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Sleep Quality in Spanish Boxers after the COVID-19 Pandemic
Calidad del sueño en boxeadores españoles tras la pandemia de COVID-19

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Abstract. Sleep is one of the most important behaviours for human cognition. Good quality sleep is also necessary for athletes for recovery, training and performance enhancement. However, the periods of quarantine and isolation caused by COVID-19 led to changes in people's routines, including sleep routines. The aim of this study is to analyse possible differences in the dimensions of the Pittsburgh Sleep Quality Index (PSIQ) according to gender, age, level of experience and frequency of practice among boxers from the province of Cáceres (Extremadura, Spain) in the pandemic. The sample consisted of 61 adults who responded to four socio-demographic questions in addition to the questions associated with the PSIQ. For the statistical analysis, the Kolmogorov-Smirnov test was used to establish the assumption of normality. Subsequently, non-parametric tests were chosen as this assumption was not met. Consequently, the Mann-Whitney U test was used to examine gender and the Kruskal-Wallis test was used to examine age, level of experience and frequency of practice. Finally, no significant differences were found between the sociodemographic variables and the dimensions of the questionnaire. Furthermore, there is little literature on sleep quality in athletes during the pandemic. Therefore, it is essential to develop studies focused on the quality of sleep in athletes, comparing the current situation with the research carried out prior to the pandemic.
Keywords: sleep quality, PSQI, boxers, adults, pandemic.

Resumen. El sueño es uno de los comportamientos más importantes para la cognición humana. Un sueño de buena calidad también es necesario para que los atletas se recuperen, entrenen y mejoren el rendimiento. Sin embargo, los periodos de cuarentena y aislamiento provocados por el COVID-19 provocaron cambios en las rutinas de las personas, incluidas las rutinas de sueño. El objetivo de este estudio es analizar posibles diferencias en las dimensiones del Índice de Calidad del Sueño de Pittsburgh (PSIQ) según sexo, edad, nivel de experiencia y frecuencia de práctica entre boxeadores de la provincia de Cáceres (Extremadura, España) en la pandemia. La muestra estuvo compuesta por 61 adultos que respondieron a cuatro preguntas sociodemográficas además de las preguntas asociadas al PSIQ. Para el análisis estadístico se utilizó la prueba de Kolmogorov-Smirnov para establecer el supuesto de normalidad. Posteriormente se optó por pruebas no paramétricas al no cumplirse este supuesto. En consecuencia, se utilizó la prueba U de Mann-Whitney para examinar el género y la prueba de Kruskal-Wallis para examinar la edad, el nivel de experiencia y la frecuencia de la práctica. Finalmente, no se encontraron diferencias significativas entre las variables sociodemográficas y las dimensiones del cuestionario. Además, existe poca literatura sobre la calidad del sueño en deportistas durante la pandemia. Por ello, es fundamental desarrollar estudios centrados en la calidad del sueño en deportistas, comparando la situación actual con las investigaciones realizadas antes de la pandemia.
Palabras clave: calidad del sueño, PSQI, boxeadores, adultos, pandemia.

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Introduction

In 2020, the world was virtually paralysed by the COVID-19 pandemic. The quarantine period was challenging for most of the population, with evidence pointing to a high risk of experiencing a range of mental health problems, especially among vulnerable groups (Wong et al., 2020). Restrictions on freedom and mobility also led to a decrease in physical activity (PA), resulting in an increase in sedentary behaviour (Fiorilli et al., 2021; Mutz & Gerke, 2021). On the other hand, several authors have demonstrated the multiple benefits of sport in their studies (Bellissimo, Galaviz, Paskert, & Lobelo, 2018; Opstoel et al., 2020), including social, psychological and physiological aspects (Manferdelli, La Torre, & Codella, 2019). Concept "sport" has been defined from different perspectives that have changed over time and according to the authors. In this sense, Suits (Suits, 1973) defines it as an extraordinary, unnecessary, skill-based physical activity or practice in which there is cooperation to achieve the prior goal of having competition. Over time, Woods and Butler (Woods & Butler, 2021) provide a modernised and advanced definition of sport as a specialised or higher order of play, or as a type of play with certain distinctive characteristics. It should be noted that confinement separated athletes from their daily training and competition routines, as well as increasing uncertainty about the future (Peña et al., 2021). In addition to these aspects that affected the athletes during the quarantine period, they also experienced a number of emotional problems such as insomnia (Çakmak, 2022), as sleep is one of the most important behaviours for human cognition (Benavides & Ramos, 2019). In relation to this, the act of sleeping is considered a biological process that involves all bodily functions and interacts bidirectionally with all organs and systems of the body. (De La Llata et al., 2011). Dement y Kleitman (Dement & Kleitman, 1957) defined sleep as a periodic physiological state of reversible rest, characterised by the suspension of consciousness and a decrease in metabolic activity. Therefore, it is necessary for athletes to have good quality sleep for recovery, training and performance enhancement (Walsh et al., 2021).

Also, the periods of quarantine and isolation caused by COVID-19 led to changes in people's routines, including sleep routines, as these processes rely heavily on a constant routine (Pilcher, Dorsey, Galloway, & Erikson, 2022). In some studies, the findings support the hypothesis that

quarantine significantly affects people's sleep routines, leading to lower sleep quality (Fong, Chang, & Ho, 2023; Hartley et al., 2020). In addition, impaired sleep during the quarantine period is also associated with reduced PA and increased sedentary behaviours (Werneck et al., 2020). Thus, sleep has been identified as a behaviour significantly related to both physical and psychological health in several studies (Baron & Culnan, 2019; Hruby, Lieberman, & Smith, 2018; Jackson, Walker, Brown, Das, & Jones, 2020). In addition, evidence has been found linking certain biological mechanisms and common behaviours that link sleep to lower levels of health (Jackson et al., 2020). Similarly, because of its importance, Worley (Worley, 2018) found that sleep is essential for the body's proper functioning, survival and waking cognition, because it is during sleep that memories are consolidated and plays a key role in emotional regulation. In addition, having a good quality of sleep helps to reduce the levels of hypertension that can arise in individuals who experience insomnia or poor sleep (Bertisch et al., 2018).

Finally, it is of utmost importance to mention that athletes' sleep is influenced by many factors, including social factors and specific sport-related stressors that may explain sleep variability (Nedelec, Aloulou, Duforez, Meyer, & Dupont, 2018). Within the world of sport, it is often assumed that high quality sleep is necessary for multiple aspects that contribute to performance, such as promoting physical and mental recovery, minimising the risk of injury, preventing fatigue and lack of concentration (Kirschen, Jones, & Hale, 2018). However, studies such as that of Netzer and co-workers show that an athlete with severely fragmented sleep can achieve an adequate amount of sleep (Netzer et al., 2021). However, the potential health risks associated with sleep deprivation, such as metabolic imbalances, mental disorders or a negative impact on long-term performance, cannot be ignored (Craven et al., 2022). For this reason, the aim of this study is to find out whether socio-demographic variables such as gender, age, level of experience and/or frequency of practice influenced the sleep quality of boxing practitioners during the pandemic.

Materials and Methods

Participants

The sample included 61 boxers from boxing clubs in Cáceres (Extremadura, Spain). A non-probabilistic convenience sampling technique was used to select these participants (Salkind, Escalona, & Valdés Salmerón, 1999). And their socio-demographic characteristics are set out in Table 1.

Instruments

The questionnaire asked The questionnaire asked four questions on gender, age, level of experience and frequency of practice to describe the sociodemographic characteristics of the boxers. In addition, the Pittsburgh Sleep Quality Index (PSQI) *(Buysse, Reynolds, Monk, Berman, &Kupfer, 1989)* in its Spanish version *(Royuela &Fernández, 1997)*, which has a high internal consistency (Cronbach's α: 0.81), was applied. This instrument consists of 24 items (19 self-administered and 5 assessed by the participant's roommate or spouse, if any). The score includes only the self-administered questions, which assess a wide variety of factors related to subjective sleep quality, sleep latency, sleep time, sleep efficiency, sleep disturbance, hypnotic medication use and daytime dysfunction. Seven component scores are created from the 19 self-assessed items, and each score has a range from 0 to 3. A score of 0 points in any of the situations denotes no difficulty, while a score of 3 denotes great difficulty. The seven components are then summed to give an overall score ranging from 0 to 21 points, where a score of 0 points denotes little difficulty and a score of 21 denotes extreme difficulty, indicating poorer sleep quality.

Procesures

The sports clubs that taught the boxing modality in Cáceres (Extremadura, Spain) were chosen and subsequently these clubs were called to inform them of the objective of the study and, in the case of those who accepted, a URL containing both the informed consent necessary to participate in the study and the PSQI was sent to them via email.

The questionnaire was developed using the Google Forms tool, which allowed all the responses to be stored in the same database, as well as facilitating the administration of the instrument among the athletes. The questionnaire took between 5 and 10 minutes to complete. All data were collected and processed anonymously, respecting the ethical principles of current legislation. Data were collected from 7 May 2020 to 29 May 2020.

Statistical Analysis

Version 23 of the IBM SPSS for MAC (Chicago, IL, USA) statistical software was used to process the data. First, the Kolmogorov-Smirnov test was used to examine the assumption of normality in the distribution of the data for continuous variables. This assumption turned out to be false, so non-parametric statistical tests were used.

The Mann-Whitney U test was then used to examine differences between the factors/dimensions of the questionnaire and gender, and the Kruskal-Wallis test was used to examine differences between the factors and age, level of experience and frequency of practice.

Table 1.
Socio-demographic characteristics of the sample (N = 61).

Variables	Categories	N	%
Sex	Male	42	68.9
	Female	19	31.1
Age	20-29 years old	12	19.7
	30-39 years old	24	39.3
	40-49 years old	18	29.5
	$\geq$ 50 years old	7	11.5
Experience Level	6 months- 2 years	44	72.1
	2-4 years	7	11.5
	4-6 years	4	6.6
	> 6 years	6	9.8
Practice Frecuency	2 sessions/week	11	18.0
	3-4 sessions/week	37	60.7
	5-6 sessions/week	9	14.8
	> 6 sessions/week	4	6.6

N: number; %: percentaje.

Results

Table 2 shows the descriptive analyses of the dimensions of the PSQI questionnaire according to the gender of the participants. It can be seen that there are no significant differences between men and women. However, in general, it is found that men have the same scores as women, except in the dimensions "Sleep latency" and "Sleep time" where men have higher scores than women, as well as in the total score.

Table 2.
Descriptive analyses of the PSQI dimensions according to sex.

Dimensions	Total Me (RIQ)	Sex		
		Male Me (RIQ)	Female Me (RIQ)	*p*
Subjective sleep quality	1.0 (1.0)	1.0 (1)	1.0 (1)	0.90
Sleep latency	1.5 (1.8)	2.0 (2)	1.0 (1)	0.67
Sleep time	1.0 (2.0)	1.0 (2)	0.0 (2)	0.26
Sleep efficiency	3.0 (1.0)	3.0 (1)	3.0 (1)	0.98
Sleep disorders	1.0 (1.0)	1.0 (1)	1.0 (1)	0.56
Hypnotic medication use	0.0 (0.1)	0.0 (1)	0.0 (0)	0.14
Daytime dysfunction	1.0 (0)	1.0 (0)	1.0 (0)	0.41
Total	8.5 (3.8)	9.0 (3.50)	8.0 (4)	0.60

Me = median value; IQR = interquartile range. Differences are significant at ** $p < 0.01$; * $p < 0.05$.

Subsequently. the dimensions of the questionnaire were analysed descriptively according to age in Table 3. The results obtained reported that there were no significant differences. Generally, the scores were very similar, except for the dimensions "Sleep latency" and "Sleep time" where participants between 20 and 29 years old had lower scores than the rest. Also, in the total score of the questionnaire, participants aged 40-49 years obtained higher scores than the others.

Table 3.
Descriptive analysis of the PSQI dimensions according to age.

Dimensions	Age				
	20-29 years old Me (RIQ)	30-39 years old Me (RIQ)	40-49 years old Me (RIQ)	≥50 years old Me (RIQ)	*p*
Subjective sleep quality	1.0 (0.75)	1.0 (1)	1.0 (1)	1.0 (2)	0.65
Sleep latency	1.0 (1.75)	2.0 (1)	2.0 (3)	2.0 (2)	0.28
Sleep time	0.0 (1)	1.0 (1.75)	1.0 (2.50)	1.0 (3)	0.16
Sleep efficiency	3.0 (0.75)	3.0 (1)	3.0 (1.50)	3.0 (2)	0.64
Sleep disorders	1.0 (1)	1.0 (1)	1.0 (1)	1.0 (1)	0.70
Hypnotic medication use	0.0 (0)	0.0 (0)	0.0 (2.50)	0.0 (1)	0.09
Daytime dysfunction	1.0 (0.75)	1.0 (0)	1.0 (0.50)	1.0 (1)	0.57
Total	8.0 (3.50)	8.5 (3.75)	10.0 (3)	8.0 (5)	0.40

Me = median value; IQR = interquartile range. Differences are significant at ** $p < 0.01$; * $p < 0.05$.

Similarly, in Table 4, the results of the dimensions of the questionnaire according to the level of experience of the participants are descriptively presented. There were no significant differences in the results, however, it is worth highlighting some results. In this regard, it should be noted that boxers with a level of experience of more than six years in the dimensions "Use of hypnotic medication" and "Daytime dysfunction" obtained scores well above the rest of the participants. However, in the rest of the dimensions and even in the total score they have very similar results among them.

Table 4.
Descriptive analysis PSQI dimensions in experince level.

Dimensions	Experience Level				
	6 months- 2 years Me (RIQ)	2-4 years Me (RIQ)	4-6 years Me (RIQ)	>6 Years Me (RIQ)	*p*
Subjective sleep quality	1.0 (1)	1.0 (2)	1.5 (1.75)	1.0 (1.25)	0.98
Sleep latency	1.0 (2)	2.0 (2)	1.0 (2.75)	2.0 (1.50)	0.34
Sleep time	1.0 (2)	1.0 (2)	0.5 (1.75)	0.5 (1)	0.17
Sleep efficiency	3.0 (1)	2.0 (2)	2.5 (1)	3.0 (1)	0.21
Sleep disorders	1.0 (1)	1.0 (1)	2.0 (0.75)	1.0 (0.25)	0.31
Hypnotic medication use	0.0 (1)	0.0 (0)	0.0 (0.75)	4.0 (0)	0.49
Daytime dysfunction	1.0 (0)	1.0 (2)	1.0 (0.75)	4.0 (0)	0.78
Total	8.0 (3)	9.0 (4)	9.0 (4)	8.5 (3)	0.99

Me = valor de la mediana; RIQ = rango intercuartílico. Las diferencias son significantes a ** $p < 0.01$; * $p < 0.05$.

Finally, Table 5 shows that there are no significant differences between the dimensions of the questionnaire and the frequency of boxing. However, some results should be mentioned. Generally, similar scores have been found, especially in the "Use of hypnotic medication". On the other hand, in the dimension "Subjective quality of sleep", participants who practised five or six sessions a week scored one point higher than the rest of the participants. As for "Sleep efficiency", the boxers who practised five or six sessions a week, as well as in "Sleep disturbances", the students who practised twice a week scored one point more than the rest of the participants. Finally, the highest final score, and by far the highest among the rest, was that of boxers doing five or six sessions a week.

Table 5.
Descriptive analysis of the PSQI dimensions in line with frequency of practice.

Dimensions	Practice Experience				
	2 sessions/ weeks Me (RIQ)	3-4 sessions/ weeks Me (RIQ)	5-6 sessions/ weeks Me (RIQ)	>6 sesions/ weeks	*p*
Subjective sleep quality	1.0 (1)	1.0 (1)	2.0 (1)	1.0 (1)	0.25
Sleep latency	1.0 (2)	1.0 (2)	2.0 (1)	2.0 (2)	0.70
Sleep time	0.0 (2)	1.0 (2)	1.0 (2)	0.5 (3)	0.43
Sleep efficiency	3.0 (1)	3.0 (1)	2.0 (2)	3.0 (2)	0.53
Sleep disorders	2.0 (1)	1.0 (1)	1.0 (1)	1.0 (1)	0.11
Hypnotic medication use	0.0 (0)	0.0 (0)	0.0 (1)	0.0 (2)	0.98
Daytime dysfunction	1.0 (0)	1.0 (0)	1.0 (0)	0.5 (1)	0.36
Total	8.0 (4)	8.5 (4)	10.0 (3)	8.0 (6)	0.52

Me = median value; IQR = interquartile range. Differences are significant at ** $p < 0.01$; * $p < 0.05$.

Discussion

The aim of this study is to find out the quality of sleep in boxers after the COVID-19 pandemic. For this purpose, the PSQI was used as an instrument (Buysse et al., 1989), in the Spanish version (Royuela & Fernández, 1997), analysing whether there are significant differences between the dimensions of the questionnaire and the socio-demographic variables.

Firstly, this study found no significant differences in terms of PSQI dimensions and gender. However, despite not finding any differences, some results have been highlighted. In this sense, in general terms, it is found that men have the same scores as women, except in the "Sleep latency" and "Sleep time" dimensions where men obtain higher scores than women, as well as in the total score. In

contrast to the present research, studies by Valiensi and coworkers (Valiensi, Folgueira, Enriz, Garay, & Giardino, 2022; Valiensi, Folgueira, & Garay, 2021) found that women have worse sleep habits, take longer to fall asleep, wake up later and sleep longer, have trouble falling asleep in the first half hour, wake up more often, snore more, have more nightmares and experience other sleep disrupting factors. In addition, they reported poor to very poor sleep quality, used more sleeping pills and woke up in a worse mood than men to perform tasks. Similarly, in other studies of university students (Bustamante Ara, Russell Guzmán, Godoy-Cumillaf, Merellano-Navarro, & Uribe Uribe, 2022; Cellini et al., 2021; Chipia Lobo, Camacho Camargo, Omaña, & Márquez, 2021), also reported that subjective sleep quality, sleep disturbances and daytime dysfunction were more pronounced in women than in men. However, this lower sleep quality in women may be associated with differences in non-REM sleep (Mallampalli & Carter, 2014) and to the physiological responses generated by the menstrual cycle (Colten, Altevogt, & Institute of Medicine (US), 2006). In addition, as another study points out (Moscoso-Sánchez, 2020), It should be mentioned that this may be influenced by the fact that women continue to struggle with the triple feminine role (reproductive, domestic and work) and that this is probably increased in the pandemic by having school-age children or elderly dependents at home all the time.

Secondly, with respect to age, no significant differences were found. Although the value of p=0.09 suggests a trend or possible association between hypnotic medication use and age, this finding does not meet the conventional threshold for statistical significance. Generally, the scores were very similar, except for the dimensions "Sleep latency" and "Sleep time" where participants between 20 and 29 years old had lower scores than the rest. This may be due to exposure to new technologies, as this exposure (television, mobile phones, etc.) during waking hours correlates with a decrease in the total duration of sleep, and is also associated with sleep onset and maintenance disorders. (Reyes-Ordóñez, Aragón-Castillo, Flórez G., & De La Cruz Vargas, 2022). With respect to the total score of the questionnaire, participants aged between 40 and 49 years obtained higher scores than the others. Along these lines, and in contrast to the present research, other studies have shown that participants aged 40-49 had higher scores than others (Valiensi et al., 2022, 2021) report that people over 65 years of age have the poorest sleep quality.

Next, the level of experience did not show significant differences, but it should be mentioned that boxers with a level of experience of more than six years in the dimensions "Use of hypnotic medication" and "Daytime dysfunction" scored well above the rest of the participants. However, in the rest of the dimensions and even in the total score they have very similar results among them.In this sense, these results can be explained by a study conducted by Mon et al. with professional handball players in Spain, in which it was observed that an increase in the time spent in bed and a delay in waking up led to an increase in the quantity of sleep and a decrease in the quality of sleep. Some of the arguments provided related to exercise restrictions, the inability to train in appropriate settings, which could lead to performance problems, and the resumption of competition, which led to poor mental health conditions that prevented ideal resting conditions. In addition, sleep quality and the experience of exhaustion may have been altered as a result of dietary changes, decreased PA, increased use of technology and substance use, among other behaviours (Mon-López, De La Rubia Riaza, Hontoria Galán, & Refoyo Roman, 2020).

Finally, the frequency of practice, like the previous socio-demographic variables, did not show significant differences with the dimensions. Similar scores were found, especially in "Use of hypnotic medication". However, in the dimension "Subjective quality of sleep" and "Sleep efficiency", participants who practised five or six sessions a week scored one point higher than the rest of the participants. Similarly, in "Sleep disturbance", students who practised twice a week scored one point more than the rest of the participants. Finally, the highest final score, and by far the highest among the rest of the participants, was that of the boxers who practised five or six sessions a week. In this respect, it should be noted that there is a significant association between the time dedicated to PA and sleep quality and, therefore, the higher the level of PA, the better the sleep quality (Zapata Salazar, Ríos Esparza, & De Los Santos Ramírez, 2021). For that reason, the subjects who participated most in boxing, unable to do so because of the pandemic, had poorer sleep quality than the other participants. In addition, the period of confinement separated the athletes from their daily training routines, increasing uncertainty about the future (Peña et al., 2021).

Practical Implications

Due to the importance of sleep quality and the difficulties in defining and quantifying it, the PSQI has been developed (Escobar-Córdoba & Eslava-Schmalbach, 2005), which is one of the most widely used questionnaires (Favela Ramírez, Castro Robles, Bojórquez Díaz, & Chan Barocio, 2022). The PSQI is a tool used in clinical populations as well as in other research procedures for different populations to diagnose sleep disorders and poor sleep quality (Manzar et al., 2018).

Limitations and research future lines

Like other studies, this project also has a number of limitations. Firstly, given that only boxers from Cáceres were included, there are factors that could have influenced the results obtained, as well as socio-demographic characteristics. In addition, the participants were chosen by non-probabilistic, i.e. non-random, convenience sampling, so caution should be exercised when presenting the results. Finally, it should be noted that there are few previous studies

analysing sleep quality in boxers, and even more so in, during and after the pandemic, so there has been very little literature. This means that there is not much contrasted information. Generally, studies on sleep quality after the pandemic have been carried out on students or older people, but not on athletes. On the other hand, it is considered that possible lines of future research would be to extend the sample to a national level and even to compare the results obtained with another sport and/or discipline to check whether the results obtained were due to a small sample or to the sport practised. Consequently, it is essential to reach an agreement with other researchers in the different communities in order to collect all the necessary data.

Conclusions

In the present study, no significant differences were found between the dimensions of the PSQI and the sociodemographic variables. However, some results have been highlighted that have been considered relevant despite not being significant. It is also essential to continue research on sleep quality in athletes after the pandemic, as well as to generalise the study at a national level, since sleep has been identified as a behaviour significantly related to both physical and psychological health.

Author Contributions

Conceptualization, Rodrigo Aníbal Díaz-Torres; Data curation, Rodrigo Aníbal Díaz-Torres; Formal analysis, Jorge Rojo-Ramos; Funding acquisition, Antonio Castillo-Paredes; Investigation, Carmen Galán-Arroyo and Jorge Rojo-Ramos; Methodology, Jorge Rojo-Ramos; Project administration, Rodrigo Aníbal Díaz-Torres and Jorge Rojo-Ramos; Resources, Antonio Castillo-Paredes; Supervision, Carmen Galán-Arroyo, Antonio Castillo-Paredes and Jorge Rojo-Ramos; Visualization, Carmen Galán-Arroyo and Antonio Castillo-Paredes; Writing – original draft, Rodrigo Aníbal Díaz-Torres, Carmen Galán-Arroyo and Jorge Rojo-Ramos; Writing – review & editing, Rodrigo Aníbal Díaz-Torres, Carmen Galán-Arroyo, Antonio Castillo-Paredes and Jorge Rojo-Ramos. All authors have read and agreed to the published version of the manuscript.

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Conflicts of Interest

The authors declare no conflict of interest.

References

Baron, K. G., & Culnan, E. (2019). Sleep and healthy decision making. 359-369. https://doi.org/10.1016/B978-0-12-815373-4.00027-7

Bellissimo, M. P., Galaviz, K. I., Paskert, M. C., & Lobelo, F. (2018). Cardiometabolic Risk Reduction Through Recreational Group Sport Interventions in Adults: A Systematic Review and Meta-analysis. Mayo Clinic Proceedings, 93(10), 1375-1396. https://doi.org/10.1016/j.mayocp.2018.03.014

Benavides, P., & Ramos, C. (2019). Fundamentos Neurobiológicos Del Sueño. Revista Ecuatoriana de Neurología, 28(3), 73-80.

Bertisch, S. M., Pollock, B. D., Mittleman, M. A., Buysse, D. J., Bazzano, L. A., Gottlieb, D. J., & Redline, S. (2018). Insomnia with objective short sleep duration and risk of incident cardiovascular disease and all-cause mortality: Sleep Heart Health Study. Sleep, 41(6), zsy047. https://doi.org/10.1093/sleep/zsy047

Bustamante Ara, N., Russell Guzmán, J., Godoy-Cumillaf, A., Merellano-Navarro, E., & Uribe Uribe, N. (2022). Rendimiento académico, actividad física, sueño y género en universitarios durante la pandemia-2020. Cultura, ciencia y deporte, 17(53), 109-131.https://doi.org/10.12800/ccd.v17i53.1897

Buysse, D. J., Reynolds, C. F., Monk, T. H., Berman, S. R., & Kupfer, D. J. (1989). The Pittsburgh sleep quality index: A new instrument for psychiatric practice and research. Psychiatry Research, 28(2), 193-213. https://doi.org/10.1016/0165-1781(89)90047-4

Çakmak, H. S. G. (2022). Early phase of COVID-19 quarantine impacted insomnia symptoms in Turkish families. Sleep

Science, 15, 195-202. https://doi.org/10.5935/1984-0063.20220019

Cellini, N., Conte, F., De Rosa, O., Giganti, F., Malloggi, S., Reyt, M., … Ficca, G. (2021). Changes in sleep timing and subjective sleep quality during the COVID-19 lockdown in Italy and Belgium: Age, gender and working status as modulating factors. Sleep Medicine, 77, 112-119.
https://doi.org/10.1016/j.sleep.2020.11.027

Chipia Lobo, J. F., Camacho Camargo, N., Omaña, P., & Márquez, R. (2021). Calidad del sueño en estudiantes de medicina durante la pandemia por COVID-19. GICOS: Revista del Grupo de Investigaciones en Comunidad y Salud, 6(3), 11-26. Recuperado de https://dialnet.unirioja.es/servlet/articulo?codigo=8083614

Colten, H. R., Altevogt, B. M., & Institute of Medicine (US). (2006). Sleep Disorders and Sleep Deprivation: An Unmet Public Health Problem (p. 11617). Washington, D.C.: National Academies Press. https://doi.org/10.17226/11617.

De-La-Llata-Romero M, Castorena-Maldonado A, Corsi-Cabrera M, Díaz M, Haro-Valencia R, Jiménez-Genchi

A, Meza-Vargas MS, Pérez-Padilla R, Próspero-García O, Reyes-Zúñiga M, Torre-Bouscoulet L, Valencia-Flores M, Velázquez-Moctezuma J. Medicina del dormir: desarrollo, contribuciones y perspectivas. Reporte del grupo de trabajo en medicina del dormir [Sleep medicine: development, contributions and perspectives. Report of the work group on sleep medicine]. Rev Invest Clin. 2011 Jan-Feb;63(1):90-9. Spanish. PMID: 21585014.Dement, W., & Kleitman, N. (1957). Cyclic variations in EEG during sleep and their relation to eye movements, body motility, and dreaming. Electroencephalography and Clinical Neurophysiology, 9(4), 673-690. https://doi.org/10.1016/0013-4694(57)90088-3

Escobar-Córdoba, F., & Eslava-Schmalbach, J. (2005). Validación colombiana del índice de calidad de sueño de Pittsburgh. Rev Neurol, 40(3), 150-155.

Favela Ramírez, C. A., Castro Robles, A. I., Bojórquez Díaz, C. I., & Chan Barocio, N. L. (2022). Propiedades psicométricas del índice de calidad de sueño de Pittsburgh en deportistas. Revista Iberoamericana de Ciencias de la Actividad Física y el Deporte, 11(3), 29-46. https://doi.org/10.24310/riccafd.2022.v11i3.15290

Fiorilli, G., Grazioli, E., Buonsenso, A., Martino, G. D., Despina, T., Calcagno, G., & Cagno, A. di. (2021). A national COVID-19 quarantine survey and its impact on the Italian sports community: Implications and recommendations. PLOS ONE, 16(3), e0248345. https://doi.org/10.1371/journal.pone.0248345

Fong, T. C. T., Chang, K., & Ho, R. T. H. (2023). Association between quarantine and sleep disturbance in Hong Kong adults: The mediating role of COVID-19 mental impact and distress. Frontiers in Psychiatry, 14, 1127070. https://doi.org/10.3389/fpsyt.2023.1127070

Hartley, S., Colas Des Francs, C., Aussert, F., Martinot, C., Dagneaux, S., Londe, V., … Royant-Parola, S. (2020). Les effets de confinement SARS-CoV-2 sur le sommeil: Enquête en ligne au cours de la quatrième semaine de confinement. L'Encéphale, 46(3), S53-S59. https://doi.org/10.1016/j.encep.2020.05.003

Hruby, A., Lieberman, H. R., & Smith, T. J. (2018). Self-reported health behaviors, including sleep, correlate with doctor-informed medical conditions: Data from the 2011 Health Related Behaviors Survey of U.S. Active Duty Military Personnel. BMC Public Health, 18(1), 853. https://doi.org/10.1186/s12889-018-5781-2

Jackson, C. L., Walker, J. R., Brown, M. K., Das, R., & Jones, N. L. (2020). A workshop report on the causes and consequences of sleep health disparities. Sleep, 43(8), zsaa037. https://doi.org/10.1093/sleep/zsaa037

Kirschen, G. W., Jones, J. J., & Hale, L. (2018). The Impact of Sleep Duration on Performance Among Competitive Athletes: A Systematic Literature Review. Clinical Journal of Sport Medicine, Publish Ahead of Print. https://doi.org/10.1097/JSM.0000000000000622

Mallampalli, M. P., & Carter, C. L. (2014). Exploring Sex and Gender Differences in Sleep Health: A Society for Women's Health Research Report. Journal of Women's Health, 23(7), 553-562. https://doi.org/10.1089/jwh.2014.4816

Manferdelli, G., La Torre, A., & Codella, R. (2019). Outdoor physical activity bears multiple benefits to health and society. The Journal of Sports Medicine and Physical Fitness, 59(5). https://doi.org/10.23736/S0022-4707.18.08771-6

Manzar, M. D., BaHammam, A. S., Hameed, U. A., Spence, D. W., Pandi-Perumal, S. R., Moscovitch, A., & Streiner, D. L. (2018). Dimensionality of the Pittsburgh Sleep Quality Index: A systematic review. Health and Quality of Life Outcomes, 16(1), 89. https://doi.org/10.1186/s12955-018-0915-x

Mon-López, D., De La Rubia Riaza, A., Hontoria Galán, M., & Refoyo Roman, I. (2020). The Impact of Covid-19 and the Effect of Psychological Factors on Training Conditions of Handball Players. International Journal of Environmental Research and Public Health, 17(18), 6471. https://doi.org/10.3390/ijerph17186471

Moscoso-Sánchez, D. (2020). El contexto del deporte en España durante la crisis sanitaria de la COVID-19. Sociología del Deporte, 1(1), 15-19. https://doi.org/10.46661/socioldeporte.5000

Mutz, M., & Gerke, M. (2021). Sport and exercise in times of self-quarantine: How Germans changed their behaviour at the beginning of the Covid-19 pandemic. International Review for the Sociology of Sport, 56(3), 305-316. https://doi.org/10.1177/1012690220934335

Nedelec, M., Aloulou, A., Duforez, F., Meyer, T., & Dupont, G. (2018). The Variability of Sleep Among Elite Athletes. Sports Medicine - Open, 4(1), 34. https://doi.org/10.1186/s40798-018-0151-2

Netzer, N. C., Rausch, L. K., Gatterer, H., Burtscher, M., Eliasson, A. H., & Pramsohler, S. (2021). Extreme sports performance for more than a week with severely fractured sleep. Sleep and Breathing, 25(2), 951-955. https://doi.org/10.1007/s11325-020-02172-4

Opstoel, K., Chapelle, L., Prins, F. J., De Meester, A., Haerens, L., Van Tartwijk, J., & De Martelaer, K. (2020). Personal and social development in physical education and sports: A review study. European Physical Education Review, 26(4), 797-813. https://doi.org/10.1177/1356336X19882054

Peña, J., Altarriba-Bartés, A., Vicens-Bordas, J., Gil-Puga, B., Piniés-Penadés, G., Alba-Jiménez, C., … Casals, M. (2021). Sports in time of COVID-19: Impact of the lockdown on team activity. Apunts Sports Medicine, 56(209), 100340. https://doi.org/10.1016/j.apunsm.2020.100340

Pilcher, J. J., Dorsey, L. L., Galloway, S. M., & Erikson, D. N. (2022). Social Isolation and Sleep: Manifestation During COVID-19 Quarantines. Frontiers in Psychology, 12. Recuperado de

https://www.frontiersin.org/articles/10.3389/fpsyg.2021.810763

Reyes-Ordóñez, D. E., Aragón-Castillo, J., Flórez G., L. G., & De La Cruz Vargas, J. A. (2022). Factores asociados a calidad de sueño en deportistas universitarios de la Universidad Ricardo Palma durante el periodo de cuarentena en 2020. Revista Peruana de Medicina Integrativa, 7(3). https://doi.org/10.26722/rpmi.2022.v7n3.7

Royuela, A., & Fernández, J. (1997). Propiedades clinimetricas de la versión castellana del cuestionario de Pittsburgh. Vigilia-Sueño, 9(2), 81-94.

Salkind, N. J., Escalona, R. L., & Valdés Salmerón, V. (1999). Métodos de investigación. México: Prentice-Hall.

Suits, B. (1973). The elements of sport. In the philosophy of sport. A collection of original essays. Springfield.

Valiensi, S. M., Folgueira, A. L., Enriz, N. M., Garay, A. D. C., & Giardino, D. L. (2022). Análisis de la calidad del sueño, alteraciones del humor y modificaciones de algunos hábitos y conductas durante dos diferentes períodos de la pandemia por COVID-19 en Argentina. Vertex Revista Argentina de Psiquiatría, 33(157), 23-33. https://doi.org/10.53680/vertex.v33i157.270

Valiensi, S. M., Folgueira, A. L., & Garay, A. D. C. (2021). Calidad del sueño, síntomas depresivos y de ansiedad durante el confinamiento por COVID-19 en Argentina. Vertex Revista Argentina de Psiquiatría, 32(151), 6-14. https://doi.org/10.53680/vertex.v32i151.3

Walsh, N. P., Halson, S. L., Sargent, C., Roach, G. D., Nédélec, M., Gupta, L., ... Samuels, C. H. (2021). Sleep and the athlete: Narrative review and 2021 expert consensus recommendations. British Journal of Sports Medicine, 55(7), 356-368. https://doi.org/10.1136/bjsports-2020-102025

Werneck, A. O., Silva, D. R., Malta, D. C., Lima, M. G., Souza-Júnior, P. R. B., Azevedo, L. O., ... Szwarcwald, C. L. (2020). The mediation role of sleep quality in the association between the incidence of unhealthy movement behaviors during the COVID-19 quarantine and mental health. Sleep Medicine, 76, 10-15. https://doi.org/10.1016/j.sleep.2020.09.021

Wong, A. Y.-Y., Ling, S. K.-K., Louie, L. H.-T., Law, G. Y.-K., So, R. C.-H., Lee, D. C.-W., ... Yung, P. S.-H. (2020). Impact of the COVID-19 pandemic on sports and exercise. Asia-Pacific Journal of Sports Medicine, Arthroscopy, Rehabilitation and Technology, 22, 39-44. https://doi.org/10.1016/j.asmart.2020.07.006

Woods, R., & Butler, B. N. (2021). Social Issues in Sport. Human Kinetics.

Worley, S. L. (2018). The Extraordinary Importance of Sleep. Pharmacy and Therapeutics, 43(12), 758-763.

Zapata Salazar, J., Ríos Esparza, J. A., & De Los Santos Ramírez, S. (2021). Confinamiento por COVID-19 y detección de trastornos no orgánicos del ciclo sueño-vigilia en deportistas de alto rendimiento. Nova Scientia, 13. https://doi.org/10.21640/ns.v13ie.2735