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How Do the Habitual Sleep Patterns of Elite Female Basketball and Soccer Athletes Compare With the General Population?

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Purpose: To compare the habitual sleep of female basketball and soccer athletes to age- and sex-matched controls and to characterize the sleep of basketball and soccer athletes at different competition locations and on the days surrounding competition. ***Methods***: Using an observational case–control design, 41 female participants were recruited to participate, consisting of 11 basketball athletes (mean [SD]: age = 24.1 [4.9] y), 10 soccer athletes (24.8 [6.4] y), and 20 nonathletic controls (24.2 [2.8] y). Sleep was monitored using actigraphy for four 7-day periods throughout the preseason and subsequent competition season. Generalized linear models were used to analyze the effect of group and competition situation (eg, Home or Away) on sleep. ***Results***: During habitual conditions, basketball athletes had longer sleep durations (7.4 [1.5] h) than soccer athletes (7.0 [1.2] h, $P < .001$) and controls (7.3 [1.2] h, $P = .002$). During competition, basketball and soccer athletes had longer sleep durations following home (7.7 [1.7] and 7.2 ± 1.3 h) compared with away games (6.8 [1.8] and 7.0 [1.3] h). In addition, basketballers went to bed earlier (23:49 [01:25]) and woke earlier (07:22 [01:59]) following away games compared with soccer athletes (00:10 [01:45] and 08:13 [01:45]). ***Conclusions***: Basketballers had longer habitual sleep durations compared with soccer athletes and nonathletic controls. During competition, basketballers had earlier bed and wake times compared with soccer athletes following away games, highlighting the need for individualized sleep strategies.

Keywords*:* actigraphy, women, team sport, fatigue, recovery

Sleep is an integral component in the preparation for, and recovery from, athletic training and competition.[1] However, recent research indicates that elite athletes have suboptimal habitual sleep patterns and habits,[2] in addition to regularly encountering sport-specific situational challenges to sleep, such as competition schedules[3] and travel demands.[4] For athletes, risk factors for poor sleep may also include those considered to negatively influence the sleep of nonathletic individuals, such as the female sex.[5,6] For example, compared with their male counterparts, a cohort of elite female athletes reported experiencing more lifelong sleep problems, such as difficulty falling asleep and nocturnal waking.[7] There remains however, limited published data on sleep in female athletes. To enable practitioners to provide effective and targeted sleep support for female athletes, habitual and competition sleep must first be characterized to identify specific situations that can impair sleep for this population.

Although there has been recent discussion surrounding the issue,[2] whether a causal relationship exists between elite sport participation and poor sleep remains to be elucidated. For example, there is still limited evidence demonstrating that sleep inadequacy is actually more prevalent in elite athletes than the general population.[1,8–10] Of this evidence, only one study reports the results of an objective comparison between female athletes and an age- and sex-matched control group. The study reported that soccer athletes' sleep duration was 38 minutes longer than the controls'.[10] Despite the suggestion of superior sleep in this cohort of soccer athletes, the study reports assessing their sleep at different times during the season, thereby increasing the potential for variation in habitual sleep characteristics for the athlete group.

At present, the vast majority of sleep research is in male athlete populations and does not demonstrate the impact that situational challenges may have on the sleep of female athletes who may already be at an increased risk of sleep problems based on general population evidence.[5,6] Although the exact reasons are not yet known, it is suggested that the misalignment between circadian rhythms (eg, core body temperature minimum and pineal melatonin secretion) and sleep–wake behavior,[11] high prevalence of depression and anxiety,[12] and ovarian steroid hormones[13] may be potential reasons for an increased risk of sleep problems in females. In addition, in male athletes, postcompetition sleep loss can impair physiological, cognitive, and perceptual recovery.[14] Considering the sex differences in physiological responses to exercise and recovery,[15] direct applications of these findings to female athletes are limited.

Therefore, the aims of the research were to (1) compare the habitual sleep of elite female basketball and soccer athletes to an age- and sex-matched population and (2) characterize the sleep and perceptual recovery of elite female basketball and soccer athletes at different competition locations and on the days surrounding competition.

Methods

Subjects

A total of 41 female participants were recruited to participate in this study consisting of 11 elite basketball athletes (mean [SD]: age = 24.1 [4.9] y; mass = 85.7 [10.6] kg; stature = 188.9 [5.5] cm), 10 elite soccer athletes (age = 24.8 [6.4] y; mass = 67.0 [7.3] kg; stature = 170.5 [6.6] cm), and 20 age- and sex-matched nonathletic

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controls (age = 24.2 [2.8] y; mass = 69.5 [15.0] kg; stature = 168.6 [8.8] cm). The basketball and soccer athletes were contracted to professional Australian teams, had 8.8 (4.3) and 7.7 (5.1) years of experience at this level, respectively, and had individually experienced previous success in national and international competitions. Therefore, all athletes were classified as successful elite.[16] Of the athletes who participated in the study, 6 basketball and 5 soccer players had additional work and/or study commitments. The control participants were university students and physically active, but not partaking in competitive sport. During the data collection period, the control participants exercised on 53% of days with an average sessional rating of perceived exertion of 406 (295) arbitrary units (AU). All participants were screened for factors that could affect sleep, such as diagnosed sleep disorders and shift work, through verbal and written self-report. Before the commencement of the study, the participants were informed of any associated risks and were provided with verbal and written informed consent. The study was approved by the University of Canberra Human Ethics Committee (project number 17-167).

Design

During this observational case–control study, the athletes' sleep and perceptual recovery were monitored for four 7-day periods throughout both the habitual preseason training phase and subsequent competition season (early, mid, and late season). Each of these periods was separated by 28 days in an attempt to control for the menstrual cycle phase. The menstrual cycle phase was estimated using self-reported date of menses onset and length to determine menses and early follicular subphase (previously described with recommendations by Allen et al[17]). The control participants' sleep and mood were monitored for four 7-day periods, contemporaneous with the athletes' data collection.

Methodology

Throughout the data collection periods, the participants completed a sleep diary immediately before bed and after waking, and wore an activity monitor (GTX3+; ActiGraph, Pensacola, FL) on the wrist of their nondominant hand. The wrist-worn GTX3+ activity monitor has a sensitivity of 90%, specificity of 46%, and accuracy of 84% when compared with polysomnography (the gold standard of sleep measurement).[18] According to previously described methods from Sargent et al,[19] the data from the sleep diaries and activity monitors were used to determine when the participants were awake and asleep. All of the time records were scored as wake, unless the sleep diary indicated the participant was lying down, attempting to sleep, and the monitors' activity counts were sufficiently low to indicate that the participant was immobile. Time was scored as sleep when these 2 conditions were satisfied. The scoring process was conducted using the Cole–Kripke algorithm in the ActiGraph software (ActiLife, version 6.13.4; ActiGraph, Pensacola, FL). In addition, the sleep diary ascertained information about postsleep fatigue, sleep quality, and perceptual recovery, using the Perceived Recovery Status scale.[20] Over the duration of the study, the combined compliance rate for the actigraphy and sleep diary in terms of days complete was 88.6% (basketball = 83.7%, soccer = 90.7%, and control = 91.4%).

The following variables were derived from the actigraphy and sleep diary:

- Bedtime (h:min): time when the participants went to bed to attempt to sleep.
- Wake time (h:min): time when the participants got out of bed and stopped sleeping.
- Total sleep time (TST, h): the amount of time spent in bed asleep.
- Sleep efficiency (SE, %): the percentage of time in bed that was spent asleep.
- Wake after sleep onset (WASO, min): the time spent awake after sleep onset.
- Sleep onset latency (SOL, min): the time between bedtime and sleep onset time.
- Postsleep fatigue (AU): self-rating of postsleep fatigue on a scale of 1 (fully alert) to 7 (completely exhausted).
- Sleep quality (AU): self-rating of sleep quality on a scale of 1 (very good) to 5 (very poor).
- Perceived recovery status (recovery, AU): self-rating of recovery status on a scale of 1 (very poorly recovered) to 10 (very well recovered).

Habitual days were classified as those when athletes were outside of competition, and included preseason training days, regular in-season training days, and rest days. Over the course of the season, the basketball athletes performed strength training sessions at 08:30 and on-court team training sessions at 16:30. In comparison, the soccer athletes performed all sessions (whether strength or on-field team-based) at 06:30. For the respective basketball and soccer competition seasons, home games (Home) were considered to be those played at the club's home venue, while away games (Away) were those not played at home. Travel to away games was always short haul via plane and/or bus, with no change in time zone. For both the basketball and soccer athletes, the day before the game (G − 1), the day of the game (G), and the day following the game (G + 1) were coded. In addition, basketball athletes had instances of 2 games played within 24 hours of each other, and as such, were coded as (G ± 1). Throughout the basketball data collection, games commenced after 18:00 (ie, night games), while only day games (commencing between 15:30 and 16:30) were conducted during soccer data collection.

Statistical Analysis

Generalized linear mixed models were used to analyze the data. Group (ie, basketball, soccer, or control) was fitted as a fixed factor to determine whether there was a difference between groups for the dependent sleep and perceptual variables (eg, TST and recovery). Group (ie, basketball or soccer) and competition situation (ie, game location [Home or Away] or game day [G − 1, G, G + 1, or G ± 1]), and their interaction, were fitted as fixed factors to determine whether there was a difference in the effect of athlete group over the competition situation on the dependent sleep and perceptual variables. All models met the assumptions of linearity, homogeneity of variance, and normal distribution. A participant identification number was used as a random factor to account for repeated measures in each model. Likelihood ratio tests of a full model with the fixed factor in question, against the null model without the fixed factor in question, were performed to determine statistical significance and obtain P values. Data analysis was performed using the lme4 package in R Studio (R Foundation for Statistical Computing, Vienna, Austria), with significance accepted when $P \leq .05$. Standardized effect sizes (ES; <0.2, very small effect; 0.2–0.5, small effect; 0.5–0.8, moderate effect; and >0.8, large effect) were calculated using the emmeans package in

R Studio. Data are presented as mean (SD) unless otherwise specified.

Results

Sleep and perceptual variables during habitual conditions are shown in Table 1. The basketball athletes had longer sleep durations (7.4 [1.5] h) than the soccer athletes (7.0 [1.2] h; ES = 0.6, $P < .001$) and controls (7.3 [1.2] h; ES = 0.32, $P = .002$). There was also a main effect of group on WASO, SE, and SOL. For perceptual variables, there was a main effect of group on recovery, with the controls (6.5 [5.5] AU, $P = .017$) having better recovery compared with both the soccer (6.0 [1.7] AU; ES = 0.21) and basketball athletes (5.6 [1.7] AU; ES = 0.43). There were no other significant main effects during habitual conditions.

There was an interaction effect between the athlete group and game location for bedtime ($P = .012$) and wake time ($P < .001$). The basketball athletes went to bed later than the soccer athletes following Home (23:45 [01:22] vs 23:01 [01:14]; ES = 0.38) and earlier following Away games (23:49 [01:25] vs 00:10 [01:45]; ES = 0.39). The basketball athletes woke later than the soccer athletes following Home (08:34 [00:57] vs 07:17 [01:12]; ES = 0.10) and earlier following Away games (07:22 [01:59] vs 08:13 [01:45]; ES = 0.10). There was also a main effect of game location on TST (Figure 1; ES = 0.39, $P = .004$) and WASO (ES = 0.24, $P = .009$). For perceptual variables, there was a main effect of game location (ES = 0.46, $P = .010$) and athlete group (ES = 0.50, $P = .009$) on recovery. Basketball and soccer athletes had greater perceptual recovery following Home (basketball, 5.7 [1.6] AU vs soccer, 6.3 [1.5] AU) compared with Away games (basketball, 5.0 [1.8] AU vs soccer, 5.8 [1.9] AU). There were no other significant effects for game location.

There was a main effect of game day on bedtime for the basketball and soccer athletes (G – 1, 23:16 [01:14] and 23:24

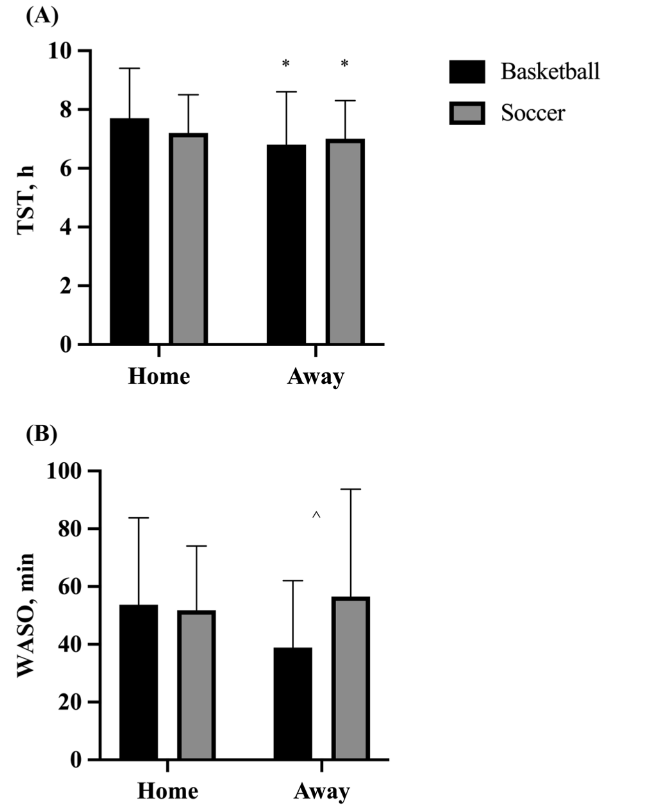

Figure 1 — Sleep variables following home or away games in basketball and soccer athlete groups (mean [SD]). (A) TST (in hours) and (B) WASO (in minutes). TST indicates total sleep time; WASO, wake after sleep onset. *Difference in home and away games within athlete group ($P < .05$). ^Difference in away games between athlete groups ($P < .05$).

Table 1 Habitual Sleep and Recovery of Basketball, Soccer, and Control Groups

Variable	Basketball	Soccer	Control
Bedtime, h:min	23:19 (01:18) (20:24–03:55)	23:10 (01:24) (20:30–04:34)	22:58 (01:15) (20:51–03:13)
Wake time, h:min	07:43 (01:26) (03:59–10:49)	07:12 (01:28) (05:00–11:22)	07:11 (01:07) (04:52–10:20)
TST, h	7.4 (1.5)*,** (2.7–10.2)	7.0 (1.2)* (3.4–10.5)	7.3 (1.2) (2.7–11.4)
WASO, min	52.6 (30.3)*,** (5.0–202.0)	53.6 (27.2)* (7.0–242.0)	50.2 (26.5) (5.0–188.0)
SE, %	87.8 (5.9)* (62.2–99.5)	87.5 (5.3)* (57.6–97.2)	88.4 (5.3) (66.1–96.9)
SOL, min	9.4 (10.9)*,** (2.0–113.0)	6.5 (4.5)* (1.0–28.0)	6.5 (5.5) (1.0–48.0)
Post sleep fatigue, AU	4.1 (1.3) (1.0–7.0)	3.8 (1.3) (1.0–7.0)	3.7 (1.3) (1.0–7.0)
Sleep quality, AU	2.9 (1.1) (1.0–5.0)	3.0 (1.0) (1.0–5.0)	2.8 (0.9) (1.0–5.0)
Recovery, AU	5.6 (1.7)* (1.0–9.0)	6.0 (1.7)* (1.0–9.0)	6.5 (5.5) (1.0–10.0)

Abbreviations: AU, arbitrary unit; SE, sleep efficiency; SOL, sleep onset latency; TST, total sleep time; WASO, wake after sleep onset. Note: Values are presented as mean (SD) (range [min–max]).
*Difference compared with control ($P < .05$). **Difference between basketball and soccer ($P < .05$).

[01:13]; G, 00:38 [01:23] and 00:35 [01:47]; G + 1, 23:26 [01:17] and 22:59 [01:22]; and G ± 1, 22:58 [00:40]; $P < .001$). Compared with G, there was a large effect of G − 1 (ES = 0.95), G ± 1 (ES = 1.23), and G + 1 (ES = 1.10) on bedtime. There was an interaction effect between the athlete group and game day for wake time ($P < .001$). The soccer athletes woke later than the basketball athletes the morning of the day before and the day of a game (G − 1, 08:11 [01:14] vs 07:28 [02:22]; G, 08:33 [01:25] vs 07:15 [01:49]; ES = 0.10) but earlier the day after a game (G + 1, 06:43 [01:23] vs 08:07 [00:58]; ES = 0.41). For TST, there was also an interaction effect (Figure 2; $P < .001$), with the basketball athletes sleeping less than the soccer athletes the day of the game (G, 5.9 [1.7] h vs 6.9 [1.3] h; ES = 0.83), but more the day after the game (G + 1, 7.2 [1.2] h vs 6.7 [1.2] h; ES = 0.45). There was a main effect of game day on WASO (Figure 2; $P < .001$) and SOL ($P = .016$). Compared with G, there was a large effect of G − 1 (ES = 2.54), G ± 1 (ES = 5.00), and G + 1 (ES = 1.38) on WASO. Compared with G, there was also a small to moderate effect of G − 1 (ES = 0.20), G ± 1 (ES = 0.65), and G + 1 (ES = 0.10) of SOL. The basketball and soccer athletes had shorter SOL the day before a game (G − 1, 7.3 [3.9] min vs 6.0 [5.0] min), and it increased the day of a game (G, 8.7 [9.3] min vs 8.3 [5.0] min). For perceptual variables, there was a main effect for morning fatigue (G − 1, basketball 3.8 [1.3] AU vs soccer 3.5 [1.4] AU; G, basketball 4.7 [1.3] AU vs soccer 4.1 [1.3] AU; $P < .001$), and an interaction effect for perceptual recovery (Figure 2; $P = .027$). Compared with G, there was a small

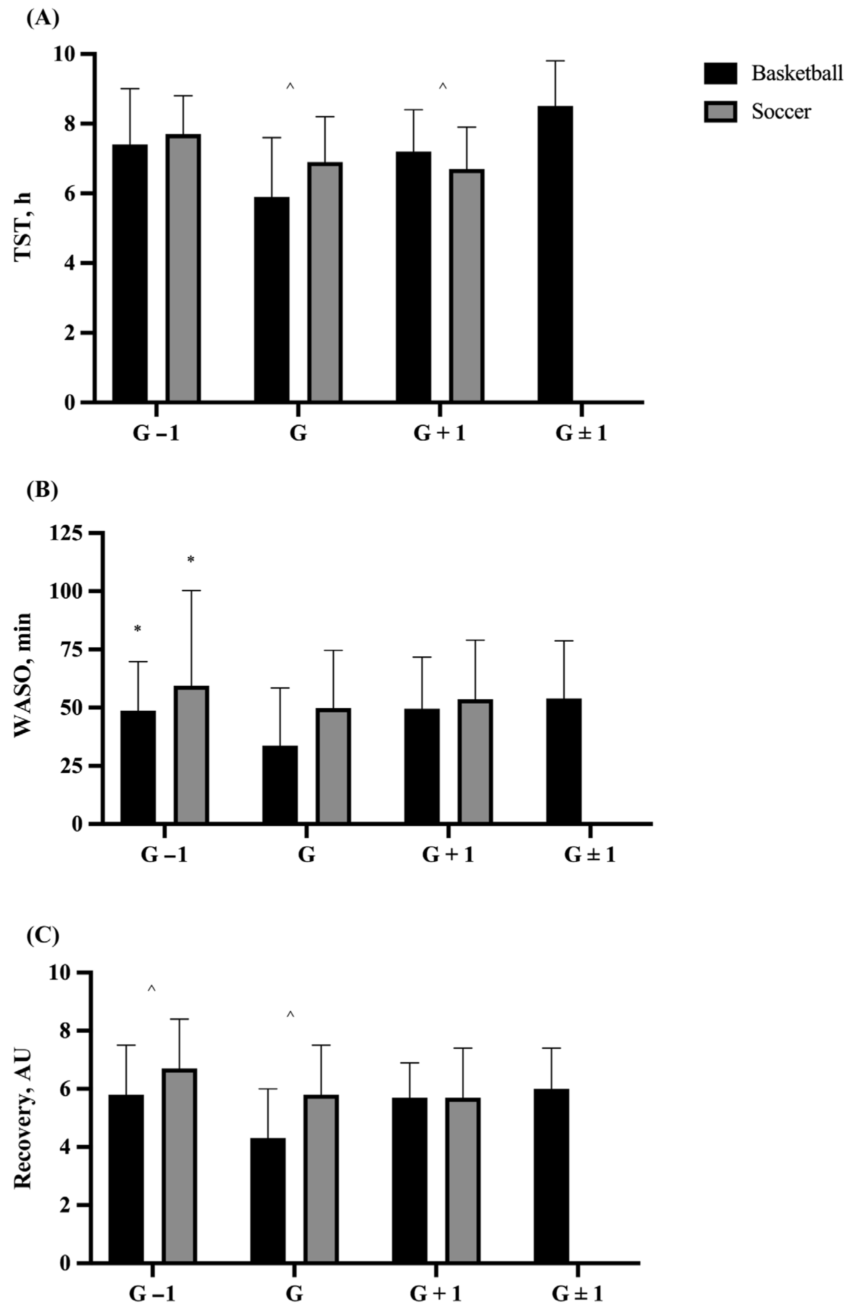

Figure 2 — Sleep and perceptual variables following different game days (G − 1, G, G + 1, and G ± 1) in basketball and soccer athlete groups (mean [SD]). (A) TST (in hours), (B) WASO (in minutes), and (C) recovery (in arbitrary units). AU indicates arbitrary units; TST, total sleep time; WASO, wake after sleep onset. *Difference compared with game day of the same athlete group ($P < .05$). ^Difference in game day between athlete groups ($P < .05$).

to moderate effect of G − 1 (ES = 0.60), G ± 1 (ES = 0.59), and G + 1 (ES = 0.33) on morning fatigue. Compared with G, there was a large effect of G − 1 for both the basketball (ES = 0.81) and soccer (ES = 0.81) athletes. There were no other significant effects for game day.

Discussion

The main findings of the present study were that (1) the nonathletic controls had shorter habitual sleep durations compared with the basketball group, but longer sleep durations compared with the soccer athletes; (2) the soccer athletes had the poorest habitual sleep of all 3 groups, sleeping 0.4 hours less than the basketball athletes due to earlier wake times; (3) both the basketball and soccer athletes had longer sleep durations following home compared with away games; and (4) the basketball players went to bed earlier and woke earlier compared with the soccer athletes following away games.

The present study demonstrates that elite athletes from 2 separate team-sport disciplines, and nonathletic controls, have different habitual sleep characteristics. For example, the basketball athletes had 0.1 hours longer sleep durations than the nonathlete controls, largely due to waking 32 minutes later. However, the soccer athletes slept less than both the nonathletic controls (–0.3 h) and basketball athletes (–0.4 h). Within the literature, there is conflicting evidence on whether athletes objectively sleep worse than nonathletic controls.[1,10] For example, male and female Olympic athletes had shorter sleep durations compared with controls.[1] In comparison, female soccer athletes had 38 minutes longer sleep durations compared with nonathletic controls as a result of different sleep–wake patterns (–00:31 earlier bedtime).[10] For sleep quality, the emerging evidence appears to be more consistent. In the present study, the nonathletic controls experienced slightly less wake time after falling asleep (–2.4 min) and better sleep quality (–0.6 to 0.9%) compared with both athlete groups. Our findings are comparable with other recent studies showing that nonathletic controls have superior objective[1] and subjective[21] sleep quality compared with athletes. It has previously been hypothesized that poor sleep quality in athletes could be due to a misalignment between preferred and actual sleep times.[21] In addition, rumination and anxiety may also influence sleep quality,[22] especially in female athletes.[7] Therefore, based on the overall suboptimal and inter-individual variability of habitual athlete sleep, it may be beneficial for practitioners to apply an athlete sleep toolbox approach.[23] The concept of the sleep toolbox centers around practitioners being equipped with different tools (ie, sleep education, sleep screening and referral, encouraging naps, and banking and sleep extension) to help overcome the challenges they may face when assisting athletes with their sleep.[23] There may also be particular benefit in focusing on sleep quality improvements by refining sleep hygiene (ie, sleep habits) practices (eg, obtaining adequate exposure to natural light in the morning, avoiding caffeine and heavy meals too close to bedtime, having a relaxing bedtime routine, and having a sleep environment which is cool, dark, and quiet).

During habitual conditions, the soccer athletes in the present study slept for 7.0 hours per night. This is at the lower end of the recommended sleep duration for healthy adults (7.0–9.0 h)[24] and is less than the habitual sleep durations identified in other cohorts of female soccer athletes.[25,26] For example, in 2 studies objectively measuring sleep using actigraphy, Costa et al[25,26] identified sleep durations of 7.2 to 7.3 hours on night training days (sessions starting at 21:00) and 7.9 to 8.6 hours on rest days in female soccer athletes. We suggest that the reduced sleep duration observed with the soccer athletes in the present study may be due to the early morning training sessions (06:30) compared with those scheduled for the basketball athletes (08:30 and 16:30), and the soccer athletes in the studies by Costa et al[25,26] (21:00). Comparable evidence has been found in a cohort of predominantly individual sport athletes (individual sport athletes, n = 50 and team-sport athletes, n = 20), with early morning training sessions resulting in reductions in sleep duration.[27] In addition, compared with the team-sport athletes in the present study, the individual sport athletes (both males and females) had an average sleep duration of 6.5 (1.1) hours, with early bed (22:27 [00:49]) and wake times (06:42 [01:00]).[28] Anecdotally, female athletes have to fit in their athletic pursuits around work commitments and share gyms with male athletes whose facility use often takes priority. Therefore, practitioners should strongly encourage strategies, such as prioritizing the night-time sleep window around logistical commitments and napping during the day.

Across their respective competition seasons, the basketball and soccer athletes had longer sleep durations following home games (basketball, 7.7 h and soccer, 7.2 h) compared with away games (basketball, 6.8 h and soccer 7.0 h). There was also a difference in the sleep–wake patterns; for example, the basketballers went to bed 29 minutes earlier than the soccer athletes following away games and then woke 51 minutes earlier the next morning. In comparison, previous research has found no difference in sleep durations for female basketball (home games, 7.4 h and away games, 7.6 h)[29] or soccer athletes (home games, 9.0 h and away games, 8.9 h), alongside minimal variance in sleep–wake patterns (eg, soccer athlete wake time: home games, 09:32; away games, 09:21).[25] We suggest that the differences we observed in sleep–wake patterns following away games relate to the travel schedules required by the athletes. For example, the soccer athletes traveled home immediately following day games, potentially delaying the time they went to bed. In comparison, the basketball athletes traveled home on the morning of the day following games, leading to earlier wake times. Therefore, coaches and support staff should try and organize return travel during the middle of the day following away games to allow athletes a longer sleep window and to not interfere with regular sleep–wake patterns. If athletes do have to sleep overnight following an away game, it may also be beneficial to prioritize making the physical sleeping environment as familiar as possible to prevent decrements in sleep quality.[30] In addition, researchers should begin to investigate the efficacy of easy-to-implement strategies (eg, a nutritional sleep supplement) that have the potential to improve sleep surrounding these situational challenges.

The basketball athletes slept less than the soccer athletes the day before the game (7.4 vs 7.7 h) and the day of the game (5.9 vs 6.9 h), but more the day after the game (7.2 vs 6.7 h). For the basketball athletes, these trends surrounding competition align with a recent study in netballers, finding that sleep duration was longest the night before the game (8.5 h), decreasing on game night (6.8 h), and then increasing slightly again the night following the game (7.4 h).[31] These increases in sleep quantity the day after the game for basketball athletes may be due to a build-up in homeostatic sleep pressure,[32] following the loss of sleep the day prior. Although the soccer athletes had similar sleep trends the day before and the day of a game, the day following a game, they experienced a further reduction in sleep duration. The primary cause of the reduced sleep duration in soccer players the day after a game appeared to be the early wake time (06:43). This reduction in sleep duration may impair soccer athletes' ability to recover and prepare for subsequent training sessions and games. Furthermore, over the course of a competition season, the suboptimal habitual and in-competition sleep (ie, at the lower end of the sleep recommendations of 7.0–9.0 h)[24] may result in cumulative sleep debt, thereby impairing athletes' health and athletic performance.[33]

This study provides much-needed normative data on the sleep of elite female basketball and soccer athletes. However, it is important to note that, due to the logistics of the respective competition seasons, not all situations could be accounted for in the data analysis (ie, day or night games, and regular or double-header rounds). In addition, the differences observed between groups for habitual sleep and home and away situations were generally small to medium (ie, effect sizes between 0.2 and 0.5 and 0.5 and 0.8); therefore, the clinical meaningfulness of these findings needs to be considered by practitioners working with female athletes. The present study attempted to account for some of the variance in sleep parameters that may occur during different phases of the menstrual cycle.[34] However, the self-reported methods used may lead to a misclassification of the menstrual phase due to daily hormone fluctuations, as well as the high variability among women in length of menstrual phases.[17] In addition, due to a lack of consistency in the collection of subjective and objective training load variables across the respective soccer and basketball seasons, there was no consideration of training load in the data analysis. Training load has been identified as a possible covariant that can influence sleep[35] and, therefore, would be a variable addition to future female athlete sleep studies.

Practical Applications

- Because of female athletes' suboptimal habitual and in-competition sleep, sleep screening should be conducted alongside other routine in-season physical and medical assessments so that appropriate and individualized interventions can be implemented.
- To better deal with scenarios that impair sleep during a competition season (ie, early-morning training sessions and away games), practitioners should provide female athletes with a tool kit of targeted sleep strategies, such as napping during the day and improving sleep hygiene.
- Athletes should consider the concept of protecting sleep surrounding competition. For example, if sleep may be disturbed on the day before and day of games, athletes should look to increase day and night-time sleep opportunities leading into and following these periods.

Conclusions

The results of the present study suggest that athletes and nonathletic controls have suboptimal sleep, with soccer athletes experiencing the poorest sleep of all 3 groups. In addition, during a competition season, basketball and soccer athletes experience different, and likely deleterious, sleep quantity and sleep–wake patterns following home and away games, as well as during the nights surrounding games. These findings highlight that sleep recommendations and interventions need to be individualized to specific sports, athlete groups, and competition scenarios encountered during a season.

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