Subjective Sleep Quality prior to Home and Away Games for Female Volleyball Players

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Summary. In the field of professional team sports, anecdotal reports about athletes who experience disturbed sleep in the night prior to away games due to changes in the sleep environment have been published. Ten semi-professional female volleyball players participated in the study. Subjective sleep quality was psychometrically recorded prior to a home game, an away game, and two training days. The night before the away game the players slept in a hotel. The players reported poor sleep quality and a higher frequency of nocturnal awakenings for the night prior to the away game in comparison to the nights prior to the home game and the training days. One might speculate that the poor sleep quality reported during nights spent away from home interferes with performance during sports games, and therefore contributes to the so-called home advantage. Future studies should correlate sleep parameters with performance to corroborate this assumption.

Keywords: Athlete; Sport; First night effect

1. Introduction

In the field of professional team sports it is common that athletes have to sleep in unfamiliar locations (e.g. hotel) the night prior to away games. There are anecdotal reports that athletes experience disturbed sleep in these unfamiliar locations due to causes such as changes in environment, being in a different bed, noise, etc. (cf. Savis, 1994). The disturbed sleep that athletes experience in unfamiliar locations is comparable to the first-night effect (when a person spends his/her first night in a sleep laboratory), which is well known in sleep research (e.g. Agnew, Webb, & Williams, 1966). In general, during the first night in a sleep laboratory participants show less total sleep time, a lower sleep efficiency, more intermittent wake time, and prolonged sleep latency (cf. Le Bon et al., 2001).

Even though the circumstances during the first night in a sleep laboratory are more unpleasant than sleeping in a hotel room, some studies (cf. Brownman & Cartwright, 1966) have shown that an unfamiliar location might have similar effects on sleep.

Less total sleep time, prolonged sleep latency, and frequent awakenings during the night indicate a partial sleep restriction. Many studies have shown that partial sleep restrictions can have significant effects on daytime performance (e.g. Van Dongen & Dinges, 2005). Surprisingly, there are no published studies investigating whether sleep is disturbed in the night before an away game.

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The aim of the present study is to record the self-reported sleep quality of athletes prior to home games, away games, and usual training days. It is predicted that sleep quality is reduced the night prior to an away game in comparison to nights of home games and usual training.

2. Method

2.1. Participants

Ten female volleyball players participated in the study. Their mean age was 22.1 years (*SD* = 5.3), ranging from 16 to 32 years of age. The volleyball players are from one team and were in their regular game season playing in the second division of the German female volleyball league. The participants practiced volleyball an average of 16.20 hours a week (*SD* = 2.39). The participants had given written informed consent to the study. Participation was not paid. The study has been performed in accordance with the ethical standards laid down in the Declaration of Helsinki.

2.2. Materials

The subjective sleep quality was elicited by a sleep questionnaire (SF-A; Görtelmeyer, 1986). The SF-A has to be filled out the morning after awakening, and comprises 22 items measuring composite scores of five factors (e.g. “sleep quality”, “the feeling of being refreshed in the morning”) of the night before. For the study only the factor “sleep quality” was analyzed. The sleep quality scale includes 9 items with self-ratings about sleep latency, frequency of nocturnal awakenings, duration of nocturnal wakefulness, and psychological items. These items are anchored by a 5-point Likert scale, with descriptions such as sleep quality, uniform, deep, restless (negative pooled), relaxed, undisturbed, and good. Sleep latency was measured by a six-point scale (less than five minutes, 5 to 10 minutes, 10 to 20 minutes, 20 to 30 minutes, 30 minutes to one hour,

more than one hour). Frequency of nocturnal awakenings was measured by a five-point scale (none, yes, once, twice, three times, more than three times). The duration of nocturnal wakefulness was calculated as the sum of estimations in minutes for every awakening and afterwards categorized (less than five minutes, 6 to 10 minutes, 11 to 20 minutes, 21 to 40 minutes, more than 40 minutes). The composite scores (averages) for the sleep quality ranged from 1 = worse sleep quality to 5 = very good sleep quality.

Additionally, the bedtime was calculated from going-to-bed time and getting-up time in the morning, and both times are covered by the questionnaire. The interim consistency for the composite scores was for sleep quality r = .89 and the retest reliability (4 weeks) was r = .68 (Görtelmeyer, 1986, 1996). Construct validity was shown in several factor analyses, and comparisons with expert ratings were satisfying, for example, r = -.67 between sleep quality and the degree of insomnia (Görtelmeyer, 1986).

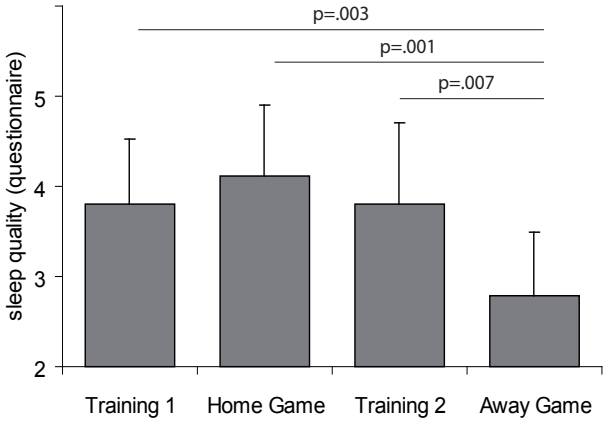

Figure 1. Mean values and standard deviation of the subjective sleep quality for the four conditions.

2.3. Design and Procedure

The volleyball players were contacted by one of the authors to distribute the set of questionnaires and to give the instructions about "how" and "when" to fill out the SF-A. Data was collected in the order of nights prior to a training day, a home game, another training day, and an away game. For the away game all players arrived the evening before the game and spent the night in a hotel. All participants were active players, e.g. the players played at least several minutes during the two games included in this study. The coach of the team stated that both games (home and away) were of equal importance for the team regarding their position in the league.

Analyses of variance for repeated measures were carried out to analyze the differences between the four time periods. Since the sub scales of sleep latency and number of awakenings were ordinal prior to transformation, Friedman coefficients were computed. One-tailed tests were applied since the direction of the effect was predicted for the subjective sleep quality variables. All other sleep parameters were tested two-tailed. Statistical analyses were carried out with the SPSS for Windows (Version 15.0.1) software package.

3. Results

Figure 1 shows the mean values and standard deviations for the sleep quality. For the subjective sleep quality a significant difference over the four time periods was found; $F(3, 27) = 9.3$, $p < .01$, $\eta^2 = 0.5$. Post-hoc analysis revealed a significant difference for the night prior to the away game in comparison to the other three nights. In Table 1 the mean values and standard deviations for three sub items of sleep quality and bedtime are depicted. A post-hoc analysis revealed marginally significant differences for the sleep latency, number of nocturnal awakenings, and duration of nocturnal wakefulness but not for the bedtime.

4. Discussion

The findings of the present study indicate that the subjective sleep quality of female volleyball players is reduced during the night before an away game in comparison to the nights prior to the home game or training days.

Two nights prior training sessions were included before the home game and before the away game to control for serial effects due to the non-randomized design. The results showed a marked decrease in sleep quality for the night prior to the away game whereas the sleep quality for the three other nights remained almost on the same level. This result makes serial effect implausible because if serial effects were present one would expect a constant decrease of the sleep quality over time. In future studies, a randomized design should be conducted to rule out the possibility of serial effects.

Since the importance of the home and away games were stated by the coach as similar, it might be speculated that the unfamiliar location affected the sleep quality from the volleyball players prior to the away game. This marked ef-

Table 1. Mean values and standard deviation of three sub items of sleep quality and bedtime for the four conditions.

	Training Session 1	Home Game	Training Session 2	Away Game	Test
	M* ± *SD	***M* ± *SD***	***M* ± *SD***	***M* ± *SD***	
Sleep Latency	2.7 ± 1.4[a]	1.6 ± 1.3[b]	2.1 ± 1.5	2.5 ± 1.2	$\chi^2 = 6.8$; $p = .04$
Number of Nocturnal Awakenings	2.0 ± 0.7[c]	1.8 ± 1.0[d]	1.5 ± 0.7[e]	3.2 ± 1.3[f]	$\chi^2 = 11.5$; $p < .01$
Duration of Nocturnal Wakefulness (min)	2.8 ± 3.0[g]	5.4 ± 11.2[h]	6.1 ± 17.2	16.6 ± 13.0[i]	$F = 2.8$; $p = .04$
Bedtime (hours)	8.6 ± 1.9	8.3 ± 1.5	7.7 ± 1.6	8.4 ± 1.2	$F = 0.9$; $p = .45$

Note. . [a] significant different from [b] ; [c, d, e] significant different from [f] ; [g, h] significant different from [i]; calculation for n = 10.

fect was even detected in a very small sample. Although the bedtime remained the same, participants had more and longer awakenings during the night before the away game in comparison to the home game and the training days. Comparable to the first night effect known in sleep laboratory studies (cf. Le Bon et al., 2001) the unfamiliar location was associated with poor sleep quality in the athletes during the night prior the away game.

The higher frequency of nocturnal awakenings during the night indicates that a partial sleep restriction might have taken place prior to the away game. It seems plausible that poor sleep quality could interfere with performance during sports games, and therefore might contribute to a lower quality performance in away games than in home games. This effect might partially explain the so-called home advantage, which describes the consistent finding that home teams in sports competitions win on a higher percentage rate than under a balanced home and away schedule (cf. Carron, Loughhead, & Bray, 2005) by an "away disadvantage". Future studies should record objective sleep parameters prior to the away game by using a portable sleep recording device and study whether disturbed sleep affects the performance in a sports game (cf. Zimmermann, 1996).

For athletes who have difficulties with sleep prior to an away game it might be helpful to offer them specific interventions („sleep training") (e.g. Müller & Paterock, 1999). Even though sleep research in sports is not well developed, the topic is of interest and relevance to researchers and practitioners in sports psychology.

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