavioral health issues (46/281, 16.4%), and transportation issues (32/281, 11.4%) were most common. For the 23.0% (166/725) of SDOH acted upon, ATs used counseling and education (73/166), provided additional resources (60/166), referred to others (29/166), or communicated with others (4/166).

Conclusions: Because ATs are positioned to accurately assess SDOH, they can promote better patient-centered care and improve patient outcomes. Our results suggest that many SDOH observed by ATs in the collegiate or university setting have a negative influence on patient health. Better support for patients with academic stressors and behavioral health issues is important because of these SDOH.

Key Words: athletic health care, patient outcomes, social factors, academic stressors, behavioral health

Key Points

- Social determinants of health were observed by athletic trainers in the collegiate and university setting and were often perceived to negatively influence patient health.
- Because behavioral health was commonly perceived to negatively influence patient health, athletic trainers should be aware of best practice guidelines for mental health emergency action plans and policies and procedures.
- Referral and education were frequent actions taken by athletic trainers to address the negative influences of social determinants of health, which emphasized their ability to mitigate these at the point of care.

The athletic training profession is advancing efforts to recognize and study the circumstances in which patients live, learn, work, play, and grow and determine how those conditions influence health and well-being.[1–4] These conditions, known as *social determinants of health* (SDOH), have been reported to influence health more than the care provided through traditional health care services in both positive and negative ways.[5,6] Further, SDOH have been categorized by the Centers for Disease Control and Prevention into 5 interconnected domains: economic stability, education access and quality, health care access and quality, neighborhood and built environment, and social and community context.[7] Although the influences of SDOH can be both positive and negative, much of the research has focused on the negative influence due to the lasting effects on health as well as the contribution to the widening of health disparities. For example, individuals who do not earn an income above the poverty line (*economic instability*) may be unable to afford housing in a safe neighborhood (neighborhood and built environment), and those living in neighborhoods with more social disorder may have higher rates of anxiety and depression.[8] Often the result of the unequal allocation of power and resources,[9] these factors can negatively influence mental, physical, and

social well-being and may preclude optimal individual and population health.[6,7] Therefore, SDOH should be recognized by clinicians as an integral part of health care.

Recognition and assessment of SDOH may lead to interventions that mitigate negative effects in populations at various societal levels, improving patient-centered care and leading to better patient outcomes.[7,9,10] Public health efforts and interventions can reduce the negative influences of SDOH on individual and population health. At the patient level, when UK physicians referred their patients with known anxiety, stress, or depression to social services, the patients' symptoms improved.[11] Similarly, when US children were screened for their basic needs and providers referred families to community resources for support, positive outcomes included child care, fuel to meet transportation needs, and a reduction in homelessness.[12] At the community level, a faith-based organization in the Dominican Republic provided youth baseball athletes attending sports academies with an education in addition to the opportunity to play sports.[13] Partners of this organization indicated a positive influence of the academies, noting that they promoted equity and education and kept the youth off the street.[13] These examples highlight the potential for implementation of interventions as long as the negative influence of SDOH on a population is recognized. To date, research on SDOH has primarily focused on nonathletic populations, yet investigation of the athletic population to promote better support and understanding of these athletes has been suggested.[4,14]

Despite the health benefits of sport activity, individuals participating in sport are still susceptible to the influence of SDOH, and clinicians in athletic health care are just now recognizing their effects.[15–18] Although athletes participate in various settings, a central setting for athletic health care is the college or university. Participation in collegiate or university athletics often places an athlete in regular communication with athletic trainers (ATs). Athletic trainers have reported managing patient cases in which a variety of SDOH were negatively influencing their patients' well-being.[19] Because of their unique position in the athletic health care system and because they are often the only health care provider an athlete interacts with regularly,[15] ATs are in an optimal position to assess SDOH. In college and university settings, ATs are likely the first providers from whom athletes seek care. Additionally, ATs in this setting have many opportunities to create meaningful patient encounters, build trusting relationships, and initiate difficult conversations. Unfortunately, limited evidence has described SDOH that affect collegiate athletes and the strategies used to reduce their negative influence. More intentional observation and documentation of SDOH may highlight trends, which may allow us to address significant concerns affecting collegiate athletes. When ATs recognize SDOH and identify trends in their own practice, they will be better positioned to support their patients, provide guidance toward the appropriate resources, and facilitate referrals.[20] Therefore, the purpose of our study was to explore ATs' observations of SDOH and describe actions taken at the point of care in collegiate and university settings.

METHODS

Design

The current study used a descriptive observational prevalence card study design. Card studies are designed to collect large samples of data over a short period at the point of care without altering or changing the care provided or the interaction between the clinician and patient.[21,22] Prevalence card studies collect clinician observations about the prevalence of a certain phenomenon in clinical practice.[21] This study design allowed us to gain insight into SDOH observed by ATs at the collegiate level during patient encounters. The study was approved by the sponsoring university's institutional review board.

Participants

We recruited ATs employed in the collegiate or university setting through criterion-based convenience sampling. Individuals were considered eligible to participate if they were certified by the Board of Certification and were currently providing athletic training services in a collegiate or university setting. A member of the research team emailed a convenience sample of 45 ATs to determine their interest in the study. Additionally, ATs were recruited through social media sites, including Twitter and Facebook. Athletic trainers who saw a social media posting and were interested in participating were asked to contact the principal investigator using the email address provided on the post. A total of 23 ATs who met the inclusion criteria expressed interest in participating in the study.

Instrumentation

To achieve the study aims, we used an observation card to collect data about SDOH during meaningful patient encounters. A *meaningful patient encounter* was defined as "an interaction that occurs through verbal communication and/or physical examination."[23] An example of a meaningful encounter is when a patient receives passive stretching by the AT after practice, and the AT engages in conversation about how the patient felt throughout practice. Applying an ice bag to an athlete without any clinically relevant discussion is not considered a meaningful patient encounter.

To create the SDOH observation card, 3 members of the research team (K.J.P., C.W.B., A.S.V.) requested permission to modify a previously validated card developed to capture primary care providers' SDOH observations.[22] The main modifications involved adjusted the wording on the card so that it was relevant and appropriate for ATs. Once all modifications were made, the SDOH card was rereviewed by a content expert (J.H.L.) and 2 experienced ATs to ensure that the modifications were appropriate and the card remained readable and understandable. The content expert has expertise in SDOH and previously conducted observational research using a card study design. Based on feedback from the content expert and ATs, we made no additional modifications.

The final SDOH card (Figure) was 9 in (22.9 cm) × 6 in (15.2 cm) and provided basic instructions for completion of the card on the front and a table to record SDOH observations on the back. Each card consisted of a table with 4 columns: (1) a list of predetermined SDOH, (2) a checkbox for observed SDOH, (3) a checkbox for the perceived negative influence of observed SDOH on patient health, and (4) an open box to write in what actions, if any, were taken to address the observed SDOH. Based on the 5 domains of SDOH, 19 SDOH were listed in the first column with an

Front of Card

Social Determinants of Health Card Instructions

Place an "x" on the grid for all that apply to this patient encounter.

Columns

A. **Observe**: Observe your patient for social factors. Check the box only if you observe the corresponding social factor.

If you observed a social factor, complete columns B and C for that social factor.

B. **Negative Impact**: Evaluate the impact of the social factor on the patient's health. Check the box only if you believe the social factor has a negative impact on the patient's health.

C. **Action Taken**: If you took action to address the observed social factor, enter a brief statement regarding the action taken (eg, education, counseling, referral, resources).

Back of Card

	A	B	C
Social Factors	**Observed Social Factors**	**Negative Impact on the Patient's Health?**	**Action Taken**
Access to social media/emerging technologies			
Behavioral health issues			
Cultural beliefs/values			
Educational limitations			
Family care demands			
Individual/family life circumstances			
Poor social support			
Language barrier			
Lack of health literacy			
Poverty/near poverty			
Insufficient/lack of health insurance			
Food insecurity			
Homeless/poor or unstable living conditions			
Transportation issues			
Migrant/immigration status			
Neighborhood safety			
Substance use/abuse			
Academic stressors			
Job stressors			
Other _____			

I am unsure if this patient is affected by any of the listed social factors ☐

I did not observe any of the listed social factors ☐

Figure. Social determinants of health card study instructions.

option to add a factor if it was observed but not on the list. At the bottom of the card were 2 checkbox options that stated, "I am unsure if this patient is affected by any of the listed social factors" and "I did not observe any of the listed social factors." Participants could check either or both boxes. The cards were designed to be completed in less than 30 seconds. The domain (economic stability, education access and quality, health care access and quality, neighborhood and built environment, and social and community context) of each specific social determinant is outlined in Table 1.

To establish the feasibility and validity of the research methods, we conducted a pilot study with 17 ATs who were employed in the collegiate, university, or secondary school setting and who were not involved in the final analysis. Over a 2-week period, the 17 ATs returned 122 cards and reported an average of 1.5 SDOH per card (range = 0–8). Based on review of the data collected during the pilot study, we noted that the social determinant of health listed as "job/academic stressors" did not allow for differentiation between a job and an academic stressor. Therefore, we split this factor into 2 factors for data collection.

Procedures

Once eligible ATs agreed to participate in the study, they were asked to complete a brief demographic questionnaire. Before data collection, each AT was sent a packet through postal mail that supplied instructions (see Supplemental Appendix, available online at http://dx.doi.org/10.4085/1062-6050-0327.23.S1), 30 blank SDOH cards, a definition sheet for all SDOH listed on the cards, and a prepaid, preaddressed envelope to return all materials to the study investigators.

One week before data collection, each participating AT completed online training hosted in the Qualtrics platform. The training provided an overview of SDOH and their

Table 1. Social Determinants of Health Categories and Examples

Category	Example	Outcome	Social Determinant of Health Collected
Economic stability	Having an income above the poverty line	More opportunities for safe housing, healthy food, and private health insurance	• Job stressors • Poverty/near poverty
Education access and quality	Access to good schools at all age levels	Increases the likelihood of obtaining higher-paying jobs, access to scholarships, and better economic stability	• Academic stressors • Educational limitations • Language barrier
Health care access and quality	Access to health insurance, medications, preventive screening, and overall health care	Proactive and preventive approaches rather than reactive approaches to care can be taken, decreasing the rate of disease and cost of care	• Insufficient/lack of health insurance • Lack of health literacy
Neighborhood and built environment	Violence within a neighborhood, unsafe air or water (or lack of access), structural integrity, and pest control	When basic needs are met, rates of illness, injury, and disease decrease	• Neighborhood safety • Transportation issues • Homeless/poor or unstable living conditions • Food insecurity
Social and community context	Relationships from home, work, and within the community	Strong social support systems allow individuals to thrive, improving health and quality of life	• Poor social support • Individual/family life circumstances • Family care demands • Cultural beliefs/values • Behavioral health issues • Access to social media/emerging technologies • Substance use/abuse • Migrant/immigration status

importance in health care. It also reviewed the study procedures and expectations of the participants. The online training took 20 to 30 minutes to complete. The principal investigator (K.J.P.) followed up with each participant after the training to answer any remaining questions before the data-collection period.

Data collection began in August 2021 and ended in May 2022. We stratified data-collection efforts so that only 2 of the 23 ATs were completing SDOH cards at any time in order to ensure that observations were being made during each month of the academic year. To guarantee that ATs would observe the most representative sample of their patient panels, we asked each AT to indicate the most appropriate months to conduct the observations, and we strategically scheduled them to collect data within that timeframe. During the assigned collection period, each AT collected data over a 2-week period or until 30 cards were completed, whichever came first. After each meaningful patient encounter, the AT completed the SDOH card. After the ATs finished data collection, they returned their completed cards in the provided envelope through postal mail to the principal investigator. After completion of the study, each AT was provided a study honorarium for participation.

Data Analysis

Once we received the completed SDOH cards, a member of the research team manually entered the data into Excel (version 1808; Microsoft Corp). Quantitative and qualitative analyses were conducted on the collected data. Descriptive statistics were calculated to characterize the quantitative data, including the ATs' demographic characteristics, frequency of cards completed, frequency of SDOH observed, and frequency of SDOH the ATs perceived to have a negative influence. Qualitative analyses were conducted to characterize the reported actions taken by ATs. To investigate which SDOH were observed by the ATs, we used a deductive thematic analysis[24]; the 9 SDOH outlined by the National Academies of Sciences, Engineering, and Medicine[9] served as the predetermined themes that guided data analysis. To analyze these open-ended responses when ATs indicated and described an action taken to mitigate the negatively perceived SDOH, qualitative data analyses were performed using a deductive thematic analysis,[24] and the multiple phases were guided by a modified consensual qualitative research (CQR) approach.[25,26] We selected this approach to guide data analysis for the open-ended response data so we could explore the actions taken by ATs when SDOH were observed and perceived to have a negative influence on the patient's health. The rigorous multiphase CQR approach requires multiple analysts to minimize researcher bias and achieve consensus during each phase.[25,26] We used a 3-person data-analysis team to complete the multiphase analysis process; 2 researchers were new to the CQR method and were trained by the third team member,[26] who had extensive experience with the method. Additionally, an internal auditor reviewed the final data analysis and confirmed the accuracy and representativeness of the study findings.[25,26] During the first phase, the identified SDOH was blinded, and only the responses for the actions taken were analyzed. Each member of the data-analysis team reviewed the first 50 rows and developed an initial codebook of emergent categories. Next, the data-analysis team met to discuss the categories and develop a consensus codebook. During the second phase, each member coded 50 new responses using the initial codebook. The team then met again to discuss the codes and confirm the codebook. During the third phase, all open-ended responses were coded and reviewed by each

Table 2. Demographic Characteristics of Participating College/University Athletic Trainers (N = 23)

Characteristic	No. (%)
Sex	
Male	5 (21.7)
Female	18 (78.3)
Race	
Black or African American	2 (8.7)
Other	1 (4.3)
Unreported	3 (13.0)
White	17 (73.9)
Highest degree attained	
Bachelor's	3 (13.0)
Master's	12 (52.2)
Clinical doctorate	2 (8.7)
Academic doctorate	2 (8.7)
Unreported	4 (17.4)
Years as a certified athletic trainer	
0–4	9 (39.1)
5–10	5 (21.7)
11–15	3 (13.0)
16–20	1 (4.3)
Unreported	5 (21.7)

team member until consensus was achieved. Finally, the coded responses were categorized by the social determinant of health listed, and descriptive statistics were calculated to establish the frequency of each category. The internal auditor reviewed all study findings once the data analysis was completed to ensure that researcher bias was minimized and the participant responses were accurately represented.

RESULTS

Overall, 424 observation cards were collected from 23 ATs (age = 28.1 ± 3.7 years) at 20 colleges or universities (Table 2). Each AT collected a mean of 18.4 ± 9.2 observation cards. In 78% (331/424) of patient encounters, SDOH were observed, whereas in 22.0% (93/424) of patient encounters, no SDOH were observed, and in 4.0% (17/424) of patient encounters, ATs recorded being *unsure* whether SDOH were observed. Across all cards, 725 SDOH were documented and 38.8% (281/725) were perceived to have a negative influence on the patient's health (Table 3). The top 3 SDOH observed were access to social media and emerging technologies (153/725, 21.1%), academic stressors (131/725, 18.1%), and behavioral health issues (71/725, 9.8%). The 3 SDOH selected the least were educational limitation (1/725, 0.14%), poverty/near poverty (3/725, 0.41%), and homeless/poor or unstable living conditions (5/725, 0.69%). Neighborhood safety was not observed by the ATs.

The top 3 reported SDOH that were perceived to have a negative influence on patient health were academic stressors (49/281, 17.4%), behavioral health issues (46/281, 16.4%), and transportation issues (32/281, 11.4%; Table 3). Although not documented as often as other SDOH, when insufficient/lack of health insurance (15/18, 83.3%), food insecurity (8/11, 72.7%), or poor social support (24/39, 61.5%) was observed, ATs also perceived these SDOH as negatively influencing patient health.

Of the 725 SDOH observed, ATs reported acting on 25.0% (181/725). Of those 181, 15 actions were deemed unclear; the handwriting of the response was illegible or undecipherable by the data-analysis team without making assumptions

Table 3. Athletic Trainers' Observations of Social Determinants of Health and the Actions Taken When Social Determinants of Health Were Perceived to Have a Negative Impact on Health

	Observations		Action Taken				
Social Determinant of Health	Observed in a Patient	Perceived as a Negative Effect on Patient Health	Counseling and Education	Provide Additional Resources	Referral to Others	Communication With Others	Total
Access to social media/emerging technologies	153	13	5	2	1	0	8
Academic stressors	131	49	5	8	3	0	16
Behavioral health issues	71	46	17	4	13	0	34
Transportation issues	56	32	0	20	0	0	20
Lack of health literacy	50	27	21	2	0	1	24
Individual/family life circumstances	46	24	2	2	5	0	9
Poor social support	39	24	8	1	0	0	9
Job stressors	37	11	4	2	0	0	6
Language barrier	23	4	0	2	0	1	3
Cultural beliefs/values	23	2	0	0	0	0	0
Family care demands	22	7	0	4	2	0	6
Insufficient/lack of health insurance	18	15	1	6	3	0	10
Migrant/immigration status	14	2	0	0	0	0	0
Substance use/abuse	13	7	4	1	1	0	6
Food insecurity	11	8	3	2	1	2	8
Other	9	6	2	0	0	0	2
Homeless/poor or unstable living conditions	5	3	1	3	0	0	4
Poverty/near poverty	3	1	0	1	0	0	1
Educational limitations	1	0	0	0	0	0	0
Neighborhood safety	0	0	0	0	0	0	0
Total	725	281	73	60	29	4	166

Data are reported as frequencies.

about the action taken. Therefore, 166 responses about the actions taken were included in our qualitative analyses (Table 3). Four categories emerged for the actions taken by ATs to address SDOH: counseling and education (73/166), providing additional resources (60/166), referral to others (29/166), and communication with others (4/166). The most common SDOH for which actions were taken were behavioral health, lack of health literacy, and transportation issues.

DISCUSSION

In the current study, we described ATs' observations of SDOH and investigated actions taken at the point of care in collegiate and university settings. Although interest in SDOH and their influence on health is increasing, research exploring the influence of SDOH in athletic health care and the role of ATs in mitigating these SDOH is limited.[1,27–30] Our results suggest that many SDOH observed by ATs in the collegiate and university setting have a negative perceived influence on patient health. These outcomes support foundational findings that ATs in the collegiate or university setting observe SDOH in their daily practice that often require intervention.

The most commonly noted social determinant by these ATs was social media use. Access to and use of social media has been on the rise, with most users in the age range of 18 to 29 years.[31] Similar to all SDOH, social media can have a positive or negative influence on health and well-being.[32,33] For these collegiate and university athletes, social media and emerging technologies were not often perceived by the ATs as negatively influencing health, possibly because the patients had access to education, health care, and sport. However, previous authors suggested that prolonged use of social media was related to increases in sedentary behavior, anxiety, depression, and stress.[32,34,35] In college freshmen, a strong positive correlation between sleep quality and social media use has been identified, indicating worse sleep quality with increased use of social media.[36] Although our ATs did not document these potential negative effects, awareness of the possible negative effects of social media and emerging technologies may help with the early detection of concerns so that they can be addressed sooner.

Academic stressors and behavioral health were the 2 SDOH that were observed most frequently and most often perceived as negatively influencing patient health. These findings were not surprising because earlier investigators determined that a common cause of mental distress in collegiate athletes was academics.[37,38] To address this topic, the National Collegiate Athletic Association created a mental health and athlete wellness task force to develop a "Mental Health Best Practices" consensus document[39] to guide coaches and health care providers on navigating mental health concerns in collegiate athletes. The document outlines the importance of mental health screening in preparticipation physical examinations and the need for emergency action plans for mental health emergencies; it also identifies the appropriate clinical staff to manage such situations. Although an AT may be the first to recognize an athlete's behavioral health condition, the document recommends that a licensed mental health provider handle it. This recommendation highlights the importance of creating teams of medical professionals to support the care of athletes.[39,40] Taken together, our results and guidance from the consensus document indicate that ATs in the collegiate or university setting should be prepared with emergency action plans, policies, and procedures to handle patients with behavioral health conditions and emergencies.[39,40]

Even though the ATs in this study did not report social media and emerging technologies as negatively influencing patient health, social media's contribution to behavioral health conditions cannot be ignored. These ATs may not have been in a position to attribute observed behavioral health conditions to the use of social media, yet researchers found that young adults' use of social media may undermine their well-being.[41] Additionally, addiction to online social networking is being studied and in some work is considered an addiction disorder[42]; several scales and questionnaires were used to determine the effects of social media on behavioral health. Athletic trainers with concerns about social media addiction or its relationship to patient behavioral health may want to administer 1 or more of the following instruments: the Addictive Behavior Questionnaire, Online Social Support Scale, Rosenberg Self-Esteem Scale, Beck Depression Inventory, or Patient Health Questionnaire-9 depression screen.[42] However, before implementing screenings or questionnaires such as these, ATs need to consider what the results may yield and have appropriate plans in place.

Although less commonly observed than academic stressors and behavioral health, insufficient/lack of health insurance (83.3%), food insecurity (72.7%), and poor social support (61.5%) received high percentages of perceived negative influence on patients. When compared with the total number of observations, insufficient/lack of health insurance had the highest perceived negative influence on overall health compared with all other observed SDOH (15/18, 83.3%). Having access to health insurance has been preliminarily linked to greater use of health care services and is essential in the United States for access to quality care.[43] In 2017, the American College Health Association reported that 82.8% of college students had some form of health insurance, 2.4% did not, and 0.8% were not sure.[44] The limited observation of health insurance concerns may have reflected many institutions' requirement to have health insurance to be able to participate in sports. The collegiate setting is unique because some institutions also cover all additional costs of health care for student-athletes. Nonetheless, the financial amount that a collegiate setting covers for external services varies among institutions.[45] A college or university may cover all health care costs for student-athletes, yet ATs must be aware of the costs of health care so that they can reduce potential costs for patients through their clinical decisions, especially for those with insufficient insurance. The negative influence of this social determinant is particularly important because ATs are often the only health care providers in a community and may manage untreated health conditions because of a lack of insurance or quality health care.[15]

The prevalence of food insecurity among US college students ranged from 20% to 50%,[46–48] which was higher than in the general population.[49] That percentage may seem high for our reported observations, but athletes are a subset of the collegiate population that may require further study. Further, although student-athletes are often provided with meals or snacks during the seasons depending on the

institution, ATs may not be observing food insecurities because this resource is in place to feed student-athletes. Regardless, when food insecurity was observed, it was perceived as a serious problem. In a review article, Freudenberg et al[47] provided examples of how college campuses can respond and have responded to food insecurity, which could be applied to athletic programs. For example, in collaboration with the college or university and athletic program or department, ATs could create food pantries, set aside funds for emergency situations, prepare meal vouchers for student-athletes, and learn about government resources.[47] Having information readily available would be beneficial when this social determinant is observed so that athletes in need can access community food banks or enroll in the Supplemental Nutritional Assistance Program.

The role of social support in individual health and well-being is crucial. In general, *social support* refers to a person's social network, social norms, values, and cultural background.[50] Consequences of poor social support or isolation include high blood pressure, a weaker immune system, heart disease, obesity, and mental health conditions.[51] In our study, ATs recognized the negative influence of social support in their patient populations. In athletic health care, ATs provide vital support to their patients during the recovery and rehabilitation process and may be an additional source of support when it is perceived to be missing. Previous researchers showed that social support provided by ATs in the collegiate setting reduced patient anxiety and depressive symptoms after injury.[2,27] Athletic trainers also described managing patient cases when social support negatively influenced patient health, and they strongly agreed with its importance in athletic health care.[19] Our results add to the existing literature that acknowledges the ability of ATs to observe and intervene when social support negatively influences patient health.

Although important in the global context of society, educational limitations, poverty, and homelessness were not often documented by our ATs. This result was unsurprising because all patients observed by the ATs were enrolled in college and, as a part of the college experience, may have had housing. Therefore, ATs may not have considered education itself a problem because their patients were actively enrolled in college. Additionally, many collegiate and university athletes live in dormitories or are provided with housing expenses. Unless specific questions are asked about living in poverty or experiencing homelessness, some athletes may not divulge such information. Our ATs also did not observe the social determinant of health of neighborhood safety. Explanations for this result may be that it is not naturally discussed in athletic health care or does not generally apply to those living in dormitories. In the university setting, education and housing concerns may be addressed by the university instead of the student. In general, these SDOH are not easily observed without further questioning, a screening tool, or an established relationship. Athletic trainers may want to directly inquire about how safe athletes feel in their neighborhoods or what their housing situations are if they are not living in on campus.

Because SDOH are often intertwined, SDOH that were not observed in our study may have presented as other SDOH that were observed. Although these SDOH were limited or not observed, ATs should not assume that the student-athlete has not experienced these SDOH before attending the university or that they are not currently experiencing them. Instead, ATs should assess SDOH through the regular use of patient-reported outcome measures or already established screening tools, which may lead to deeper conversations and understanding, potentially highlighting some of the more difficult SDOH to observe. Ultimately, improved observation and assessment of and intervention for SDOH that negatively influence patient health may lead to better health equity in athletic health care.

Participating ATs in our investigation were not only observing the influence of SDOH in their patients but also trying to mitigate some of the perceived negative influences. As we demonstrated, ATs were well versed in educating their patients and advocating for them. The main actions used by our ATs to address the negative influences of SDOH were counseling and education, additional resources, referral to others, and communicating with others. Although ATs were taking action to mitigate the negative influence of SDOH, action was reported in only about 25% of cases where SDOH were perceived to be negatively influencing health. As health care providers, ATs' awareness and observation of SDOH is insufficient to improve patient outcomes, and ATs should continue to support patients experiencing a negative effect of SDOH when appropriate or possible. These findings indicate the need for additional resources to mitigate the negative influences of SDOH. Specifically, academic stressors, behavioral health issues, health literacy, and transportation were commonly perceived to have negative influences on patient health and were SDOH that ATs reported acting on the most. Future authors should expand on these results to determine which resources ATs are lacking that would allow them to provide better care and direction for athletes in need.

Athletic trainers continue to be advocates for their patients through observation and actions to address SDOH negatively influencing health. Further, continued observation, with the addition of assessment of SDOH, will help ATs align with the Institute of Medicine's 6 aims for improving health care quality when making clinical decisions.[52] Making a conscious effort to practice clinically in a manner that prioritizes these criteria can help ATs address SDOH identified through assessment and intervene appropriatelye.[52]

Limitations

One limitation of our work was its observational design. We chose this design for our card study because it captures what is occurring in the environment and gathers information about the current state of practice. However, it does not allow for shifts in clinical practice or the opportunity to confirm observations with others. Another limitation was that some SDOH may be less observable than others. Because participants were specifically instructed to not alter their clinical practice or ask questions they normally would not, it is possible that some SDOH were not observed even though they were affecting the patient's life. Moreover, we did not inquire about the positive influences of SDOH. Despite its limitations, this study design permits large amounts of data to be collected quickly at many sites without too much additional work for the clinician, providing a foundation for future SDOH research.[21] Future research should confirm the ATs' observations of SDOH with patients' experiences.

CONCLUSIONS

Overall, our results suggest that ATs employed in the collegiate or university setting are observing and perceiving the negative influences of SDOH in their clinical practice. They are also acting to mitigate the negative influence of SDOH through counseling and education, more resources, referral to others, and communication with others. Importantly, ATs in this setting seemed prepared to address academic stressors and behavioral health issues, which were the most commonly observed SDOH and were most often perceived to negatively influence SDOH. Ways to address these concerns may include having mental health emergency action plans, policies, and procedures in place and providing resources and access to individuals who can help student-athletes struggling with mental health. Although these outcomes support the ability of ATs to observe and act on perceived negative influences of SDOH in their clinical practice, future researchers should focus on patient confirmations of ATs' observations and the best methods of SDOH assessment in this population so that appropriate interventions can be developed.

ACKNOWLEDGMENTS

The National Athletic Trainers' Association Foundation New Investigator Grant Program and A.T. Still University Strategic Research Fund Grant Program provided financial support for this investigation. We thank Deborah Goggin for her editorial assistance.

REFERENCES

1. Roberts JM, Rivera MJ, Winkelmann ZK, Eberman LE. Health literacy levels of collegiate student-athletes. *Int J Athl Ther Train.* 2022;27(4):184–187. doi:10.1123/ijatt.2021-0027
2. Sullivan L, Ding K, Tattersall H, Brown S, Yang J. Social support and post-injury depressive and anxiety symptoms among college-student athletes. *Int J Environ Res Public Health.* 2022;19(11):6458. doi:10.3390/ijerph19116458
3. Wallace J, Beidler E, Register-Mihalik JK, et al. Examining concussion nondisclosure in collegiate athletes using a health disparities framework and consideration of social determinants of health. *J Athl Train*. 2022;57(1):16–24. doi:10.4085/1062-6050-0054.21
4. Picha KJ, Welch Bacon CE, Normore C, Snyder Valier AR. Social determinants of health: considerations for athletic health care. *J Athl Train*. 2022;57(6):521–531. doi:10.4085/1062-6050-0010.21
5. Hood CM, Gennuso KP, Swain GR, Catlin BB. County health rankings: relationships between determinant factors and health outcomes. *Am J Prev Med*. 2016;50(2):129–135. doi:10.1016/j.amepre.2015.08.024
6. A conceptual framework for action on the social determinants of health. World Health Organization. Accessed May 31, 2023. https://www.who.int/publications/i/item/9789241500852
7. Social determinants of health. US Department of Health and Human Services. Accessed May 31, 2023. https://health.gov/healthypeople/objectives-and-data/social-determinants-health
8. Braveman P, Egerter S, Williams DR. The social determinants of health: coming of age. *Annu Rev Public Health*. 2011;32:381–398. doi:10.1146/annurev-publhealth-031210-101218
9. Communities in action: pathways to health equity. Robert Wood Johnson Foundation. Accessed May 31, 2023. https://www.rwjf.org/en/insights/our-research/2017/01/communities-in-action–pathways-to-health-equity.html
10. Andermann A; CLEAR Collaboration. Taking action on the social determinants of health in clinical practice: a framework for health professionals. *CMAJ*. 2016;188(17–18):E474–E483. doi:10.1503/cmaj.160177
11. Grant C, Goodenough T, Harvey I, Hine C. A randomised controlled trial and economic evaluation of a referrals facilitator between primary care and the voluntary sector. *BMJ*. 2000;320(7232):419–423. doi:10.1136/bmj.320.7232.419
12. Garg A, Toy S, Tripodis Y, Silverstein M, Freeman E. Addressing social determinants of health at well child care visits: a cluster RCT. *Pediatrics*. 2015;135(2):e296–e304. doi:10.1542/peds.2014-2888
13. Franz CE, Cook K. Utilisation of social determinants of health to improve education among youth in Dominican baseball academies. *Health Soc Care Community.* 2020;28(2):423–430. doi:10.1111/hsc.12874
14. Barkley L, Taliaferro LA, Baker K, Garcia J. The Holistic Athletic Healthcare Model: addressing the developmental, social, and cultural needs of collegiate athletes. *J High Educ Athl Innov.* 2018;1(3):26–47. doi:10.15763/issn.2376-5267.2018.1.3.26-47
15. Silberholz EA, Brodie N, Spector ND, Pattishall AE. Disparities in access to care in marginalized populations. *Curr Opin Pediatr*. 2017;29(6):718–727. doi:10.1097/MOP.0000000000000549.
16. Post EG, Green NE, Schaefer DA, et al. Socioeconomic status of parents with children participating on youth club sport teams. *Phys Ther Sport.* 2018;32:126–132. doi:10.1016/j.ptsp.2018.05.014
17. Hyde ET, Omura JD, Fulton JE, Lee SM, Piercy KL, Carlson SA. Disparities in youth sports participation in the US, 2017–2018. *Am J Prev Med*. 2020;59(5):e207–e210. doi:10.1016/j.amepre.2020.05.011
18. Chen C, Tsai LT, Lin CF, et al. Factors influencing interest in recreational sports participation and its rural-urban disparity. *PLoS One*. 2017;12(5):e0178052. doi:10.1371/journal.pone.0178052
19. Picha KJ, Welch Bacon CE, Bay RC, Lewis JH, Snyder Valier AR. Athletic trainers' perceptions of and experience with social determinants of health. *Int J Environ Res Public Health*. 2023;20(8):5602. doi:10.3390/ijerph20085602
20. Popay J, Kowarzik U, Mallinson S, Mackian S, Barker J. Social problems, primary care and pathways to help and support: addressing health inequalities at the individual level. Part II: lay perspectives. *J Epidemiol Community Health*. 2007;61(11):972–977. doi:10.1136/jech.2007.061945
21. Westfall JM, Zittleman L, Staton EW, et al. Card studies for observational research in practice. *Ann Fam Med*. 2011;9(1):63–68. doi:10.1370/afm.1199
22. Lewis JH, Whelihan K, Navarro I, Boyle KR; SDH Card Study Implementation Team. Community health center provider ability to identify, treat and account for the social determinants of health: a card study. *BMC Fam Pract*. 2016;17(1):121. doi:10.1186/s12875-016-0526-8
23. Van Lunen BL, Cavallario JM, Walker SE, Bay RC, Welch Bacon CE. Athletic training student application of evidence-based practice during clinical education: a report from the Athletic Training Clinical Education network. *Athl Train Educ J*. 2018;13(4):390. doi:10.4085/1304377
24. Patton MQ. *Qualitative Research & Evaluation Methods*. 3rd ed. Sage Publications; 2001.
25. Hill CE, Thompson BJ, Williams EN. A guide to conducting consensual qualitative research. *Couns Psychol*. 1997;25(4):517–572. doi:10.1177/0011000097254001
26. Hill CE, Knox S, Thompson BJ, Williams EN, Hess SA, Ladany N. Consensual qualitative research: an update. *J Couns Psychol*. 2005;52(2):196–205. doi:10.1037/0022-0167.52.2.196
27. Yang J, Schaefer JT, Zhang N, Covassin T, Ding K, Heiden E. Social support from the athletic trainer and symptoms of depression and anxiety at return to play. *J Athl Train*. 2014;49(6):773–779. doi:10.4085/1062-6050-49.3.65
28. Lu FJ, Hsu Y. Injured athletes' rehabilitation beliefs and subjective well-being: the contribution of hope and social support. *J Athl Train*. 2013;48(1):92–98. doi:10.4085/1062-6050-48.1.03
29. Post EG, Roos KG, Rivas S, Kasamatsu TM, Bennett J. Access to athletic trainer services in California secondary schools. *J Athl Train*. 2019;54(12):1229–1236. doi:10.4085/1062-6050-268-19

30. Picha KJ, Welch Bacon CE, Bay C, Lewis J, Snyder Valier AR. Athletic trainers' familiarity, comfort, knowledge, and recognition of social determinants of health. *J Athl Train.* Published online February 23, 2023. doi:10.4085/1062-6050-0337.22
31. Ortiz-Ospina E. The rise of social media. Our World in Data. Published September 18, 2019. Accessed May 31, 2023. https://ourworldindata.org/rise-of-social-media
32. Karim F, Oyewande AA, Abdalla LF, Chaudhry Ehsanullah R, Khan S. Social media use and its connection to mental health: a systematic review. *Cureus*. 2020;12(6):e8627. doi:10.7759/cureus.8627
33. O'Reilly M, Dogra N, Hughes J, Reilly P, George R, Whiteman N. Potential of social media in promoting mental health in adolescents. *Health Promot Int*. 2019;34(5):981–991. doi:10.1093/heapro/day056
34. Escobar-Viera CG, Whitfield DL, Wessel CB, et al. For better or for worse? A systematic review of the evidence on social media use and eepression among lesbian, gay, and bisexual minorities. *JMIR Ment Health*. 2018;5(3):e10496. doi:10.2196/10496
35. Iwamoto D, Chun H. The emotional impact of social media in higher education. *Int J High Educ*. 2020;9(2):239–247. doi:10.5430/ijhe.v9n2p239
36. Distor JM, Cabello C, Tus J. Social media usage and sleep quality among freshmen college students in the new normal. *Spec Educ*. 2022;2(43):2030–2046.
37. Hwang S, Choi Y. Data mining in the exploration of stressors among NCAA student athletes. *Psychol Rep*. 2016;119(3):787–803. doi:10.1177/0033294116674776
38. Karagiorgakis A, Blaker ER. The effects of stress on USCAA student-athlete academics and sport enjoyment. *Coll Stud J*. 2021;55(4):429–439.
39. Mental health best practices. NCAA Sport Science Institute. Accessed May 31, 2023. https://s3.amazonaws.com/ncaa.org/documents/2021/1/18/HS_Mental_Health_Best_Practices_20160317.pdf
40. Neal TL, Diamond AB, Goldman S, et al. Inter-association recommendations for developing a plan to recognize and refer student-athletes with psychological concerns at the collegiate level: an executive summary of a consensus statement. *J Athl Train*. 2013;48(5):716–720. doi:10.4085/1062-6050-48.4.13
41. Kross E, Verduyn P, Demiralp E, et al. Facebook use predicts declines in subjective well-being in young adults. *PLoS One*. 2013;8(8):e69841. doi:10.1371/journal.pone.0069841
42. Pantic I. Online social networking and mental health. *Cyberpsychol Behav Soc Netw.* 2014;17(10):652–657. doi:10.1089/cyber.2014.0070
43. Farrell CM, Gottlieb A. The effect of health insurance on health care utilization in the justice-involved population: United States, 2014–2016. *Am J Public Health*. 2020;110(S1):S78–S84. doi:10.2105/AJPH.2019.305399
44. American College Health Association-National College Health Assessment: spring 2017 reference group executive summary. American College Health Association. Accessed May 31, 2023. https://www.acha.org/documents/ncha/NCHA-II_SPRING_2017_REFERENCE_GROUP_EXECUTIVE_SUMMARY.pdf
45. NCAA insurance programs and resources. National Collegiate Athletic Association. Accessed May 31, 2023. https://www.ncaa.org/sports/2021/6/25/insurance.aspx
46. El Zein A, Shelnutt KP, Colby S, et al. Prevalence and correlates of food insecurity among US college students: a multi-institutional study. *BMC Public Health.* 2019;19:660. doi:10.1186/s12889-019-6943-6
47. Freudenberg N, Goldrick-Rab S, Poppendieck J. College students and SNAP: the new face of food insecurity in the United States. *Am J Public Health.* 2019;109(12):1652–1658. doi:10.2105/AJPH.2019.305332
48. Martinez SM, Frongillo EA, Leung C, Ritchie L. No food for thought: food insecurity is related to poor mental health and lower academic performance among students in California's public university system. *J Health Psychol*. 2020;25(12):1930–1939. doi:10.1177/1359105318783028
49. Coleman-Jensen A, Rabbitt MP, Gregory CA, Singh A. Household food security in the United States in 2020. US Department of Agriculture. Published September 2021. Accessed May 31, 2023. https://www.ers.usda.gov/webdocs/publications/102076/err-298_summary.pdf?v=1801.4
50. Cockerham WC, Hamby BW, Oates GR. The social determinants of chronic disease. *Am J Prev Med*. 2017;52(1S1):S5–S12. doi:10.1016/j.amepre.2016.09.010
51. Organisation for Economic Co-operation and Development (OECD). Lack of social support (indicator). Accessed May 31, 2023. https://data.oecd.org/healthrisk/social-support.htm
52. Institute of Medicine (US) Committee on Quality of Health Care in America. *Crossing the Quality Chasm: A New Health System for the 21st Century.* National Academies Press; 2001.

SUPPLEMENTAL MATERIAL

Supplemental Appendix. Social determinants of health card study instructions.

Found at DOI: http://dx.doi.org/10.4085/1062-6050-0327.23.S1

Address correspondence to Kelsey J. Picha, PhD, ATC, A.T. Still University, 5850 East Still Circle, Mesa, AZ 85206. Address email to kpicha@atsu.edu.