

Deaflympians' Satisfaction With Athletic Training Services at the 2013 Deaflympic Summer Games

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Context: Athletic trainers have the opportunity to treat unique populations. Determining athletes' satisfaction with the athletic training services supplied can offer insights into how to improve the health care provided to athletes.

Objective: To explore Deaflympians' satisfaction with athletic training services at the 2013 Deaflympic Summer Games.

Design: Cross-sectional survey.

Setting: The 2013 Deaflympic Summer Games in Sofia, Bulgaria.

Patients or Other Participants: Of the 115 Deaflympians contacted, 55 completed the questionnaire, for a 48% response rate (women = 33, men = 22).

Main Outcome Measure(s): The Medical Interview Satisfaction Survey–Athletic Training was used. The questionnaire gathered demographic data and included 25 Likert-scale items that assessed 6 components of athletic training. Descriptive statistics were calculated as normalized scores to adjust for the different numbers of questions for each item. On a 5-point scale, the scores ranged from 3.82 (management) to 4.24 (environment), with an overall satisfaction score of 3.89. We conducted

comparison tests to assess possible differences in overall satisfaction and satisfaction components. Satisfaction with frequency of use of the athletic training room and knowledge were the only areas that showed statistically significant differences. Other differences were in perceptions of medical coverage among age groups and management between sexes.

Results: Satisfaction with the athletic training services provided was lower among these Deaflympians than among collegiate athletes in other studies. However, we observed no differences in overall satisfaction scores by age, sex, race, previous Deaflympic experience, or individual or team sport. Deaflympians who used and visited the athletic training facility more often had higher overall satisfaction scores than individuals who used and visited the facility less.

Conclusions: Deaflympians were satisfied with the athletic training services provided at the 2013 Deaflympic Summer Games.

Key Words: Deaflympics, athletes who are deaf, special populations, medical care

Key Points

- Deaflympians were satisfied with the athletic training services provided at the 2013 Deaflympic Summer Games.
- No differences in satisfaction were identified by age, sex, race, previous Deaflympic experience, or participation in an individual or team sport.
- Athletes who used the athletic training facility more had higher levels of satisfaction than those who used the facility less.

The documented history¹ of athletic training began with the establishment of the National Athletic Trainers' Association (NATA) in 1950. As the athletic training profession developed, athletic trainers (ATs) found themselves working in a variety of populations and settings.² Historically, ATs served in professional, collegiate, or high school athletics.³ However, ATs have more recently had the opportunity to care for unique populations of athletes. One such population of athletes is those who are deaf or hard of hearing at the Deaflympic Games.

To appreciate the Deaflympic Games, one must understand the social and psychological aspects of the deaf and hard-of-hearing population.⁴ This population has specific labels to describe itself. The term *deaf* is used when referring to someone with an audiologic condition of loss of hearing,⁵ whereas the term *Deaf* is associated with individuals who share the same social structures, cultural views, and history and use American Sign Language (ASL)

as their primary mode of communication.^{5,6} The term *hard of hearing* is often used to identify individuals who have a milder form of hearing loss but can still communicate efficiently with the hearing community.⁷ Last, the term *hearing impaired* is considered an insult to the Deaf community because it highlights a disability rather than the ability of the Deaf to communicate via nonoral means.⁸

The Deaflympic Games are organized and managed by individuals who are deaf.⁹ The International Olympic Committee sanctions the Deaflympics as the competition organization for deaf and hard-of-hearing elite athletes.⁹ The Deaflympic Games originated with the first summer games in Paris, France, in 1924 and the inaugural Winter Deaflympic Games in Seefeld, Austria, in 1949.⁹ The Deaflympics are the second-longest-running multisporting event in the world and are hosted every 4 years.¹⁰ To qualify for competition, the athlete must have a hearing loss of 55 dB pure-tone average in the better ear.¹¹ In addition,

hearing aids and cochlear implants are forbidden at the Games during competition.^{12,13}

As with any international competition, ATs are often the first medical professionals with whom the athlete who is deaf interacts.¹⁴ As such, ATs should be conscious of the quality of services they are providing their athletes. Patient satisfaction with medical services has long been an important focus for those who work in the medical field and continues to be one of the most common outcome measures.¹⁵ The first published study of athletic training satisfaction was performed in 1989.¹⁶ Since then, other athlete satisfaction studies have been completed.^{14,17} Additional researchers^{18–24} have addressed athletes' perceptions of intervention and their influence on rehabilitation adherence. The literature suggests an association between the athlete's perception of treatment and his or her relationship with the ATs.^{21–24} However, to our knowledge, the satisfaction with athletic training services of athletes who are deaf or hard of hearing has yet to be determined.

As the athletic training profession continues to grow, ATs find themselves being invited to work at unique state, national, and international events. To ensure that appropriate health care is being provided during these events, we must measure athlete satisfaction. Therefore, the purpose of our study was to explore Deaflympians' satisfaction with athletic training services at the 2013 Deaflympic Summer Games.

METHODS

Participants

A total of 124 American Deaflympians participated in the 2013 Deaflympic Summer Games in Sofia, Bulgaria. After the event, we sent 115 recruitment e-mails. Seven ATs provided medical coverage during the 2013 Deaflympic Summer Games.

Instrumentation

The questionnaire used in this study was the Medical Interview Satisfaction Survey—Athletic Training (MISS-AT), an adaptation of the Medical Interview Satisfaction Survey (MISS) developed by Wolf et al.²⁵ The original MISS consisted of 3 subscales (cognitive, affective, and behavioral) that measure patient satisfaction with physician services. Wolf et al.²⁵ found the MISS had high reliability, with a Cronbach α of 0.93. Meakin and Weinman²⁶ and Kinnersley et al.²⁷ reported that the Cronbach α values for the MISS subscales ranged from 0.67 to 0.92 and 0.58 to 0.84, respectively.

From the MISS, Steeves²⁸ developed the MISS-AT, which was used by Steeves,²⁸ Reynolds,²⁹ and Matsuno³⁰ to assess athlete satisfaction with athletic training services. The first section of the questionnaire used in this study consisted of 1 item regarding participation eligibility and 7 demographic items: participant age, sex, race, previous Deaflympic experience, Deaflympic sport participation, athletic training facility and service use, and athletic training facility and service use frequency. Items 1 through 4 addressed consent and demographic factors and were not part of the original instrument. Items 5 through 8 were demographic questions specific to the deaf and hard-of-

hearing population and were also not part of the original instrument.

For our study, we modified items 9 through 15 and item 26 to change the population focus from intercollegiate athletics to Deaflympic athletics but did not change the content of the questions.

The second section of the questionnaire consisted of 26 items that used the same 3 subscales as the original MISS to assess 6 components of athletic training on a 5-point Likert scale. These 6 components closely resemble the domains described in *The 2009 Athletic Trainer Role Delineation Study*³¹: knowledge of the athletic training staff (items 16, 17, 25, 29, and 31), resources within the facilities (items 12, 13, 22, 24, and 26), the facility environment (items 10 and 11), organization and management (items 18 and 33), the level of medical coverage provided at athletic events (items 14, 15, 20, and 23), and Deaflympian-AT communication (items 19, 21, 27, 28, 30, and 32). In addition, items 9 and 34 were used to assess Deaflympians' level of satisfaction with their ATs and the ATs' level of importance to the Deaflympics. The 6 components were reported²⁸ to have high reliability, with Cronbach α coefficients ranging from 0.60 to 0.89, and were shown to be viable for measuring athletes' satisfaction with ATs. Statistical analysis of the 6 components of the Deaflympic-focused MISS-AT demonstrated a Cronbach α of 0.96.

Procedures

We recruited Deaflympians via e-mail after obtaining their addresses through each sport's coaching staff. Athletes in all sports of the 2013 Deaflympic Summer Games were represented in the recruitment effort except the men's and women's bowling teams, because we were unable to obtain their e-mail addresses. The questionnaire was hosted online (<http://www.surveymonkey.com>; SurveyMonkey, San Mateo, CA). The questionnaire was sent to Deaflympians 2 days after the Games, with 1 follow-up e-mail sent at the 1-week mark. Before accessing the questionnaire, the Deaflympians were asked to read and agree to the informed consent. By completing item 1 of the questionnaire, they consented to participate and confirmed that they were 18 years of age or older. The institutional review board at Central Michigan University approved the study and written permission to conduct this study at the 2013 Deaflympic Summer Games was given by the Deaflympics medical director.

Data Analysis

We followed the methods described by Reynolds.²⁹ Scores on each subscale were summed and averaged. A direct comparison of the mean sums of scores was difficult due to the different numbers of questions for each component. To allow such comparisons, we normalized scores by averaging each component score according to the number of questions (Table 1). To determine the level of Deaflympian overall satisfaction, the sum of the athletic training components was used. A *t* test was conducted to determine Deaflympians' overall satisfaction by sex, race, and sport, and an analysis of variance was performed to determine Deaflympians' overall satisfaction by age group and use of athletic training services. The α level was set a priori at .05.

Table 1. Satisfaction Component Scores Among Deaflympians by Age at the 2013 Deaflympic Summer Games

Component	Age Group, y (Mean \pm SD)			
	18–20 (n = 10)	21–25 (n = 22)	26–30 (n = 14)	31+ (n = 9)
Knowledge	20.67 \pm 4.30	19.32 \pm 2.89	21.31 \pm 2.90	19.78 \pm 3.77
Resources	20.30 \pm 2.63	19.36 \pm 2.56	20.00 \pm 3.39	18.0 \pm 3.57
Environment	8.90 \pm 1.29	8.23 \pm 1.57	8.86 \pm 1.35	8.00 \pm 1.80
Organization and management	7.89 \pm 1.97	7.36 \pm 1.53	8.15 \pm 1.63	7.33 \pm 1.66
Medical coverage	16.40 \pm 3.57	15.59 \pm 2.32	17.31 \pm 1.89	14.11 \pm 3.26
Communication	24.33 \pm 4.80	22.73 \pm 3.99	24.92 \pm 3.35	22.67 \pm 4.33
Importance and satisfaction	8.78 \pm 1.09	8.45 \pm 1.22	9.23 \pm 0.83	7.78 \pm 1.92
Overall satisfaction	106.56 \pm 18.33	101.04 \pm 13.76	109.92 \pm 11.92	97.67 \pm 17.68

RESULTS

Participants, AT Staff, and Instrumentation

Of the 115 recruitment e-mails sent, 60 participants completed the questionnaire, for a response rate of 52%. Five Deaflympians who completed the questionnaire were under the age of 18 years and did not continue; thus, 55 Deaflympians (48%) participated in the study.

Of the 55 respondents, 60% were women, 40% were men; 46 were between 18 and 30 years old; and 45 Deaflympians indicated their race as *White, not of Hispanic origin* (Table 2). Athletes of color totaled 4; therefore, for the purpose of statistical analysis, race was coded as a binary variable (white, athletes of color). In terms of previous experience, 43.6% (n = 24) of respondents indicated they had participated in the previous Deaflympic Summer Games.

The largest number of athletes participated in team sports, especially soccer (n = 11) and basketball (n = 10; Table 3). Although we hoped to analyze the association between individual sports and overall satisfaction, the small number of participants in some categories meant that we were unable to do so. As a result, for the purposes of statistical analysis, we recoded sports as team or individual.

The demographic data of the athletic training staff, including hearing status and ASL fluency, were collected via e-mail questionnaire and are shown in Table 4. The MISS-AT is shown in the Appendix.

Table 2. Participant Demographics

Characteristic	n (%)
Age, y	
18–20	10 (18.2)
21–25	22 (40.0)
26–30	14 (25.5)
31–35	6 (10.9)
>35	3 (5.5)
Sex	
Female	33 (60.0)
Male	22 (40.0)
Race	
American Indian or Alaska Native	1 (1.8)
Asian or Pacific Islander	3 (5.5)
Black or African American, not of Hispanic origin	4 (7.3)
Hispanic or Latino	2 (3.6)
White, not of Hispanic origin	45 (81.8)

Components of Athletic Training

The mean and normalized scores for each component are presented in Table 5. The extent to which Deaflympians perceived their ATs as knowledgeable was reflected in the knowledge perception score of 20.11 \pm 3.32 (range, 13–25). Regarding the resources within the facilities, the perception score was 19.46 \pm 2.98 (range, 12–25). The mean score for the overall perception of the facility environment was 8.47 \pm 1.51 (range, 4–10). Similarly, organization and management of the Deaflympics Games resulted in a score of 7.64 \pm 1.64 (range, 5–10). The level of medical coverage received a score of 15.91 \pm 2.80 (range, 8–20). The adequacy of communication level of the ATs rated 23.53 \pm 4.06 (range, 17–30). Satisfaction with and importance of the services provided scored 8.59 \pm 1.32 (range, 4–10). Last, overall satisfaction was measured by summing component scores for a total of 103.58 \pm 15.15 (range, 78–130).

Age

The questionnaire offered 5 options for reporting the participant's age, but 2 groups (31–35 years old and 36+ years old) were represented by only 6 and 3 participants, respectively; due to the low numbers, we combined them into a single group: 31+ years old. Overall satisfaction scores by age groups and components are presented in Table 1.

Despite the differences among satisfaction components of Deaflympians of different ages, 1-way analysis of variance did not reveal any difference in overall satisfaction ($F_{3,49} = 1.59$, $P = .20$). The normalized scores by satisfaction

Table 3. Participants' Deaflympic Sports

Sport	Frequency (%)
Individual	
Athletics	7 (12.7)
Cycling (road)	3 (5.5)
Swimming	5 (9.1)
Tae kwon do	1 (1.8)
Tennis	2 (3.6)
Wrestling	1 (1.8)
Team	
Basketball	10 (18.2)
Beach volleyball	3 (5.5)
Handball	5 (9.1)
Soccer	11 (20.0)
Volleyball	7 (12.7)
Total	55 (100.0)

Table 4. Athletic Training Staff Demographics

Characteristic	Frequency (%)
Sex	
Male	5 (71.4)
Female	2 (28.6)
Race	
White	7 (100)
Person of color	0 (0)
Hearing status	
Hearing	4 (57.1)
Hard of hearing	1 (14.3)
Deaf	2 (28.6)
American Sign Language fluency?	
Yes	6 (85.7)
No	1 (14.3)

Table 5. Deaflympians' Perceptions of the Components of Athletic Training at the 2013 Deaflympic Summer Games

Component	n	Mean \pm SD	Minimum	Maximum	Normalized Score per Question
Knowledge	53	20.11 \pm 3.32	13	25	4.02
Resources	54	19.46 \pm 2.98	12	25	3.89
Environment	55	8.47 \pm 1.51	4	10	4.24
Organization and management	53	7.64 \pm 1.64	5	10	3.82
Medical coverage	54	15.91 \pm 2.80	8	20	3.98
Communication	53	23.53 \pm 4.06	17	30	3.92
Importance and satisfaction	53	8.59 \pm 1.32	4	10	4.29
Overall satisfaction	53	103.58 \pm 15.15	78	130	3.89

components and age group demonstrated a pattern of slightly higher overall satisfaction in the groups whose members were 18 to 20 or 26 to 30 years old (Figure 1). Based on the same analysis repeated for separate components, only perception of medical coverage differed among age groups at a borderline level of significance ($F_{3,50} = 2.76$, $P = .05$). The post hoc Tukey honestly significant difference test identified the only significant difference between the groups whose members were 26 to 30 or 31+ years old; however, due to unequal group sizes, the type I error levels are not guaranteed.

Sex

Although the overall satisfaction score reported by women (105.77 ± 14.07) was higher than that reported by men (100.5 ± 16.38), an independent-samples t test did not reveal a difference ($t_{51} = 1.26$, $P = .23$; equal variances assumed by the Levene test). Similar analyses for each component showed that the only difference was for perception of management ($t_{51} = 2.32$, $P < .05$). Mean values for satisfaction components by sex are presented in Table 6.

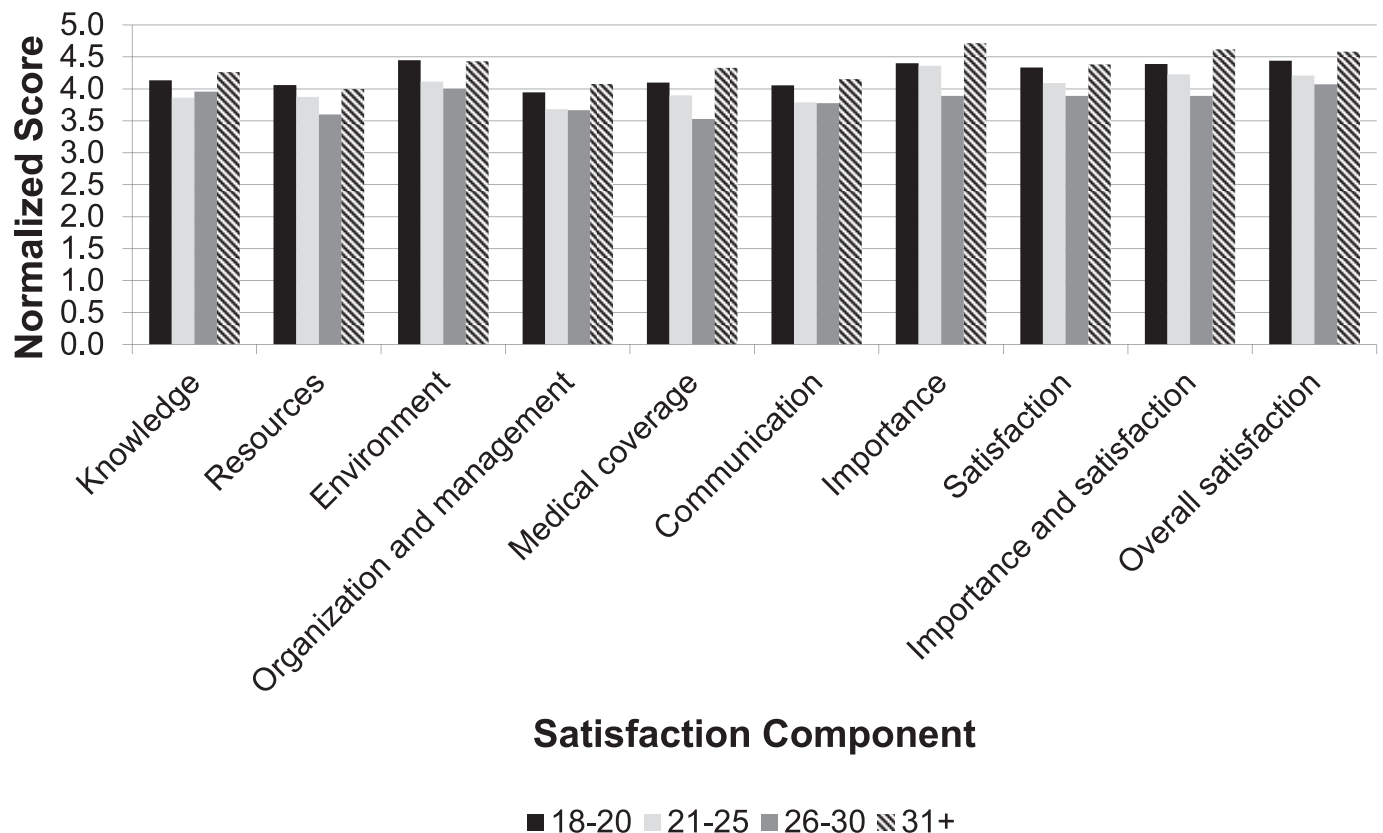


Figure 1. Normalized scores of satisfaction components from the Medical Interview Satisfaction Survey–Athletic Training by athletes' age groups during the 2013 Deaflympic Summer Games.

Table 6. Satisfaction Component Scores by Sex During the 2013 Deaflympic Summer Games

Component	Sex				<i>t</i> Statistic	<i>P</i> Value
	Females		Males			
	<i>n</i>	Mean \pm SD	<i>n</i>	Mean \pm SD		
Knowledge	31	20.32 \pm 3.21	22	19.82 \pm 3.53	0.541	.59
Resources	32	19.94 \pm 2.56	22	18.77 \pm 3.34	1.143	.16
Environment	33	8.61 \pm 1.30	22	8.27 \pm 1.80	0.787	.43
Organization and management	31	8.06 \pm 1.48	22	7.05 \pm 1.70	2.318	.02
Medical coverage	32	16.25 \pm 2.48	22	15.41 \pm 3.20	1.088	.28
Communication	31	24.10 \pm 4.09	22	22.73 \pm 3.95	1.217	.23
Importance and satisfaction	31	8.68 \pm 1.08	22	8.45 \pm 1.83	0.635	.55
Overall satisfaction	31	105.77 \pm 14.07	22	100.50 \pm 16.38	1.256	.23

Race

As mentioned previously, racial distribution was heavily skewed toward white non-Hispanics, who represented more than 80% of the sample. We found no difference in overall satisfaction by race (Table 7).

Previous Deaflympic Experience

Among the Deaflympians, 43.6% stated they had participated previously in the Games. No difference in overall satisfaction based on previous participation was evident (Table 8).

Deaflympic Sport Participation

We were interested in the association between a participant's sport and his or her overall satisfaction score. However, the number of participants for certain sports was too low for statistical analysis, so we instead considered athletes in team and individual sports. Although the independent-samples *t* test did not reveal a difference in overall satisfaction ($t_{51} = 1.52$, $P = .13$), individual components of satisfaction displayed borderline significance (Table 9). Participants in team sports indicated greater satisfaction with organization, management, and medical coverage.

Athletic Training Facility Service Use and Frequency

Participants who responded positively to question 7 (use of the athletic training facilities) had a higher level of satisfaction with the knowledge and communication components and greater overall satisfaction. However, *t* tests did not confirm differences for resources, environment, management, or medical coverage (Table 10). Yet, participants who used the athletic training facility had an average 10% higher level of overall satisfaction.

During the Deaflympics, 40% of participants indicated they used the athletic training facility 1 to 3 times, whereas 30.9% said they never used the facility. The remaining participants used the athletic training facility 4 to 6 times ($n = 5$, 9.1%), 7 to 9 times ($n = 3$, 5.5%), and more than 9 times ($n = 8$, 14.5%). Due to the small number of participants in each group, we recoded the data to combine those who used the athletic training facility more than 3 times into a single category. Normalized satisfaction scores for each questionnaire component by use are shown in Figure 2. Despite the apparent visual associations between satisfaction scores and use for all components, the statistical analysis indicated a difference only for overall satisfaction ($F_{2,50} = 3.28$, $P = .046$) and the knowledge component ($F_{2,50} = 5.66$, $P = .01$). For communication, the association was of borderline significance ($F_{2,50} = 2.89$, $P = .07$).

DISCUSSION

Components of Athletic Training

To our knowledge, this is the first athletic training satisfaction survey to be conducted on a Deaflympic event. Overall, Deaflympians were satisfied with the athletic training services provided at the 2013 Summer Games. Other athlete-satisfaction studies at the collegiate level have demonstrated a high level of overall satisfaction with ATs and the services they provide, regardless of participation level.^{14,17,25,29,30} The results of other investigators who also used the MISS-AT are provided in Table 11. Although our participants' overall satisfaction score was less than the scores reported by Reynolds²⁹ and Matsuno,³⁰ it is important to remember that the common denominator of athlete satisfaction is the AT.²⁵ Athletic trainers practice at all competition levels, but the athletic training services they supply should be valued the same, as noted in the NATA

Table 7. Satisfaction Component Scores by Race at the 2013 Deaflympic Summer Games

Component	White, Non-Hispanics	Athletes of Color	<i>t</i> Statistic	<i>P</i> Value
	Mean \pm SD	Mean \pm SD		
Knowledge	20.05 \pm 3.31	20.40 \pm 3.53	0.30	.77
Resources	19.43 \pm 3.03	19.60 \pm 2.84	0.16	.87
Environment	8.47 \pm 1.58	8.50 \pm 1.27	0.06	.95
Organization and management	7.56 \pm 1.70	8.00 \pm 1.41	0.76	.45
Medical coverage	15.93 \pm 2.83	15.80 \pm 2.78	0.13	.89
Communication	23.40 \pm 4.01	24.10 \pm 4.41	0.49	.63
Importance and satisfaction	0.60 \pm 1.33	8.50 \pm 1.35	0.22	.29
Overall satisfaction	103.29 \pm 15.06	104.90 \pm 16.26	0.30	.76

Table 8. Satisfaction Component Scores Between First-Time Participants and Previous Participants at the 2013 Deaflympic Summer Games

Component	Participants, Mean \pm SD		<i>t</i> Statistic	<i>P</i> Value
	First Time	Previous		
Knowledge	19.93 \pm 3.70	20.35 \pm 2.81	0.46	.65
Resources	19.94 \pm 2.94	18.83 \pm 2.96	1.37	.18
Environment	8.68 \pm 1.60	8.22 \pm 1.38	1.14	.26
Organization and management	7.70 \pm 1.71	7.57 \pm 1.59	0.29	.70
Medical coverage	16.23 \pm 2.62	15.48 \pm 3.03	0.97	.34
Communication	23.83 \pm 4.37	23.13 \pm 3.66	0.64	.54
Importance and satisfaction	8.73 \pm 1.21	8.39 \pm 1.47	0.93	.36
Overall satisfaction	104.80 \pm 15.98	102.00 \pm 14.17	0.66	.51

“Code of Ethics”³² and Board of Certification “Standards of Professional Practice.”³³

Age

Slight differences were present for overall satisfaction by age group. However, the possibility of type I error makes it difficult to draw conclusions from the data. Furthermore, in the related literature,^{29,30} authors of collegiate athlete satisfaction studies typically considered year in school rather than age. Yet, previous research³⁰ suggests that upper-class students had better perceptions of and higher levels of satisfaction regarding ATs secondary to more interaction and experiences with them.

Sex

Similar to the work of Reynolds²⁹ with National Collegiate Athletic Association Division II and National Athletic Intercollegiate Association athletes, our results showed no differences between male and female Deaflympians’ overall satisfaction with the athletic training services provided during the Games. Nevertheless, previous findings were inconsistent. Women demonstrated both less¹⁴ and more¹⁷ satisfaction than men. Although we did not address this topic, one possible explanation is that athletes may be more comfortable when same-sex ATs deliver their care.³⁴ At the 2013 Deaflympic Summer Games, 7 ATs were on staff (2 women, 5 men). An effort was made to assign a same-sex AT to male and female sports, but this was challenging due to limited staffing. Having an AT of the same sex available should be a consideration for future Deaflympic Games and for athletic programs at all levels to optimize athlete satisfaction.³⁴

Athletes who were treated by the opposite sex primarily reported sex-related reasons for their discomfort,³⁴ even

though ATs believe they have appropriate educational preparation in treating same- and opposite-sex athletes.^{35,36} The female Deaflympians in our study reported a higher mean overall score than the men, yet the difference was not significant. The similarities in scores demonstrates adequate satisfaction with the care provided to both male and female Deaflympians, an ideal result for the Deaflympic medical staff as well as other ATs in their practice settings.

Race

Similar to Reynolds,²⁹ we found no differences regarding race. Few investigators have addressed the effect of race on patient satisfaction in athletic training. Other literature suggests that patients prefer physicians who are from the same race or ethnicity over those of another race or ethnicity,³⁷ which may also be applicable to ATs.³⁸ The ATs staffing the Deaflympic Games were all white; white Deaflympians represented 81.8% of the athletes. The high overall satisfaction scores may be due to the racial and ethnic congruency^{36,39} between the ATs and the majority of Deaflympians.

Athletic training professionals abide by the highest professional, ethical, and quality standards set out by the NATA “Code of Ethics,”³² which states “members shall not discriminate against any legally protected class.” Low component or overall satisfaction scores would be alarming in possibly indicating violation of the oaths and athletic training standards set out by the NATA.

Previous Deaflympic Experience

No differences were demonstrated in Deaflympians’ overall satisfaction according to previous participation in the Games. Past experiences can have significant implications for future perceptions of athlete satisfaction.²⁹

Table 9. Satisfaction Component Scores Between Individual-Sport and Team-Sport Participants at the 2013 Deaflympic Summer Games

Component	Sport, Mean \pm SD		<i>t</i> Statistic	<i>P</i> Value
	Individual	Team		
Knowledge	19.67 \pm 3.79	20.34 \pm 3.09	0.70	.49
Resources	19.56 \pm 2.96	19.42 \pm 3.03	0.16	.87
Environment	7.94 \pm 1.95	8.73 \pm 1.19	1.85	.71
Organization and management	7.00 \pm 1.81	7.97 \pm 1.47	2.11	.40
Medical coverage	14.61 \pm 5.52	16.56 \pm 2.13	2.16	.42
Communication	22.06 \pm 4.68	24.29 \pm 3.53	1.95	.57
Importance and satisfaction	8.39 \pm 1.34	8.69 \pm 1.32	0.77	.44
Overall satisfaction	99.22 \pm 17.85	105.83 \pm 13.28	1.39	.18

Table 10. Satisfaction Component Scores Between Participants Who Did or Did Not Use Athletic Training Facilities at the 2013 Deaflympic Summer Games

Component	Used Athletic Training Facilities?		Difference	P Value
	Mean \pm SD			
	No	Yes		
Knowledge	18.07 \pm 3.79	20.85 \pm 2.84	2.86	.01
Resources	19.00 \pm 3.05	19.64 \pm 2.97	0.71	.48
Environment	7.93 \pm 1.83	8.68 \pm 1.35	1.64	.11
Organization and management	7.00 \pm 1.57	7.87 \pm 1.63	1.74	.09
Medical coverage	14.73 \pm 3.65	16.36 \pm 2.29	1.96	.06
Communication	21.57 \pm 4.57	24.23 \pm 3.67	2.18	.03
Importance and satisfaction	8.21 \pm 1.19	8.72 \pm 1.36	1.23	.23
Overall satisfaction	95.79 \pm 17.94	106.38 \pm 13.17	2.34	.02

However, our participants' previous experiences with ATs at past Deaflympic Games did not influence their overall satisfaction scores for the 2013 Summer Games.

Deaflympic Sport Participation

Deaflympians who participated in team and individual sports did not differ in their overall satisfaction levels. The literature suggests that athletes who are deaf or hard of hearing prefer to train and compete with athletes who are deaf or hard of hearing for reasons of easier communication.⁴⁰ Also, athletes who are deaf appear to prefer to communicate with their ATs via ASL.⁴¹ The Deaflympic medical staff used the preferred mode of communication with the athletes throughout the Games. Using the preferred mode of communication with athletes can lead to better

physical evaluations⁴² and overall attitudes,⁴³ which may lead to improved overall satisfaction scores for all athletes, regardless of whether they participate in team or individual sports.

Although not investigated in this study, the relationship between high- and low-profile sports and their athletes' satisfaction with athletic training services has been addressed.^{14,17,29} Discrepant results indicated that "sport profile is an inconsistent predictor of patient satisfaction."^{29(p95)}

Athletic Training Facility Service Frequency and Use

Deaflympians who used the athletic training facility had 10% greater overall satisfaction than those who did not. In addition, the more frequently a Deaflympian used the

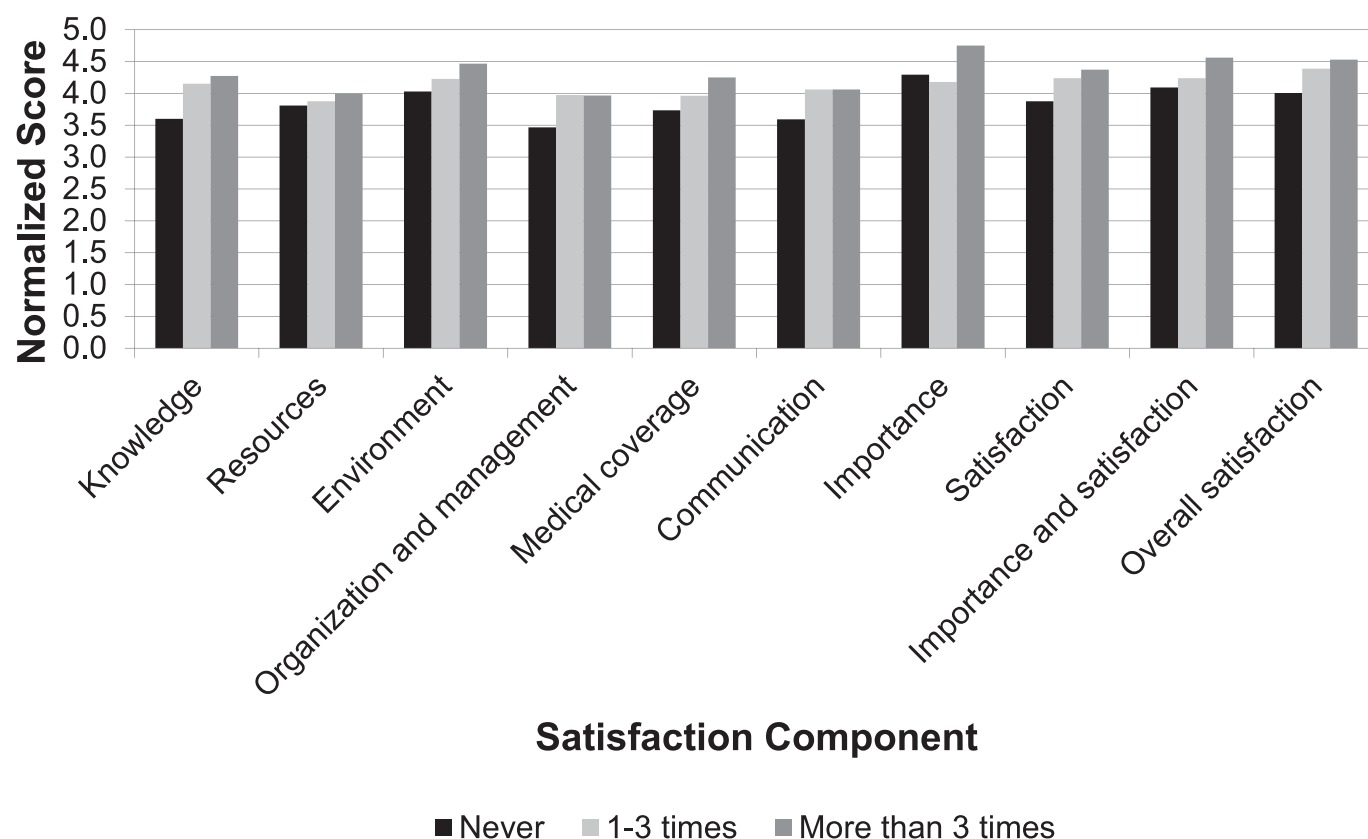


Figure 2. Normalized scores of satisfaction components from the Medical Interview Satisfaction Survey–Athletic Training by athletes' use of athletic training facilities during the 2013 Deaflympic Summer Games.

Table 11. Athlete Satisfaction With Athletic Training Services per Results on the Medical Interview Satisfaction Survey–Athletic Training

Component	Study, Mean \pm SD		
	Brancaleone et al	Reynolds ²⁹	Matsuno ³⁰
Knowledge	20.11 \pm 3.32	21.89 \pm 3.46	21.84 \pm 2.69
Resources	19.46 \pm 2.98	20.86 \pm 3.03	22.11 \pm 2.25
Environment	8.47 \pm 1.51	8.98 \pm 1.31	9.00 \pm 1.05
Organization and management	7.64 \pm 1.64	8.48 \pm 1.46	8.39 \pm 1.33
Medical coverage	15.91 \pm 2.80	15.47 \pm 3.34	16.86 \pm 2.26
Communication	23.53 \pm 4.06	26.20 \pm 3.31	25.75 \pm 3.03
Satisfaction and importance	8.59 \pm 1.32	8.98 \pm 1.46	9.25 \pm 0.85
Overall satisfaction	103.58 \pm 15.15	110.86 \pm 17.37	113.23 \pm 13.46

athletic training facility, the more positive the overall satisfaction score. Athletes who interacted more frequently with their ATs had more trust and communication, which allowed the athletes' comfort levels to grow.²⁹ Furthermore, research suggests that ATs can improve athlete satisfaction by building a strong rapport with their athletes and working to improve their communication and listening skills.^{14,17}

Communication

Despite the lack of significant differences involving communication, it is important to discuss this aspect of Deaflympians' overall satisfaction. Communication is one of the most important aspects of patient satisfaction.²⁷ Individuals who are deaf are at the greatest risk of miscommunication with individuals who are hearing.⁴⁴ Of the ATs working the 2013 Summer Games, 2 of the 7 were deaf; 1 was hard of hearing; and the others were hearing, with all but 1 fluent in ASL. Given the use of ASL by all but 1 AT and the fact that athletes who are Deaf prefer to communicate via ASL,⁴¹ we surmise there may have been fewer communication barriers throughout the Games, less chance for miscommunication, and higher overall communication scores. Without appropriate and efficient communication between the medical staff and the Deaflympians, the other component scores might have been lower.

Limitations

Limitations of this study include the convenience sample of American Deaflympians. In addition, the participants were invited to reply to the online questionnaire 2 days after the Games, with 1 follow-up e-mail sent at the 1-week mark. Therefore, the Deaflympians filled out the questionnaire retrospectively, with the last participant completing the questionnaire 2 weeks after the Games were completed. This may have resulted in difficulty recalling their athletic training experiences and may have influenced their responses. Another limitation is the use of 1 response category of *Neutral/Not applicable* instead of 2 categories. This presents the possibility of negative bias when *not applicable* responses are counted as *neutral*, thereby lowering the mean response score. However, in order to compare our results with those of previous investigators using the MISS-AT, we did not alter the middle response. Last, the questionnaire used in this study has a Flesch-Kincaid grade level of 9.9, which means it is expected to be

understandable to the average 9th- to 10th-grade student. Within the United States, the average 18-year-old student who is deaf reads between a 3rd- and 4th-grade reading level.⁴⁵ Therefore, it is possible that some of our participants misunderstood the questions.

Future Studies

There continues to be a paucity of literature on ATs working with individuals who are deaf. Further research should involve analyzing the satisfaction levels of high school and collegiate athletes who are deaf or hard of hearing. Future authors should also examine the relationship between the preferred communication mode of athletes who are deaf or hard of hearing and their satisfaction level with athletic training services. Continuing to examine this population will allow health care providers to offer the most efficient and optimal care.

CONCLUSIONS

Overall, Deaflympians were satisfied with the athletic training services provided at the 2013 Deaflympic Summer Games. This finding was similar to the findings of studies on National Collegiate Athletic Association²⁹ Division I and II and National Association of Intercollegiate Athletics athletes.^{29,30} Although many results were not statistically significant, our outcome is reassuring to athletic training staffs, suggesting that ATs were providing satisfactory care that was compliant with the NATA "Code of Ethics"³² and Board of Certification "Standards of Professional Practice."³³

Appendix. Medical Interview Satisfaction Survey–Athletic Training^a

Listed below are questions related to the athletic training services provided at the Deaflympic Games. Please take a few minutes to fully answer each question of the questionnaire to the best of your ability. The responses will remain confidential and the questionnaire is completely voluntary. By entering the questionnaire, you consent to participate in the study and agree that you are 18 years of age or older.

- I am 18 years of age or older and eligible to participate in this study.
 - Yes
 - No. Please return your blank answer sheet to the drop-box in the athletic training room.
- What is your current age?
 - 18–20
 - 21–25
 - 26–30
 - 31–35
 - >35
- What is your gender?
 - Male
 - Female
- What is your race?
 - American Indian or Alaska Native
 - Asian or Pacific Islander
 - Black or African American, Not of Hispanic Origin

^a The instrument is presented in its original form.

- d. Hispanic or Latino
- e. White, Not of Hispanic Origin
5. Have you competed in previous summer Deaflympic Games?
 - a. Yes
 - b. No
6. What Deaflympic sport do you participate in?
 - a. Athletics
 - b. Badminton
 - c. Basketball
 - d. Beach Volleyball
 - e. Bowling
 - f. Cycling Mountain
 - g. Cycling Road
 - h. Handball
 - i. Judo
 - j. Karate
 - k. Orienteering
 - l. Shooting
 - m. Soccer
 - n. Swimming
 - o. Table Tennis
 - p. Tae kwon do
 - q. Tennis
 - r. Volleyball
 - s. Wrestling
7. Have you ever used the Deaflympic athletic training facility or the services of an athletic trainer during the games?
 - a. Yes
 - b. No
8. How often did you utilize the Deaflympic athletic training room for health care services?
 - a. Never
 - b. 1–3 times during the Games
 - c. 4–6 times during the Games
 - d. 7–9 times during the Games
 - e. More than 9 times during the Games
9. The athletic training room and its staff are essential at the Deaflympic Games.
 - a. Strongly Disagree
 - b. Disagree
 - c. Neutral/Not Applicable
 - d. Agree
 - e. Strongly Agree
10. The athletic trainers at the Deaflympics conduct themselves in a professional manner.
 - a. Strongly Disagree
 - b. Disagree
 - c. Neutral/Not Applicable
 - d. Agree
 - e. Strongly Agree
11. I feel the environment within the Deaflympic athletic training room creates a positive atmosphere.
 - a. Strongly Disagree
 - b. Disagree
 - c. Neutral/Not Applicable
 - d. Agree
 - e. Strongly Agree
12. I feel more comfortable as an athlete when an athletic trainer travels to Deaflympic events with my team.
 - a. Strongly Disagree
 - b. Disagree
 - c. Neutral/Not Applicable
 - d. Agree
 - e. Strongly Agree
13. The Deaflympic athletic training room has adequate resources for treatments and rehabilitation (eg, ultrasound, electrical stimulation, ice, open space, tables).
 - a. Strongly Disagree
 - b. Disagree
 - c. Neutral/Not Applicable
 - d. Agree
 - e. Strongly Agree
14. The number of athletic trainers provided by the Deaflympics is effective for the US Deaflympic-athlete population size.
 - a. Strongly Disagree
 - b. Disagree
 - c. Neutral/Not Applicable
 - d. Agree
 - e. Strongly Agree
15. There is always a certified athletic trainer at all of my practices, games, and events while at the Deaflympic Games.
 - a. Strongly Disagree
 - b. Disagree
 - c. Neutral/Not Applicable
 - d. Agree
 - e. Strongly Agree
16. I am satisfied with the quality of care provided by my athletic trainer.
 - a. Strongly Disagree
 - b. Disagree
 - c. Neutral/Not Applicable
 - d. Agree
 - e. Strongly Agree
17. I feel confident with the knowledge demonstrated by my athletic trainer regarding my injuries.
 - a. Strongly Disagree
 - b. Disagree
 - c. Neutral/Not Applicable
 - d. Agree
 - e. Strongly Agree
18. My athletic trainers method for proper rehabilitation of athletic injuries is ideal.
 - a. Strongly Disagree
 - b. Disagree
 - c. Neutral/Not Applicable
 - d. Agree
 - e. Strongly Agree
19. The amount of time it takes for an athletic trainer to approach me for consultation once I enter the athletic training room is suitable.
 - a. Strongly Disagree
 - b. Disagree
 - c. Neutral/Not Applicable
 - d. Agree
 - e. Strongly Agree
20. The location of my athletic trainer during practice/events is such that he/she is capable of responding quickly and properly to an injury.
 - a. Strongly Disagree
 - b. Disagree
 - c. Neutral/Not Applicable
 - d. Agree
 - e. Strongly Agree

- e. Strongly Agree
21. I am satisfied with the time lapsed from when the athletic trainer knows I have a serious injury until I see a physician.
 - a. Strongly Disagree
 - b. Disagree
 - c. Neutral/Not Applicable
 - d. Agree
 - e. Strongly Agree
22. The level of concern my athletic trainer portrays toward each athlete is appropriate no matter what sport they are in.
 - a. Strongly Disagree
 - b. Disagree
 - c. Neutral/Not Applicable
 - d. Agree
 - e. Strongly Agree
23. The quality of care provided to each athlete is consistent for both male and female athletes.
 - a. Strongly Disagree
 - b. Disagree
 - c. Neutral/Not Applicable
 - d. Agree
 - e. Strongly Agree
24. The amount of medical supplies provided for use by my athletic trainer is sufficient.
 - a. Strongly Disagree
 - b. Disagree
 - c. Neutral/Not Applicable
 - d. Agree
 - e. Strongly Agree
25. My athletic trainer provides me with the information I need to prevent reinjury after sustaining an initial injury.
 - a. Strongly Disagree
 - b. Disagree
 - c. Neutral/Not Applicable
 - d. Agree
 - e. Strongly Agree
26. I am satisfied with the availability of physicians for the Deaflympic Games.
 - a. Strongly Disagree
 - b. Disagree
 - c. Neutral/Not Applicable
 - d. Agree
 - e. Strongly Agree
27. The time it takes from when I get injured until the time the coaching staff is made aware of my injury is appropriate.
 - a. Strongly Disagree
 - b. Disagree
 - c. Neutral/Not Applicable
 - d. Agree
 - e. Strongly Agree
28. The level of respect my athletic trainer gives me is suitable.
 - a. Strongly Disagree
 - b. Disagree
 - c. Neutral/Not Applicable
 - d. Agree
 - e. Strongly Agree
29. I am satisfied with the assessment process my athletic trainer uses to evaluate my injury.
 - a. Strongly Disagree
 - b. Disagree
 - c. Neutral/Not Applicable
 - d. Agree
 - e. Strongly Agree
30. I am satisfied that my athletic trainer is truly interested in helping me fully recover from my injury in a timely fashion so that I can return to competition.
 - a. Strongly Disagree
 - b. Disagree
 - c. Neutral/Not Applicable
 - d. Agree
 - e. Strongly Agree
31. All of the athletic trainers trust one another to properly assist me as an athlete.
 - a. Strongly Disagree
 - b. Disagree
 - c. Neutral/Not Applicable
 - d. Agree
 - e. Strongly Agree
32. I am confident in the athletic trainer's decision to remove me from a game or practice due to my injury or illness.
 - a. Strongly Disagree
 - b. Disagree
 - c. Neutral/Not Applicable
 - d. Agree
 - e. Strongly Agree
33. I am satisfied with the athletic training room hours of availability to athletes prior to practice or competition.
 - a. Strongly Disagree
 - b. Disagree
 - c. Neutral/Not Applicable
 - d. Agree
 - e. Strongly Agree
34. Overall, I am satisfied with the athletic training services.
 - a. Strongly Disagree
 - b. Disagree
 - c. Neutral/Not Applicable
 - d. Agree
 - e. Strongly Agree

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