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Impact of social and physical factors on psychological well-being under covid-19 lockdown in taekwondo athletes: A cross-sectional study

Impacto de los factores sociales y físicos en el bienestar psicológico bajo el confinamiento de covid-19 en atletas de taekwondo: un estudio transversal

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Abstract. In sports and taekwondo in particular, it is of interest to understand the impact of sociodemographic and physical factors of athletes during this period, as well as their impact on psychological health. This study aimed to analyze the relationship between physical activity levels, demographic factors, and psychological well-being during the COVID-19 lockdown in Taekwondo athletes. Seventy-eight male Taekwondo athletes (35 ± 14.6 years) at national and international levels participated in an online survey during the COVID-19 Lockdown period in September 2020. The factors analyzed included expertise, socioeconomic status, education, and physical activity levels. The main findings of this study indicated that university education level was significantly associated with both well-being and lower distress ($\chi^2 = 7.0$; $p = 0.03$). Similarly, athletes with a moderate level of physical activity showed a significant association with their state of well-being ($\chi^2 = 7.0$; $p = 0.03$) and absence of distress ($\chi^2 = 10.5$; $p = 0.00$). However, no significant associations were found between technical level and age category with well-being or distress. Our findings showed that the lockdown negatively affected both total physical activity levels and psychological well-being in Colombian Taekwondo Athletes. A higher educational level allows for a greater understanding of the situations presented during the pandemic, and the level of physical activity is a determinant of the mental health of athletes.
Keywords: public health, SARS-CoV-2, martial arts, mental health.

Resumen. En el ámbito deportivo y del taekwondo en particular, resulta de interés conocer el impacto de los factores sociodemográficos y físicos de los deportistas durante este periodo, así como su repercusión en la salud psicológica. Este estudio tuvo como objetivo analizar la relación entre los niveles de actividad física, los factores demográficos y el bienestar psicológico durante el confinamiento COVID-19 en atletas de taekwondo. Setenta y ocho atletas masculinos de Taekwondo (35 ± 14,6 años) a nivel nacional e internacional participaron en una encuesta en línea durante el período de confinamiento COVID-19 en septiembre de 2020. Los factores analizados incluyeron la experiencia, el nivel socioeconómico, la educación y los niveles de actividad física. Los principales hallazgos de este estudio indicaron que el nivel de educación universitaria se asoció significativamente tanto con el bienestar como con una menor angustia ($\chi2 = 7,0$; $p = 0,03$). Del mismo modo, los deportistas con un nivel moderado de actividad física mostraron una asociación significativa con su estado de bienestar ($\chi2 = 7,0$; $p = 0,03$) y ausencia de angustia ($\chi2 = 10,5$; $p = 0,00$). Sin embargo, no se encontraron asociaciones significativas entre el nivel técnico y la categoría de edad con el bienestar o la angustia. Nuestros hallazgos mostraron que el confinamiento afectó negativamente tanto los niveles de actividad física total como el bienestar psicológico en los practicantes colombianos de Taekwondo. Un mayor nivel educativo permite una mayor comprensión de las situaciones presentadas durante la pandemia, y el nivel de actividad física es un determinante de la salud mental de los deportistas.
Palabras clave: salud pública, SARS-CoV-2, artes marciales, salud mental.

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Introduction

The global health restrictions imposed by the Covid-19 pandemic, particularly the lockdown, have had a significant negative impact on the sports sector (Monterrosa et al.,2022). Competitions, both recreational and elite, are affected by postponements and cancellations, disrupting the regular training of athletes (Washif et al., 2022). This has resulted in adverse effects on their physical and mental performance, thus affecting their overall well-being (Facer-Childs, Hoffman, Tran, Drummond, & Rajaratnam, 2021; Washif et al., 2022).

Studies by Facer-Childs et al. (2021) and Washif et al. (2022) documented significant decreases in the frequency, duration, and intensity of training during lockdown. In the same period, less than 40% of athletes managed to maintain the specific training of their sports before the lockdown (Washif et al., 2022). Simultaneously, there was a notable increase in mental health disorders, including depression, anxiety, and stress, in the athletic population (Facer-Childs et al., 2021; Washif et al., 2022).

These factors make it even more relevant to explore the relationship between athletes' physical and mental health in this context. (Faulkner et al., 2021; Ozan & Secer, 2022) examined this correlation in a sample of adults from various countries and found that individuals with more positive changes in their exercise behavior reported better mental health and well-being (Linhares et al., 2022). However, the specific relationship among combat sports athletes, such as taekwondo, remains a scarcely explored research area. Additionally, other demographic factors, such as educational level and socioeconomic status, may influence access to sports practice and modulate the physical and mental activity levels of athletes (Chang et al., 2020; Hallmann &

Breuer, 2014; Sarkar & Fletcher, 2014).

Taekwondo, in particular, has been shown to provide significant psychological benefits to Athletes, such as cognitive and affective self-regulation, improvements in social behavior, and elevated mood (Akehurst, Southcott, & Lambert, 2020; Harwood, Lavidor, & Rassovsky, 2017; Yang, Ko, & Roh, 2018). Taekwondo Athletes have also been observed to have low levels of anxiety, depression, and aggression as well as excellent physical conditions (Bridge, da Silva Santos, Chaabene, Pieter, & Franchini, 2014; Moore, Dudley, & Woodcock, 2019;Quintero et al., 2023; Valdés-Badilla et al., 2021).

Despite the recognized benefits of this discipline and the fact that the relationship between perceived psychological and social well-being and PA levels has been studied (Lindell-Postigo, Zurita-Ortega, Ortiz-Franco, & González-Valero, 2020), the impact of decreased PA on athletes during lockdown remains an issue that requires further investigation. Specifically, the relationship between the mental health of taekwondo athletes and the decline in PA levels during the pandemic and lockdown should be explored in greater depth.

Therefore, this study aimed to analyze the relationship between PA levels, demographic factors, and psychological well-being during the Covid-19 lockdown period in Taekwondo athletes.

Material and Methods

Design and Participants

This study used a cross-sectional observational design with a convenience sample designed to analyze the impact of lockdown during the COVID-19 pandemic on self-perceived psychological well-being in relation to PA levels, nutritional status, and demographic characteristics of taekwondo athletes. The sample consisted of male athletes (n = 78; age: 35.05 ± 14.6 years; body mass: 71.8 ± 11.4 kg, height: 174 ± 6.4 cm) belonging to clubs associated with the Colombian Taekwondo Federation. To participate, they had to meet the following inclusion criteria: i) being a member of a club associated with the Colombian Taekwondo Federation, ii) being 18 years of age or older, iii) systematic practice of taekwondo at least three times a week before the pandemic, and iv) being confined for at least two months at the time of data collection. All participants were previously informed of the purpose of the study and the benefits associated with the research through the signing of an electronic informed consent form. This study was approved by the Declaration of Helsinki for working with humans for research. All procedures were approved by the Bioethics and Biosafety Commission of the University of Extremadura (Spain) (approval number:57/2020).

Assessments

Physical Activity Levels (PA)

To assess the PA levels of the taekwondo athletes, the short form of the International Physical Activity Questionnaire (IPAQ-SF) survey was used, previously validated in different countries including Colombia and used by the World Health Organization (Arango-Vélez, Echavarría-Rodríguez, Aguilar-González, & Patiño-Villada, 2020; Bauman et al., 2009; Craig et al., 2003; Lee, Macfarlane, Lam, & Stewart, 2011). The questions allowed for the evaluation of PA levels by providing information about minutes per day or days per week, at any time of the day, devoted to activity before the lockdown, and the last four weeks during the lockdown. Athletes reported the frequency and duration of different types of activity: vigorous (e.g., lifting heavy objects, intense aerobic exercise, cycling, or treadmill use); moderate (e.g., carrying light loads and cycling at a regular pace, gardening); walking activities; as well as the average time spent sitting on a weekday, including sitting at work (De la Rosa et al., 2022; Maugeri et al., 2020). Results were calculated as the weekly metabolic equivalent of a task in minutes (MET-min/week). According to the IPAQ recommendations for the scoring protocol, participants were classified according to their level of PA: low (<600 MET-min/week), moderate (>600 MET-min/week), and high (>3000 MET-min/week) (http://www.ipaq.ki.se).

Psychological General Well-Being Index (PGWBI-S)

The short version of the Psychological General Well-Being Index (PGWBI-S) was used to assess the general psychological well-being of Taekwondo athletes during the lockdown (Grossi et al., 2006). Briefly, this version consists of six dimensions of the original PGWB and a subset of six items scored on a six-point scale from 0 to 5, reaching a maximum of 30 points. The total score was obtained from the sum of the scores of the six dimensions (Anxiety, Vitality, Depression, Self-Control, Well-being, and General Health) by multiplying the overall score by 3.66 (to make it comparable to the original version of the PGWBI). Subsequently, participants were graded on the basis of a six-level scale: values below 60 indicated strong distress, values between 60 and 69 indicated distress, values between 70 and 89 indicated a state of absence of distress, and values of 90 and above indicated a state of positive well-being (Grossi et al., 2006).

Procedures

Coaches from the associated clubs were contacted by phone and mail in September 2020 to coordinate the participation of their respective athletes. Once recruited, the principal investigator, coaches, and participating athletes held a virtual meeting to explain the purpose, benefits, and potential risks of the study. In addition, the athletes underwent an induction of the assessments performed to avoid the learning effect. The outcomes were obtained from September 8 to 22, 2020, during the lockdown period in Colombia. During that time period, athletes completed an online survey https://tinyurl.com/ybsrz9z5 that took between 10 and 15 minutes to answer. The survey included questions related to sociodemographic characteristics,

IPAQ-SF, and PGWBI-S. Body mass and height data were obtained from the August 2020 trainer database. The summary of the procedures can be observed in figure 1.

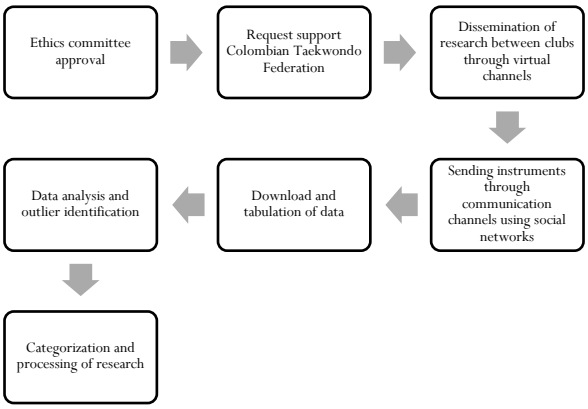

Figure 1. diagram of procedures.

Statistical Analysis

Statistical analyses were performed using the SPSS software (version 25.0; IBM Corp., Armonk, NY, USA). Continuous results are presented as mean ± standard deviation and categorical results are presented as absolute and percentage terms. The normality of the data was analyzed and verified using the Kolmogorov-Smirnov test. The chi-square ($\chi 2$) test was used to examine the differences between categorical factors. Statistical significance was set at $P < 0.05$.

Results

Descriptive Results

Regarding the well-being variables, absence of distress, distress, and strong distress, patterns were observed in the distribution of population characteristics. Regarding technical level, most individuals reporting well-being (62.5%, n=15) and absence of distress (65.5%, n = 20) identified themselves as experienced. However, for those with strong distress, the distribution was more balanced between the experienced (55.5%, n=10) and amateur (44.4%, n = 8) technical levels.

At the academic level, athletes with well-being were primarily distributed among those with a university level (58.3%, n = 14), followed by those with a postgraduate level (25%, n = 6), and secondary education (16.6%, n = 4). This trend remained similar for those without distress, while in the group with strong distress, individuals with a university level of education made up the majority (61.1%, n = 11).

As for the age category, most athletes reporting well-being were young adults (54.1%, n = 13), followed by adults (29.1%, n = 7), and youth (16.6%, n = 4). However, the distribution of ages between the categories of no distress and strong distress varied.

Finally, regarding PA level, most athletes with well-being and no distress reported moderate PA (58.3%, n=14 for well-being and 51.6%, n = 15 for no distress). Among those with strong distress, there was a more equitable distribution of different levels of PA. In summary, these variations demonstrate the diversity and complexity of interactions between the general characteristics of the population and their corresponding psychological states.

Associations

Table 1 shows the significant associations between certain individual characteristics and their state of well-being and distress. University education level was found to be significantly associated with both well-being and strong distress ($\chi 2 = 7.0$; $p = 0.03$). Similarly, individuals with a moderate level of PA showed a significant association with their state of well-being ($\chi 2 = 7.0$; $p = 0.03$) and absence of distress ($\chi 2 = 10.5$; $p = 0.00$). However, the table does not show significant associations between technical level and age category with the state of well-being or distress.

Table 1. ′
Comparison between psychological variables and general characteristics of the population

	Well-being	No distress	Distress	Strong distress
Technical level				
Amateur n (%)	9 (37.5)	11 (35.4)	-	8 (44.4)
Experienced n (%)	15 (62.5)	20 (65.5)	5 (100)	10 (55.5)
$\chi 2$; p	1.5; 0.22	2.6; 0.10	-	0.2; 0.63
Academic Level				
Secondary school n (%)	4 (16.6)	9 (29)	-	5 (27.7)
University n (%)	14 (58.3)	16 (51.6)	5 (100)	11 (61.1)
Postgraduate n (%)	6 (25)	6 (19)	-	2 (11.1)
$\chi 2$; p	7.0; 0.03*	5.0; 0.07	-	7.0; 0.03*
Age category				
Young n (%)	4 (16.6)	10 (32.2)	-	4 (22.2)
Young adults n (%)	13 (54.1)	8 (25.8)	-	7 (38.8)
Adults n (%)	7 (29.1)	13 (41.9)	-	7 (38.8)
$\chi 2$; p	5.2; 0.07	1.2; 0.54	-	1.0; 0.60
Physical activity Level				
Low n (%))	4 (16.6)	2 (6.4)	-	3 (16.6)
Moderate (n (%)	14 (58.3)	15 (51.6)	5 (100)	8 (44.4)
High n (%)	6 (25)	13 (41.9)	-	7 (38.8)
$\chi 2$; p	7.0; 0.03*	10.5; 0.00*	-	2.3; 0.31

*: $p < 0.05$. Significant values for the test Chi-Square statistic ($\chi 2$).

Discussion

This study aimed to analyze the relationship between PA levels, demographic factors, and psychological well-being during the Covid-19 lockdown period in Taekwondo athletes. The main findings indicated significant associations between university education level, moderate PA, and states of well-being and distress. However, the associations between technical level, age category, and state of well-being or distress were not significant.

It is evident that university education level is significantly associated with well-being and distress (Facer-Childs et al., 2021; Washif et al., 2022). This implies that education may provide additional psychological resources for managing stressful situations such as pandemics. Previous research has highlighted the influence of educational level and socioeconomic status on access to sports practice, and their impact on athletes' PA levels and mental health (Hallmann & Breuer, 2014; Sarkar & Fletcher, 2014).

From the descriptive findings, notable patterns were observed in the distribution of participant characteristics related to well-being and distress. The majority of participants who reported well-being and the absence of discomfort had a university education level and technical experience. This suggests that experience and adaptability to changes in training routines may help alleviate stress during periods of lockdown (Facer-Childs et al. 2021; Washif et al. 2022).

With respect to age, most individuals reporting well-being were young adults, indicating that the effects of lockdown on well-being and distress may vary depending on the age of the athlete. It is important to keep in mind that there are additional factors that may affect the mental health of athletes during a pandemic, and more detailed research is required to fully understand these relationships (Washif et al., 2022; Lindell-Postigo et al., 2020).

Regarding PA, we found that the majority of participants with well-being and absence of distress reported engaging in moderate PA. This finding is consistent with previous studies that have shown a positive relationship between favorable changes in exercise behavior and improved mental health and well-being (Facer-Childs et al., 2021; Lindell-Postigo et al., 2020). However, the exact relationship between PA levels and well-being may be more complex and requires further investigation, especially in the context of combat sports such as taekwondo.

The study concluded that the lockdown due to the Covid-19 pandemic negatively impacted the psychological well-being of taekwondo athletes. This is consistent with existing evidence showing a decrease in the frequency, duration, and intensity of training during the lockdown, which has led to an increase in mental health disorders among athletes (Facer-Childs et al. 2021; Washif et al. 2022). Washif et al. (2022) found that less than 40% of athletes managed to maintain previous training levels, which had an impact on their physical and mental performance.

In the broader context of the COVID-19 pandemic, significant disruptions in athletes' training and competition patterns are evident. Studies by Facer-Childs et al. (2021) and Washif et al. (2022) documented a decrease in the frequency and duration of training during lockdown, significantly affecting athletes' mental health. These drastic and abrupt changes in training and competition routines can have adverse consequences on athletes' mental wellbeing. Hallmann and Breuer (2014) and Sarkar and Fletcher (2014) highlighted the importance of participation and social recognition in sports for athletes' mental health, as well as the relevance of psychological resilience, particularly during periods of acute stress, such as lockdown.

Finally, Lindell-Postigo et al. (2020) suggested that PA practiced prior to the COVID-19 lockdown might have functioned as a mitigating factor for adolescents' mental health, thereby influencing their self-concept. These findings emphasize the need for further research to understand how individual factors such as age, education, and PA may affect the mental health of athletes during a pandemic.

In accordance with the above, however, it is important to consider expanding the sample for future research. In this study, we specifically focused on Taekwondo athletes. Athletes should consider a variety of sports and disciplines to provide a more holistic picture of how lockdown affects athletes in general. A limitation of this study is its cross-sectional nature, which provided an analysis at a specific point in time during the lockdown. A longitudinal design that allows for data collection at various points in time throughout the lockdown and even after lockdown could provide a more complete picture of how athletes' experiences and well-being change over time. In addition, it could be beneficial for future studies to conduct pre- and post-lockdown comparisons. An analysis of athletes' PA levels and psychological well-being before and after lockdown could provide a clearer picture of the effects of the lockdown on athletes' health and well-being. In addition, this study could benefit from a greater demographic diversity. Our sample was primarily limited to taekwondo athletes with university-level education. Increasing diversity in terms of education level and other demographic characteristics in future studies would allow for greater generalizability of the findings. Additionally, the incorporation of qualitative assessments is relevant. In our study, we used questionnaires to collect the data. However, qualitative methods, such as interviews and focus groups, can provide a deeper understanding of athletes' individual experiences and perceptions during the lockdown.

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clearer picture of the effects of the lockdown on athletes' health and well-being.

In terms of methodology, a possible improvement for future studies would be the incorporation of objective PA measures. In our study, PA was measured by self-reporting, which may have been subject to bias. Objective measurement devices, such as accelerometers, can provide a more accurate estimate of PA levels.

Finally, although this study focused on psychological well-being, it would be interesting to explore other measures of well-being in the future. Aspects such as social and emotional well-being could also be affected during lockdown and would provide a more complete picture of how lockdown affects athletes.

The authors believe that despite the evident results obtained through statistical processes, our study may have biases and several limitations that need to be considered for future research. Firstly, due to the nature of the study relying on self-reported surveys, there may be strengths and weaknesses that go beyond the scope of the research, influenced by cultural, physical, psychological, and economic factors (Cui et al., 2022). On the other hand, monitoring physical activity levels through self-perceived instruments rather than standardized measurement devices may introduce inaccuracies in the assessment of time and intensity of exercise performed (De la Rosa et al., 2022).

In conclusion, this study provides important insights into the impact of the Covid-19 lockdown on Taekwondo athletes in Colombia. The improvements proposed here could help to refine the methodology and increase the relevance and applicability of the findings in future research.

Conclusions

The main objective of our study was to provide insights into Colombian taekwondo Athletes' PA levels and mental well-being during the COVID-19 lockdown. Our findings showed that lockdown negatively affected both total PA levels and psychological well-being among Colombian taekwondo athletes. An academic level allows for a greater understanding of the situations presented during the pandemic, and the level of PA is a determinant of the mental health of athletes. In summary, this study provided valuable insight into the biopsychosocial state of athletes during the pandemic season, based on collaboration between several national academic and sports institutions.

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