Differences in self-reported stress between pre- and late-season periods in academy soccer players

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Headline

The monitoring of sleep and subjective wellbeing is of increased interest to sports practitioners (1,2). Increases in subjective stress have been associated with maladaptation and underperformance (3,4), and have the potential to negatively influence sleep (5). Furthermore, it is often reported that sports people fail to get sufficient sleep (6), which can negatively influence both recovery and performance (7).

Aim. The aim of the present study was to examine changes in self-reported sleep and subjective wellbeing scores between pre- and late-season in a cohort of elite soccer academy players. Understanding any changes in the scores could potentially drive interventions aimed at optimizing sleep and/or wellbeing in the late-season phase within this squad.

Methods

Athletes. Forty-two youth soccer players (age: 16.5 ± 1.2 years; height 176.9 ± 7.3 cm, mass 70.5 ± 4.4 kg), who attended the same English Premier League club academy, participated in this study. The data was collected as a condition on player monitoring, in which data is routinely collected as assessed across the season; as such, ethics committee clearance was not required (8). Nonetheless, the study conforms to the recommendations of the Declaration of Helsinki.

Design. A retrospective observational research design. Data was collected over the course of a season as part of regular monitoring, and analysed upon completion of the season. No further interventions were made.

Methodology. A five-question sleep and wellness questionnaire was administered on weekdays when players reported to training. The questions were related to hours slept (continuous, rounded to nearest half-hour), along with quality of sleep, muscle soreness, fatigue, and stress (all utilizing a 7-point interval scale; 1 = very good, 7 = very poor).

Statistical analysis. Upon completion of the competitive season, the individual player data was collected into a centralized spreadsheet. This data was then grouped into pre-season (July 3rd – August 11th) and late-season (March 5th – May 7th) training blocks. The pre-season period was six weeks in duration, and the late season period eight weeks in duration. The mean and SD were calculated for each of the five collected measures for both the pre- and late-season periods. Effect sizes for the difference in means were calculated and interpreted as trivial ($0 \leq ES \leq 0.2$), small ($0.2 \leq ES \leq 0.6$), moderate ($0.6 \leq ES \leq 1.2$), large ($1.2 \leq ES \leq 2.0$), and very large ($2.0 \leq ES \leq 4.0$) (9,10). Magnitude based inferences (MBI) were calculated using a downloadable spreadsheet (11), utilizing the following scale; 25-75% possibly; 75-95% likely, 95-99.5% very likely, >99.5% most likely. The threshold values used for this calculation were the smallest worthwhile effect (SWC) of the pre-season data, calculated as 0.2 x SD for each variable.

Results

It total, 1709 full data points (i.e. answers to all 5 questions) were collected across the pre-season (n=908) and late-season (n=801) time points.

Upon examining the data utilizing MBI, it was determined that there was a *likely small* increase in self-reported stress score in the late-season compared to the pre-season phase. This finding occurred alongside a *likely trivial* decrease in the quality of sleep from pre- to late-season, along with a possibility *trivial increase* in hours slept. Changes in muscle soreness and fatigue between the two periods were most *likely trivial*.

Discussion

The main finding of this study is that there was a small, but likely harmful, increase in subjective self-reported feelings of stress in this cohort of academy soccer players between the pre- and late-season phases of the year. This increase in stress score was accompanied by a trivial decrease in self-reported quality of sleep, and a possibly trivial (65%), possibly small (35%) increase in self-reported sleep duration. Importantly, there were no differences in regards to the two physiological-based measures (muscle soreness and fatigue) between the two periods, suggesting that this increase in self-reported stress was not due to increased fatigue. Additionally, on average, the players slept for over 8.5 hours per night in both of the phases examined in this study. This compares favorably to research in other athlete groups, who often get less than the recommended 8 hours per night (6,12,13), and suggests that interventions to further increase time spent asleep are perhaps not required in this group.

Our results suggest that there was a small increase in self-reported stress during the late phase of the season. This increase could have been due to increases in competition match play and travel (14) compared to the pre-season period. Increases in psychological stress have previously been associated with disturbances in immune function (15), risk of injury (16), and smaller adaptations to training (3); as such, increases in self-reported stress have the potential to negatively impact performance (4). Accordingly, addressing this increase in self-reported stress could be an important intervention for this cohort, particularly later during the competitive season. Our findings suggest that practitioners at other sporting clubs may wish to better understand how the subjective well-being of their players varies over the course of the season, allowing for targeted, periodized interventions to be implemented (17).

Practical Applications

- Soccer players appear to perceive a greater amount of stress towards the end of the season when compared to pre-season. This suggests that an increased emphasis on managing these increases in stress should occur as the season progresses.

Table 1. Pre- and late-season questionnaire scores.

Variable	Pre-season (n=908)	Late-Season (n=801)	Effect Size
Quality of Sleep	2.06 ± 0.86	1.94 ± 0.68	0.16 (0.08-0.24) "Trivial"
Hours Slept	8.54 ± 1.18	8.75 ± 0.93	0.20 (0.12-0.28) "Trivial"
Muscle Soreness	2.36 ± 0.86	2.39 ± 0.83	0.03 (-0.05-0.11) "Trivial"
Fatigue	2.29 ± 0.77	2.31 ± 0.64	0.03 (-0.05-0.11) "Trivial"
Stress	1.79 ± 0.75	1.97 ± 0.80	0.23 (0.15-0.31) "Small"

- This increase in stress occurred alongside a reduction in sleep quality and an increase in time spent asleep, although both these changes were trivial. However, interventions around sleep have the potential to be low cost and high impact7. As a result, interventions aimed at maximizing sleep quality may have a benefit, for little obvious downside.
- There were no meaningful differences in self-reported subjective measures of fatigue and soreness between the two time periods, suggesting that this increase in stress was psychological in nature.

Limitations

- The data analysed were self-report measures, which have the potential to be incorrect and subject to bias. A better approach, budget permitting, might be to utilise objective markers such as sleep trackers. However, subjective markers of wellbeing have been shown to have some utility1, and have the benefit of being very low in cost.
- Stress is a difficult phenotype to define, and as such may have been subject to differing interpretations across players.
- It's unclear what impact, if any, this increase in stress score has on performance, injury risk, and recovery. Further research will aim to build on this.

Conflicts of Interest

Craig Pickering is an employee of DNAFit Ltd, a genetic testing company.

Dataset

Dataset available on SportPerfSci.com

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