

Athletic Trainers' Attitudes and Perceptions of Environmental Sustainability

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Context: Environmental sustainability efforts are becoming a critical concern in health care. However, little is known regarding how athletic trainers feel about the environment or what can be done to reduce the environmental impact of the practice of athletic training.

Objective: To examine athletic trainers' attitudes toward and perceptions of factors related to environmental sustainability.

Design: Sequential, mixed methods using a survey, focus groups, and personal interviews.

Setting: Field study.

Patients or Other Participants: Four hundred forty-two individuals completed the survey. Sixteen participated in the qualitative portion.

Main Outcome Measure(s): Quantitative results from the Athletic Training Environmental Impact Survey included data from a 5-point Likert scale (1 = lowest rating and 5 = highest rating). Descriptive statistics and 1-way analyses of variance were used to describe perceptions and determine differences in mean opinion, National Athletic Trainers' Association district, and use of green techniques. Qualitative data were transcribed verbatim and analyzed inductively.

Results: The mean score for opinion of the environment was 3.30 ± 0.52 . A difference was found between opinion and National Athletic Trainers' Association district ($F_{9, 429} = 2.43$, $P = .01$). A Bonferroni post hoc analysis identified this difference ($P = .03$) between members of District 2 (Delaware, New Jersey, New York, Pennsylvania) and District 9 (Alabama, Florida, Georgia, Kentucky, Louisiana, Mississippi, Tennessee). An inductive analysis resulted in 3 emergent themes: (1) barriers to using green techniques, (2) motivators for using green techniques, and (3) solutions to overcoming the barriers. The information gleaned from participants in the qualitative portion of the study can be useful for clinicians wishing to implement basic conservation efforts in their practice settings and may guide future sustainability projects.

Conclusions: Overall, participants reported a positive opinion of environmental sustainability topics related to athletic training. However, many barriers to practicing green techniques were identified.

Key Words: conservation, green health care

Key Points

- Participants were moderately favorable toward conservation of the environment. Members of District 2 held the highest opinion of environmental sustainability, and members of District 6 held the lowest opinion.
- Psychological and logistical concerns are frequently cited barriers to using green techniques; education, leadership, economic considerations, and alternative treatment choices offer solutions to overcoming these barriers. Awareness of waste produced, cultural influences, and convenience are motivators to using green techniques.

The health of the environment and the health of its population have a documented link.^{1–6} Environmental degradation can lead to global climate change.^{6–10} *Climate change* is defined as any significant alteration in measures of climate (ie, temperature, precipitation, or wind) lasting for an extended period (ie, a decade or longer).⁸ These changes may result in increased incidences of several health conditions often seen in the physically active population, such as heat illness, asthma, and allergies.³

The World Health Organization recognizes this link between the health of the environment and its population and called for better sustainability among health care systems.¹¹ As a result, many health care professionals are searching for ways to implement environmentally sustainable techniques in their clinical practice.^{12–16} *Environmental sustainability* refers to an individual's or institution's

actions to protect or not harm the environment.¹⁷ Key to this philosophy is a respect for natural resources so that future generations might live in a world the present generation enjoyed but did not diminish. This idea of providing quality health care while protecting the environment necessitates both personal and organizational commitment.¹⁸

Athletic trainers (ATs) are included in the call to action. For change to occur, ATs need education on the effects of clinical practice on the environment as well as actions they can take to minimize these effects and serve as agents of change in their communities.¹⁹ To date, there is a dearth of literature exploring topics related to environmental sustainability in athletic training. It is important to understand the attitudes and perceptions of environmental sustainability among ATs in order to encourage environmentally friendly practices. Therefore, the purpose of our study was to

examine the attitudes toward and perceptions of environmental sustainability among ATs as the first step in an effort to raise awareness and initiate conservation efforts within the profession.

METHODS

We employed a sequential, explanatory mixed-methods design to portray a holistic picture surrounding topics of environmental sustainability as they pertain to the practice of athletic training.^{20,21} First, we developed a survey to explore ATs' views on the types of waste generated by the profession. Then, focus groups and 1-on-1 interviews were conducted using a semistructured format to further investigate the attitudes and perceptions regarding waste as well as any associated conservation efforts. One-on-one interviews supplemented focus-group data until data saturation was achieved.

Instrumentation

The principal investigator (K.P.) created a survey instrument, the Athletic Training Environmental Impact Survey (ATEIS), to better determine an AT's opinion of environmental sustainability as a first step to investigating the effect of the practice of athletic training on the environment. The ATEIS consists of 4 sections. Section 1 collects participant demographic information and is distributed via SurveyMonkey (<http://surveymonkey.com>, Portland, OR). Sections 2, 3, and 4 use a 5-point Likert scale to examine the participant's opinion of environmental sustainability, views specific to athletic training, knowledge of green techniques, and institutional practices. Section 2 of the survey, opinion of the environment, was modified with permission from the Ohio Environmental Survey.²² Examples of subscale items in this section are "How important is the issue of climate change to you personally?" anchored from 1 = *not important* to 5 = *extremely important*; and, "Assuming climate change is happening, if nothing is done to reduce it in the future, how serious of a problem do you think it will be or would be for the world?" anchored from 1 = *no problem* to 5 = *very serious problem*. Though these anchors differed slightly, a rating of 1 represented a *low regard for sustainability concerns*, whereas 5 represented a *high regard for sustainability concerns*. The survey was used in its original form with the exception of 2 questions that used a 3-item stem response; these questions were omitted in an effort to improve the internal consistency of the instrument. Section 3 of the survey focuses on views specific to the practice of athletic training, such as the amount of waste produced as well as ATs' knowledge of green techniques. Section 4 seeks to determine the specific conservation practices ATs are using in their clinical practice. Sections 3 and 4 were developed based on a review of the literature on environmental sustainability in health care. All sections of the survey instrument were piloted with a group of 4 *environmental sustainability experts* in the field of athletic training (defined as those who either published or presented on the topic) to examine them for content and face validity. Minor revisions were made based on the feedback provided.

A second pilot study was conducted to establish the instrument's reliability. The survey was distributed to 40 certified ATs using a convenience-sampling method.

Nineteen participants accessed the survey, for a response rate of 47.5%. Internal consistency measures were conducted on sections 2 and 3 to help ensure reliability. Using this process, 2 questions in section 2 of the survey were removed to improve internal consistency of the instrument. The Cronbach α was .602 ($n = 7$) for section 2 and .609 ($n = 8$) for section 3 of the instrument. Section 4, institutional practices, was dichotomous in nature and did not lend itself to an internal consistency measure.

A semistructured interview guide was developed by the primary investigator based on a review of the literature. The following questions were used to guide the study:

1. What types of green practices are currently used in the practice of athletic training?
2. What are the barriers and challenges to using green techniques?
3. What types of waste associated with athletic training duties are of greatest concern?

In an effort to avoid bias, the same guide was used for the focus groups and interviews.

Participants and Sampling

Members of the National Athletic Trainers' Association (NATA) were specifically targeted. For the survey portion of the study, the Member Services Department generated a random list of 3500 ATs stratified by employment setting, membership district, age, and sex in an effort to accurately represent the population. The primary investigator's home institutional review board approved the study, and all participants acknowledged informed consent before starting the survey. Those who participated in the qualitative portion provided informed consent before starting the interview process.

Data Collection

A total of 574 participants accessed the survey (16.4%). One hundred thirty-two participants elected not to proceed beyond question 20, a series of Likert items probing the participant's environmental sustainability views specific to the practice of athletic training. These responses were deemed incomplete and were discarded from the results. A total of 442 participants (216 [48.9%] males, 224 [50.7%] females; age = 36.9 ± 10.8 years; 2 respondents did not indicate sex) completed the survey for a response rate of 12.6%. Participant demographics are provided in Table 1.

At the end of the survey, participants were given an opportunity to express interest in being involved in the qualitative portion of the study. Of the 442 survey respondents, 39 (8.8%) indicated interest in the qualitative portion. However, only 14 of those who reported interest actually participated in the qualitative portion of the study. Two additional participants were recruited via convenience sampling in an effort to purposefully recruit representation from Districts 6 (Arkansas, Texas) and 9 (Alabama, Florida, Georgia, Kentucky, Louisiana, Mississippi, Tennessee). Participant demographics are provided in Table 2. We felt that ATs' representation from these districts was important based on their opinions of the environment (Table 3). To collect qualitative data, we assembled 2 focus groups based on the participants' availability and supple-

mented these with individual interviews in an attempt to reach data saturation.

The teleconference focus-group data were recorded and transcribed verbatim using tollfreeconference.com (Los Angeles, CA). All other qualitative data were recorded using a digital voice recorder (Olympus America Inc, Center Valley, PA) and transcribed verbatim by Transcription Professionals (Evanston, IL). Focus-group sessions lasted approximately 1 hour and interview sessions lasted approximately 30 minutes.

Data Analysis

After the survey closed, we analyzed the data using descriptive statistics for section 1 (participant demographics). Sections 2 (opinions of the environment) and 3 (views specific to the practice of ATs) used a 5-point Likert scale. Section 2 responses were aggregated and a subscore (the participant's total score for the section) was created for each participant. Tests for normality were conducted to examine standardized skewness. The Shapiro-Wilks test indicated the data were statistically normal. Therefore, a 1-way analysis of variance was used to analyze opinion and knowledge data sets. Determining the directions of attitudes toward and perceptions of environmental sustainability as well as the magnitude of differences between membership districts were also important. A *moderately favorable opinion* toward conservation of the environment was defined as a mean score of 3.00 to 3.99, and a score of 4.00 to 5.0 was classified as *very favorable*, whereas a score lower than 3.00 was defined as a *less than favorable opinion*. A Bonferroni post hoc comparison was used, when needed, to compare scores according to geographic regions. The probability value was set at the .05 level for all measures. Qualitative data were analyzed to extract significant comments or phrases related to green ATs' practices using the Creswell Data Analysis Spiral.²³ Using this approach, all extracted data were coded, categorized by meaning, and clustered into themes.

Trustworthiness

Trustworthiness was established through peer debriefing, member checks, and the use of rich description. Peer debriefing with an expert in qualitative methods occurred once the data were analyzed and themes were reconstructed. Rich description text was used in the "Results" section to clearly illustrate the participants' emotions, thoughts, and perceptions toward the topic. After the analysis, qualitative results were returned to randomly selected participants to review for authenticity. Fifty percent ($n = 8$) of section 2 respondents (4 in the focus group and 3 individual interviewees) participated in the member-checking process.

RESULTS

The second section of the ATEIS explored the participants' opinions and personal perceptions regarding the state of the environment as well as the importance of and personal contributions toward the matter. The mean opinion about the environment was 3.30 ± 0.52 on a 5-point Likert scale, indicating that participants were moderately favorable toward conservation of the environment. A 1-way analysis of variance indicated how ATs' opinions varied by district. A difference was found for ATs' opinions among

various NATA member districts ($F_{9,429} = 2.43$, $P = .01$). The opinions of District 2 (Delaware, New Jersey, New York, Pennsylvania) and District 9 (Alabama, Florida, Georgia, Kentucky, Louisiana, Mississippi, Tennessee) members differed ($P = .03$). Members of District 2 held the highest opinion of the environment (3.42 ± 0.48), and members of District 6 (Arkansas, Texas) held the lowest opinion (3.06 ± 0.52 ; Table 3). The participants in the qualitative portion supported these data. When asked specifically about her opinion toward environmental sustainability efforts, 1 interviewee stated, "I would say very favorable. I don't know that I do it to the extent that I should, but I have a positive attitude towards it," whereas another interviewee commented, "I think there should be more of it. I think there could be. I mean, there's options for reusable and recycled goods in just about every other aspect of life. So I think that's [a] fairly feasible wish."

An inductive analysis of the data resulted in the emergence of 3 themes, represented in the Figure: (1) barriers to using green techniques, (2) motivators for using green techniques, and (3) solutions to overcoming barriers. Several of these higher-order themes contained lower-order themes. The first theme, barriers to using green techniques, included the lower-order themes of (1) psychological concerns and (2) logistical concerns. The second theme, motivators for using green techniques, included the lower-order themes of awareness, cultural influence, and convenience.

Barriers to Using Green Techniques

Psychological Concerns. The first emergent theme revealed the psyches of the participants regarding participating in green initiatives. These varied and ranged from the sheer difficulty of making a behavioral change to feelings of lack of control and lack of priority to a feeling of disconnection between the clinician and employer.

Participants described a variety of ways in which behavioral change is difficult. These included altering their ideas, overcoming negative perceptions associated with conservation, and difficulty gaining the support of others. Often, participants were faced with resistance either in the form of negativity or apathy. A focus-group participant noted, "I'm trying to get onboard with this being green, but it's an adjustment in my life."

Athletic trainers also felt a lack of control or powerlessness regarding implementing conservation efforts within their work settings. For example, 1 focus-group participant stated, "If I'm not there setting it up, then I'm not really in charge of putting out a recycling bin." For others, the lack of control was due to their patients' unique values. For instance, 1 interview participant shared, "We try and use braces as much as possible to reduce the use of tape. . . some athletes are against that."

Certain participants expressed a lack of control over implementing new practices, whereas others stated that they had more pressing priorities than using green techniques. For example, 1 AT cited time constraints and the desire to be adequately prepared for adverse events rather than dividing her focus with conservation efforts: "I think it's something that we're just—we're so busy, and I don't have time to worry about—you want to do what's most efficient as opposed to what would be better in the long term." Another participant agreed, "There's certain

Table 1. Demographic Information of Part I (Survey) Participants (N = 442) Continued on Next Page

Characteristic	Participants n (%) ^a
National Athletic Trainers' Association district (states)	
1 (Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, Vermont)	32 (7.2)
2 (Delaware, New Jersey, New York, Pennsylvania)	67 (15.2)
3 (District of Columbia, Maryland, North Carolina, South Carolina, Virginia, West Virginia)	41 (9.3)
4 (Illinois, Indiana, Michigan, Minnesota, Ohio, Wisconsin)	103 (23.3)
5 (Iowa, Kansas, Missouri, Nebraska, North Dakota, Oklahoma, South Dakota)	42 (9.5)
6 (Arkansas, Texas)	22 (5.0)
7 (Arizona, Colorado, New Mexico, Utah, Wyoming)	22 (5.0)
8 (California, Hawaii, Nevada)	36 (8.1)
9 (Alabama, Florida, Georgia, Kentucky, Louisiana, Mississippi, Tennessee)	56 (12.7)
10 (Alaska, Idaho, Montana, Oregon, Washington)	18 (4.1)
Total respondents	439 (99.3)
Missing	3 (0.7)
Total	442 (100.0)
Sex	
Male	216 (48.9)
Female	224 (50.7)
Total respondents	440 (99.5)
Missing	2 (0.5)
Total	442 (100.0)
Race	
Black/African American	14 (3.2)
Asian-American	7 (1.6)
Hispanic/Latino	8 (1.8)
Native Hawaiian/other Pacific Islander	0 (0.0)
White/Caucasian	403 (91.2)
Other	9 (2.0)
Total respondents	441 (99.8)
Missing	1 (0.2)
Total	442 (100.0)
Employment setting	
Clinic	15 (3.4)
Clinic outreach/contracted services	77 (17.4)
Collegiate/dual appointment	30 (6.8)
Collegiate/academic appointment	26 (5.9)
Collegiate/professional staff, athletics, clinical	104 (23.5)
Corporate	1 (0.2)
Hospital	8 (1.8)
Industrial/occupational	4 (0.9)
Military	1 (0.2)
Professional sports	15 (3.4)
Secondary schools	140 (31.7)
Other ^b	19 (4.3)
Total respondents	440 (99.5)
Missing	2 (0.5)
Total	442 (100.0)
Employment status	
Part time	55 (12.4)
Full time	387 (87.6)
Total	442 (100.0)
Student status	
Full time	13 (2.9)
Part time	19 (4.3)
Not a student	408 (92.3)
Total respondents	440 (99.5)
Missing	2 (0.5)
Total	442 (100.0)

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Table 1. Continued From Previous Page

Characteristic	Participants n (%) ^a
Level of education	
Bachelor's degree	121 (27.4)
Master's degree	293 (66.3)
Doctorate	27 (6.1)
Total respondents	441 (99.8)
Missing	1 (0.2)
Total	442 (100.0)
Residential setting	
Rural	121 (27.4)
Urban	94 (21.3)
Suburban	224 (50.7)
Total respondents	439 (99.3)
Missing	3 (0.7)
Total	442 (100.0)
Employment setting	
Rural	122 (27.6)
Urban	135 (30.5)
Suburban	185 (41.9)
Total	442 (100.0)

^a Percentages are rounded.

^b Participants could list other employment settings.

things we can't cut corners on. We still got to think about health care." Not only was the focus on the work hindering conservation efforts, many times the actual workload affected the use of conservation techniques.

Participants' workloads took priority over using green techniques. As 1 interview participant, who works in a collegiate setting, mentioned, "We have a lot of focus on speed and convenience and getting things done in the heat of the moment. A lot of times you don't take the time to look into where's the nearest recycling can." Athletic trainers may not have prioritized the use of green techniques; however, these values were not always shared by their employers.

Often, participants described occasions when athletic training practices were different than those of the institution. One interview participant noted, "At our institution, they try to buy recycled products, but it's not always doable. Within our athletic training [staff] here, they hardly ever buy recycled products." Other times, the separation occurred between facilities:

It kind of makes me laugh because everyone focuses on that [Leadership in Energy and Environmental Design-certified] building so much because it's [a] new huge building. We have 3 athletic training facilities at the college I work at. There is 1 in that [Leadership in Energy and Environmental Design-certified] building. It's very plush. I go to [the other athletic training rooms in] the field house and the athletic facility that I currently work at—it doesn't matter. That building is from the 1800s. You do whatever you want.

Although changing a person's psyche is difficult, logistical challenges also affected the implementation of green techniques.

Logistical Concerns. Lack of access to resources, most notably recycling services, was cited as a barrier to green behavior. According to participants, access to recycling was

not readily available in every community. One participant explained, "The place I live is very rural. So there's no access to recycling centers." For others, access to recycling was either limited or inconvenient:

You have to take it yourself to a convenience center, which have limited hours of when they're open. Usually it's during business hours, which most of the time you can get to [in time], but sometimes you can't.

For some participants, recycling at home was easy, but recycling at their place of employment was limited. When asked about his recycling habits at work, 1 interview participant said, "No, I don't. It's a challenge. So no, I do not [recycle] at work. I do privately at my home." A lack of access to recycling services at home and work was a barrier to conservation efforts.

The lack of recycling services was cited as a barrier, yet participants also expressed concern about the number of disposable products on the market and the lack of durable and ecofriendly alternatives. One interview participant commented, "I think the biggest challenge I face is a lot of the products we use are not designed to be reusable." Even when ATs tried to conserve resources, their values were not always supported by the greater health care system. As 1 participant shared, "You send a kid in [to the emergency department] with a SAM splint, you don't get the splint back; they cut it off and put it in the trash."

Ecofriendly products, including the ability to purchase recycled goods, could be an expanding market for athletic training product suppliers. One participant noted, "There's options for reusable and recycled goods in just about every other aspect of life. So I think that's a fairly feasible wish with athletic materials as well." Many participants sought product alternatives and were disappointed with their findings: "I know there have been some issues in the past

Table 2. Demographic Information of Part II (Focus-Group and Interview) Participants Continued on Next Page

Characteristic	Focus Group	Interview	Total N (%)
Total participants	10	6	16 (100)
National Athletic Trainers' Association district (states)			
1 (Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, Vermont)	0	0	0 (0.00)
2 (Delaware, New Jersey, New York, Pennsylvania)	1	0	1 (6.25)
3 (District of Columbia, Maryland, North Carolina, South Carolina, Virginia, West Virginia)	1	1	2 (12.50)
4 (Illinois, Indiana, Michigan, Minnesota, Ohio, Wisconsin)	6	1	7 (43.75)
5 (Iowa, Kansas, Missouri, Nebraska, North Dakota, Oklahoma, South Dakota)	1	1	2 (12.50)
6 (Arkansas, Texas)	0	1	1 (6.25)
7 (Arizona, Colorado, New Mexico, Utah, Wyoming)	0	1	1 (6.25)
8 (California, Hawaii, Nevada)	0	0	0 (0.00)
9 (Alabama, Florida, Georgia, Kentucky, Louisiana, Mississippi, Tennessee)	0	1	1 (6.25)
10 (Alaska, Idaho, Montana, Oregon, Washington)	1	0	1 (6.25)
Total	10	6	16 (100)
Age, y			
<25	1	0	1 (6.25)
25–40	4	4	8 (50.00)
41–55	4	2	6 (37.50)
56–70	1	0	1 (6.25)
>70	0	0	0 (0.00)
Sex			
Male	5	4	9 (56.25)
Female	5	2	7 (43.75)
Race			
Black/African-American	2	0	2 (12.50)
Asian-American	1	0	1 (6.25)
Hispanic/Latino	1	0	1 (6.25)
Native Hawaiian/other Pacific Islander	0	0	0 (0.00)
White/Caucasian	6	6	12 (75.00)
Other	0	0	0 (0.00)
Employment setting			
Clinic	0	0	0 (0.00)
Clinic outreach/contracted services	3	0	3 (18.75)
Collegiate/dual appointment	2	2	4 (25.00)
Collegiate/academic appointment	2	0	2 (12.50)
Collegiate/professional staff, athletics, clinical	2	2	4 (25.00)
Corporate	0	0	0 (0.00)
Hospital	1	0	1 (6.25)
Industrial/occupational	0	0	0 (0.00)
International	0	0	0 (0.00)
Military	0	0	0 (0.00)
Professional sports	0	0	0 (0.00)
Secondary schools	0	2	2 (12.50)
Other ^a	0	0	0 (0.00)
Employment status			
Part time	0	0	0 (0.00)
Full time	10	6	16 (100.00)
Student status			
Yes ^b	1	1	2 (12.50)
No	9	5	14 (87.50)
Level of education			
Bachelor's degree	3	1	4 (25.00)
Master's degree	6	5	11 (68.75)
Doctorate	1	0	1 (6.25)
Residential setting			
Rural	5	3	8 (50.0)
Urban	1	0	1 (6.25)
Suburban	4	3	7 (43.75)

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Table 2. Continued From Previous Page

Characteristic	Focus Group	Interview	Total N (%)
Employment setting			
Rural	5	5	10 (62.50)
Urban	1	0	1 (6.25)
Suburban	4	1	5 (31.25)

^a Participants could list other employment settings.
^b Both respondents were part-time students.

where I’ve looked into trying to get some more environmentally sustainable products, and it’s just not available.”
 Barriers to using green techniques in the practice of athletic training are multifaceted and diverse. The decision to use green techniques requires a behavioral change that may be challenging to accomplish. Additional factors, such as a lack of conservation support and product availability, may affect the implementation of green techniques.

Motivators for Using Green Techniques

Although the barriers to environmental sustainability were numerous, motivators were also identified. These included an awareness of sustainability concerns, cultural influences, and convenience.

Awareness. Athletic trainers reported several ways in which they became aware of the need for environmental sustainability in their own practices. For some ATs, this awareness developed over time; for others, their working environment played a large role. One focus group member observed:

I have students who enlighten me. [They say], “Are you using wax paper cups? That’s not very good usage. Why don’t you get these paper cups that are biodegradable?”

For me, it’s just trying to fit into the direction of what my students want to see happen within the sports medicine program, and if I can make my students happy by changing this or recycling that or purchasing something better for the environment, then I think that I’m fulfilling that role.

Other ATs reported that their physical work environments made them more aware of factors related to environmental sustainability:

Just being in [a Leadership in Energy and Environmental Design-certified] building reminds you that you need to reuse and recycle. Every toilet has the dual flush handle. There are no towels. Everything has a motion sensor. The lights, the walls—everything in that whole building is completely built with environmental sustainability products.

Athletic trainers stated that their work environments helped to raise awareness of the need for environmental sustainability; however, a greater cultural influence may also affect behavior.

Table 3. Opinions of the Environment Among Athletic Trainers by National Athletic Trainers’ Association District^{a,b}

District (States)	Mean ± SD (95% Confidence Interval)	F _{9,429} Value	P Value
1 (Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, Vermont)	3.40 ± 0.50 (3.22, 3.57)		
2 (Delaware, New Jersey, New York, Pennsylvania)	3.42 ± 0.48 (3.30, 3.53)		
3 (District of Columbia, Maryland, North Carolina, South Carolina, Virginia, West Virginia)	3.31 ± 0.52 (3.15, 3.48)		
4 (Illinois, Indiana, Michigan, Minnesota, Ohio, Wisconsin)	3.37 ± 0.50 (3.27, 3.47)		
5 (Iowa, Kansas, Missouri, Nebraska, North Dakota, Oklahoma, South Dakota)	3.34 ± 0.60 (3.15, 3.53)		
6 (Arkansas, Texas)	3.06 ± 0.52 (2.84, 3.29)		
7 (Arizona, Colorado, New Mexico, Utah, Wyoming)	3.21 ± 0.54 (2.98, 3.45)		
8 (California, Hawaii, Nevada)	3.27 ± 0.48 (3.11, 3.44)		
9 (Alabama, Florida, Georgia, Kentucky, Louisiana, Mississippi, Tennessee)	3.10 ± 0.51 (2.96, 3.24)		
10 (Alaska, Idaho, Montana, Oregon, Washington)	3.20 ± 0.38 (3.25, 3.35)		
Total	3.30 ± 0.52 (3.25, 3.35)	2.43	.01

^a Bonferroni post hoc testing demonstrated a difference between Districts 2 and 9 ($P = .03$, effect size = 0.31).
^b Opinions toward conservation of the environment were interpreted as *less than favorable* (mean < 3.00), *moderately favorable* (mean = 3.00–3.99), or *very favorable* (4.00–5.00).

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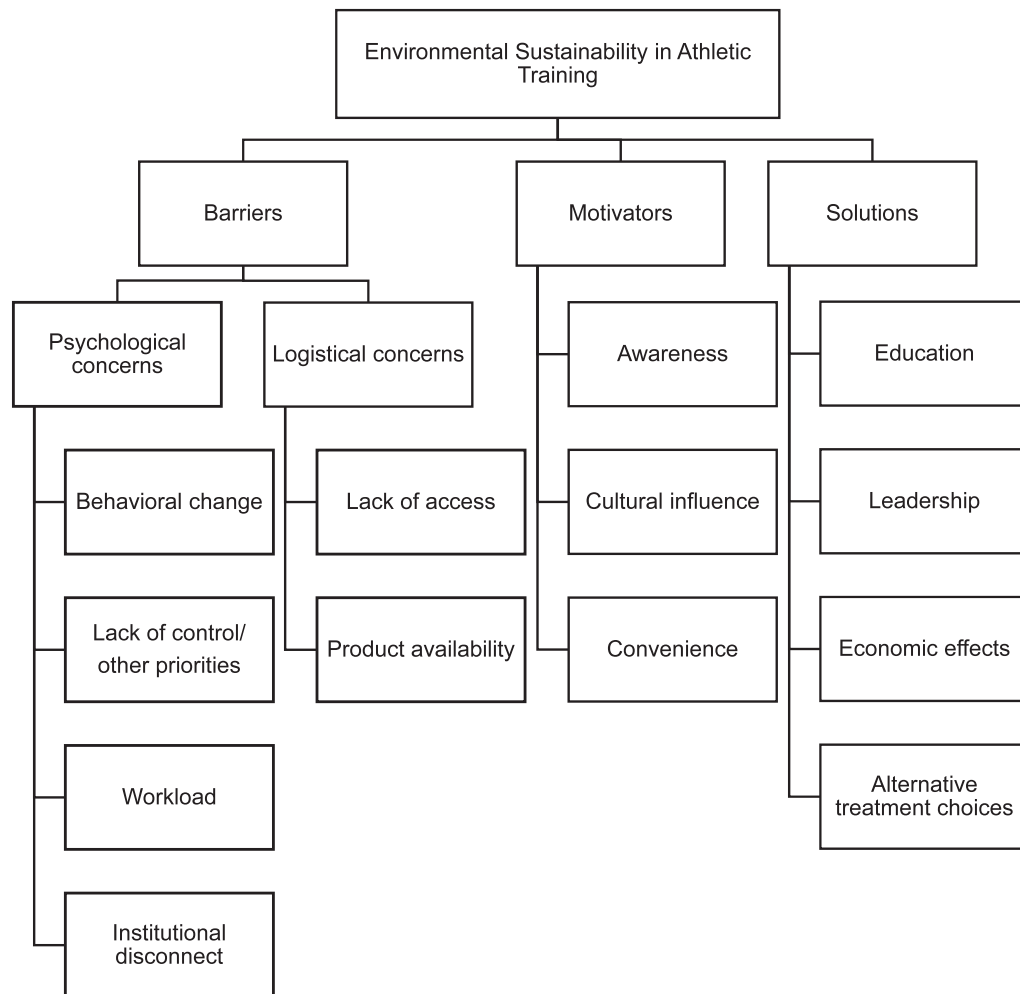


Figure. Schematic representation of emergent themes.

Cultural Influence. Some participants learned green habits as children through family influence, whereas other ATs became aware of environmental sustainability concepts via pop culture or national trends. One focus-group respondent recalled his parents' habits when referencing his own sustainable behaviors: "I've recycled. My parents always recycled, and thank God they did." Another interview participant agreed: "It has to do with how you were raised. It's kind of second nature to me. We just always have recycling things, drinking [out of] reusable cups and [reusing] plates, those small things you can do on a day-to-day basis."

Some ATs cited their geographic region as an influence in using green techniques. A focus-group participant recalled:

The Northwest is a little bit more aggressive than the rest of the country. So we're hoping the athletes—the visiting teams coming—will say [when learning of their efforts to conserve resources]. . . "Well, yeah, it sounds good."

Other participants believed that environmental sustainability efforts were an emerging societal trend. When asked about her feelings toward environmental sustainability, a respondent shared these thoughts:

Right now, it's a big trend because of pop culture. . . Being green is a cool thing, which I think is good because now you have more resources and more products that are better for the environment. So it's a little bit easier now to achieve some of these things that we're trying to do. . . I'm just worried if it's a trend that's going to continue or if it's going to be something that starts to fade out again once it's not cool.

The use of green techniques may be more culturally accepted today; however, some evidence suggests that people will not use green techniques unless they are convenient.

Convenience. According to participants, convenience was a factor even if attitudes toward recycling became more favorable. One focus-group participant explained, "You need to have the recycling right next to the door because, if it's over here, they're not going to take the 5 steps that it's going to take to go over there."

The type of recycling services available also affected whether or not a person chose to recycle. One focus-group member described, "There's certain places with real restrictions on what can be recycled, and then there's other areas. . . as long as it has a triangle, throw it in!"

Awareness, cultural influences, and convenience all encouraged green behaviors. However, using green tech-

niques also had drawbacks. Therefore, solutions to overcoming barriers are needed.

Solutions to Overcoming Barriers

Education, leadership, economic effects, and alternative treatment choices may all provide solutions to overcoming barriers to using green techniques.

Education. Education should occur at many levels. First, ATs need education regarding the waste produced by athletic training practice as well as the fundamentals of environmentally friendly techniques such as recycle, reduce, and reuse. As 1 interview participant elaborated, “I don’t think a lot of people know about some ways to go green and what to do.” Other ATs may need more specific information such as alternative methods for practice. One interviewee stated, “Providing an alternative would definitely help out. . . you might look at [various options for disposal] when you’re done with it.”

Education can be provided through multiple avenues. Some participants believed that continuing education devoted to environmental sustainability techniques could help; another suggested that green concepts be included in the athletic training curriculum. Others thought a dialogue on the use of green techniques was needed: “Maybe communication is the way to go. Maybe we can show you that tape can be recycled. I think education would be beneficial.”

Education is 1 factor, but leadership is also important:

If there was 1 person in every athletic training room that pushed the recycling thing and they were able to educate with their own staff on what can be recycled and what can’t, maybe that would be the way to do it.

Leadership. Participants’ comments suggested that leadership was needed for change to occur. In many cases, this requires perseverance and the ability to lead by example. A focus-group participant offered an illustration of green techniques being implemented by example: “Just within our program especially, there’s a couple [of staff members] that are kind of the drivers of where we are.”

Being a leader is not easy. As 1 interview participant noted, it requires perseverance: “Our program director has tried for years, and finally, this past year was successful in getting those big recycling bins.” A focus-group participant stated,

I think, if you have 1 person that really has a drive for it and is adamant about it, the rest will catch on.” We hosted the [National Collegiate Athletic Association] regionals for softball, and I was very adamant about leaving the water. We had people in and out all the time, and it took a while to get used to, but they’re catching on a little bit more.

However, 1 person should not carry the burden alone. Leadership can occur at various levels as well as within the ethos of the institution.

Economic Effects. The economic effects of environmental sustainability were viewed as both a barrier to and a motivator for the use of green techniques. Sustainable products often cost more. One interview participant found

the cost of environmental sustainable products too great: “There are some products out there, but it’s cost prohibitive. Either the upfront costs are too high, or the cost of purchasing [environmentally sustainable] products is more expensive.” However, not everyone shared this view. Some realized that although the upfront costs were greater, investing in environmentally sustainable products was more cost effective in the long term. This belief was reinforced by an interview participant’s statement: “There’s a pretty significant investment upfront, but down the road, the cost savings should be pretty significant as well.” Others thought cheaper products might be of lower quality:

Two years ago, I bought economy friendly or environmentally friendly icepacks. They were good, but I think they were pretty expensive for the number of bags we were getting. The athletic director said, “We really need [a] change on the icepacks,” and so I went with something else. It ended up being every ice bag I pulled off the roll had a small hole in it. So every 1 of them had to be double bagged.

The programs of some ATs were willing to pay more for certain items if they aligned with the university’s core values: “I know my institution would buy it, and they would pay more money for it because they know, in the beginning, it’s going to take some institutions to lead the way.”

Other ATs reported they pursued more environmentally sustainable options in response to their budget woes. When discussing how ATs in his district decided to stop using cups at sporting events, 1 interview participant observed, “Some of it evolved from an economic standpoint because the cups are expensive.”

Alternative Treatment Choices. Another way ATs reduced costs while diminishing waste was by altering their treatment choices. One common choice was to use ankle braces instead of tape in their effort to prevent sprains. As an interview participant shared, “We do try and get away from taping as much; we use more of an ankle brace so we feel like we’re not turning over as much out of the tape.”

DISCUSSION

A difference was found between opinion of the environment and NATA district ($F_{9,429} = 2.43, P = .01$). District 2 members held the highest opinion (3.42 ± 0.48), whereas members of District 6 held the lowest opinion (3.06 ± 0.52). These findings are consistent with a 2017 ranking of the most and least ecofriendly states in America.²⁴ Few authors have investigated opinions of the environment within the health care sector.^{14,15,25,26} One group¹⁵ surveyed members of the American Society of Anesthesiologists to determine their knowledge and attitudes toward environmental sustainability in their clinical practice. Similar to those in our study, the anesthesiologists generally supported sustainable practices in their industry but felt they lacked adequate information to implement these practices. Athletic trainers are encouraged to research ways of providing patient-centered care that also considers the health of the environment. Furthermore, considering other health care professionals

may possess a similar knowledge of and attitudes toward the environment, this is an excellent opportunity for an AT seeking a multidisciplinary service project.

Although participants in our study exhibited favorable opinions toward the environment, follow-up interviews identified both psychological and logistical barriers to implementing sustainable practices. Psychological barriers included difficulty changing behaviors, lack of control or other priorities, and institutional disconnects. These obstacles are similar in nature to those reported in the nursing literature: denial, groupthink, ignorance, and diffusion of responsibility.²⁶ For sustainable practices to become more of a priority for the health care community, Bretti et al¹⁶ suggested the health care community evolve from a biopsychosocial model of medicine, which considers the whole person when evaluating and developing a plan of treatment, to an ecological model, which considers the health of both the patient and the population. Yet how to best implement an ecological model of care is still unknown.¹² One way to move toward this ecological model of care is to review current policies and procedures to determine if operational waste could be reduced. In addition, clinicians are encouraged to research green health care strategies to determine the economic effects of techniques that can be implemented at their facilities.

To overcome psychological barriers, ATs should focus on continuing education and policy development.¹⁴ For example, 1 intervention reported in the literature²⁷ is educational programming such as the “Know Before You Throw” program. This hospital-based intervention teaches nurses how to dispose of various wastes correctly to reduce the amount of waste produced and lower the cost of waste management. In another hospital, nurses implemented a recycling program to divert solid wastes such as monitor batteries, light bulbs, and paper for administrative use from landfills.¹ Athletic trainers could modify these programs in their own practices to identify items that can be either recycled or reused. Educational events can be conducted to promote similar practices and raise the overall awareness of sustainable techniques.

Logistical barriers to the implementation of green practices were also identified. The most frequently cited barriers were lack of access to conservation services and product availability. The first step in advocating for increased conservation services is to demonstrate the returned value.²⁸ It is helpful to examine the sustainability practices used in other health care facilities for green project ideas. The Sustainability Roadmap for Hospitals²⁹ is a Web site (<http://www.sustainabilityroadmap.org>) developed by the American Hospital Association in cooperation with the Association for the Healthcare Environment and the Association for Healthcare & Materials Management to serve as a comprehensive resource for the health care field. This Web site includes how-to guides for specific projects as well as performance indicators and case studies to examine the effects of various sustainability efforts. For example, 1 project outlined in the roadmap is how to optimize ice-machine water use. The ice-machine’s water flow rates and ice cycle times can be adjusted for optimal efficiency. Making these adjustments can reduce water, energy, and sewer costs and may extend the life of the machine. Athletic training educators could use this Web site as a model for a class project that challenges students to

use concepts of sustainability to modify common athletic training practices for increased sustainability.

Similar to advocating for conservation services, ATs can also promote sustainable product choices.³⁰ Through language used in requests for product bids, ATs can both notify and educate suppliers of their interest in purchasing environmentally sustainable products. Some common ways to do this include (1) signaling, “One quarter of our product bid must be made from postconsumable materials in our next contract,” (2) preference, “We prefer products that are made from postconsumer materials,” and (3) requirement, “We will only purchase materials with at least 25% postconsumer materials when available, and they must be priced equal to or lower than conventional materials.” This allows ATs to use their purchasing power to leverage the market for change. By raising awareness and advocating for change, ATs can overcome both psychological and logistical barriers and help create a health care community that precipitates a healthier community.

A portion of this study focused on green practices already in place either institutionally or personally. Education, leadership, economic effects, and alternative treatment choices were suggested as solutions for overcoming barriers to using green techniques. One focus-group participant proposed that education should start with our curriculum programs, and many health care educators agree.^{12,13,31–33} The American Association of Colleges of Nursing recommended 4 new competencies addressing topics related to sustainability for nursing education: the judicious use of health care resources, responsible disposal of medical waste, minimization of medical waste, and adoption of policies to promote sustainability in nursing education and practice.³³ These competencies were designed to implement or enhance sustainability efforts for the nursing skills already evaluated rather than necessitate new content for courses. A similar approach could be taken in athletic training education. For example, students could brainstorm potential sustainability projects such as the 1 described earlier or suggest policies to help implement sustainability practices in their administration course work, or in a general medical course, students could explore the environmental factors related to incidence rates of chronic diseases. This content could be implemented in both didactic and clinical courses.³²

It is important to keep in mind that educational programs should not bear the sole responsibility for initiating change. Instead, it should be distributed across the profession. Continuing education programming focusing on the science of climate variability and its influences on the health of the population, the effects of waste related to the practice of athletic training and interventions to reduce waste, and solutions to overcoming barriers to using green techniques should also be developed.

Employers could benefit by exploring the economic results of green interventions. Each strategy listed on the Sustainability Roadmap for Hospitals site²⁹ includes a performance impact measure that provides the triple bottom-line benefits (cost, environmental, and health and safety benefits) of implementation. The performance impact measures provided were developed and reviewed independently to be free of vendor, product, and service-provider bias. In addition, ATs should develop our own

sustainability roadmap, not only for the profession but also as a reference for other health care providers.

Finally, institutional leadership had an important role in whether ATs used green techniques. However, providing leadership on sustainability presents its own challenges.¹⁸ This may explain why only one-fourth of the survey participants indicated that their institution maintained leadership dedicated to the practice of environmental sustainability, and of those who reported their place of employment offered a formal committee on environmental sustainability, few had served on the committee. Commonly reported leadership challenges included a lack of (1) a clear and cohesive understanding of the meaning “green,” (2) the ownership or innovation needed to drive change, (3) the infrastructure for change, and (4) a culture that supported change.^{18,34}

LIMITATIONS AND FUTURE DIRECTIONS

Participants with limited knowledge of green practices may be hesitant to speak openly about their professional practices; therefore, we conducted focus groups rather than 1-on-1 interviews to increase interaction among the participants.²³ Two focus groups were assembled based on the participants’ availability and were supplemented with individual interviews in an attempt to reach data saturation. Scheduling focus groups is difficult due to geographic and time constraints.²⁰ Therefore, 1-on-1 interviews were conducted with participants who completed the prescreening questionnaire but were unable to attend a focus group. The 1-on-1 nature of these interviews may have constrained participants in either their thoughts or their openness to share freely and is a limitation of this study.

The internal consistency of sections 2 and 3 of the survey instrument was lower than desired. Internal consistency is concerned with the interrelatedness of test items and is a factor in the trustworthiness of a survey.³⁵ Because the survey involved several constructs, we assessed internal consistency on specific sections instead of the entire survey. The data in sections 1 (demographics) and 4 (institutional practices) do not lend themselves to measures of internal consistency. The Cronbach α was .602 ($n = 7$) for section 2 and .609 ($n = 8$) for section 3. Moreover, the low number of questions in each section may underestimate the level of reliability.³⁵ In addition, 1 question in each section was reverse scored to reduce response bias. However, these reverse-scored items may also negatively affect the level of reliability.

The implementation of green techniques is multifaceted and may vary by setting. Representatives from every athletic training setting, as defined by NATA membership category, participated in the survey. The work settings of most survey participants were colleges and universities ($n = 160$, 36.2%), secondary schools ($n = 140$, 31.7%), and clinical outreach ($n = 77$, 17.4%). However, not every setting was represented in the qualitative portion of the study. Therefore, the generalizability of these findings may be limited.

Furthermore, both psychological and logistical changes may be needed for progress to occur. To date, literature exploring the attitudes of health care professionals toward environmental sustainability is limited. Therefore, we do

not know how ATs compare with other health care professionals. Future researchers should poll other health care professionals regarding their attitudes toward and perceptions of environmental sustainability as well as green techniques, including alternative treatment choices, implemented in their clinical practices. Sustainability lessons that complement the current athletic training competencies should also be explored.

CONCLUSIONS

Whether due to financial constraints or personal values, ATs are making modest attempts to practice in a way that is environmentally sustainable. This was evident in the use of recycling, environmental leadership, and other green techniques reported by practicing ATs. However, more work must be accomplished.

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