Implementation of the International Olympic Committee Sport Mental Health Assessment Tool 1: Screening for Mental Health Symptoms in a Canadian Multisport University Program

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ABSTRACT

Objective: To apply the International Olympic Committee Sport Mental Health Assessment Tool 1 (SMHAT-1) to determine the prevalence of mental health symptoms in a cohort of university student athletes over an academic year. A secondary objective was to explore the internal consistency of the screening tools from the SMHAT-1.

Design: Cross-sectional design with 3 repeated measurements over an academic year.

Setting: A large university multisport program.

Participants: Five hundred forty-two university-level student athletes from 17 sports.

Intervention: N/A.

Main Outcome Measures: On 3 occasions, the participants completed the SMHAT-1, which consists of the Athlete Psychological Strain Questionnaire. If an athlete's score was above the threshold (≥17), the athlete completed step 2, consisting of (1) Generalized Anxiety Disorder-7; (2) Patient Health Questionnaire-9; (3) Athlete Sleep Screening Questionnaire; (4) Alcohol Use Disorders Identification Test Consumption; (5) Cutting Down, Annoyance by Criticism, Guilty Feeling, and Eye-openers Adapted to Include Drugs; and (6) Brief Eating Disorder in Athletes Questionnaire. Internal consistency of the SMHAT-1 was also measured.

Results: Participants reported mental health symptoms with prevalence of 24% to 40% for distress, 15% to 30% for anxiety, 19% to 26% for depression, 23% to 39% for sleep disturbance, 49% to 55% for alcohol misuse, 5% to 10% for substance use, and 72% to 83% for disordered eating. Female athletes were more likely to suffer psychological strain, depression, and sleep disturbance; male athletes were more likely to report substance use.

Conclusions: The SMHAT-1 was feasible to implement with good internal consistency. University-level athletes suffer from a variety of mental health symptoms underscoring the necessity for team physicians to have the clinical competence to recognize and treat mental health symptoms.

Clinical Relevance

- Elite university-level athletes suffer from a variety of mental health symptoms including anxiety, depression, sleep disturbance, alcohol and substance use, and disordered eating.
- Sport medicine physicians working with university-level athletes should have the clinical competence to recognize and treat mental health symptoms and disorders.
- The International Olympic Committee Sport Mental Health Assessment Tool 1 is feasible to implement in a multisport university sport program.

Key Words: mental health, elite athlete, screening, anxiety, depression

INTRODUCTION

The benefits of physical activity for mental health and well-being of university students are well documented in the scientific literature.[1,2] However, recent evidence demonstrates that elite athletes, defined by the International Olympic Committee (IOC) as being Olympic, professional, or collegiate athletes,[3] are not impervious to mental health symptoms and disorders. Coping with injuries, competition pressures, performance anxiety, travel burdens, media exposure, poor athletic performance, transition out of sport,[4] and exposure to harassment and abuse within the sporting context[5] are all stressors that can exacerbate mental health symptoms and disorders in athletes. Elite athletes in the university sport system have additional pressures including school-related commitments, living away from home, alcohol abuse, and

balancing a busy sport program.[6] Although athletes have the persona of being "mentally tough," and "super-human," they are human beings susceptible to mental health challenges.[7]

The prevalence of mental health disorders in the general population in Canada is approximately 20%.[8] Concerns have been increasing for the mental well-being of Canadian university athletes, with 18% reporting feelings of anxiety, depression, difficulty sleeping, substance abuse, and suicide.[6,9] Given this evidence, what is being done to support university-level elite athletes? A consensus statement by the National Athletic Trainers' Association identified the need for a strategy to identify student athletes with mental health concerns, including screening, identification of referral mechanisms, and emergency mental health crisis management.[10] Despite this recommendation, neither the 2020 Canadian Mental Health and Well-being for Post-Secondary Students document[11] nor the Canadian Centre for Mental Health and Sport's position stand[12] references the university sport-specific context. However, the Canadian "Best Practice Guidelines" for the assessment and management of mental health of university athletes highlights the importance of screening for mental health symptoms and provides recommendations to support athlete mental health.[13]

In 2019, the IOC embedded athlete mental health into underpinning foundational documents of the Olympic movement and created a Mental Health Working Group of experts to create knowledge translation activities. One of these activities was the development of the IOC Sport Mental Health Assessment Tool 1 (SMHAT-1) to encourage and standardize the screening of elite athletes for mental health symptoms and disorders and to facilitate early intervention and referral to appropriate care.[14]

In response to the gap in scientific knowledge about mental health symptoms and disorders among athletes in the Canadian University Sport System, the primary objective of this study was to apply the SMHAT-1 to determine the prevalence of mental health symptoms in a cohort of university student athletes over an academic year. A secondary objective was to explore the internal consistency of the screening tools from the SMHAT-1.

METHODS

Study Population

The University population we studied was based at a large institution located in Ontario, Canada, with approximately 30 000 students from more than 130 countries, 80 undergraduate programs, and 100 graduate, postdoctoral, and co-op programs.[15] The university sport program consists of 17 sports including 550 (250 female and 300 male) student athletes. All registered student athletes in the 2020 to 2021 academic year were eligible to participate in the study.

Study Design and Procedure

We employed a cross-sectional design with 3 repeated measurements over an academic year. Student athletes were invited by the athletics department through email to complete the online mental health screening tool (SMHAT-1) on 3 occasions: October 2020 (mid semester; T0), January 2021 (early semester; T1), and early April 2021 (late semester; T2). Owing to the COVID-19 pandemic, all competitive seasons were cancelled; thus, the survey timing measured changes in psychological stressors related to the time in the school year and stressors related to the evolving COVID-19 pandemic. Athletes were encouraged to participate by appointed study ambassadors: 2 coaches (male—track and field; female—women's basketball),

2 support staff (male—strength and conditioning coach; female—head athletic therapist), and 4 student athletes (2 male athletes—rugby and ice hockey; 2 female athletes—soccer and track and field). On logging into the online software program (BP Logix Process Director), athletes provided informed consent in line with the protocol approved by the University's Research Ethics Review Board (G-20-06-043). All athlete mental health screening results were reviewed, and medical care was provided as required by the University's Health and Performance Centre, regardless of the status of consent to participate in the study. The data were stored on an encrypted server, and only the data of the athletes who provided consent were extracted for data reduction and analysis after each survey window. The extracted data were anonymized and contained minimal demographic data (sport, age, sex) to protect individual's identities.

International Olympic Committee Sport Mental Health Assessment Tool 1

The SMHAT-1 consists of 3 steps. In step 1, all athletes complete the Athlete Psychological Strain Questionnaire (APSQ), which has a defined cut-off threshold. If an athlete's score is above the threshold, the athlete is asked to complete step 2, which consists of 6 screening tools: the (1) Generalized Anxiety Disorder-7 (GAD-7); (2) Patient Health Questionnaire-9 (PHQ-9); (3) Athlete Sleep Screening Questionnaire (ASSQ); (4) Alcohol Use Disorders Identification Test Consumption (AUDIT-C); (5) Cutting Down, Annoyance by Criticism, Guilty Feeling, and Eye-openers Adapted to Include Drugs (CAGE-AID); and (6) Brief Eating Disorder in Athletes Questionnaire (BEDA-Q)[14] (Figure). At this point, the athlete responses to the SMHAT-1 were managed clinically following steps 3a and/or 3b of the SMHAT-1, as applicable.

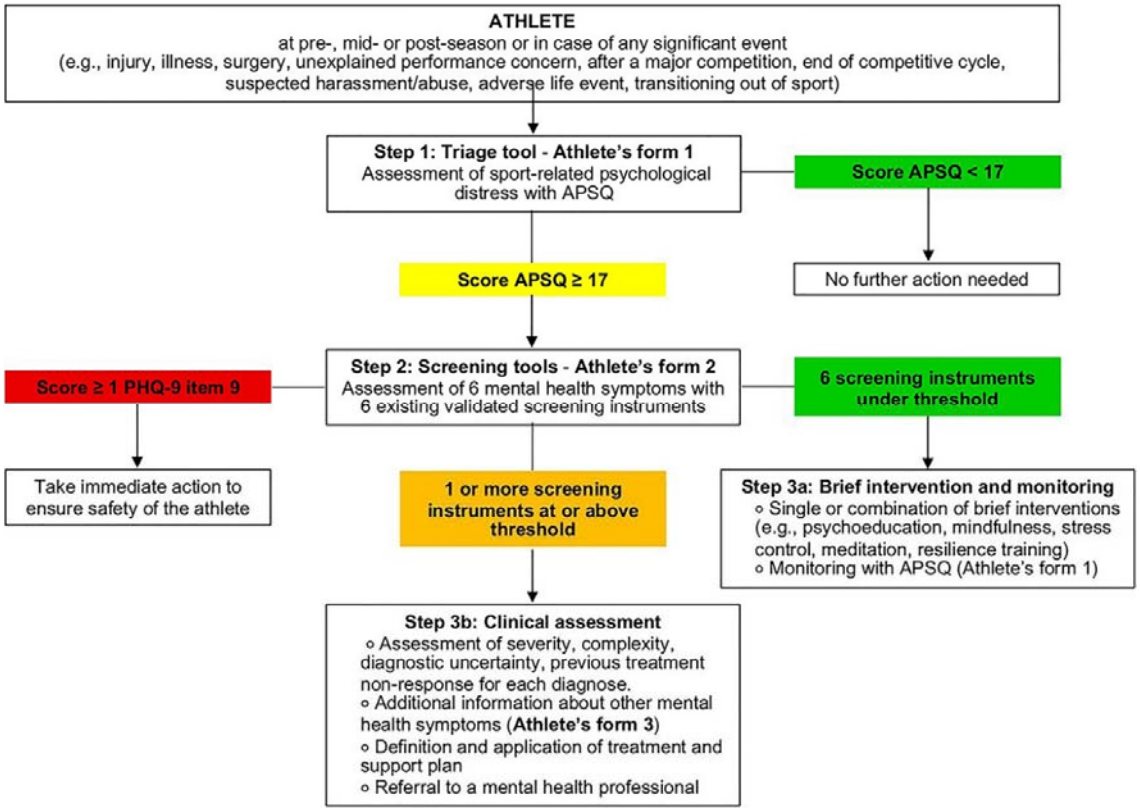

Figure: Flow chart of the International Olympic Committee Sport Mental Health Assessment Tool 1.[14]

In step 1, the APSQ measures sport-related psychological distress through 10 items (eg, "It was difficult to be around teammates") scored on a 5-point scale (from 1 "none of the time" to 5 "all of the time"). A total score ranging from 10 to 50 was calculated, with a score of ≥17 indicating the presence of sport-related psychological distress. The GAD-7 assesses anxiety through 7 items (eg, "Over the last 2 weeks, how often have you been bothered by feeling nervous, anxious, or on edge?") scored on a 4-point scale (from 0 "not at all" to 3 "nearly every day"). A total score ranging from 0 to 21 was calculated, with a score of ≥10 indicating symptoms consistent with anxiety. The PHQ-9 measures depression through 9 items (eg, "Over the last 2 weeks, how often have you been bothered by little interest or pleasure in doing things?") scored on a 4-point scale (from 0 "not at all" to 3 "nearly every day"). A total score ranging from 0 to 27 was calculated, with a score of ≥10 indicating symptoms consistent with depression. The ASSQ assesses sleep disturbance through 5 items (eg, "During the recent past, how many hours of actual sleep did you get at night?") scored on 4-point and 5-point scales. A total score ranging from 1 to 17 was calculated, with a score of ≥8 indicating the presence of sleep disturbance. The AUDIT-C measures alcohol misuse through 3 items (eg, "How often do you have a drink containing alcohol?"). A total score ranging from 0 to 12 was calculated, with a score of ≥4 (male) and ≥3 (female) indicating the presence of alcohol misuse. The CAGE-AID assesses substance misuse through 4 items (eg, "In the last 3 months, have you felt you should cut down or stop using drugs?") scored as yes or no. A total score ranging from 0 to 4 was calculated, with a score of ≥2 indicating the presence of substance misuse. The BEDA-Q assesses disordered eating through 9 items (eg, "Over the last 2 weeks, how often have you been bothered by feeling extremely guilty after overeating?") scored on several scales. A total score ranging from 0 to 18 was calculated, with a score of ≥4 indicating the presence of disordered eating.

Statistical Analysis

The statistical software IBM SPSS 27.0 was used for data analysis. Descriptive analyses (mean, SD, frequency, and range) were performed for all descriptive variables at T0, T1, and T2 for the whole cohort of athletes and for relevant subgroups (male and female athletes, team vs individual sport, collision vs noncollision sports). For our primary objective, the prevalence of mental health symptoms (expressed as percentage) was calculated as the proportion of the number of participants with a given condition (eg, anxiety symptoms) relative to the total number of participants, using the (adjusted) Wald method for 95% confidence intervals. All prevalence rates were calculated at T0, T1, and T2 for the whole cohort of athletes and for each subgroup. Changes in mental health symptoms (continuous) over time (T0, T1, and T2) were explored with repeated measures ANOVA tests for the whole cohort of athletes, while differences between subgroups in the prevalence of mental health symptoms (dichotomous) were determined at T0, T1, and T2 with the χ^2 test (statistical significance set at <0.05). For our secondary objective, internal consistency of all screening tools used in step 1 and step 2 of the SMHAT-1 was calculated (expressed with Cronbach alpha; $\alpha \geq 0.70$ considered as good; $0.60 < \alpha < 0.70$ considered as moderate; $r \leq 0.59$ considered as low) at T0 in the whole cohort of athletes.[16]

RESULTS

Characteristics

At T0, 542 student athletes (response rate of 98%) completed the measurement (248 female athletes and 294 male athletes). The mean age of the student athletes at T0 was 21.0 years (SD

= 1.7). At T1, 336 student athletes (response rate of 61%) completed the measurement (190 female athletes and 146 male athletes). The mean age of the student athletes at T1 was 20.8 years (SD = 1.6). At T2, 133 student athletes (response rate of 24%) completed the measurement (89 female athletes and 44 male athletes). The mean age of the student athletes at T2 was 20.5 years (SD = 1.4; see Table 1).

TABLE 1. - Characteristics of the Student Athletes

	Total	**Female**	**Male**
T0			
No. of student athletes	543	248	294
Age (in yr; mean ± SD)	21.0 ± 1.7	20.6 ± 1.4	21.4 ± 1.9
Team[*]/individual[†] sport (N)	369/174	141/107	228/66
Collision[‡]/noncollision[§] sports (N)	305/238	108/140	197/97
T1			
No. of student athletes	336	190	146
Age (in yr; mean ± SD)	20.8 ± 1.6	20.6 ± 1.4	21.1 ± 1.9
Team[*]/individual[†] sport (N)	232/104	100/68	99/28
Collision[‡]/noncollision[§] sports (N)	174/162	69/99	80/47
T2			
No. of student athletes	133	89	44
Age (in yr; mean ± SD)	20.5 ± 1.4	20.3 ± 1.3	20.8 ± 1.6
Team[*]/individual[†] sport (N)	95/38	50/29	30/7
Collision[‡]/noncollision[§] sports (N)	71/62	36/43	24/13

[*]Baseball, basketball, curling, field hockey, football, hockey, lacrosse, rowing, rugby, soccer, volleyball.
[†]Cross country, figure skating, golf, Nordic skiing, swimming, track and field, wrestling.
[‡]Baseball, basketball, field hockey, football, hockey, lacrosse, rugby, soccer, wrestling.
[§]Curling, cross country, figure skating, golf, rowing, Nordic skiing, swimming, track and field, volleyball.
N, number of participants.

Prevalence of Mental Health Symptoms

As displayed in Table 2, the prevalence of mental health symptoms fluctuated throughout the academic year. Repeated measures ANOVA showed that only sport-related psychological distress differed over time ($F(2,188) = 5.922$, $P = 0.003$) with statistical difference only found between T0 and T1 ($P = 0.01$). At T0, the prevalence of mental health symptoms was 24.3% for sport-related psychological distress, 29.5% for anxiety, 25.8% for depression, 39.4% for sleep disturbance, 54.5% for alcohol misuse, 9.8% for substance misuse, and 82.6% for disordered eating. At T0, differences were found between female and male athletes for sport-related psychological distress (30.2% vs 19.4%; X2 = 8.603, df = 1, $P = 0.003$) and substance misuse (4.0% vs 17.5%; X2 = 6.828, df = 1, $P = 0.009$) and between team versus individual sport for alcohol misuse (63.9% vs 38.8%; X2 = 6.741, df = 1, $P = 0.009$). At T1, the prevalence of mental health symptoms was 39.6% for sport-related psychological distress, 15.0% for anxiety, 18.8% for depression, 31.6% for sleep disturbance, 54.9% for alcohol misuse, 8.3% for substance misuse, and 79.7% for disordered eating. At T1, differences were found between female and male athletes for sport-related psychological distress (45.2% vs 33.9%; X2 = 3.915, df = 1, $P = 0.048$) and depression (25.0% vs 8.2%; X2 = 5.747, df = 1, $P = 0.017$), between team versus individual sport for sport-related psychological distress (36.4% vs 48.0%; X2 = 5.631, df = 1, $P = 0.018$), and between collision versus noncollision sport for sport-related psychological distress (32.4% vs 45.2%; X2 = 11.029, df = 1, $P < 0.001$). At T2, the prevalence

of mental health symptoms was 32.3% for sport-related psychological distress, 27.9% for anxiety, 25.6% for depression, 23.3% for sleep disturbance, 48.8% for alcohol misuse, 4.7% for substance misuse, and 72.1% for disordered eating. At T2, differences were only found between female and male athletes for sleep disturbance (31.3% vs 0%; X2 = 4.479, df = 1, *P* = 0.034).

TABLE 2. - Prevalence (%; 95% CI) of Mental Health Symptoms in Student Athletes Over an Academic Year

	T0	**T1**	**T2**
Distress (APSQ)			
Total	24.3 (20.7-27.9)	39.6 (34.4-44.8)	32.3 (24.9-40.7)
Female	30.2 (24.5-36.0[*])	45.2 (37.8-52.8[*])	36.7 (26.9-47.7)
Male	19.4 (14.8-23.9[*])	33.9 (26.2-42.4[*])	27.0 (15.2-43.1)
Team sport	22.5 (18.2-26.7)	36.4 (29.6-43.2)	30.4 (21.3-41.2)
Individual sport	28.2 (21.4-34.8)	48.0 (38.3-57.7)	40.5 (26.3-56.5)
Collision sport	21.6 (17.0-26.2)	32.4 (25.4-40.3)	28.3 (18.4-40.8)
Noncollision sport	27.7 (22.0-33.7)	45.2 (38.1-52.3)	35.6 (25.5-47.0)
Anxiety (GAD-7)			
Total	29.5 (21.9-38.1)	15.0 (9.9-22.2)	27.9 (16.6-42.8)
Female	33.3 (23.6-44.6)	19.0 (11.9-28.8)	28.1 (15.4-45.5)
Male	24.6 (15.1-37.2)	8.2 (2.7-19.7)	27.3 (9.2-57.1)
Team sport	28.9 (20.2-39.4)	18.1 (10.7-28.6[†])	20.8 (8.8-40.9)
Individual sport	30.6 (19.4-44.6)	10.6 (4.1-23.0[†])	33.3 (14.9-58.5)
Collision sport	31.8 (21.8-43.8)	20.8 (11.5-34.4[‡])	29.4 (12.9-53.4)
Noncollision sport	27.3 (17.9-39.1)	11.8 (6.3-20.5[‡])	26.9 (13.4-46.3)
Depression (PHQ-9)			
Total	25.8 (19.0-34.1)	18.8 (13.0-26.3)	25.6 (14.7-40.4)
Female	26.7 (17.9-37.7)	25.0 (16.9-35.3[*])	31.3 (17.8-48.7)
Male	24.6 (15.1-37.2)	8.2 (2.7-19.7[*])	9.1 (0.0-39.9)
Team sport	24.1 (16.1-34.3)	19.4 (11.8-30.1)	25.0 (11.6-45.2)
Individual sport	28.6 (17.7-42.5)	14.9 (7.0-28.0)	20.0 (6.2-45.9)
Collision sport	25.8 (16.6-37.5)	14.6 (6.9-27.4)	23.5 (9.0-47.7)
Noncollision sport	25.8 (16.6-37.5)	21.2 (13.7-31.1)	26.9 (13.4-46.3)
Sleep disturbance (ASSQ)			
Total	39.4 (31.4-47.9)	31.6 (24.2-39.9)	23.3 (12.9-37.9)
Female	40.0 (29.6-51.3)	34.5 (25.2-45.2)	31.3 (17.8-48.7[*])
Male	38.6 (27.0-51.5)	26.5 (16.1-40.3)	0[*]
Team sport	41.0 (31.0-51.7)	34.7 (24.7-46.2)	16.7 (6.0-36.4)
Individual sport	36.7 (24.6-50.7)	25.5 (15.1-39.6)	26.7 (10.4-52.3)
Collision sport	42.4 (31.2-54.4)	31.3 (19.8-45.4)	23.5 (9.0-47.7)
Noncollision sport	36.4 (25.7-48.4)	31.8 (22.8-42.3)	23.1 (10.7-42.3)
Alcohol misuse (AUDIT-C)			
Total	54.5 (46.0-62.8)	54.9 (46.4-63.1)	48.8 (34.6-63.3)
Female	57.3 (46.0-67.9)	53.6 (42.9-63.9)	43.8 (28.1-60.7)
Male	50.9 (38.2-63.3)	57.1 (43.2-69.9)	63.6 (35.1-85.0)
Team sport	63.9 (53.1-73.3[†])	50.0 (38.7-61.2)	50.0 (31.4-68.5)
Individual sport	38.8 (26.4-52.7[†])	55.3 (41.2-68.5)	40.0 (19.7-64.3)
Collision sport	59.1 (47.0-70.1)	47.9 (34.4-61.6)	47.1 (26.1-69.0)
Noncollision sport	50.0 (38.2-61.7)	58.8 (48.1-68.6)	50.0 (32.0-67.9)
Substance misuse (CAGE-AID)			
Total	9.8 (5.7-16.2)	8.3 (4.5-14.3)	4.7 (0.4-16.3)
Female	4.0 (0.9-11.6[*])	4.8 (1.5-12.0)	3.1 (0.0-17.1)

Male	17.5 (9.6-29.5*)	14.3 (6.7-26.9)	9.1 (0.0-39.9)
Team sport	9.6 (4.7-18.1)	6.9 (2.6-15.6)	4.2 (0.0-21.8)
Individual sport	10.2 (4.0-22.1)	10.6 (4.1-23.0)	0
Collision sport	10.6 (4.9-20.6)	10.4 (4.0-22.6)	5.9 (0.0-28.9)
Noncollision sport	9.1 (3.9-18.7)	7.1 (2.9-14.8)	3.8 (0.0-20.4)
Disordered eating (BEDA-Q)			
Total	82.6 (75.2-88.2)	79.7 (72.0-85.7)	72.1 (57.1-83.4)
Female	84.0 (73.9-90.8)	84.5 (75.1-90.9)	75.0 (57.6-86.9)
Male	80.7 (68.4-89.0)	71.4 (57.5-82.2)	63.6 (35.1-85.0)
Team sport	83.1 (73.5-89.8)	79.2 (68.3-87.0)	75.0 (54.7-88.3)
Individual sport	81.6 (68.4-90.2)	85.1 (72.0-92.9)	66.7 (41.5-85.0)
Collision sport	83.3 (72.3-90.6)	79.2 (65.5-88.4)	70.6 (46.5-87.0)
Noncollision sport	81.8 (70.7-89.4)	80.0 (70.1-87.2)	73.1 (53.6-86.5)

*Statistically significant difference between female and male.
†Statistically significant difference between team sport and individual sport.
‡Statistically significant difference between collision sport and noncollision sport.
CI, confidence interval; T0, time = 0; T1, time = 1; T2, time = 2.

Internal Consistency

Internal consistency was good for the APSQ (α = 0.84), GAD-7 (α = 0.90), PHQ-9 (α = 0.87), AUDIT-C (α = 0.81), and BEDA-Q (α = 0.70) and moderate for the ASSQ (α = 0.66) and CAGE-AID (α = 0.69).

DISCUSSION

This study explored the prevalence of mental health symptoms captured by the SMHAT-1 among student athletes at a Canadian university during the period spanning October 2020 to April 2021. Participants reported mental health symptoms with prevalence of 24% to 40% for distress, 15% to 30% for anxiety, 19% to 26% for depression, 23% to 39% for sleep disturbance, 49% to 55% for alcohol misuse, 5% to 10% for substance use, and 72% to 83% for disordered eating.

Sport-Related Psychological Distress

The prevalence rates of sport-related psychological distress varied throughout the study period with the lowest scores recorded at T0 (24.3%) in contrast with T1 (39.6%) and T2 (32.3%). The increasing rates of psychological stress reported at T1 and T2 could be attributed to the effects of isolation from the COVID-19 pandemic because the student athletes were only training together on campus during the T0 data collection period. A larger study (n = 24 974) conducted by the NCAA during the same time frame as T0 also reported that the number of athletes reporting mental health concerns was 1.5 to 2x greater than the comparative prepandemic time frame.[17] Female athletes reported statistically significantly higher rates of sport-related psychological distress than male athletes at both T0 (30.2% vs 19.4%, respectively) and T1 (45.2% vs 33.9%, respectively), which is consistent with the findings reported in other studies of elite athletes,[17–19] and highlights the need to develop targeted sex-specific primary and secondary mitigation strategies for psychological distress in this population. There was a statistically significant difference in the prevalence of sport-related psychological distress at T1 in collision (32.4%) versus noncollision (45.2%) sports and team (36.4%) versus individual (48.0%) sports. As the largest collision and team sport seasons end in November (ie, football, rugby), it could be hypothesized that this study period coincided

with the peak of the competitive season; thus, the loss of sport season may have affected athlete mental stress.

Anxiety and Depression

The prevalence rates of anxiety ranged from 29.5% at T0, to 15% at T1, and 27.9% at T2, which are comparable with those of university athletes in China (22%).[20] The prevalence of anxiety and depression was higher during mid semester (T0) (depression 25.8%; anxiety 29.5%) and end of semester (T2) (depression 25.6%; anxiety 27.9%) in contrast with the early semester (T1) (depression 18.8%; anxiety 15%). This finding may be related to the increased academic stressors experienced during T0 and T2, modulated in the early semester (T1) by the recent holiday break and absence of examinations. Rates of depression and anxiety detected in our study are higher than those reported in other studies (eg, collegiate student athletes),[21,22] which may have been due to the psychological impact of the COVID-19 pandemic's influence on athlete mental health,[23] in addition to disruptions to academic programming, and cancellation of the sports seasons.[24] Female athletes recorded a statistically higher prevalence of depression than male athletes at T1 (25.0% vs 8.2%, respectively), consistent with the findings in other studies[22,25] and underscoring the need for sex-specific interventions.

Sleep

University athletes are at risk of experiencing inadequate sleep due to travel, training schedules, stress of competition, balancing academics and athletics, and pain from injuries.[26] Rabin et al[27] reported sleep disturbance in 25% of a cohort of collegiate athletes also measured by the ASSQ. There was a significant difference between female (31%) and male (0%) athletes at T2; however, this finding may be confounded by the poor response rate by male athletes at T2. Although the absence of an athletic season eliminated the potential contribution of sports-related travel and competition, many sports continued to train remotely and thus the athletes would have still been vulnerable to the influence of training schedules, balancing demands, and injury effects on sleep. In addition, the asynchronous flexible on-line curriculum delivery model and the absence of a structured training and competition schedule may contribute to our findings.

Alcohol and Substance Misuse

Alcohol and substance misuse are common in the university athlete population, with varying prevalence rates across sports and between sexes.[28,29] Alcohol misuse in elite athletes has been reported between 6% and 21%,[30] while rates of alcohol abuse/dependence in collegiate athletes are 7.2% to 10.3%.[31] The student athletes in this study reported alcohol misuse across all 3 survey periods (T0-54.5%, T1-54.9%, and T2-48.8%) with no differences between sexes, in contrast to reports in the literature of male athlete alcohol abuse being higher than in female athletes.[3] At T0, 63.9% of team sport athletes reported problem drinking behaviour versus 38.8% of athletes from individual sports, demonstrating cultural differences of use among sports. The substantially higher rates of alcohol misuse identified in this study may be related to impacts of the COVID-19 pandemic, which have been described in the literature in the general population.[32] The prevalence rates for substance use were higher at T0 (9.8%) and T1 (8.3%) than at T2 (4.7%), which may have been influenced either by the timing the T2 collection period (during final examinations) or by the reduced sample size.

Disordered Eating and Eating Disorders

Athletes have a higher prevalence of eating disorders and disordered eating relative to nonathletes, with female athletes reporting higher rates than male athletes (6%-45% and 0%-19%, respectively).[33,34] Identification of athletes at risk of eating disorders demonstrated significantly higher numbers in this study population at all 3 survey points [82.6% (T0), 79.7% (T1), and 72.1% (T3)] with no differences between sexes. It is noted that the SMHAT-1 consensus authors identified that the BEDA-Q had no established threshold and thus proposed a cutoff of 4 or more.[14] Our findings are not consistent with the existing literature suggesting a need to further validate the threshold limits of the BEDA-Q.

Study Limitations

There are several limitations to this study. While the SMHAT-1 has been validated as a single measurement tool (rather than future prediction), the IOC is advocating for repeated use of the SMHAT-1 over a sport season to monitor athlete mental health. This study was the first occasion of using the tool in this way. The sex of the study participants was categorized in a binary fashion, and thus, we did not capture potential differences in mental health domains of those with nonbinary sex identities. There is a paucity of literature on the mental health of individuals who identify as nonbinary and thus represents an area for future research. At baseline, most student athletes (98%) submitted responses to the SMHAT-1 during the initial study period (T0) with consecutive decreasing response rates at T1 (61%) and T2 (24%). Participant retention may have been influenced by the COVID-19 pandemic, which reduced (and at times eliminated) student presence on campus and sport participation. In addition, the SMHAT-1 is an online self-report tool that introduces vulnerability to the underreporting of symptoms.[14] Pandemic-related changes in education delivery, daily schedules, socialization, and isolation and the cancellation of the sport season likely influenced the mental health of this student–athlete population, which were not specifically explored in this study. Despite these limitations, valuable data reflecting the prevalence of mental health status of student–athletes throughout an academic year were collected and the feasibility of implementing the SMHAT-1 was successfully accomplished.

CONCLUSION

Student athletes from a large Canadian university reported mental health symptoms with a prevalence of 24% to 40% for distress, 15% to 30% for anxiety, 19% to 26% for depression, 23% to 39% for sleep disturbance, 49% to 55% for alcohol misuse, 5% to 10% for substance use, and 72% to 83% for disordered eating. The use of the SMHAT-1 throughout the academic and sport calendar should lead to increased detection of and response to mental health symptoms among university-level athletes.

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