Sleepiness among Professional, Semi Professional and Students Chinese Soccer Players in the Shanghai Lockdown

Songhui You , Yinhao Shen * , Qing Guang Liu , ANTONIO CICCHELLA *

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Article

Sleepiness Among Professional, Semi Professional and Students Chinese Soccer Players in the Shanghai Lockdown

Songhui You [1], Yinhao Shen [2], Qing Guang Liu [1], and Antonio Cicchella [1,2,*]

[1] Tongji University, International College of Football, Shanghai, China
[2] University of Bologna, Department for Quality-of-Life Studies, Bologna, Italy
* Correspondence: antonio.cicchella@unibo.it

Abstract: BACKGROUND. The aims of this study was to compare differences in daytime sleepiness between genders and qualification levels in a cohort university Chinese soccer player under 0 Covid policy restrictions in the urban area of Shanghai. METHODS. 491 questionnaires of Epworth Sleepiness Scales (ESS) were compiled online by males and females Soccer Students (SS), Semi-professional players (SP) and professional players (PP) during the ongoing measures of Shanghai lockdown. ANOVA was performed for players levels and gender. RESULTS. Significant differences were found between the 3 levels and between males and females. PP showed a very low score in the ESS (5,97) well below the threshold of 8, while SS and SP showed an ESS score above the threshold. Female showed higher scores than males. Differences between males and females reflect the confinement conditions in the ESS items. CONCLUSIONS. This study present the first data on sleepiness in Chinese soccer players of different level of qualification in a lockdown condition. Professional players has been less affected by lockdown measures than SS and SP. We can hypothesize the reasons resides in the more ordered lifestyle of PP in comparison to SS and SP, which mitigated the effects of the lockdown. Our results suggest that measures to improve sleep in females' soccer player should be adopted.

Keywords: sleepiness; lockdown; female athletes; Epworth Scale; soccer

1. Introduction

After decades of focusing merely on the performance, there is more public awareness on the wellbeing and quality of life of the athletes and consequently research in the field has increased [1]. Well-being in sport performance has been thus investigated, to increase the health of the athlete/worker. Among the parameters who affect the quality of life, sleep has a significant role. Sleep is a determinant of many illnesses and relates to several psychological and physical diseases [2], not to mention the effect of sleep on performance. In athletes, poor sleep quality has been reported more by female athletes than by male athletes: 31.4% of men and 48.8% of women had poor subjective sleep quality [3] and females experience diminished total sleep times [4,5]. Also, elite athletes seems to have shorter sleep than lower-level athletes [4,5]. Some explanation has been proposed for sleep shortage in professional athletes. Physiological causes has been advocated, such as hormonal activation (adrenal axis arousal) and induced by physical activity [6]. Forced exercise has been shown to cause circadian phase shifts in the kidney, liver, and submandibular glands by activating the sympathetic nervous system and the hypothalamus-pituitary-adrenal gland axis [7]. Beside these factors, it has been hypothesized that Elite athletes can possess personality characteristics which predispose to success in elite sport (i.e., perfectionism and anxious concern) which also predispose individuals to sleep disturbances [8].

The Covid-19 Lockdown also impacted athletes training [9,10] and powerful impacted lifestyles. Beside the worsening of the performance and the increased rate of injury, psychological and mood states were altered in male and female professional and non-professional soccer players, by the

restriction imposed by Covid 19 epidemic, increasing depression and anxiety [9]. Sleep quality and length has also been affected significantly by the lockdown. In a study performed on 175 Spanish football players of different level, males and females reported a worse sleep than before lockdown, and women has been shown to have a worsened sleep than males [9]. Shanghai complete lockdown was a unique setting for studying sleep related behaviors. It lasted 2 months and continued for several months with intermittent opening-closing of public places and sport facilities, and suspension of sport events. Universities and other large communities were locked when some positive cases were found. Stritch confinements in dormitories and limited mobility, were applied. University students has been especially affected by lockdowns because of the tightest restrictions in the campus, in comparison with the outside environment. Tongji University has a large College of Football, which enrolls both professional (dual career), semi-professional and student players, which were double affected by the restrictions: as students and as players. This fact can have altered players mood and thus influenced sleep habits. A study performed during lockdown in England on high level athletes, showed that during lockdown 20% of the dual-career athletes adopted a negative coping strategy with the lockdown measures [11].

There is some evidence among professional soccer players that males have a better sleep quality than women during the isolation period [9]. However, also in normal life conditions, sleep disturbances in females' soccer players has been only recently studied [5], showing a high incidence of sleep disturbance associated with the night pre-game [12], post-game or post training [13] with a decrease in sleep time in those conditions. Female sleep has been shown also to be sensitive to menstrual cycle [14] which in turn affect arousal control, stress response, and memory consolidation [14]. From the response of a survey in 231 woman (non-athletes, 18–28 years old), it was revealed that during lockdown, the habit of going to bed at night after 12 P.M was significantly increased [15] and was associated with disturbances in menstrual cycle. Another study performed in lockdown condition in China on 2084 university students, reported 10% higher rates of sleep disorders in females than male students. Females, also experienced a higher incidence of mental disorders having as a mediating factor sleep [16]. However, findings in male/female differences are controversial in different sports. A study in 146 top Brazilian Olympic athletes of various sport showed worse sleep (measured with polysomnography) in man than in woman [17], however this study didn't investigate soccer players. The same study showed that 36% of all athletes had a sleep disorder with a greater reduction in sleep quality in men than in women. Female athletes can also show a higher increase in inflammatory biomarkers and an higher fasting insulin levels subsequently to sleep disturbances in comparison to males [18]. Female athletes also showed higher circulating cortisol (which is known to increase as a response to sleep loss) after sleep deprivation than non-athlete females [19]. In another study comparing professional and Olympic athletes, was found that Olympic athletes has less disturbances than recreational athletes, but in the sample weren't professional soccer players [20]. Daytime sleepiness was found in 22.5% of a sample of 111 Qatar male professional players (ESS>8) [21]. Data on sleep after a prolonged lockdown in professional players are becoming available [9,10] but at our knowledge any data exist on daytime sleepiness in "normal" life conditions and during and after a lockdown in Asian male and female soccer athletes of different level of qualification. Thus, aims of this study was to compare differences in daytime sleepiness between genders and qualification levels in Chinese soccer players of different level of qualification under 0 Covid policy restrictions in the urban area of Shanghai.

2. Methods

Epworth sleepiness scale (ESS) is an 8 items clinical scale commonly used for the measure of sleepiness [22,23] and has been extensively used in different cultural contexts [24,25], and in clinical and sport populations [26]. It has the advantage of being easily administrable, to have extensive normative references [27], and to be available in several languages [28–31]. The ESS was validated also for Chinese language [32,33]. It comprises 8 items asking how the subject feel sleepy in different daily living activities concerning life situations while a person can feel sleepiness during the day, can be answered in a 0-3 scale [32]. The ESS shown to be stable in time across a period of one year [34]

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and consistent with other questionnaires for sleepiness [35]. A score of > 8 in the ESS is the threshold for the diagnosis of daytime sleepiness [3].

The ESS questionnaire was submitted online. Subjects were recruited by mean of University offices and after with the social media Wechat and by direct contact and were asked to fill the Chinese version of the questionnaire built in the Chinese social media Wechat (Tencent Technologies, Shenzen, China) [36]. Wechat has proven to be a valuable tool to submit online questionnaires and in China is used by everyone [37]. The questionnaires were filled by soccer students (SS), semi-professional (SP) and professional players (PP) in the city of Shanghai in the weeks 16 to 31 October 2022, after a 10 days complete lockdown in the universities and with still ongoing limitation to mobility. Shanghai experienced a complete lockdown from 28 of March till 30 of May 2022. All the subjects, including the professional players, were also university students. Players' levels were defined according to the rules of CFA (Chinese Football Association), which are complex, but guarantee a tight classification because are grounded in several performance parameters (e.g., number of games in one year in the division) and on the career of the player. SS were students in the International College of Football of Tongji University and participate in soccer training at least four times per week plus an inter-university weekend match, while SP and PP trained once per day, SP play a regional match every weekend, and PP play a match every 4 days, and sometime twice per week in the major Chinese League. The measures were performed during the championships season. The study was conducted according to the guidelines of the Declaration of Helsinki, and approved by the Ethics Committee of Tongji University (approval code: tjdxsr029). Informed consent was obtained by the participants, after the explanation of the aim of the study.

Gender and level comparisons was performed using One way ANOVA (Scheffe post-hoc) with SPSS v.20.0 and significance level was set a 0.5. Post-hoc statistical power with an MDE (minimum detectable effect) of 0.5, was calculated at 0,9732.

3. Results

A total of 491 soccer players, 441 male and 50 females filled the questionnaire. Mean age for the total group was 19,16±2,68 years (19,17±3,41 for males and 19.10±1.68 for females. 407 were soccer collegiate students (SS), 55 were semi-professional (SP, Level 1 and 2 CFA) and 29 were professional players, playing in the Chinese major league (PP). Among females, 21 were SS and 29 SP players, among males, 386 were SS and 56 SP players. Data were all normal distributed at Kolmogorov-Smirnoff test. Descriptive statistics are summarized in Table 1.

Table 1. Epworth scale for the different groups (SS = soccer students, SP = semiprofessional, PP = professional).

Level	Gender		Age (years)	Epsworth Score
SS	Males	Mean	18,49	7,89
		N	386	386
		Std. Deviation	15,14	3,45
	Females	Mean	18,24	9,05
		N	21	21
		Std. Deviation	1,37	3,35
	Total	Mean	18,48	7,95
		N	407	407
		Std. Deviation	15,07	3,45
SP	Males	Mean	20,31	9,85
		N	26	26
		Std. Deviation	1,89	4,81
	Females	Mean	19,72	10,14
		N	29	29
		Std. Deviation	1,62	4,28
	Total	Mean	20	10
		N	55	55
		Std. Deviation	1,76	4,50
PP	Males	Mean	27,21	5,97

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		N	29	29
		Std. Deviation	3,44	3,05
Total	Males	Mean	19,17	7,88
		N	441	441
		Std. Deviation	2,77	3,58
	Females	Mean	19,10	9,68
		N	50	50
		Std. Deviation	16,81	39,20
Total		Mean	19,17	8,07
		N	491	491
		Std. Deviation	2,68	3,65

Age was significantly different between levels ($F_{2,490}$ = 361,42 p = ,000) but not between gender in each group. Four items of the Epworth scale were find different between males and females. Females declared to feel sleepier in the following items: "sleeping while sitting and reading" ($F_{1,490}$ = 9,76, p = 0,002) and while watching television/mobile (F = 11,88, p = 0,001), "sitting and talking with someone" ($F_{1,490}$ = 11,22. P =0,001); "sitting quietly after a lunch without alcohol" ($F_{1,490}$ = 13, p= 000). Total score was also significantly different between the genders ($F_{1,490}$ = 11,12, p= 0,001). All the items ($F_{2,490}$= 33,11 – 70,88, p = .000) and the total score ($F_{2,490}$ = 13,36 p = 0,000) were significantly different between the 3 levels of qualification. Also, all the items refers to indoor situation, albeit ESS has also item referring to external environmental settings.

The percentages of subjects over the daytime threshold sleepiness (ESS > 8) were: SP females (72%); SP males (65,38%); SS females (52%); SS males (41,6%). The overall SP group (male and females) showed a 69,09% of subject over threshold and the overall SS group 42%. In the overall group females showed the higher % of subject over threshold (64%) while males had 43,20% above the threshold for sleepiness. We found a percent of above threshold sleepiness subjects in SP dramatically higher than those found in a sample of professional players in Qatar 22.5% (ESS>8) [21].

4. Discussion

Surprisingly, in the lockdown condition our sample of male's professional players show a very low score of daytime sleepiness contrary to what reported in most of the literature we reviewed for western soccer players in normal conditions [3,4,5,17]. However, no data exist about sleepiness in Chinese soccer players in "normal" life conditions to compare. The Epworth scale items results reflect the confinement conditions, referring to all indoor environments. We can hypothesize a cause can be the higher arousal in these athletes caused by intensive training and playing, or to genetic factors, e.g., subjects with less sleepiness has more chance to reach the top level. However, at our knowledge this is the first study in Chinese professional players, and the cultural differences can also play a role in explaining the sleep behaviors. In respect to lockdown conditions, we can hypothesize professional athletes had more disciplined and lived a regular life, while students were more stressed by lockdown measures. Our study was performed during the Shanghai lockdown, with still some restrictive measures going on. In the same period of filling the questionnaire, the university students and players were locked in their dormitories for 10 days. This factor can have influenced the results, increasing the stress levels and thus the sleepiness of the students. Daytime sleepiness has been also related to depression [38], and this is the case of lockdown. In a large sample of children and adolescent the impact of lockdown on mental health has been shown to be dramatic [39]. However, social support was shown to play an important role in reducing the negative effect of lockdown on mental health in 675 non-professional soccer players in China [39], albeit this sample was not investigated for sleep. Cultural differences can also play a role. In Chinese culture, students' study is highly valued and the competition high, so students may show hopelessness for poor academic performance caused by the lockdown [40].

Despite the controversial literature about sleep disturbances in females' athletes [11,12,13,17] our results support the presence of a higher percent of sleepiness in female soccer players compared to males. This result is consistent with another study in Spanish professional football players performed

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during a lockdown, who showed men having better sleep quality than women during the isolation period [9]. However, this latter study didn't consider daytime sleepiness.

Sleep is an emerging as a key factor for health of female players, and it was indicated among the factors to be improved to increase female soccer players health [41]. It remains a question why females are so dramatically affected by sleepiness in comparison to males, due that training status should different and adapted. One hypothesis which is consistent with the available literature is dual career female athletes faces more challenges than males [42] both socially than physically, and the demands faced by players increases as their level of education/vocation becomes higher. This factor can explain the differences we found in sleepiness between males and females SP players.

We can also hypothesize the training methods for soccer are traditionally developed for men and are less suitable for women, and this can cause a training overload in females, which deals to poor sleep. In fact, as mismatch between coaches and players evaluation of training loads has been showed in professional males soccer players [43] and can be a causal factor of poor sleep, even if no such studies exist in females. Also, psychological reasons (more involvement in their role by females) can affect this outcome: professional female soccer players, show higher values for stress control, motivation, mental ability, and team cohesion in comparison to female amateur [44] which can make them more susceptible of emotional distress. Females' soccer players were found more sensitive to performance evaluation by coaches and peers [32] and more at risk for anxiety and depression than males [45] and to have shorter sleep-in comparison to other professional's sport female athletes [46]. In normal conditions, the sleep disruption is likely to be caused by the high physical and mental loads experienced during soccer games [47]. Sleep modification in normal conditions shows an association of deep and REM sleep with fatigue with increased restoring sleep two to three days after match an a pre-match reduction in sleep length [47]. Our results are also consistent with another study, who showed in Italian female professional soccer players in lockdown an increase in depressive symptoms and a sleep worsening [48]. Interactions between coach/trainer and player were more frequent (i.e, daily) among professional (27%) than amateur (11%) and semipro (17%) players during lockdown [49]. This factor can also influenced mood and thus sleepiness in PP. Another factor we didn't investigated, and that can have influenced the results, is the chronotype of the athletes, or the preference for morning or evening activities. In fact, it has been shown that athletes tended to select and pursue sports that suited their chronotype [50].

5. Conclusions

Due to the exceptional conditions of this study, we observed different behaviors in soccer players from previous studies on daytime sleepiness. However, our study focused on Chinese soccer players during an unusual life condition, and no data existed previously in such experimental conditions. Professional soccer players showed a very low score in daytime sleepiness, and this could be explained with the more organized life they had during the lockdown. Commitment to result can have reduced the impact of emotional stressor in professional soccer players. We can also hypothesize the subjects with a higher arousal reach the top level, or the intensive training and playing in professional make them less sleepy through the activation of hypothalamic-surrenal axis. Our result confirm females more susceptible to sleep disturbances than males even in the lockdown conditions. Due to the exceptional experimental conditions of the present study (Shanghai lockdown) we can hypothesize the excessive sleepiness in recreational and semiprofessional soccer players could be linked to the daily life restrictions and consequent mood disturbance, while these conditions seemed to affect less the professional players who benefit of better life arrangements. Cultural differences could also explain the observed reduced sleepiness in professional Chinese soccer players in comparison to Western players.

Beside these findings, the results suggest than interventions are necessary to improve the sleep hygiene in SP soccer players, especially in females. Further investigations are necessary on the low sleepiness of professional soccer players, e.g., a study performed in non-emergency conditions. A limit of our study is we don't have any data about sleepiness before lockdown and we didn't measure any physiological data (e.g., circulating cortisol, inflammatory biomarkers an menstrual cycle) to

correlate with the questionnaire. Also, a measurement of depression could have been helpful in better understanding the results. A follow-up measurement after the recovering of normal life, will be also necessary. Also, we missed a group of professional females' athletes to compare with males professionals. Shanghai lockdown was a unique setting to study the sleepiness in soccer players. The observed modification in sleepiness behaviors can be useful for the adoption of measure to increase soccer players health and well-being, especially in female soccer players.

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Institutional Review Board Statement: The study was conducted according to the guidelines of the Declaration of Helsinki, and approved by the Institutional Review Board (or Ethics Committee) of TONGJI UNIVERSITY (approval code: tjdxsr029 22/12/2022).

Informed Consent Statement: Informed consent was obtained from all subjects involved in the study.

Data Availability Statement: The data are kept by the corresponding author for privacy reasons, and will be given upon request.

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Conflicts of Interest: Authors declare no conflict of interests.

References

1. Giles, S.; Fletcher, D.; Arnold, R.; Ashfield, A. Harrison J. Measuring Well-Being in Sport Performers: Where are We Now and How do we Progress? *Sports Med. 2020 ,50,*1255-1270. doi: 10.1007/s40279-020-01274-z.
2. Pontin, E.; Schwannauer, M.; Tai, S.; Kinderman, P. A. UK validation of a general measure of subjective well-being: the modified BBC Subjective Well-Being Scale (BBC-SWB). *Health Qual Life Outcomes 2013,11,*1–9. doi: 10.1186/1477-7525-11-150.
3. Kawasaki, Y.; Kasai, T.; Koikawa, N. et al. A. Sex differences in factors associated with poor subjective sleep quality in athletes. *J Sports Med Phys Fitness. 2020, 60,*140-151. doi: 10.23736/S0022-4707.19.09875-X.
4. Fullagar, H.H.; Skorski, S.; Duffield, R. et al. Sleep and athletic performance: the effects of sleep loss on exercise performance and physiological and cognitive responses to exercise. *Sports Med. 2015,45,*161–86.
5. Fullagar, H.H.; Skorski, S.; Duffield, R. et al. Impaired sleep and recovery after night matches in elite football players. *J Sports Sci. 2016,34,*1333–9.
6. Healy, K.L.; Morris, A.R.; Liu A.C. Circadian Synchrony: Sleep, Nutrition, and Physical Activity. *Front Netw Physiol. 2021,1*:732243.
7. Sasaki, H.; Hattori, Y.; Ikeda, Y.; Kamagata, M.; Iwami, S.; Yasuda, S. et al. Forced rather Than Voluntary Exercise Entrains Peripheral Clocks via a Corticosterone/noradrenaline Increase in PER2:LUC Mice. *Sci. Rep 2016, 6*, 27607. doi: 10.1038/srep27607
8. Gupta, L.; Morgan, K.; Gilchrist, S. Does Elite Sport Degrade Sleep Quality? A Systematic Review. *Sports Med. 2017,47,*1317-33. doi: 10.1007/s40279-016-0650-6.
9. Mon-López, D.; García-Aliaga, A.; Ginés Bartolomé, A.; Muriarte Solana, D. How has COVID-19 modified training and mood in professional and non-professional football players? *Physiol Behav. 2020,227,*113148. doi: 10.1016/j.physbeh.2020.113148.
10. Thron, M.; Düking, P.; Härtel, S.; Woll, A.; Altmann, S. Differences in Physical Match Performance and Injury Occurrence Before and After the COVID-19 Break in Professional European Soccer Leagues: A Systematic Review. *Sports Med Open. 2022,8,*121. doi: 10.1186/s40798-022-00505-z.
11. Cartigny, E.; Vickers, E.; Harrison, G. et al. The impact of COVID-19 on dual career athletes: Three typologies of coping. *Journal of sports sciences 2022, 40,* 1265–74. https://doi.org/10.1080/02640414.2022.2065088
12. Thomas, C.; Jones, H.; Whitworth-Turner, C.; Louis, J. A Sleep Analysis of Elite Female Soccer Players During a Competition Week. *Int J Sports Physiol Perform. 2021,16,*1288-1294. doi: 10.1123/ijspp.2020-0706.
13. Miles, KH.; Clark, B.; Fowler, PM.; Miller J.; Pumpa, KL. What are the sleep characteristics of elite female athletes? A systematic review with meta-analysis. Biol Sport. 2022,39,751-763. doi: 10.5114/biolsport.2022.108705.
14. Cabrera, Y.; Holloway, J.; Poe, G.R. Sleep Changes Across the Female Hormonal Cycle Affecting Memory: Implications for Resilient Adaptation to Traumatic Experiences. *J Womens Health 2020,29,*446-451. doi: 10.1089/jwh.2020.8332. PMID: 32186966; PMCID: PMC7097681.

15. Dutta, G.; Murugesan, K. A Study on the Sleep-Wake Behavior during COVID-19 Lockdown and its Effect on Menstrual Cycle. *Indian J Community Med. 2021,46*,564-565. doi: 10.4103/ijcm.IJCM_767_20.
16. Zhang, B.; Le, S.M; Le, S.; Gong, Q.; Cheng, S.; Wang, X. Changes in health behaviors and conditions during COVID-19 pandemic strict campus lockdown among Chinese university students. *Front Psychol. 2022,17,*:1022966. doi: 10.3389/fpsyg.2022.1022966.
17. Silva, A.; Narciso, F.V.; Rosa, J.P.; Rodrigues, D.F.; Cruz, A.; Tufik, S.; Viana, F.; Bichara, J.J.; Pereira, S.R.D.; da Silva, S.C.; Mello, M.T. Gender differences in sleep patterns and sleep complaints of elite athletes. *Sleep Sci. 2019,12*,242-248. doi: 10.5935/1984-0063.20190084.
18. Suarez, E.C. Self-reported symptoms of sleep disturbance and inflammation.; coagulation.; insulin resistance and psychosocial distress: evidence for gender disparity. *Brain Behav Immun. 2008,22*,960–8.
19. Vgontzas, A.N.; Zoumakis, E.; Bixlerswe, E.O. et al. Adverse effects of modest sleep restriction on sleepiness.; performance.; and inflammatory cytokines. *J Clin Endocrinol Metab. 2004, 89*,2119–26.
20. Lucidi, F.; Lombardo, C.; Russo, P.M. et al. Sleep complaints in Italian Olympic and recreational athletes. *J Clin Sport Psychol. 2007, 1*,121–
21. Khalladi, K.; Farooq, A.; Souissi, S.; Herrera, C.P.; Chamari, K.; Taylor, L.; El Massioui, F. Inter-relationship between sleep quality.; insomnia and sleep disorders in professional soccer players. *BMJ Open Sport Exerc Med. 2019,5*,e000498. doi: 10.1136/bmjsem-2018-000498.
22. Walker, N.A.; Sunderram, J.; Zhang, P.; Lu, S.E.; Scharf, M.T. Clinical utility of the Epworth sleepiness scale. *Sleep Breath. 2020,24*,1759-1765. doi: 10.1007/s11325-020-02015-2.
23. Kendzerska, T.B.; Smith, P.M.; Brignardello-Petersen, R.; Leung, R.S.; Tomlinson, G.A. Evaluation of the measurement properties of the Epworth sleepiness scale: a systematic review. *Sleep Med Rev. 2014,18*,321-31. doi: 10.1016/j.smrv.2013.08.002.
24. Herrera, C.P. Total sleep time in Muslim football players is reduced during Ramadan: a pilot study on the standardized assessment of subjective sleep-wake patterns in athletes. *J Sports Sci. 2012,30*,S85-91. doi: 10.1080/02640414.2012.676666.
25. Rosales-Mayor, E.; Rey de Castro, J.; Huayanay, L.; Zagaceta, K. Validation and modification of the Epworth Sleepiness Scale in Peruvian population. *Sleep Breath. 2012,16*,59-69. doi: 10.1007/s11325-011-0485-1.
26. Beaudreau, S.A.; Spira, A.P.; Stewart, A.; Kezirian, E.J.; Lui, L.Y.; Ensrud, K.; Redline, S.; Ancoli-Israel, S.; Stone, K.L. Study of Osteoporotic Fractures. Validation of the Pittsburgh Sleep Quality Index and the Epworth Sleepiness Scale in older black and white women. *Sleep Med. 2012 ,13*,36-42. doi: 10.1016/j.sleep.2011.04.005.
27. Sander, C.; Hegerl, U.; Wirkner, K.; Walter, N.; Kocalevent, RD.; Petrowski, K.; Glaesmer, H.; Hinz, A. Normative values of the Epworth Sleepiness Scale (ESS).; derived from a large German sample. *Sleep Breath. 2016,20*,1337-1345. doi: 10.1007/s11325-016-1363-7.
28. Ahmed, A.E.; Fatani, A.; Al-Harbi, A.; Al-Shimemeri, A.; Ali, Y.Z.; Baharoon, S.; Al-Jahdali, H. Validation of the Arabic version of the Epworth sleepiness scale. *J Epidemiol Glob Health. 2014,4*,297-302. doi: 10.1016/j.jegh.2014.04.004.
29. Izci, B.; Ardic, S.; First, H.; Sahin, A.; Altinors, M.; Karacan, I. Reliability and validity studies of the Turkish version of the Epworth Sleepiness Scale. *Sleep Breath. 2008, 12*,161-8. doi: 10.1007/s11325-007-0145-7.
30. Beiske, K.K.; Kjelsberg, F.N.; Ruud, E.A.; Stavem, K. Reliability and validity of a Norwegian version of the Epworth sleepiness scale. *Sleep Breath. 2009,13*,65-72. doi: 10.1007/s11325-008-0202-x.
31. Veqar, Z.; Hussain, M.E. Psychometric analysis of Epworth Sleepiness Scale and its correlation with Pittsburgh sleep quality index in poor sleepers among Indian university students. *Int J Adolesc Med Health. 2018,31*,2. doi: 10.1515/ijamh-2016-0151.
32. Chen, N.H.; Johns, M.W.; Li, H.Y.; Chu, C.C.; Liang, S.C.; Shu, Y.H.; Chuang, M.L.; Wang, P.C. Validation of a Chinese version of the Epworth sleepiness scale. *Qual Life Res. 2002,11*,817-21. doi: 10.1023/a:1020818417949.
33. Peng, L.L.; Li, J.R.; Sun, J.J.; Li, W.Y.; Sun, Y.M.; Zhang, R.; Yu, L.L. [Reliability and validity of the simplified Chinese version of Epworth sleepiness scale]. *Zhonghua Er Bi Yan Hou Tou Jing Wai Ke Za Zhi. 2011,46*,44-9. In Chinese.
34. Knutson, K.L.; Rathouz, P.J.; Yan, L.L.; Liu, K.; Lauderdale, D.S. Stability of the Pittsburgh Sleep Quality Index and the Epworth Sleepiness Questionnaires over 1 year in early middle-aged adults: the CARDIA study. *Sleep. 2006,1*,1503-6. doi: 10.1093/sleep/29.11.1503.
35. Fabbri, M.; Beracci, A.; Martoni, M.; Meneo, D.; Tonetti, L.; Natale V. Measuring Subjective Sleep Quality: A Review. *Int J Environ Res Public Health. 2021, 18*, 1082. doi: 10.3390/ijeSSh18031082.
36. Chinese version of Epworth Sleepiness Scale. Available online: https://www.wjx.cn/vm/hn09EjC.aspx. (Last accessed: 12/01/2023).
37. Science on WeChat. *Nat Methods. 2020,9*,863. doi: 10.1038/s41592-020-0954-1.
38. Gonsalvez, I.; Li, J.J.; Stevens, C.; Chen, J.A.; Liu, C.H. Preexisting Depression and Daytime Sleepiness in Women and Men. *Behav Sleep Med. 2022, 20,* 380-392. doi: 10.1080/15402002.2021.1924720.

39. Ma, J.; Ding, J.; Hu, J.; Wang, K.; Xiao, S.; Luo, T.; Yu, S.; Liu, C.; Xu, Y.; Liu, Y.; Wang, C.; Guo, S.; Yang, X.; Song, H.; Geng, Y.; Jin, Y.; Chen, H.; Liu, C. Children and Adolescents' Psychological Well-Being Became Worse in Heavily Hit Chinese Provinces during the COVID-19 *Epidemic. J Psychiatr Brain Sci. 2021*,5,:e210020. doi: 10.20900/jpbs.20210020.
40. Zhao, L.; Liu, Z.; Zhang, L. The effect of the perceived social support on mental health of Chinese college soccer players during the COVID-19 lockdown: The chain mediating role of athlete burnout and hopelessness. *Front Psychol. 2022,11*;13:1001020. doi: 10.3389/fpsyg.2022.1001020.
41. Crossley, K.M.; Patterson, B.E.; Culvenor, A.G.; Bruder, A.M.; Mosler, A.B.; Mentiplay, B.F. Making football safer for women: a systematic review and meta-analysis of injury prevention programmes in 11 773 female football (soccer) players. *Br J Sports Med. 2020,54*,1089-1098. doi: 10.1136/bjsports-2019-101587.
42. Harrison, G. E.; Vickers, E.; Fletcher, D. and Taylor, G. Elite female soccer players' dual career plans and the demands they encounter. *Journal of Applied Sport Psychology, 2020,34,* 133–154. https://doi.org/10.1080/10413200.2020.1716871.
43. Brink, M.S.; Frencken, W.G.P.; Jordet, G.; Lemmink, K.A. Coaches' and players' perceptions of training dose: not a perfect match. *Int J Sports Physiol Perform. 2014,9*,497-502. doi: 10.1123/ijspp.2013-0009.
44. Ruiz-Femal Esteban, C.; Olmedilla, A.; Méndez, I.; Tobal, J.J. Female Soccer Players' Psychological Profile: Differences between Professional and Amateur Players. *Int J Environ Res Public Health. 2020,17*,4357. doi: 10.3390/ijeSSh17124357.
45. Junge, A.; Feddermann-Demont, N. Prevalence of depression and anxiety in top-level male and female football players. *BMJ Open Sport & Exercise Medicine 2016,2*,e000087. doi: 10.1136/bmjsem-2015-000087.
46. Miles, K.H.; Clark, B.; Mara, J.K.; Fowler, P.M.; Miller, J.; Pumpa, K.L. How Do the Habitual Sleep Patterns of Elite Female Basketball and Soccer Athletes Compare With the General Population? *Int J Sports Physiol Perform. 2022,17*,234-240. doi: 10.1123/ijspp.2021-0189.
47. Moen F.; Olsen M.; Halmøy G.; Hrozanova M. Variations in Elite Female Soccer Players' Sleep.; and Associations With Perceived Fatigue and Soccer Games. *Front Sports Act Living. 2021,3*,694537. doi: 10.3389/fspor.2021.694537.
48. Ivarsson, A.; McCall, A.; Mutch, S.; Giuliani, A.; Bassetto, R.; Fanchini, M. Mental health and well-being during COVID-19 lockdown: A survey case report of high-level male and female players of an Italian Serie A football club. *Sci Med Footb. 2021,5*,70-75. doi: 10.1080/24733938.2021.1962540.
49. Washif, J.A.;Mujika, I.; DeLang, M.D.; Brito, J. et al. Training Practices of Football Players During the Early COVID-19 Lockdown Worldwide. *Int J Sports Physiol Perform. 2022,18*,37-46. doi: 10.1123/ijspp.2022-0186.
50. Lastella, M.; Roach, G.D.; Halson, S.L.; Sargent, C. The Chronotype of Elite Athletes. *J Hum Kinet. 2016,54*,219-225. doi: 10.1515/hukin-2016-0049.