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Implementación de un Programa Integral del Control y Monitoreo del Bienestar en una academia de jóvenes futbolistas

Implementation of a Comprehensive Well-Being Control and Monitoring Program in a Youth Soccer Academy

Implementação de um Programa Integral de Controle e Monitoramento do Bem-Estar em uma Academia de Futebol Juvenil

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RESUMEN

El presente estudio tuvo como objetivo evaluar la evolución en la implementación de un programa integral de seguimiento del bienestar en una academia de fútbol durante la fase de pretemporada, involucrando a una muestra de 120 jóvenes futbolistas. Con un enfoque metodológico de diseño mixto, la investigación combinó análisis cuantitativos y cualitativos para obtener una comprensión exhaustiva del estado de bienestar de los atletas. Durante la pretemporada, se realizaron evaluaciones semanales de diversos indicadores, como molestias musculares, niveles de estrés, estado de ánimo, fatiga, calidad del sueño y un índice global de bienestar. Los resultados mostraron aumentos estadísticamente significativos en el dolor muscular, el estrés, la fatiga y las alteraciones en la calidad del sueño ($p=0.001$ en todos los casos), mientras que el estado de ánimo se mantuvo relativamente estable a lo largo del período evaluado ($p=0.46$). Además, los datos cualitativos obtenidos a través de diarios reflexivos destacaron la relevancia de estos programas para guiar estrategias personalizadas de entrenamiento y recuperación, fomentando mejores condiciones físicas y mentales. La investigación evidencia la importancia urgente de implementar sistemas de monitoreo del bienestar en contextos formativos del fútbol juvenil, ya que actualmente existe una carencia de herramientas que permitan a los jóvenes deportistas controlar y gestionar su carga interna de entrenamiento y competición. La adopción de estos programas no solo contribuye a reducir molestias físicas y estrés psicológico, sino que también favorece el bienestar integral de los jóvenes atletas. En vista de estos hallazgos, futuras investigaciones deberían centrarse en analizar los efectos a largo plazo de estas intervenciones, con el fin de perfeccionar su diseño y aumentar su impacto en el desarrollo deportivo y personal de los futbolistas en etapas formativas.

Palabras clave: Monitoreo del Bienestar; fútbol; pretemporada; rendimiento; entrenamiento.

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ABSTRACT

The present study aimed to evaluate the progression of implementing a comprehensive athlete well-being monitoring program within a soccer academy during the pre-season phase, involving a sample of 120 young players. Employing a mixed-methods approach, the research integrated quantitative and qualitative analyses to achieve an in-depth understanding of the athletes' well-being. Weekly assessments were conducted throughout the pre-season, monitoring indicators such as muscle discomfort, stress levels, mood, fatigue, sleep quality, and a global wellness index. Results revealed statistically significant increases in muscle pain, stress, fatigue, and sleep disturbances ($p = 0.001$ in all cases), while mood remained relatively stable across the evaluation period ($p = 0.46$). Additionally, qualitative data obtained through reflective diaries underscored the critical role of these programs in guiding tailored training and recovery strategies, thereby promoting better physical and mental conditions. The findings highlight the urgent need to implement wellness monitoring systems in youth football training environments, as currently, there is a lack of tools enabling young athletes to effectively track and manage their internal training load. The adoption of such programs not only helps mitigate physical discomfort and psychological stress but also supports the overall well-being of young players. Based on these results, future research should focus on examining the long-term effects of these interventions, with the goal of refining their design and maximizing their positive impact on the athletic and personal development of young soccer players.

Keywords: Well-being Monitoring; young soccer Players, Preseason; Performance; training

RESUMO

O presente teve como objetivo avaliar o progresso na implementação de um programa abrangente de monitoramento do bem-estar dos atletas dentro de uma academia de futebol durante a fase de pré-temporada, envolvendo uma amostra de 120 jovens jogadores. Utilizando uma abordagem mista, a pesquisa integrou análises quantitativas e qualitativas para obter uma compreensão aprofundada do bem-estar dos atletas. Avaliações semanais foram realizadas ao longo da pré-temporada, monitorando indicadores como desconforto muscular, níveis de estresse, humor, fadiga, qualidade do sono e um índice global de bem-estar. Os resultados mostraram aumentos estatisticamente significativos na dor muscular, estresse, fadiga e distúrbios no sono ($p = 0,001$ em todos os casos), enquanto o humor permaneceu relativamente estável ao longo do período avaliado ($p = 0,46$). Além disso, os dados qualitativos obtidos por meio de diários reflexivos ressaltaram o papel fundamental desses programas na orientação de estratégias personalizadas de treinamento e recuperação, promovendo melhores condições físicas e mentais. As descobertas evidenciam a necessidade urgente de implementar sistemas de monitoramento do bem-estar em ambientes de treinamento de futebol juvenil, uma vez que atualmente há uma carência de ferramentas que permitam aos jovens atletas acompanhar e gerenciar efetivamente sua carga interna de treinamento. A adoção desses programas não só ajuda a reduzir desconfortos físicos e estresse psicológico, mas também apoia o bem-estar geral dos jovens jogadores. Com base nesses resultados, pesquisas futuras devem focar na análise dos efeitos a longo prazo dessas intervenções, com o objetivo de aperfeiçoar seu desenho e ampliar seu impacto positivo no desenvolvimento esportivo e pessoal dos jovens futebolistas.

Palavras chave: Monitoramento do Bem-Estar; jovens jogadores de futebol; Pré-temporada; Performance; treinamento

INTRODUCTION

The introduction of a comprehensive well-being monitoring and control program in youth football academies signifies a pivotal step forward in performance management (Alfano & Collins, 2021; Sarmento et al., 2018; Saward et al., 2016). Utilizing well-being questionnaires has become a vital method for evaluating the physical and psychological demands faced by players during training and competition (Saidi et al., 2022; Selmi et al., 2018). This approach not only seeks to enhance athletic performance but also aims to reduce the risks associated with injuries and overtraining by gaining critical insights into the well-being of athletes (Castilla-López & Romero-Franco, 2024; Medina-Porqueres et al., 2024; Nobari et al., 2021). Understanding and addressing the diverse needs

of young soccer players is essential for promoting their long-term development, particularly within a competitive landscape (Castro-Infantes et al., 2024; Musculus & Lobinger, 2018).

Recent trends show that coaching staffs are progressively implementing periodization strategies that modify training intensities in response to players' well-being feedback gathered from prior sessions (Layton et al., 2023). This adaptive approach allows coaches to tailor training loads more effectively, ensuring that player welfare is prioritized while optimizing performance outcomes (Op De Beéck et al., 2019). Normally, well-being assessed through well-structured questionnaires that measure various aspects such as fatigue, quality of sleep, muscle soreness, mood fluctuations, and stress levels (Hooper & Mackinnon, 1995). These assessment tools equip coaches with valuable knowledge regarding how players are coping with their training and performance challenges while fostering a culture of open communication between athletes and coaching staff (Gledhill et al., 2017; Ivarsson et al., 2020).

Several studies highlight the strong correlation between well-being and training intensity, illustrating how athletes react to diverse levels of exertion (Oliveira et al., 2023). For instance, when athletes report low well-being scores alongside high training loads, it signals a potential need for modifications in their training regime. Conversely, positive well-being scores following high-intensity sessions may reflect the success of the training approach (Baldacchino et al., 2023). Research has investigated the links between training intensity and well-being indicators in both youth and professional soccer players (Silva et al., 2022). Particularly noteworthy is the significant relationship observed between well-being outcomes and cumulative training loads, emphasizing that the total training volume can substantially affect players' health and performance (Oliveira et al., 2023). This insight reinforces the importance of assessing well-being within the broader framework of training and competition settings that young soccer players experience. In particular, emerging technologies focused on well-being offer valuable feedback, contributing to discussions surrounding digitally assisted mental health interventions aimed at developing meta-skills related to mental and emotional resilience in athletes (Mitsea et al., 2024). Furthermore, the concept of well-being has been examined in various contexts, including studies on young students where psychological well-being, sleep quality, and situational intrinsic motivation were assessed among adolescents participating in physical education classes (Cervelló et al., 2014) and university students (Lopez-Walle et al., 2020). Therefore, integrating comprehensive well-being monitoring into training programs, academies can not only enhance performance but also ensure the long-term health and development of their athletes (Nobari et al., 2020).

The implementation of well-being assessments via questionnaires has become an essential strategy for effectively managing training loads and competitive stress in soccer (Querido et al., 2021) as well as in various other sports (Ballester-Martínez et al., 2022). Additionally, promoting open conversations about well-being fosters a supportive atmosphere where both physical fitness and mental health take precedence (Wieser & Thiel, 2014). Establishing a climate of trust and dialogue between the coaching staff and players enhances load management, encouraging constructive communication (Ivarsson et al., 2020; Querido et al., 2021; Sarmento et al., 2018). It is essential for coaches to grasp these dynamics, as this knowledge enables them to customize training loads effectively, ensuring that athletes sustain optimal performance throughout the competitive season (Arnold & Fletcher, 2021). Given the increasing demands of travel, lengthy seasons, and tournaments, players often face substantial physical and psychological strain from the pressures of consecutive matches (Noor et al., 2021). Therefore, integrating well-being assessments into training regimens, especially during peak competition periods, is critical for assisting athletes in managing accumulated stress while aiming for peak performance (Ross et al., 2020).

Given the considerable variations in training and competitive demands experienced during the preseason, it is essential to examine how these factors affect athletes' well-being. Accordingly, this study aims to: (i) quantitatively evaluate changes in key well-being parameters, including muscle soreness, stress levels, mood, fatigue, sleep quality, and overall wellness, over the course of the preseason; (ii) qualitatively explore players' perceptions and experiences related to these well-being indicators through in-depth reflective diaries; and (iii) investigate players' perspectives on the effectiveness of various recovery strategies in managing their well-being. Employing a mixed-methods approach, this research seeks to provide a comprehensive understanding of how a well-being monitoring

system can inform personalized training and recovery programs, ultimately promoting better health and athletic performance among young soccer players. The underlying hypothesis posits that fluctuations in training intensity and match frequency during the preseason significantly influence players' overall well-being, with increased loads leading to greater discomfort and declining wellness indicators. It is also anticipated that players' subjective insights will highlight effective recovery techniques and reveal the personal impact of training loads. Ultimately, the findings are expected to demonstrate that systematic well-being assessment can facilitate tailored interventions that enhance health, resilience, and athletic outcomes in this population.

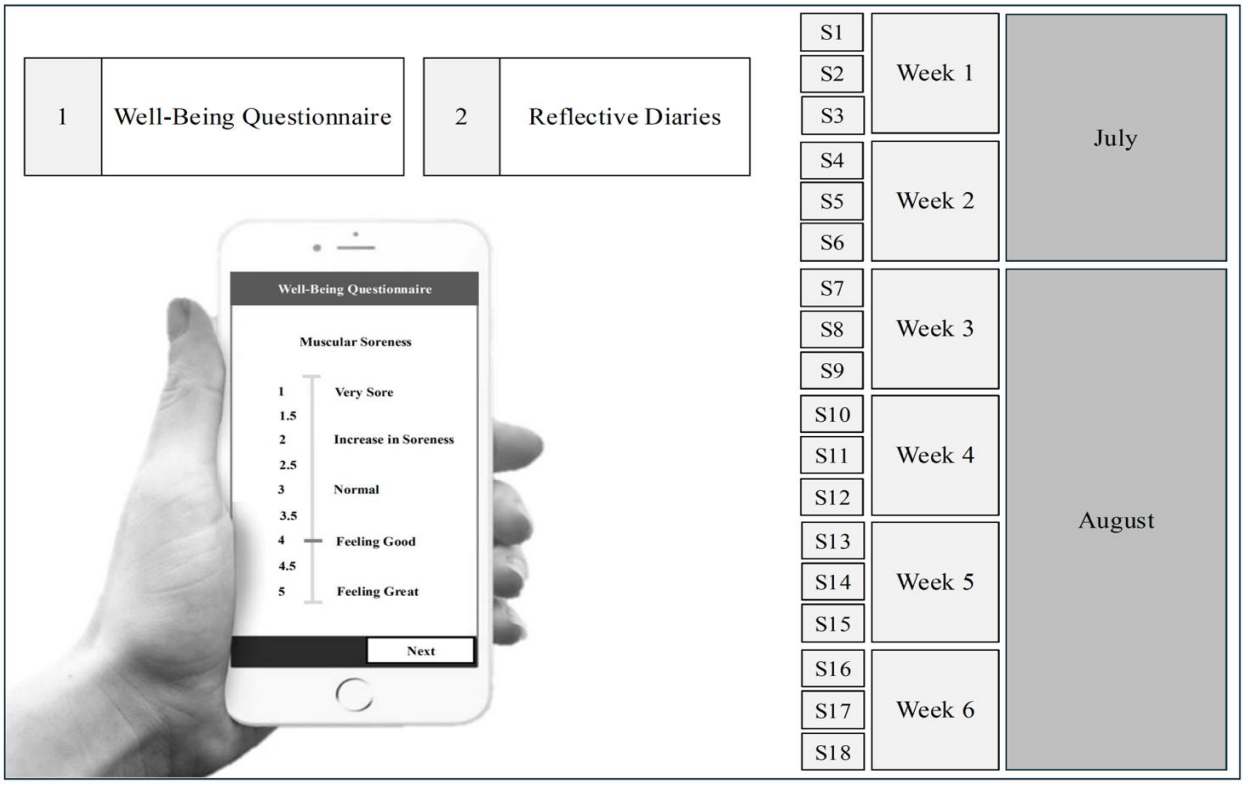
MATERIALS AND METHODS

Study design

The present study adopted a mixed-methods design (Creswell et al., 2003), incorporating both statistical and qualitative analyses to foster a comprehensive understanding of player well-being among youth soccer athletes. Conducted over the course of a preseason, the focus was specifically on monitoring and assessing the well-being of 120 young players. Well-being was monitored on a weekly basis by indicators included muscle soreness, stress levels, mood, fatigue, sleep quality, and an overall well-being index. Data collection was executed rigorously by members of the research team, ensuring the validity and reliability of the obtained results. It is important to emphasize that the study was conducted without interfering with or altering any training session plans established by the coaching staff (See Figure 1, for more information).

Figure 1.

Comprehensive Diagram Illustrating the Design and Framework of the Study



Participants

A total of 120 young male soccer players participated in this study, with an average age of 16.42 years (± 1.35), an average height of 176.01 cm (± 7.83), and an average body weight of 66.23 kg (± 9.22). The participants had a body fat percentage of 15.05% (± 2.82) and an average Body Mass Index (BMI) of 21.30 kg/m² (± 2.07). All participants were recruited from soccer academies affiliated with a semi-professional club situated in a region with an estimated population of 80,000 to 100,000 residents, based on data provided by the National Institute of Statistics of Spain (http://www.ine.es/; accessed January 1, 2023).

To determine the appropriate sample size, G*Power™ software (www.gpower.hhu.de) was employed, indicating that a minimum of 80 records would be sufficient for the analysis. The significance level (α) was set at 0.05, with a desired statistical power (1 - β error probability) of 0.80. Participants were recruited through convenience sampling. Prior to their involvement, players' parents and guardians, along with representatives from the regional soccer federation, were informed about the study's objectives and provided written informed consent. The research was conducted in accordance with the principles of the Declaration of Helsinki (World Medical Association, 2000; Bošnjak, 2001; Tyebkhan, 2003), which establish the fundamental ethical guidelines for research involving human subjects. All participants voluntarily agreed to take part, and informed consent was obtained in all cases. Ethical standards outlined by the American Psychological Association (APA) and the International Society of Sports Science Research (Harriss et al., 2017) were strictly followed to ensure the confidentiality and privacy of participants' responses. Inclusion criteria comprised: (i) signed informed consent from guardians; (ii) attendance at at least 90% of all training sessions; (iii) complete submission of all well-being reports during the data collection period; and (iv) normal vision with no history of neuropsychological impairments that could affect the study outcomes. Additionally, given the characteristics of the sample, compliance with Organic Law 3/2018, of December 5th, on the Protection of Personal Data and Digital Rights Guarantee, was also ensured. The study protocol received approval from the Research Ethics Committee of the University of Granada (Approval No. 4712/CEIH/2024).

Measures

Well-Being questionnaire

During the study period, young soccer players completed a customized psychological questionnaire, designed in line with McLean et al. (2010) framework. This tool evaluated various dimensions of well-being, including muscle soreness, perceived stress, mood, fatigue, and sleep quality. Muscle soreness was assessed based on the degree of discomfort reported by the players, utilizing a scale from 1) Very Sore to 5) Feeling great. Stress levels were gauged using a perceived scale, ranging from 1) Highly stressed to 5) Very relaxed. Mood was classified as either negative or positive, with response options such as 1) Highly annoyed/irritable/down to 5) Very positive mood. Fatigue was evaluated by asking players to describe their energy levels on a scale from 1) Always/constantly tired to 5) Very refreshed. Lastly, sleep quality was rated in terms of overall effectiveness, with responses categorized from 1) Insomnia to 5) Very restful. Players' responses were recorded using a five-point scale, allowing for scores to vary from 1 to 5 in increments of 0.5. To derive an overall well-being index, the scores from these five dimensions were summed, providing a thorough assessment of the athletes' psychological and physical states. This methodology facilitated a detailed exploration of the interrelations among these factors and their impact on performance throughout the tournament. These valuable insights are critical for enhancing the training and recovery strategies employed by both the physical and technical coaching staff.

Reflective diaries

As previously outlined, this study involved 120 young soccer players and took place during the preseason training phase. Throughout this period, athletes regularly documented their well-being indicators using a structured

reflective diary, which served as the core tool for data collection. This diary enabled continuous self-assessment, allowing players to express their physical and emotional states in their own words, providing rich qualitative data on their personal experiences. Data were gathered weekly, facilitating prompt analysis and enabling quick adjustments to address any emerging concerns. The entries were meticulously transcribed and organized for subsequent qualitative examination, aimed at identifying common themes and notable patterns in the players' perceptions and feelings (refer to Table 1 for additional details). This approach not only enhanced the understanding of how training impacted their physical and emotional health but also promoted reflective practices that supported self-awareness and regulation. Furthermore, the use of the diary created opportunities for meaningful interactions between players and coaching staff, ensuring that their reflections contributed to both tailored interventions and the overarching goals of the research (Smith and Zajda, 2018). Overall, the reflective diary played a vital role as an active participatory tool, strengthening the methodological framework and deepening the interpretive insights derived from the study.

Table 1.

Issues in the players' reflective diaries.

1.- How has the well-being monitoring program helped you understand muscle soreness and its role in recovery from soccer training?
2.- How can what you learned from the well-being monitoring program improve your mental well-being and stress management? How might this affect your performance in training and games?
3.- Do you think the well-being monitoring program changed how you view sleep quality and its importance for recovery in soccer? If yes, how could this affect your daily habits and overall health and performance?

Procedure

This study was carefully planned prior to the conclusion of the 2023-2024 soccer season, with the aim of conducting a thorough analysis of the entire training regimen and preseason structure to assess the well-being of youth academy soccer players. The data collection took place between July and August 2025. To gather comprehensive insights, participants completed standardized well-being questionnaires before each of their three weekly training sessions. To ensure familiarity with the assessment tools, initial orientation sessions were conducted, explaining the purpose of the questionnaires and instructing players on how to complete them accurately. The well-being evaluations were systematically carried out by administering the questionnaires approximately three hours prior to each training session. This timing aimed to capture the players' current state, minimizing the influence of immediate physical exertion. Additionally, players maintained Reflective Diaries throughout the preseason, which were reviewed and collected on the last training day of each week to monitor evolving perceptions of their physical and mental condition. Data collection was facilitated through digital platforms, specifically using Google Forms, allowing players to conveniently complete the questionnaires and diaries on their smartphones during designated assessment windows. This approach enabled real-time, precise data capture, reducing the risk of errors or reporting bias. The collected responses were subsequently organized into Microsoft Excel spreadsheets, where they were systematically coded and prepared for statistical analysis. The resulting data provided valuable trends and patterns related to player well-being over the preseason period, informing future training and recovery protocols.

Statistical analysis

The current research utilized a mixed-methods framework, combining both statistical and qualitative analyses to provide a detailed understanding of player well-being in youth soccer. Given the non-normal distribution of the data, nonparametric tests were employed for analysis. Specifically, the Kruskal-Wallis H test was utilized to

evaluate well-being indicators, including Muscle Soreness, Stress, Mood, Fatigue, Sleep Quality, and the Well-Being Index, across different time points (Weeks 1 through 6). A test used to observe non-normality, such as the Shapiro-Wilk and Kolmogorov-Smirnov tests, are commonly used to formally test for normality; these were applied to determine data distribution prior to selecting the appropriate statistical methods. For each variable, mean values and standard deviations were computed and reported for each match. The significance level was set at $p < 0.05$. All statistical analyses were conducted using SPSS v.27.0 for Windows (SPSS Inc., Chicago, IL), and data were expressed as mean ± standard deviation (SD).

A qualitative approach was employed to thoroughly investigate the significance of well-being questionnaires for young football players. This analysis aimed to delve into the players' experiences during preseason and their overall well-being throughout this period. Key data came from the reflections of participants involved in the educational process, which provided insights into how these experiences influence player well-being. To ensure reliable and credible findings, important excerpts were coded using cross-matching patterns, as outlined by Saldaña (2009). The data were organized into thematic axes relevant to the study's categories through selective, open, and axial coding. The analysis focused on aligning research objectives with the data collection methods, guaranteeing proportionality and fairness across techniques. After transcription, the information was categorized thematically and linked to analysis categories, with axes emerging from saturated results. Subsequently, the most pertinent text excerpts were identified using WeftQDA software following a comprehensive review by the research team.

RESULTS

The descriptive data from the well-being questionnaire are summarized in Table 2, organized by session (eighteen) and week (six).

Table 2.

Well-being parameters in the research group, presented as mean ± standard deviation (Mean ± SD), reflect the characteristics of the participants in the study during the season based on training sessions.

		Muscle Soreness	Stress	Mood	Fatigue	Sleep Quality	Well-Being Index
		2.49±0.50	3.09±0.81	3.89±0.79	3.56±0.50	3.53±1.15	16.56±1.78
	S1	(2.00 | 1.00 | 3.00)	(2.00 | 2.00 | 4.00)	(3.00 | 2.00 | 5.00)	(3.00 | 1.00 | 4.00)	(2.00 | 3.00 | 5.00)	(12.00 | 9.00 | 21.00)
		2.54±0.50	2.98±0.79	4.04±0.81	3.53±0.50	3.57±1.10	16.66±1.86
W1	**S2**	(2.00 | 1.00 | 3.00)	(2.00 | 2.00 | 4.00)	(3.00 | 2.00 | 5.00)	(3.00 | 1.00 | 4.00)	(2.00 | 3.00 | 5.00)	(13.00 | 8.00 | 21.00)
		2.48±0.50	3.00±0.74	4.03±0.79	3.53±0.50	3.99±0.82	17.03±1.57
	S3	(2.00 | 1.00 | 3.00)	(2.00 | 2.00 | 4.00)	(3.00 | 2.00 | 5.00)	(3.00 | 1.00 | 4.00)	(3.00 | 2.00 | 5.00)	(14.00 | 7.00 | 21.00)
		2.52±0.50	2.93±0.84	3.96±0.80	3.46±0.50	4.03±0.85	16.89±1.61
	S4	(2.00 | 1.00 | 3.00)	(2.00 | 2.00 | +4.00)	(3.00 | 2.00 | 5.00)	(3.00 | 1.00 | 4.00)	(2.00 | 3.00 | 5.00)	(13.00 | 8.00 | 21.00)
		2.42±0.50	3.00±0.82	3.93±0.83	3.52±0.50	3.52±1.20	16.38±1.73
W2	**S5**	(2.00 | 1.00 | 3.00)	(2.00 | 2.00 | 4.00)	(3.00 | 2.00 | 5.00)	(3.00 | 1.00 | 4.00)	(2.00 | 3.00 | 5.00)	(12.00 | 9.00 | 21.00)
		2.40±0.49	2.95±0.84	3.96±0.83	3.58±0.50	3.44±1.08	16.33±**1**.74
	S6	(2.00 | 1.00 | 3.00)	(2.00 | 2.00 | 4.00)	(3.00 | 2.00 | 5.00)	(3.00 | 1.00 | 4.00)	(2.00 | 3.00 | 5.00)	(12.00 | 8.00 | 20.00)
		2.87±0.79	3.08±0.84	4.01±0.81	3.61±0.49	3.53±1.09	17.10±1.69
	S7	(2.00 | 2.00 | 4.00)	(2.00 | 2.00 | 4.00)	(3.00 | 2.00 | 5.00)	(3.00 | 1.00 | 4.00)	(2.00 | 3.00 | 5.00)	(14.00 | 7.00 | 21.00)

W3		3.00±0.89	3.02±0.81	4.06±0.74	3.50±0.50	4.03±0.84	17.61±1.67
	S8	(2.00 | 2.00 | 4.00)	(2.00 | 2.00 | 4.00)	(3.00 | 2.00 | 5.00)	(3.00 | 1.00 | 4.00)	(3.00 | 2.00 | 5.00)	(14.00 | 7.00 | 21.00)
		2.97±0.86	3.08±0.82	4.06±0.81	3.48±0.50	3.98±0.78	17.58±1.60
	S9	(2.00 | 2.00 | 4.00)	(2.00 | 2.00 | 4.00)	(3.00 | 2.00 | 5.00)	(3.00 | 1.00 | 4.00)	(3.00 | 2.00 | 5.00)	(13.00 | 9.00 | 22.00)
		3.01±0.80	3.52±0.50	4.03±0.83	3.92±0.81	3.49±1.12	17.97±1.87
	S10	(2.00 | 2.00 | 4.00)	(3.00 | 1.00 | 4.00)	(3.00 | 2.00 | 5.00)	(3.00 | 2.00 | 5.00)	(2.00 | 3.00 | 5.00)	(14.00 | 9.00 | 23.00)
		2.98±0.83	3.43±0.50	3.95±0.83	3.46±0.50	3.92±0.85	17.73±1.60
W4	**S11**	(2.00 | 2.00 | 4.00)	(3.00 | 1.00 | 4.00)	(3.00 | 2.00 | 5.00)	(3.00 | 1.00 | 4.00)	(3.00 | 2.00 | 5.00)	(14.00 | 8.00 | 22.00)
		2.94±0.82	3.54±0.50	4.12±0.79	3.52±0.50	4.03±0.84	18.15±1.59
	S12	(2.00 | 2.00 | 4.00)	(3.00 | 1.00 | 4.00)	(3.00 | 2.00 | 5.00)	(3.00 | 1.00 | 4.00)	(3.00 | 2.00 | 5.00)	(14.00 | 8.00 | 22.00)
		3.45±1.12	3.38±0.49	4.03±0.77	3.56±0.50	3.98±0.78	18.41±1.61
	S13	(2.00 | 3.00 | 5.00)	(3.00 | 1.00 | 4.00)	(3.00 | 2.00 | 5.00)	(3.00 | 1.00 | 4.00)	(3.00 | 2.00 | 5.00)	(15.00 | 7.00 | 22.00)
		3.34±1.14	3.43±0.50	4.12±0.83	4.11±0.82	3.99±0.82	18.99±1.90
W5	**S14**	(2.00 | 3.00 | 5.00)	(3.00 | 1.00 | 4.00)	(3.00 | 2.00 | 5.00)	(3.00 | 2.00 | 5.00)	(3.00 | 2.00 | 5.00)	(14.00 | 10.00 | 24.00)
		3.45±1.13	3.50±0.50	4.01±0.84	4.00±0.82	4.03±0.85	18.99±1.88
	S15	(2.00 | 3.00 | 5.00)	(3.00 | 1.00 | 4.00)	(3.00 | 2.00 | 5.00)	(3.00 | 2.00 | 5.00)	(3.00 | 2.00 | 5.00)	(14.00 | 9.00 | 23.00)
		3.60±1.15	3.54±0.50	4.03±0.81	4.03±0.79	4.11±0.78	19.31±1.86
	S16	(2.00 | 3.00 | 5.00)	(3.001.00 | 4.00)	(3.00 | 2.00 | 5.00)	(3.00 | 2.00 | 5.00)	(3.00 | 2.00 | 5.00)	(15.00 | 9.00 | 24.00)
W6		3.43±1.14	3.55±0.50	4.05±0.83	3.61±0.49	4.00±0.86	18.64±1.73
	S17	(2.00 | 3.00 | 5.00)	(3.00 | 1.00 | 4.00)	(3.00 | 2.00 | 5.00)	(3.00 | 1.00 | 4.00)	(3.00 | 2.00 | 5.00)	(15.00 | 8.00 | 23.00)
		3.37±1.14	3.53±0.50	3.98±0.85	3.98±0.80	3.48±1.11	18.32±1.87
	S18	(2.00 | 3.00 | 5.00)	(3.00 | 1.00 | 4.00)	(3.00 | 2.00 | 5.00)	(3.00 | 2.00 | 5.00)	(2.00 | 3.00 | 5.00)	(14.00 | 9.00 | 23.00)

Note: W: Week; S: Session. In parentheses, the minimum values, the range, and the maximum values can be found in that order.

Complementing this data, Figure 2 offers a visual representation of well-being trends over time. This combination enhances our ability to perform a thorough analysis of how different factors may have influenced the participants' experiences throughout the season, facilitating a deeper insight into their overall well-being and performance dynamics.

The muscle soreness scores exhibited fluctuations over the course of six weeks. In Week 1, the average score recorded was 2.51 ± 0.28, which slightly decreased to 2.44 ± 0.27 in Week 2. During Week 3, there was a notable increase, with the mean score rising to 2.94 ± 0.48, followed by a period of relative stability at 2.98 ± 0.47 in Week 4. Finally, there was a significant upward trend in Weeks 5 and 6, where scores climbed to 3.41 ± 0.59 and 3.47 ± 0.67, respectively. To analyze these fluctuations in muscle soreness scores across the six weeks, a Kruskal-Wallis H test was employed. The results indicated significant differences ($H = 292.49$, $p = 0.001$), suggesting that muscle soreness levels meaningfully increased throughout the pre-season period.

The levels of reported stress, which ranged from negative to positive emotions, showed slight fluctuations throughout the weekly assessments. In Week 1, the average stress score was 3.03 ± 0.44. This value remained relatively stable in Weeks 2 and 3, where scores recorded were 2.96 ± 0.48 and 3.06 ± 0.46, respectively. Notably, in Week 4, the average stress score increased to 3.50 ± 0.31. Following this trend, Weeks 5 and 6 recorded scores

of 3.44 ± 0.26 and 3.54 ± 0.27. Despite these minor variations, the results from a Kruskal-Wallis H test indicated statistically significant differences between the matches (H = 197.37, p = 0.001), indicating that perceived stress levels notably increased primarily after the initial three weeks.

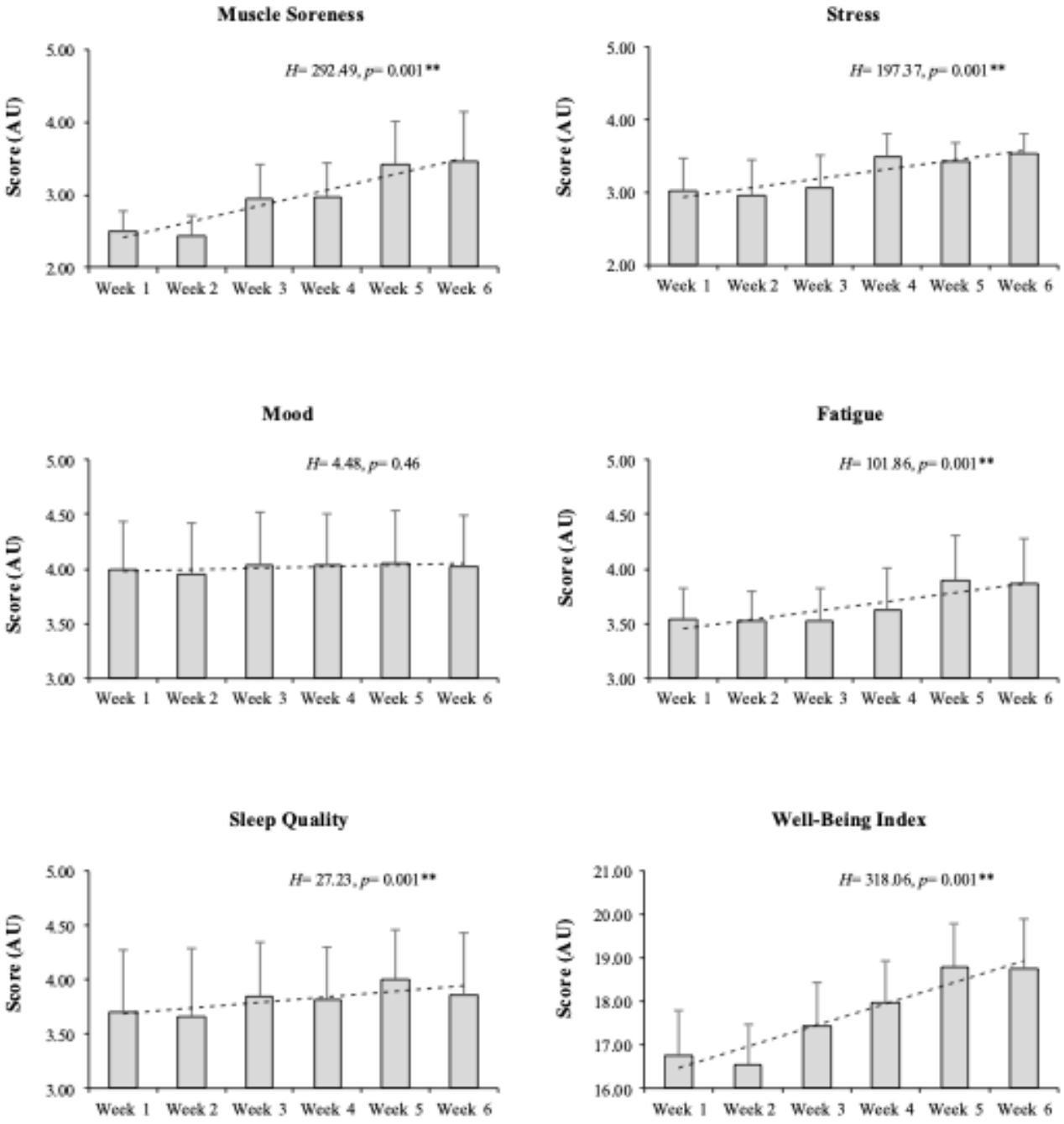
Mood scores demonstrated consistent stability throughout the preseason period, with average values consistently hovering around 4.00. The mean scores recorded for each week were as follows: Week 1: 3.99 ± 0.45, Week 2: 3.95 ± 0.48, Week 3: 4.04 ± 0.48, Week 4: 4.03 ± 0.48, Week 5: 4.05 ± 0.49, and Week 6: 4.02 ± 0.47. Kruskal-Wallis H test did not show any significant difference (H = 4.48, p = 0.46), indicating that mood levels remained stable throughout the entire preseason.

Fatigue levels, rated on a scale from 1 (Always tired) to 5 (Very fresh), exhibited fluctuations throughout the preseason. During Weeks 1 through 4, the young soccer players reported average fatigue scores of 3.54 ± 0.28, 3.52 ± 0.27, 3.53 ± 0.28, and 3.63 ± 0.37, respectively. Notably, the highest fatigue scores, indicating a greater sense of freshness, were observed in Weeks 5 and 6, with mean scores of 3.89 ± 0.41 and 3.87 ± 0.41. The results from the Kruskal-Wallis H test revealed a significant effect (H = 101.86, p = 0.001), suggesting that players experienced a progressive increase in fatigue levels over time, which translates into an improved sense of freshness and overall well-being as they progressed through preseason.

Sleep quality exhibited notable variations throughout the weeks of the study. During Weeks 1 to 4, the mean scores remained fairly consistent at 3.54 ± 0.28, 3.52 ± 0.27, 3.53 ± 0.30, and 3.63 ± 0.37, respectively. In contrast, significant improvements were observed in Weeks 5 and 6, with mean scores rising to 3.89 ± 0.41 in Week 5 and 3.87 ± 0.41 in Week 6. The results from the Kruskal-Wallis H test revealed a statistically significant effect (H = 27.23, p = 0.001), indicating that perceived sleep quality fluctuated significantly between weeks, ultimately enhancing towards the conclusion of the preseason period.

Finally, the overall wellness index demonstrated a consistent increase from Week 1 to Week 6. Specifically, a positive trend can be observed, beginning with Week 1 at a score of 16.75 ± 1.05, followed by Week 2 at 16.53 ± 0.92, Week 3 at 17.43 ± 1.02, Week 4 at 17.95 ± 0.99, Week 5 at 18.80 ± 1.00, and finally Week 6 at 18.76 ± 1.14. The findings from Kruskal-Wallis H test indicated a statistically significant effect (H = 318.06, p = 0.001), suggesting that perceptions of overall wellness significantly improved across the study period, culminating in enhanced wellness levels by the end of the preseason. This upward trend highlights the beneficial impact of the preseason training on player well-being.

Figure 2. Well-being values (Muscle Soreness, Stress, Mood, Fatigue, Sleep Quality and Well-Being Index) as a function of time (weeks)



Generation of Categories and Their Categorization

Utilizing qualitative analysis techniques, data were transcribed and categorized to reveal underlying themes and trends regarding the players' experiences during preseason training. Once the data from each participant was collected through questionnaires, it was processed using qualitative data analysis software, WEFT QDA. Thematic

saturation and the development of key axes facilitated the grouping of information into three primary categories: i) Physical Discomfort and Recovery: This category encompasses data related to players' experiences of muscle pain and fatigue during the training regimen; ii) Psychological Well-being and Stress Management: Responses in this category reflect players' perceptions of stress and overall mood throughout the preseason, and iii) Psychological Well-being and Stress Management: Responses in this category reflect players' perceptions of stress and overall mood throughout the preseason.

Declarations from soccer players presented in each of the identified categories

Physical Discomfort and Recovery (714 text extracts)

Declaration 1: "Initially, the training sessions left me with significant muscle soreness, causing me to doubt my ability to cope. However, by listening to my body, I discovered effective recovery techniques like foam rolling and active recovery days. Now, I feel empowered to manage my physical challenges better". Overall, soccer players express the importance of understanding their bodies and implementing recovery strategies to enhance performance.

Declaration 2: "The first weeks were tough on my muscles, and I was unsure about recovery. However, I learned to respect the recovery process, using hydration, nutrition, and stretching, which made a noticeable difference. Now, I'm more confident in my recovery abilities and understand that it's part of being an athlete". Young Soccer players emphasize the importance of proper recovery techniques to enhance performance and support continuous improvement.

Declaration 3: "At the start of training, I felt the physical strain and questioned my ability to keep up. However, by incorporating recovery strategies like massage and relaxation techniques, I learned to manage my discomfort better". Soccer players emphasize the importance of effective recovery methods to improve performance and overall well-being.

Psychological Well-being and Stress Management (716 text extracts)

Declaration 1: "Initially, I doubted the effectiveness of tracking stress levels, but sharing my feelings in a supportive environment has been transformative. Ongoing discussions about well-being have alleviated some pressure, yet I still face anxiety before games" Soccer players advocate for enhanced mental health support to better manage stress and anxiety in their sport.

Declaration 2: "I was skeptical about monitoring stress levels, but discussing my feelings with teammates and coaches has improved my coping mechanisms. This highlights the need for stronger psychology work support as we face upcoming challenges". Soccer players emphasize the importance of adequate mental health resources for coping with stress during the season.

Sleep Quality and Recovery Perception: (706 text extracts)

Declaration 1: "I struggled with sleepless nights before matches and important training session, often worrying about my performance. However, I've learned that quality sleep is crucial for recovery and performance. Coaches highlighted its importance, prompting me to establish a consistent sleep schedule, which has made me feel more refreshed and focused" Soccer players recognize that prioritizing good sleep hygiene is vital for optimizing our performance and reaching our full potential on the field.

Declaration 2: "In the past, I often found myself lying awake at night before matches and key training sessions, consumed by worries about my performance. Through this experience, I've come to understand how essential quality sleep is for effective recovery and peak performance. This change has left me feeling more refreshed and

focused. Soccer players recognize that it is not beneficial to dwell on events that have not yet occurred; therefore, it is essential for them to remain focused on the present moment without overthinking.

DISCUSSION

The present study aims to assess fluctuations in well-being indicators, including muscle soreness, stress, mood, fatigue, and sleep quality, throughout the preseason. To employ a mixed-methods design, to analyze players' perceptions of these indicators through reflective diaries, and to explore their insights on effective recovery strategies. This comprehensive approach is intended to enhance our understanding of how well-being monitoring can inform personalized training and recovery strategies, ultimately promoting better health outcomes for young soccer players. The results reveal that levels of muscle soreness, stress, fatigue, sleep quality, and the overall wellness index showed a significant increase throughout the preseason. In contrast, mood levels remained stable during this period. The qualitative analysis of the reflective diaries underscored the vital importance of well-being monitoring programs in developing individualized training and recovery plans that support improved health outcomes for soccer players. This understanding can help create more effective strategies tailored to the unique needs of athletes.

The results of this six-week preseason study provide a detailed understanding of the various well-being indicators in young soccer players. Importantly, the changes observed in muscle soreness levels highlight the physical challenges faced by these athletes during rigorous training sessions. The significant spike in soreness recorded in Week 3, followed by more stable levels in Weeks 4 to 6, aligns with established research indicating that such variations are a normal part of the body's adaptation process to contributing to improved performance as the athletes adjust to their training regimen (Khaitin, et al., 2021; Kraemer & Ratamess, 2005; Fullagar et al., 2016, Nédélec et al., 2015). In fact, measures of internal load, as indicated by perceived exertion and heart rate, consistently demonstrate strong positive correlations with external loads and intensity measured by running and accelerometer data during team-sport training and competitions, particularly evident during pre-season preparations (McLaren et al., 2018). Moreover, the increased peak soreness levels noted in the later weeks of training likely indicate a buildup of fatigue among young soccer players. This emphasizes the necessity of establishing effective recovery strategies to mitigate the risk of overuse injuries (Selmi et al., 2022).

While muscle soreness levels increased, the players' stress levels exhibited a more stable pattern, with a statistically significant uptick primarily noted after Week 3. The initial reduction in stress may indicate that players were acclimating to the heightened intensity of competition and training. However, it is essential for coaches to closely monitor stress levels to prevent burnout and support positive emotional well-being, both of which are crucial for optimal performance (Nédélec et al., 2015). Additionally, during the preseason, team rosters are being finalized, leading to increased pressure on players to secure their positions. This pressure can contribute to heightened stress responses, making it even more important for coaching staff to foster a supportive environment that addresses both physical and emotional needs

While muscle soreness levels increased, the players' stress levels exhibited a more stable pattern, with a statistically significant uptick primarily noted after Week 3. The initial reduction in stress may indicate that players were acclimating to the heightened intensity of competition and training. The literature has shown positive relationships between self-confidence and a task-oriented climate, as well as negative relationships with an ego-oriented climate. Additionally, it has been observed that ego orientation generates greater insecurity and anxiety (Morales-Sánchez et al., 2022). However, it is essential for coaches to closely monitor stress levels to prevent burnout and support positive emotional well-being, both of which are crucial for optimal performance (Nédélec et al., 2015). Furthermore, during the preseason, team rosters are being finalized, which increases pressure on players to secure their positions. This pressure can contribute to elevated stress responses, making it even more important for coaching staff to foster a supportive environment that addresses both physical and emotional needs. In sum, these considerations highlight the importance of implementing integrated strategies that promote both physical

preparation and psychological well-being of athletes, especially during critical moments like preseason and in the face of intense competition.

The stability of mood scores throughout the preseason indicated a consistent positive outlook among players despite fluctuations in other well-being metrics. This finding is indicative of the resilience of these young athletes, who possibly leveraged coping mechanisms to maintain their psychological well-being (Selmi et al., 2023). The consistent mood levels are vital, as emotional stability has been linked to improved athletic performance and teamwork (Lochbaum et al., 2021).

Fatigue levels introduced an intriguing perspective as they showed progressive increases in reported freshness over time. The spike in perceived freshness during Weeks 5 and 6 contradicts typical fatigue trajectories known in preseason training, suggesting that players may experience heightened energy levels as they gain fitness and adjust positively to training demands (Marqués-Jiménez et al., 2017). This enhancement in fatigue perception might be attributed to adaptations that lead to improved resilience and physical conditioning.

The notable enhancement in sleep quality observed during Weeks 5 and 6 underscores the critical importance of restorative sleep for optimal athletic performance and recovery. Previous research has consistently demonstrated that high-quality sleep is vital for effective recuperation, impacting cognitive function, mood regulation, and overall health (Selmi et al., 2023). The observed improvement in sleep parameters toward the end of the preseason may reflect athletes' adaptation to training demands; however, ongoing monitoring is recommended to maintain and promote these benefits throughout the competitive season (Clemente et al., 2021). Implementing continuous sleep assessment can facilitate personalized interventions, ultimately supporting sustained performance and well-being.

Finally, the robust positive trend observed in the overall wellness index throughout the study underscores the efficacy of the preseason training regimen in promoting player well-being. The significant increase in the wellness scores from Week 1 to Week 6 suggests that structured personalized training programs tailored to the players' evolving needs can lead to enhanced health outcomes (Brink et al., 2010; Gil-Rey et al., 2015). The overall findings advocate for ongoing well-being monitoring to inform individualized training and recovery strategies crucial for optimizing performance and health in young athletes and avoid injuries (Eckard et al., 2018).

The insights gathered from the players' feedback highlight the critical need to acknowledge and address physical discomfort during training sessions. This discomfort may stem from inadequate physiological adaptation during the pre-season period. According to Haller et al. (2022), implementing structured recovery techniques can lead to enhanced physical performance and reduced injury risk in athletes. Furthermore, players reported positive experiences after learning to respect the recovery process (Declaration 2). This approach aligns with findings by García-Calvo et al. (2014), which indicate that proper recovery techniques significantly impact performance enhancement and athlete confidence. Players' acknowledgment of the need to integrate recovery practices as part of their training emphasizes the essential link between physical recovery and athletic development. Not only do these practices improve physical recovery, but they also contribute to the overall well-being of young athletes (Djaoui et al., 2016). The cumulative evidence suggests that a comprehensive understanding and implementation of these recovery strategies empower athletes, leading to enhanced performance and resilience (Dambroz et al., 2022).

In addition to physical well-being is an integral aspect of an athlete's performance (Fruchart & Rulence-Pâques, 2022). In this sense, the psychological challenges faced, such as anxiety and stress, were prevalent among players (Nédélec et al., 2015). According to Botelho et al. (2022), the importance of psychological support cannot be overstated when developing coping mechanisms for athletes facing performance-related stress in female soccer players. The Declaration 2 further underscores the necessity of monitoring stress levels and connecting with teammates and coaches, that can assist young players in managing stress, particularly during competitive seasons (Beckmann et al., 2015; Olmedilla et al., 2019).

Another critical component of well-being monitoring is sleep quality, which directly affects recovery and athletic performance (Nédélec et al., 2019; Taylor et al., 2016). The Declaration 1 illustrates how sleepless nights can detract from a player's focus and overall readiness for training or competition, being essential for both cognitive function and physical recovery (Pourhassan et al., 2023; Sawczuk et al., 2018; Watson & Brickson, 2018). Implementing mindfulness interventions may serve as an effective strategy to improve stress management and enhance recovery, as evidenced by research conducted by Holguín-Ramírez et al. (2020). Additionally, Sabarit et al. (2020) found a positive association between attention, processing speed, and game performance, suggesting that improvements in psychological well-being may translate into enhanced athletic output.

The present study provides valuable insights into well-being indicators among young soccer players during the preseason training phase, effectively highlighting both its strengths and limitations in advancing our understanding of athlete health. One notable strength of this research is its mixed-methods approach, which combines quantitative evaluations of well-being variables, such as muscle soreness, stress levels, and sleep quality, with qualitative insights drawn from players' reflective diaries. This integrative strategy offers a well-rounded perspective on the athletes' experiences, facilitating a connection between empirical data and individual viewpoints. Furthermore, the substantial sample size of 120 participants bolsters the reliability of the findings, enabling broader conclusions regarding the effects of preseason training on various well-being indicators. However, the study does encounter specific limitations. The dependence on self-reported measures for subjective indicators such as stress, mood, and fatigue may introduce potential biases, as these perceptions can be influenced by personal circumstances or team dynamics. Moreover, the focus exclusively on the preseason may limit the generalizability of the findings to other phases of the competitive season, during which well-being dynamics could differ significantly.

CONCLUSION

This study reveals significant fluctuations in well-being indicators among young soccer players during the pre-season. Systematic assessments indicated increases in muscle soreness, stress, fatigue, and sleep disturbances, while mood states remained relatively stable over the period. Qualitative data derived from reflective diaries underscored the vital importance of wellness monitoring programs in guiding personalized training and recovery strategies, which are essential for enhancing both physical and mental health. The results highlight an urgent need to adopt comprehensive wellness monitoring systems within youth soccer training environments. Future research should focus on evaluating the long-term impacts of these interventions, aiming to optimize their design to effectively support athletic performance and facilitate personal development.

PRACTICAL IMPLICATIONS

This study demonstrates a strong potential for practical application in coaching, as the variables examined can offer valuable insights into athlete overload and recovery status. Coaches can leverage this information to adjust training loads, reschedule sessions, or restrict playing time during competitions—measures that can help prevent injuries and avoid disruptions in both physical and technical-tactical development, especially during the early phase of the sporting season. Nevertheless, it is essential to recognize the limitations inherent in the reviewed research. Many studies may be affected by factors such as small sample sizes, selection biases, or limited generalizability across different sports or athlete populations. Additionally, inconsistencies in data collection methods and measurement tools could impact the precision and reproducibility of the findings. These methodological constraints should be taken into account when applying these insights in practice. Future investigations should seek to address these issues to improve the robustness and reliability of these variables in real-world settings.

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