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Sedentary Behaviors and Sleeping Duration among Saudi Basketball Players

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Abstract

This Sedentary behaviour (SB) affects health and performance in highly trained athletes. A number of research efforts have demonstrated that physical inactivity and SB are two independent entities. However, SB in highly trained athletes in Saudi Arabia has not been studied. Therefore, the aim of this study was to assess SB in Saudi basketball players. Sixteen basketball players (mean ± Standard Deviation (SD), age, 22.6 ± 3.3 years; body mass, 77.8 ± 10.5 kg; height, 182.9 ± 10.8 cm) participated in this study. A self-report SB questionnaire was used to assess time spent on watching television, using a computer/Internet, playing electronic games; total sedentary time; and sleep duration. The cut-off point of ≥2 h/day was used to categorise the outcome. Inadequate sleep duration was defined as <7 (h/night). The results show that 93.7% of basketball payers spent more than 2 h/day in sedentary activities. On average, the total amount of time spent on sedentary activities was 455 ± 218 min/day. Computer/Internet use was the predominant SB (191.8 ± 115.8 min/day) among basketball players, followed by electronic games playing (186.2 ± 113.9 min/day). The mean (±SD) sleep duration for weekdays and weekends were 7.2 ± 1.5 and 7.8 ± 1.6 (h/night), respectively. The weekday and weekend sleep duration analysis also shows that 25% and 12.5% of basketball players had insufficient sleep (<7 h/night) during weekdays and weekends, respectively. These findings indicate that athletes spent significant amounts of time in SB. This may suggest that SB still exists in highly trained athletic people. A quarter of the basketball players had an inadequate weekday sleep duration, and this short weekday sleep was compensated for during the weekend.

Keywords: Keywords: Athletes, Physical inactivity, Sedentary behavior, Hypokinetic diseases, Sleep duration

Introduction

It is well documented that being physically active improves many aspects—including mental and psychosocial—of individual health as well as disease prevention. The estimated increase in life expectancy as a result of eliminating physical inactivity is 1.51 years (Lee et al. 2012). According to the WHO, physical activity (PA) has been found to reduce the risk of diabetes, stroke, ischemic heart diseases, and breast and colon cancers (Hagberg, Park and Brown 2000). Anxiety, depression, and stress are also reduced, and mental health is improved as a result

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of PA (Blake et al. 2009). Moreover, physical inactivity is one of the leading causes of the major non-communicable diseases such as cardiovascular disease, type 2 diabetes and diverse types of cancer, and this contributes substantially to the burden of diseases, death, and disability worldwide .

In addition to physical inactivity, sedentary behaviour (SB) is believed to be a separate entity with its unique determinants and health consequences. A number of scientific works have demonstrated that physical inactivity and SB are two independent entities (Chomistek et al. 2013; Janssen and Ross 2012; Tremblay et al. 2017; Young et al. 2016). SB is shown to be related to adverse cardiometabolic risk profiles and premature mortality (Löllgen, Böckenhoff and Knapp 2009; Warren et al. 2010). Further, it differs from not doing physical activity or not meeting recommended levels of moderate-to-vigorous physical activity (Hamilton et al. 2008; Tremblay et al. 2010). As highly trained individuals, such as elite athletes, compete in highly physically demanding sports, there is little doubt about their meeting recommended levels of moderate-to-vigorous physical activity to achieve health benefits. However, SB could affect health and performance in highly trained athletes. It is interesting that there has been very little research on athletes' SB, and according to the limited available studies specifically on the prevalence of SB in athletes, elite athletes spend a considerable amount of time in SB (7–11 h/day) (Exel et al. 2019; Júdice et al. 2014; Sperlich et al. 2017; Weiler et al. 2015).

Moreover, it is known that regular PA may improve both sleep quantity and quality (Lang et al. 2016). In the general population, insufficient sleep duration has been linked to several negative health effects and major medical illnesses, including cardiovascular disease, cancer, as well as depression (Irwin 2015). From an athlete's standpoint, sleep has a critical role in promoting health and performance in elite athletes and all these metabolic pathways affected by sleep disturbance are very important to athletic performance. Elite athletes do not meet the traditional 8 h/night recommendation and have reported sleeping 6.5–6.8 h/night (Lastella et al. 2015; Leeder et al. 2012). A number of studies have reported that sleep deprivation has a negative impact on athletic performance, including weight-lifting, cardiorespiratory functioning, and psychomotor tasks that require consistent accuracy and performance (Edwards and Waterhouse 2009; Mougin et al. 1991; Reilly and Piercy 1994). A recent study also summarises the effects of reduced sleep on athletic performance and shows that sleep deprivation decreases running performance, muscle glycogen concentration, submaximal strength, isokinetic peak torque, minute ventilation, distance covered, sprint times, tennis-serve accuracy, soccer kicking skills, and time to exhaustion (Vitale et al. 2019). Reaction time and accuracy are very important skills in basketball; these skills are reported to be impaired by sleep deprivation and sleep restriction. However, accuracy has been found to improve after sleep extension. A study of collegiate male basketball players found an improvement in free- throw accuracy (9%) and three-point field goal percentage (9.2%) after an increase in sleep duration from 6.6 to 8.5 h/night (Mah et al. 2011).

Although athletes still have the risk of prolonged sedentary time, SB in highly trained athletes in Saudi Arabia has not been studied. Furthermore, little, if any, research conducted in Saudi Arabia has addressed sleep duration in elite athletes. To our knowledge, there are no studies to date that document both SB and sleep duration in Saudi elite athletes. Therefore, this study aimed to assess SB and sleeping duration in Saudi basketball players.

Methods

The study used a self-report SB questionnaire to assess the amount of time spent on sedentary activities and sleep duration. The questionnaire was previously shown to be valid and reliable for the assessment of PA and other lifestyle habits, including sedentary activities in the youth of 14–25 years of age (Al-Hazzaa and Al-Ahmadi 2003; Al-Hazzaa HM 2011). Sedentary activities include time spent on watching television, playing electronic games, using a computer and Internet. The total sedentary time is also taken into consideration. The total time spent on each behaviour was converted into hours and calculated for an average day. Average total sitting time (min/day) was calculated on the basis of 7 days. SB was categorised using a cut-off point of 2 h according to the recommendations of the American Academy of Paediatrics, which suggests a limit for a total screen time of no more than 2 h/day for youth (AAP 2001) ("COUNCIL ON COMMUNICATIONS AND MEDIA. Children, Adolescents, and the Media. Pediatrics. 2013;132(5):958-961.,")("COUNCIL ON COMMUNICATIONS AND MEDIA. Children, Adolescents, and the Media. Pediatrics. 2013;132(5):958-961.,")[29] [29]. Moreover, the total SB per day reported by participants was divided into two categories. Participants who reported ≥7 h/day (≥420 min/day) were categorised as having high sitting time; other participants who reported <7 h/day (<420 min/day) were categorised as having low sitting time. The cut-off point of sitting time for mortality risk was suggested to be approximately 7 h/day (ANPHA 2014; Chau et al. 2013).In the present study, sleep duration refers to the hours spent sleeping at night. Sleep duration was self-reported through two questions: “How many hours, approximately, do you usually sleep during a workday/weekday night?” and “How many hours, approximately, do you usually sleep per night during a weekend?” The response alternatives were ≤3, 4, 5, 6, 7, 8, 9 or ≥10 h. Inadequate sleep duration (short sleep) was defined as <7 h/night (St-Onge et al. 2016).

Results

Table 1 shows the mean and ±SD of the characteristics and SB of the basketball players. The results show that the total amount of time spent in SB of the basketball players was 455.0 ± 217.7 min/day. The results also show that computer/Internet use was the predominant SB among the basketball players (191.8 ± 115.8 min/day), followed by electronic games playing (186.2 ± 113.9 min/day). Table 2 also shows that the majority of the basketball players sat more than 2 h/day (94%). The results also reveal that 43% of the basketball players spent more than 7 h/day in SB (Table 2). Mean (±) and percentage of sleep duration during weekdays and weekends are shown in Table 3.

Table 1. Characteristics and sedentary behaviour of basketball players

Variables	Results
Age (years)	22.6 ± 3.3
Weight (kg)	77.8 ± 10.5
Height (cm)	182.9 ± 10.8
BMI (kg/m^2)	23.3 ± 2.9
Watching TV (min/day)	76.8 ± 66.6
Electronic games playing (min/day)	186.2 ± 113.9
Internet use (min/day)	191.8 ± 115.8
Total sedentary time (min/day)	455.0 ± 217.7

Table 2. Percentage of SB based on two different cut-off points

Variables	Results
Sitting ≥2 h/day (%)	93.7
Sitting <2 h/day (%)	6.3
Sitting time ≥7 h/day (%)	56.25
Sitting time <7 h/day (%)	43.75

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Table 3. Mean (±) and percentage of sleep duration during weekdays and weekends

Variables	Sleep duration	
	Weekdays	Weekends
Sleep duration (h/day)	7.4 ±1.5	7.8 ± 1.6
Sleep duration <7 h/night (%)	25	12.5
Sleep duration ≥7 h/night (%)	75	87.5

Discussions

The findings of this study provide evidence for the high prevalence of SB among Saudi elite athletes. To the best of our knowledge, this is the first study of its kind to show that SB exists in Saudi professional athletes. It also reveals that athletes are not free from the high risk of prolonged sitting. The prevalence of SB found in this study among the basketball players was remarkably high. A concern regarding the amount of time spent in sedentary activities has already been made and leads to the issuing of guidelines and recommendation that screen time should not exceed 2 h/day (AAP 2001). The majority of the basketball players (93.7%) in this study actually do not meet the SB recommendations with respect to the daily screen time.

It is interesting that computer/Internet use is the predominant SD (3.20 h/day) among the basketball players, followed by electronic games playing (3.1 h/day). TV viewing was not the commonest type of SD among the basketball players (1.28 h/day). TV viewing has been the most predominant SB and has been used as a measure of it. There is also an accumulating evidence to suggest that there are adverse associations between TV viewing time and a number of cardiovascular risk factors, such as the metabolic syndrome and obesity, abnormal glucose metabolism, and type 2 diabetes (Dunstan et al. 2007; Dunstan et al. 2005; Fb et al. 2003; Wijndaele et al. 2007). Moreover, in cross-sectional studies of adults and children alike, TV viewing time was found to be the predominant leisure-time SB that may have negative effects on overweight and obesity (Owen et al. 2000). In a particular cross-sectional study, TV viewing time was also associated with cardio-metabolic biomarkers but not with computer use and reading time in an Asian population (Nang et al. 2013). This study shows that basketball players spent less time in watching TV and that the latter activity is not the commonest type of sedentary activity.

The main findings of this study are that the average amount of time spent in SB of basketball players was 7.5 h/day, and 93.7% of basketball players spent more than 2 h/day in sedentary activities. Also, slightly more than half of them (56%) sat more than 7 h/day. There is strong evidence for considering SB as a health risk factor independent of physical activity time (Koster et al. 2012; Owen et al. 2010; Proper et al. 2011; Thorp et al. 2011; Tremblay et al. 2010). Current evidence from a meta-analysis of the relationships between daily sitting time and all-cause mortality revealed that more than 7 h/day is associated with increased mortality risk (Chau et al. 2013). Another recent meta-analysis based on 13 studies found an increased risk of all-cause mortality among adults spending four or more hours per day in SB (Ekelund et al. 2016).

Although SB is particularly common in our daily life, less attention has been paid to its prevalence with respect to elite athletes; hence, there is a dearth studies about it. Conversely, elite rowers were found to display a considerable sedentary off-training behaviour, thereby spending more than 11.5 h/day (Sperlich et al. 2017). Another study conducted on marathon and half-marathon participants showed that their total sitting time was more than 10 h/day (Whitfield, Pettee Gabriel Kk Fau - Kohl and Kohl 2014). The total SB of elite male athletes from different disciplines was 7.70 (Júdice et al. 2014). A study of football players showed that for the majority of participants (79%), post-training time was spent in sedentary activities (8.3 h/day) (Weiler et al. 2015). Moreover, master amateur runners and footballers spent a considerable amount of time in sedentary activities. In fact, the median of total sedentary activity for runners and footballers alike were 8.8 h/day and 9 h/day, respectively (Exel et al. 2019).

Previous studies have reported that elite athletes' sleep duration is 6.5–6.8 (h/night), not meeting the traditional 8 h recommendation (Lastella et al. 2015; Leeder et al. 2012). In this study, the sleep duration of basketball players during weekdays and weekends were 7.2 and 7.8 (h/night), respectively. About 25% of basketball players had insufficient sleep (<7 h/night) during weekdays. It is interesting that few basketball players (12.5%) had insufficient sleep during weekends. This possibly indicates that long weekend sleep may compensate for short weekday sleep (Åkerstedt et al. 2019). The role of extended weekend sleep is not well understood. Weekend compensatory sleep has been found in obese children (Wing et al. 2009) and hypertensive adults (Hwangbo et al. 2013). Sleeping more on the weekend to compensate for weekday sleep deficit could lower the risk of hypertension in adults and the risk of childhood overweight/obesity. With respect to athletes, weekend total sleep time was longer than weekdays, and this has a negative impact of sleep debt on student-athletes' psychomotor performance (Suppiah, Low and Chia 2016). As regards adolescent student-athletes, accumulated decreased sleep time on weekdays throughout the week was linked to a worsening of reaction times by the end of the week (Suppiah, Low and Chia 2016).

Basketball skills, such as reaction time and accuracy, are reported to be impaired by sleep deprivation and sleep restriction. However, when sleep duration is extended by athletes, accuracy in basketball improves accordingly. This relationship between accuracy and sleep extension has been confirmed by the finding from a study conducted on collegiate male basketball players. The subjects had to increase their sleep duration over a five-to-seven week period (Mah et al. 2011) thus showing that free-throw accuracy and three-point field goal percentage were improved after an increase in sleep duration from 6.6 to 8.5 h/night (Mah et al. 2011).

Over the last centuries, a decline in average sleep duration and quality has been noticed, resulting in adverse consequences on general health (Chang et al. 2015). One possible reason may be the use of electronic media devices, which has had a negative impact on sleep. Of course, elite athletes are not different from other subjects researched in the literature and therefore, do not escape the impact of electronic media devices. In fact, the prevalence of technology use, such as smartphones and other electronic devices, has increased, and this may lead to additional disruption of sleep (Chang et al. 2015; Halson 2016). It is more likely that elite athletes use electronic media devices to communicate the night before and after an event/match thereby preventing good sleep hygiene. The second reason is related to the use of light-emitting devices, which has been found to disrupt sleep and affecting next-morning alertness (Chang et al. 2015). A recent study has reported that the majority of elite athletes (70%) engaged in sedentary (blue-light emitting) activities within the last hour before bedtime (Knufinke et al. 2018). In a study conducted in Chinese female basketball players and aimed to determine the effect of red light on sleep quality and endurance performance found that the 14-day whole-body irradiation with red-light treatment improved the sleep, serum melatonin level, and endurance performance (Zhao et al. 2012).

Conclusion

These findings show that the majority of the basketball players spent significant amounts of SB, indicating that SB still exists in highly trained athletic people. The most predominant

SB also was computer/Internet use among the basketball players, followed by electronic games playing. Moreover, a quarter of the basketball players had an inadequate sleep duration over the weekdays, and this short weekday sleep was compensated for during the weekend.

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