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Comparison of Match Load and Wellness between Friendly and World Cup Matches in Elite Female Soccer Players

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Abstract: (1) Objetive: Compare the internal load (ILO), external load (ELO) and wellness (WS) between official preparation friendly matches (FM) and France 2019 women world cup (WWC) matches in female soccer players. (2) Methods: Ten field players of the Chilean national football team (age 27 ± 3.4 years, height 162.8 ± 4.32 cm, weight 60.5 ± 4.6 kg, fat percentage 24.7 ± 1.62% and muscle percentage 49.2 ± 1.63%) participated in the study. Participants were compared across three FM before the world cup and three matches of the group stages in the WWC in June 2019. Both, ELO and ILO were recorded using GPS (Catapult Sports®, 10 Hz) and rating of perceived exertion (RPE), respectively. In addition, wellness was analyzed via personal questionnaire at 24 and 48 h after match. The intra subject difference was analyzed with a Student's *t*-test for related samples. (3) Results: Moderate differences were observed between WWC and FM for total and relative total distance covered [TD and TDr, respectively] (p = 0.025, ES = −0.74 and p = 0.017, ES = −0.6). In addition, a non-significant (p = 0.088; ES = −0.43) larger high-intensity distance (HSR) was also found for WWC. Likewise, greater RPE was observed in WWC (p = 0.001; ES = −1.50) when compared to FM. Finally, significantly better wellness scores were shown for FM at stress ST24h, fatigue FT48h, and muscle pain MS48h (p = 0.038; ES = 0.72, p = 0.066; ES = 0.71; and p = 0.63; ES = 0.77) when compared to WWC matches. (4) Conclusion: It was concluded that ELO and ILO were greater at WWC soccer matches, whereas WS scores were better for FM. Moreover, ILO measures (i.e., TD, HSR and TDr) were greater in WWC, which could be at least in part, be the reason behind the differences in the values reported in the wellness questionnaires at 24 and 48 h after the match.

Keywords: soccer; football; contextual factor; match running performance; internal load; fatigue

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1. Introduction

The physical load (in training or matches) is composed of internal and external load [1]. The external load (ELO) is defined as the amount of work carried out in a given task, and, more specifically, in team sports it is usually quantified as the duration in minutes, or meters completed at high, medium or low intensity [2,3]. Global positional system (GPS)

is commonly used to monitor ELO, which allows analyzing the physical demands of the competition [4,5]. Furthermore, internal load (ILO) is defined as a measurable physiological aspect that occurs within the athlete [6]. In soccer, the rate of perceived exertion (RPE) is commonly used, due its simplicity, validity and low cost [7,8], although it must be considered that this is an indirect measure [6]. In this line, perceived fatigue is another important aspect that must be taken into account by the technical staff. It is defined as the change in the sensations that control the integrity of the athlete [9]. For this purpose, the use of subjective self-reports is usually applied by coaches and practitioners. Wellness is among the most commonly used, as reported by Hooper et al. [10] and McLean et al. [11].

For technical and medical staff, the ability to control ELO and ILO has many advantages. For example, they can regulate training loads during microcycles to ensure players are in the best possible condition for competitions [12,13]. In terms of match load, numerous studies have analyzed the influence of contextual factors over ILO and ELO, such as the final score, match relevance, location, and distance traveled to play (i.e., home or away, and long or short trip), quality of the rival (i.e., ranking), and tournament configuration, among other aspects [14–16]. The reports mentioned above showed the extent to which the soccer context (i.e., level of rival or type of tournament) can influence ILO and ELO [17], and allow coaches to use these results as reference values to better control training loads [18]. In this regard, it has been reported that ELO values in official matches were higher when compared to friendly matches [19,20]. In terms of fatigue, previous studies [21,22] have shown that in elite players, it appears at the end of the game, and this could generate a negative impact in the associated biomarkers (i.e., blood lactate, creatine kinase) until 24 and 48 h. This is particularly important during World Cup competitions, due to the increased demands observed in the latest Women's World Cup (WWC) [23].

For this reason, it is of utmost importance to monitor ELO, ILO and WS, with particular interest in the differences between FM and WWC in elite soccer players. This information may help coaches to better understand the demands imposed during warm-up friendly matches and the most important competition for any soccer player (i.e., WWC). In addition, this could be a key aspect to analyze and comprehend the demands imposed on players [8,24], with the aim of optimizing recovery strategies, and program the training cycles with more precise information to face this FIFA competitions in the future.

However, to date there is only information on ELO, ILO and wellness in professional soccer players [25–28]. However, this has not been observed in elite players at world championships, which may ultimately better understand the impact that FM and WWC matches may impose to these elite athletes. Thus, the aim of this study was to compare ELO, ILO and WS in FM and WWC in the Chile women's national soccer team. Finally, it was hypothesized that ILO and ELO values will be higher and WS values lower in WWC compared to FM due to the importance of the tournament [29].

2. Materials and Methods

2.1. Design

This longitudinal, observational, intragroup, descriptive and comparative study was based on a quantitative approach.

2.2. Sample

A non-randomized convenience sampling was performed consisting of ten soccer players (excluding goalkeepers) of the Chilean women's national soccer team participated in the study (age 27 ± 3.4 years old, height 162.8 ± 4.32 cm, weight 60.5 ± 4.6 kg, fat percentage 24.7 ± 1.62% and muscle mass 49.2 ± 1.63%). Participants played in high standard senior leagues in Chile or Spain apart from their international schedules. In the moment of evaluation, the team was ranked 37th out of 155 according to the FIFA women world ranking [30]. For studies purpose, only players with more than 80 min, because a comparison of wellness will be made as a measure of fatigue, understanding that during the final phases of the match the most intense demands are usually found and could affect

these results [31] and who had played at least 1 FM and 1 WWC, were considered for the study.

2.3. Ethical Considerations

All players volunteered to participate in the present study and were informed about the objectives and nature of the research. They signed an informed consent in accordance with the guidelines of the Declaration of Helsinki [32]. The study was approved by the Institutional Ethics Committee of University Hospitals Virgen Macarena and Virgen del Rocío de Sevilla, Spain (C.P. RENFEFUTCHILE—C.I. 2355-N-20, 28 June 2021). As part of the study, each player underwent a medical check-up at the beginning of the season and did not suffer from injuries, nor did they present physical discomfort during the competitive period or during the time in which this study was carried out.

2.4. Procedures

The last three FM before the WWC, between April and May 2019 were compared with the three matches of the France 2019 WWC groups phase played in June (Figure 1), it is worth mentioning that no player was sent off in these matches (Figure 2). To record the ELO variables, GPS devices were used, whereas for ILO, data were collected through RPE ~30-min post-match, and at 24 and 48 h after the matches through WS. On match days, the players underwent a standardized warm-up led by the team's physical trainer, which lasted ~25-min, and included general joint mobility exercises, games in reduced spaces, and defensive/offensive work.

FIFA Calendar	Match #	Date	City	Country	Opponent	FIFA Ranking	Final Score	Result
Friendly match	1st	9 April 2019	Alkmar	Holland	Holland	4th	7-0	Lost
	2nd	20 May 2019	Santiago	Chile	Colombia	26th	1-1	Tie
	3rd	30 May 2019	Regensburg	Germany	Germany	2nd	2-0	Lost
Women's World Cup	1st	11 June 2019	Rennes	Francia	Sweden	5th	2-0	Lost
	2nd	16 June 2019	Paris	Francia	USA	1st	3-0	Lost
	3rd	20 June 2019	Rennes	Francia	Thailand	39º	2-0	Win

Figure 1. Official calendar of FIFA Friendly Matches and the Women's World Cup in France 2019 analyzed for the study.

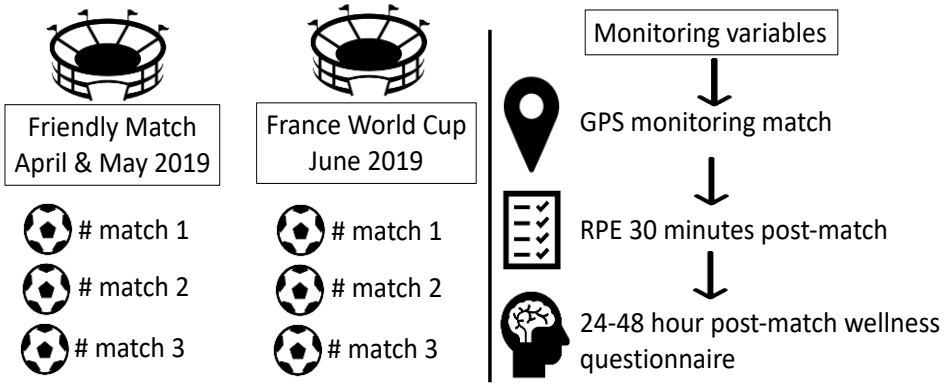

Figure 2. Study Procedures.

2.4.1. External Load—GPS Monitoring

Players wore 10 Hz GPS devices (Optimeye S5, Catapult Sports®, Melbourne, Australia), positioned on their upper backs, in neoprene underwear to prevent device displacement [33,34]. The following variables were recorded: total distance covered in meters (TD), distance covered at high intensity >18 km/h in meters (HSR), number of sprints >18 km/h (NS), maximum velocity reached in the match (MV), total distance covered, high intensity, number of sprints relative to minutes (TDr, HSRr, NSr) and, lastly, absolute player load (PL)

and player load relative to minutes played (PLr). The latter is an instantaneous variable of acceleration deltas divided by a scale factor. This model has been used to quantify other demanding activities, such as impacts, jumps and changes of direction, which are inherent characteristics of team sports such as soccer [35,36].

2.4.2. Internal Load—Rating Perceived Exertion (RPE)

In order to quantify the intensity of each match, the RPE scale was used 30 min after each match (Borg, 1990), where each player rated the intensity of the match using a 0–10 scale in a spreadsheet based on the Cloud (Google Drive, Google, CA, USA). There was no presence of pairs when responding to avoid bias in the responses [37].

2.4.3. Fatigue Perception—Wellness (WS)

During the study period, the players completed a wellness (WS) at 24 and 48 h after the match in a Cloud-based spreadsheet (Google Drive, Google, CA, USA). The proposal of McLean et al. (2010) was used, that was used under the recommendations of Hooper and Mackinnon (1995). Fatigue (FT), sleep quality (SL), muscle pain (MS), stress level (ST) and mood (MD) were evaluated using the WS on a scale of 1 to 5 points, with 5 being the maximum well-being. Total wellness (TW) was then determined by adding the five scores [11].

2.5. Statistical Analysis

The Shapiro-Wilk test showed that the variables follow a normal distribution, thus the mean and standard deviation were used for the descriptive analysis. The intra-subject difference between periods was analyzed through the Student's *t*-test for paired samples. Effect sizes were expressed through the standardized difference as Cohen's d [38], using the following thresholds for their interpretation: trivial (<0.2), small (0.2–0.6), moderate (0.6–1.2), large (1.2–2), very large (2–4), and extremely large (>4), with 90% confidence interval [39]. The statistical analysis was performed using SPSS software version 22 (IBM®, New York, NY, USA), establishing an alpha value of 0.1, since the rejection of the null hypothesis (greater type I error) in this case would not imply a risk for the subjects, but greater wakefulness in certain variables, as well as due to the hypothesis of superiority raised [40].

3. Results

Table 1 shows the comparison of the ELO variables between FM and WWC. Moderate and significantly greater TD and TD_r were found in WWC (p = 0.025, ES = −0.74 and p = 0.017, ES = −0.6, respectively). Moreover, greater HSR was observed in WWC matches (p = 0.088; ES = −0.43) versus FM.

Table 1. Description and differences of external load between periods.

Variables	Friendly Match (n = 3)		Women World Cup (n = 3)		90% CI			
	M	±SD	M	±SD	ES	LL	UL	*p*
MM (min)	88.1	3.37	89.7	0.58	−0.79	−1.84	0.26	0.200
TD (m)	9402	1044	10,054	729	−0.74	−1.24	−0.23	0.025
HSR (m)	531	166	601	161	−0.43	−0.85	−0.02	0.088
NS (count)	40.8	14.3	45.0	10.22	−0.34	−0.84	0.16	0.244
HSR_R (m/min)	6.03	1.94	6.7	1.81	−0.36	−0.79	0.07	0.164
NS_R (count/min)	0.46	0.17	0.5	0.11	−0.26	−0.76	0.23	0.353
MV (km/h)	25.4	1.60	26.8	5.58	−0.39	−1.42	0.63	0.499
PL (AU)	992	143	942	224	0.28	−0.36	0.91	0.447
TD_R (m/min)	106	9.77	111	8.61	−0.60	−0.97	−0.22	0.017
PL_R (AU/min)	11.3	1.60	10.5	2.44	0.41	−0.17	0.99	0.228

M: mean; SD: standard deviation; ES: effect size; CI: confidence interval; LL: lower limit; UL: upper limit; MM: match minutes; TD: total distance; HSR: high speed running; NS: number of sprints; MV: maximum velocity; PL: player load; R: relative to the minutes of the match.

Figure 3 shows the intra-subject differences ($p < 0.05$) between FM and WWC, for the external load variables, TD ($p = 0.025$), HSR ($p = 0.088$) and TD_r ($p = 0.017$).

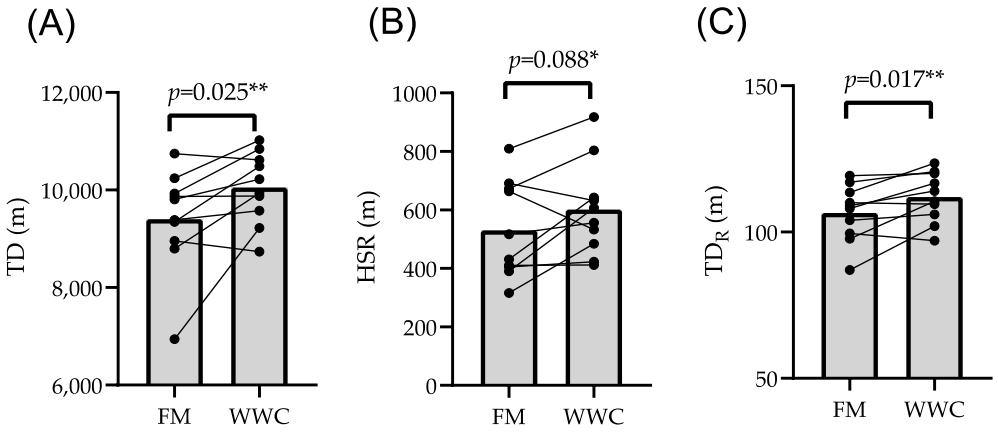

Figure 3. Bar chart with significant differences between periods. FM friendly match; WWC Women world cup; (**A**) TD total distance; (**B**) HSR high speed running; (**C**) TD_r total distance relative to the minutes of the match; * effect size small; ** effect size moderate.

Figure 4 shows the standardized difference in external load between periods.

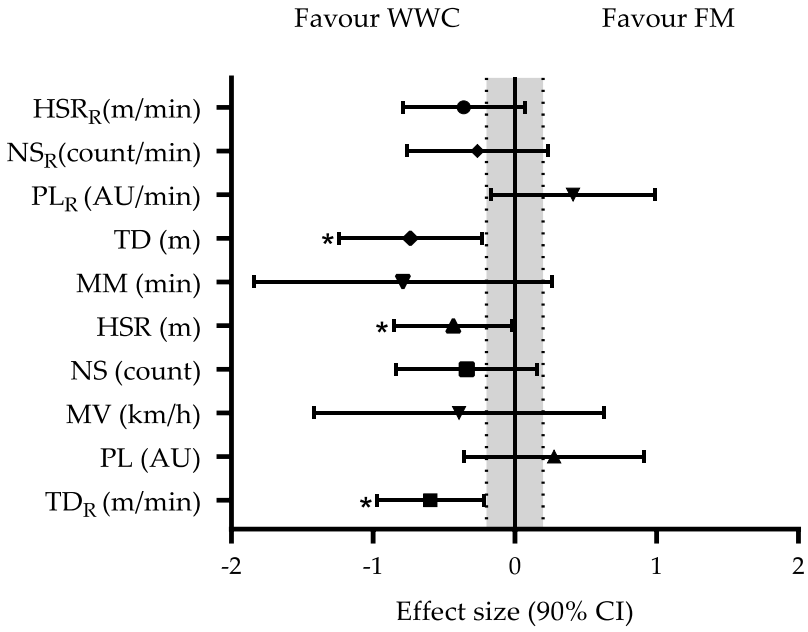

Figure 4. Standardized difference of external load between periods. FM friendly match; WWC Women world cup; MM match minutes; TD total distance; HSR high speed running; NS number of sprint; MV maximum velocity; PL player load; R relative to the minutes of the match; AU arbitrary unit; * $p < 0.1$.

Table 2 shows the comparison of ILO between FM and WWC. In this regard, significantly greater RPE was found for WWC ($p = 0.001$; ES = −1.50). Likewise, significantly better wellness scores were observed after FM, at ST24h, FT48h and MS48h ($p = 0.038$; SD = 0.72; $p = 0.066$, SD = 0.71; and $p = 0.063$; ES = 0.77, respectively).

Table 2. Description and comparison of ILO between periods.

Variables	Friendly Match (n = 3)		Women World Cup (n = 3)		90% IC			
	M	±SD	M	±SD	ES	LL	UL	*p*
RPE	8.43	0.77	9.48	0.63	−1.50	−2.03	−0.96	0.001
FT 24 h	2.58	0.50	2.27	0.69	0.53	−0.10	1.17	0.157
SL 24 h	3.40	0.52	3.35	0.71	0.08	−0.77	0.93	0.864
MS 24 h	2.73	0.48	2.50	0.69	0.40	−0.20	0.99	0.251
ST 24 h	3.40	0.60	3.05	0.37	0.72	0.18	1.26	0.038
MD 24 h	4.00	0.50	4.08	0.37	−0.19	−0.82	0.43	0.587
TW 24 h	16.12	1.60	15.25	2.25	0.45	−0.03	0.93	0.121
FT 48 h	2.95	0.61	2.53	0.55	0.71	0.09	1.34	0.066
SL 48 h	3.65	0.48	3.52	0.38	0.31	−0.54	1.16	0.52
MS 48 h	3.03	0.56	2.62	0.52	0.77	0.11	1.44	0.063
ST 48 h	3.42	0.47	3.22	0.33	0.50	−0.43	1.43	0.352
MD 48 h	4.10	0.42	4.28	0.42	−0.44	−1.08	0.21	0.246
TW 48 h	17.15	1.71	16.17	1.61	0.59	−0.19	1.37	0.197

M: mean; SD: standard deviation; ES: effect size; CI: confidence interval; LL: lower limit; UL: upper limit; RPE: rating of perceived effort; FT: fatigue; SL: sleep quality; MS: muscle soreness; ST: stress; MD: mood; TW: total wellness; 24 h: 24 h post-match; 48 h: 48 h post-match.

Figure 5 shows the intra-subject differences ($p < 0.05$) between FM and WWC, for the internal load and wellness variables, RPE ($p = 0.001$), Stress ($p = 0.038$), Fatigue 48 h ($p = 0.066$), and Muscle pain ($p = 0.063$).

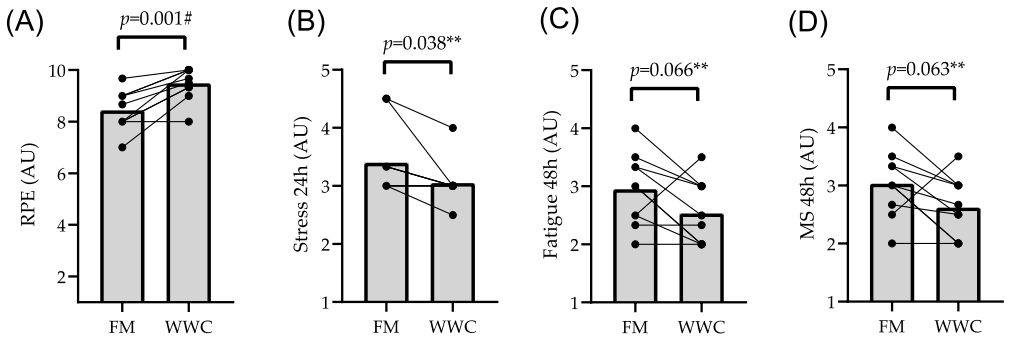

Figure 5. Bar chart with significant differences between periods. FM friendly match; WWC Women world cup; (**A**) RPE assessment of perceived exertion; (**B**) Stress; (**C**) Fatigue; (**D**) muscle pain; arbitrary unit AU; ** moderate effect size; # very large effect size.

4. Discussion

The aim of this study was to compare the external, internal load and wellness of the Chile women's national soccer team during friendly and Women's World Cup matches. The main findings of the study were that players performed greater external load and internal load in the Women's World Cup compared to friendly matches. Specifically the World Cup competition showed higher total distance covered, high speed run, total distance relative and RPE, whilst, conversely showing poorer post-match wellness, specifically in stress level 24 h, muscle pain 48 and fatigue 48 h.

Based on the specific published literature, the present results of this study can be explained by contextual factors of the matches for example, the ranking of the rival, local or away, and the type and phase of the tournament, etc. [14,41,42]. This is in line with what has been reported in several studies in which more important matches have been

analyzed (including friendly versus official matches), as well as the quality of the opponent. Freire et al. [15] found that players had higher ELO when they played in national tournaments compared to regional tournaments (e.g., TD_R but not in HSR). Similarly, Goncalves et al. [16] reported that, when the athletes played against a high quality team (better ranked), they showed higher TD_R but not a higher RPE. In contrast, Augusto et al. [14] did not observe differences in ELO when the athletes played against opponents of different quality. Furthermore, Nobari et al. [19] reported higher HSR (18–23 km/h) and MV in male official matches from Iran. However, when both halves were compared, they detected greater TD in the second half between matches. With regards to the importance of the match, Link and De Lorenzo [29] observed that, in matches of higher importance, players completed longer distances at speeds > 18 km/h. This difference may be due to the data analysis method used, as most of the studies used group designs whereas the present study used an intra-group analysis, thus minimizing bias for including different players in each group who could play in different positions in the field or have a dissimilar physical condition, thereby altering the results of the study [34].

In relation to the female population, the literature is scarce. In this sense, our results coincide with those of Andersson et al. [43], who reported that the same players selected from Sweden and Denmark, who play in international competitions (INTER), register more HSR compared to national level competitions (NAC) (i.e., 820 vs. 710-m). Although our study compares FM vs. WWC, and the study by Andersson et al. [43] compared INTER vs. NAC matches, both investigations agree that, in instances of higher level of competition, the physical demands tend to increase. Therefore, it is possible that the work carried out during a match is greater for players at higher competition levels (e.g., a World Cup) compared to lower level of competitions such as warm-up or friendly matches [44]. In the same line, Gabbett and Mulvey [45], reported that the same Australian players who played INTER vs. NAC matches had a higher rate of sprint/recovery (1:12 vs. 1:16), although they did not present differences in TD between match types ($p > 0.05$). During France 2019 WWC, the high intensity activity (>13 km/h) was greater than the one recorded in Canada 2015 WWC. These data reflect the increased physical demands for elite soccer players in this type of tournament [23], which implies that female players should adopt different preparation strategies to face the increased demands of the WWC [46]. This is important, since the players in our study performed a statistically significant higher rate of physical work in different ELO variables (i.e., TD, HSR and TDr) during the three official matches. This could be considered a key factor in the most demanding international matches, which can affect the development of player fatigue in physically demanding roles [43]. Another study [47] that analyzed the differences in ELO relative to the minutes played in the Brazilian adult women's national team in FM versus the 2016 Rio Olympic competitions, found that all variables were similar between friendly matches, although a smaller number of minutes were played in friendly matches (24.1 $\pm$ 1.0 vs. 93.5 $\pm$ 1.5 min), thus the players may have increased their intensity because they knew the duration of the match, which allowed them to change their running strategies (pacing) [48].

Finally, regarding ILO, RPE showed higher values in WWC when compared to FM. Moreover, the variables of WS showed lower values in WWC than in FM, that is, greater stress at 24 h and greater fatigue and muscle pain at 48 h. A plausible explanation to the latter results are related to the greater ELO measures observed during WWC, which in fact confirms that when competing at the highest possible standards female players are exposed to highly demanding internal load subjective responses. Nonetheless, further information with more objective measures (i.e., creatinkinase, blood lactate) are guaranteed to better understand our findings. In this line, Impellizzeri, Rampinini, and Marcora [49], reported that ELO is the main determinant of ILO, and that other factors such as genetic backgrounds, level of physical condition and type of tournament could affect the internal load imposed on the individual. These data suggest that the demands in WWC report greater volume and intensity, which could influence the ILO of the players and the perception of subsequent fatigue measured through WS. These findings are in agreement with

those of Krustrup et al. [43], who observed greater fatigue in neuromuscular and aerobic performance in elite matches vs. local league in Danish players.

5. Conclusions

We concluded that ELO and ILO were higher and WS was lower during international level competitions (i.e., WWC). Specifically, TD, HSR and TDr were higher in WWC, which may have impacted RPE and wellness scores at 24 and 48 h.

5.1. Practical Applications

A better understanding towards the demands of ELO, ILO and perception of subsequent fatigue in two different types of competitions (WWC vs. FM) may provide relevant information to plan training sessions oriented to more demanding competitions or adopt recovery strategies that positively influence the state of wellness during the 24 and 48 h after the matches.

5.2. Limitations and Future Research

One of the limitations of this study is the sample size, which is due to the nature of the competition. Future research could include a larger number of games, throughout a season, and include other variables such as accelerations and decelerations, which have shown effects on post-match internal load in professional players [22]. Furthermore, it would be interesting to analyze other contextual variables such as location, formation, quality of the opponent and games position in national team's matches. Finally, the replication of the within-subject design reduces the risk of bias for including players with differences between groups, which could affect the results (such as physical condition and game position).

Author Contributions: Conceptualization, R.V.-V. and J.A.G.-J.; data curation, P.M.-M. and J.P.-C.; formal analysis, J.P.-C. and J.A.G.-J.; investigation, S.Z. and R.V.-V.; methodology, R.V.-V. and J.A.G.-J.; resources, R.V.-V. and J.P.-C.; supervision, S.Z. and J.A.G.-J.; visualization, J.P.-C. and R.V.-V.; writing—original draft, J.B., L.V., J.P.-C., R.V.-V. and J.A.G.-J.; writing, reviewing and editing, R.V.-V. and J.A.G.-J. All authors have read and agreed to the published version of the manuscript.

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Institutional Review Board Statement: This intervention does not alter the usual practice of training sessions and matches. In addition, all the participants underwent a medical examination prior to the start of the season and performed the tests without injury or physical discomfort. This study meets the requirements of the Declaration of Helsinki (WMA, 2013).

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

Data Availability Statement: The data presented in this study are available on request from the corresponding author. The data are not publicly available due to privacy.

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Conflicts of Interest: The authors declare no conflict of interest.

References

1. Castillo, D.; Weston, M.; McLaren, S.J.; Cámara, J.; Yanci, J. Relationships between internal and external match-load indicators in soccer match officials. *Int. J. Sports Physiol. Perform.* **2017**, *12*, 922–927. [CrossRef]
2. Thorpe, R.T.; Strudwick, A.J.; Buchheit, M.; Atkinson, G.; Drust, B.; Gregson, W. Monitoring fatigue during the in-season competitive phase in elite soccer players. *Int. J. Sports Physiol. Perform.* **2015**, *10*, 958–964. [CrossRef] [PubMed]
3. Villaseca-Vicuña, R.; Pérez-Contreras, J.; Merino-Muñoz, P.; González-Jurado, J.; Aedo-Muñoz, E. Effects of COVID-19 confinement measures on training loads and the level of well-being in players from Chile women's national soccer team. *Rev. Fac. Med.* **2020**, *69*, 1–10. [CrossRef]
4. Akenhead, R.; Nassis, G.P. Training load and player monitoring in high-level football: Current practice and perceptions. *Int. J. Sports Physiol. Perform.* **2016**, *11*, 587–593. [CrossRef]

5. Park, L.A.F.; Scott, D.; Lovell, R. Velocity zone classification in elite women's football: Where do we draw the lines? *Sci. Med. Footb.* **2019**, *3*, 21–28. [CrossRef]
6. Impellizzeri, F.M.; Marcora, S.M.; Coutts, A.J. Internal and external training load: 15 Years on training load: Internal and external load theoretical framework: The training process. *Int. J. Sports Physiol. Perform.* **2018**, *14*, 270–273. [CrossRef] [PubMed]
7. Tapia, A. Propuesta de control de la carga de entrenamiento y la fatiga en equipos sin medios económicos. *Rev. Esp. Educ. Fís. Deport.* **2017**, *417*, 55–69.
8. Impellizzeri, F.M.; Rampinini, E.; Coutts, A.J.; Sassi, A.; Marcora, S.M. Use of RPE-based training load in soccer. *Med. Sci. Sports Exerc.* **2004**, *36*, 1042–1047. [CrossRef] [PubMed]
9. Enoka, R.M.; Duchateau, J. Translating fatigue to human performance. *Med. Sci. Sports Exerc.* **2016**, *48*, 2228–2238. [CrossRef] [PubMed]
10. Hooper, S.L.; Mackinnon, L.T.; Howard, A.; Gordon, R.D.; Bachmann, A.W. Markers for monitoring overtraining and recovery. *Med. Sci. Sports Exerc.* **1995**, *27*, 106–112. [CrossRef] [PubMed]
11. McLean, B.D.; Coutts, A.J.; Kelly, V.; McGuigan, M.R.; Cormack, S.J. Neuromuscular, endocrine, and perceptual fatigue responses during different length between-match microcycles in professional rugby league players. *Int. J. Sports Physiol. Perform.* **2010**, *5*, 367–383. [CrossRef] [PubMed]
12. Malone, J.J.; Di Michele, R.; Morgans, R.; Burgess, D.; Morton, J.P.; Drust, B. Seasonal training-load quantification in elite English Premier League soccer players. *Int. J. Sports Physiol. Perform.* **2015**, *10*, 489–497. [CrossRef] [PubMed]
13. Thorpe, R.T.; Strudwick, A.J.; Buchheit, M.; Atkinson, G.; Drust, B.; Gregson, W. Tracking morning fatigue status across in-season training weeks in elite soccer players. *Int. J. Sports Physiol. Perform.* **2016**, *11*, 947–952. [CrossRef] [PubMed]
14. Augusto, D.; Brito, J.; Aquino, R.; Figueiredo, P.; Eiras, F.; Tannure, M.; Veiga, B.; Vasconcellos, F. Contextual variables affect running performance in professional soccer players: A brief report. *Front. Sport. Act. Living* **2021**, *3*, 1–8. [CrossRef]
15. De Albuquerque Freire, L.; Brito, M.A.; Muñoz, P.M.; Pérez, D.I.V.; Kohler, H.C.; Aedo-Muñoz, E.A.; Slimani, M.; Brito, C.J.; Bragazzi, N.L.; Znazen, H.; et al. Match running performance of brazilian professional soccer players according to tournament types. *Monten. J. Sport. Sci. Med.* **2022**, *11*, 53–58. [CrossRef]
16. Goncalves, L.G.C.; Clemente, F.M.; Vieira, L.H.P.; Bedo, B.; Puggina, E.F.; Moura, F.; Mesquita, F.; Santiago, P.R.P.; Almeida, R.; Aquino, R. Effects of match location, quality of opposition, match outcome, and playing position on load parameters and players' prominence during official matches in professional soccer players. *Hum. Mov.* **2021**, *22*, 35–44. [CrossRef]
17. Merino-Muñoz, P.; Miarka, B.; Peréz-Contreras, J.; Bustamante-Garrido, A.; Moya-Jofré, C.; Cerda-Kohler, H.; Brito, C.; Aedo-Muñoz, E. Relationship between external load and differences in countermovement jump in an official match of professional female soccer players. In Proceedings of the 40th International Society of Biomechanics in Sports Conference, Liverpool, UK, 19–23 July 2022; 2022; Volume 40, pp. 451–454.
18. Stevens, T.G.A.; de Ruiter, C.J.; Twisk, J.W.R.; Savelsbergh, G.J.P.; Beek, P.J. Quantification of in-season training load relative to match load in professional Dutch Eredivisie football players. *Sci. Med. Footb.* **2017**, *1*, 117–125. [CrossRef]
19. Nobari, H.; Khalili, S.M.; Oliveira, R.; Castillo-Rodríguez, A.; Pérez-Gómez, J.; Ardigò, L.P. Comparison of official and friendly matches through acceleration, deceleration and metabolic power measures: A full-season study in professional soccer players. *Int. J. Environ. Res. Public Health* **2021**, *18*, 5980. [CrossRef]
20. Nobari, H.; Brito, J.P.; Pérez-Gómez, J.; Oliveira, R. Variability of external intensity comparisons between official and friendly soccer matches in professional male players. *Healthcare* **2021**, *9*, 1708. [CrossRef]
21. Krustrup, P.; Zebis, M.; Jensen, J.M.; Mohr, M. Game-induced fatigue patterns in elite female soccer. *J. Strength Cond. Res.* **2010**, *24*, 437–441. [CrossRef]
22. De Albuquerque Freire, L.; Tannure, M.; Gonçalves, D.; Aedo-Muñoz, E.; Perez, D.I.V.; Brito, C.J.; Miarka, B. Correlation between creatine kinase and match load in soccer: A case report. *J. Phys. Educ. Sport* **2020**, *20*, 1279–1283. [CrossRef]
23. FIFA. Physical Analysis of the FIFA Women's World Cup France 2019. 2019. Available online: https://digitalhub.fifa.com/m/4f40a98140d305e2/original/zijqly4oednqa5gffgaz-pdf.pdf. (accessed on 1 September 2019).
24. Muñoz Pérez, I. Métodos de cuantificación de la carga de entrenamiento en deportes de resistencia cíclica. *Búsqueda* **2016**, *3*, 53–63. [CrossRef]
25. Fernandes, R.; Brito, J.P.; Vieira, L.H.P.; Martins, A.D.; Clemente, F.M.; Nobari, H.; Reis, V.M.; Oliveira, R. In-season internal load and wellness variations in professional women soccer players: Comparisons between playing positions and status. *Int. J. Environ. Res. Public Health* **2021**, *18*, 12817. [CrossRef] [PubMed]
26. Askow, A.T.; Lobato, A.L.; Arndts, D.J.; Jennings, W.; Kreutzer, A.; Erickson, J.L.; Esposito, P.E.; Oliver, J.M.; Foster, C.; Jagim, A.R. Session rating of perceived exertion (sRPE) load and training impulse are strongly correlated to GPS-derived measures of external load in NCAA division I women's soccer athletes. *J. Funct. Morphol. Kinesiol.* **2021**, *6*, 90. [CrossRef] [PubMed]
27. Fernandes, R.; Ibrahim, H.; Clemente, F.M.; Martins, A.D. In-season microcycle quantification of professional women. *Healthcare* **2022**, *10*, 695. [CrossRef]
28. Olaizola, A.; Errekagorri, I.; Lopez-de-Ipina, K.; María Calvo, P.; Castellano, J. Comparison of the external load in training sessions and official matches in female football: A case report. *Int. J. Environ. Res. Public Health* **2022**, *19*, 15820. [CrossRef]
29. Link, D.; De Lorenzo, M.F. Seasonal pacing—Match importance affects activity in professional soccer. *PLoS ONE* **2016**, *11*, e0157127. [CrossRef]

30. FIFA. Ranking FIFA. Available online: https://www.fifa.com/es/fifa-world-ranking/women?dateId=ranking_20191213. (accessed on 27 September 2019).
31. Oliva-Lozano, J.M.; Martínez-Puertas, H.; Fortes, V.; Muyor, J.M. When do soccer players experience the most demanding passages of match play? A longitudinal study in a professional team. *Res. Sport. Med.* **2021**, *59*, 1–11. [CrossRef]
32. General Assembly of the World Medical Association. World Medical Association declaration of Helsinki: Ethical principles for medical research involving human subjects. *JAMA—J. Am. Med. Assoc.* **2013**, *310*, 2191–2194. [CrossRef]
33. Minett, M.M.; Binkley, T.B.; Weidauer, L.A.; Specker, B.L. Changes in body composition and bone of female collegiate soccer players through the competitive season and off-season. *J. Musculoskelet. Neuronal Interact.* **2017**, *17*, 386–398.
34. Villaseca-Vicuña, R.; Otero-Saborido, F.M.; Perez-Contreras, J.; Gonzalez-Jurado, J.A. Relationship between physical fitness and match performance parameters of Chile women's national football team. *Int. J. Environ. Res. Public Health* **2021**, *18*, 8412. [CrossRef]
35. Barrett, S.; Midgley, A.W.; Towlson, C.; Garrett, A.; Portas, M.; Lovell, R. Within-match PlayerLoad^{TM} patterns during a simulated soccer match: Potential implications for unit positioning and fatigue management. *Int. J. Sports Physiol. Perform.* **2016**, *11*, 135–140. [CrossRef] [PubMed]
36. Barrett, S.; Midgley, A.; Lovell, R. PlayerLoad^{TM}: Reliability, convergent validity, and influence of unit position during treadmill running. *Int. J. Sports Physiol. Perform.* **2014**, *9*, 945–952. [CrossRef]
37. Minett, G.M.; Fels-Camilleri, V.; Bon, J.J.; Impellizzeri, F.M.; Borg, D.N. Peer presence increases session ratings of perceived exertion. *Int. J. Sports Physiol. Perform.* **2021**, *17*, 106–110. [CrossRef] [PubMed]
38. Lakens, D. Calculating and reporting effect sizes to facilitate cumulative science: A practical primer for *t*-tests and ANOVAs. *Front. Psychol.* **2013**, *4*, 1–12. [CrossRef] [PubMed]
39. Hopkins, W.G.; Marshall, S.W.; Batterham, A.M.; Hanin, J. Progressive statistics for studies in sports medicine and exercise science. *Med. Sci. Sports Exerc.* **2009**, *41*, 3–12. [CrossRef]
40. Lakens, D. Equivalence tests: A practical primer for *t* tests, correlations, and meta-analyses. *Soc. Psychol. Personal. Sci.* **2017**, *8*, 355–362. [CrossRef] [PubMed]
41. Lago, C.; Casais, L.; Dominguez, E.; Sampaio, J. The effects of situational variables on distance covered at various speeds in elite soccer. *Eur. J. Sport Sci.* **2010**, *10*, 103–109. [CrossRef]
42. Barrera, J.; Sarmento, H.; Clemente, F.M.; Field, A.; Figueiredo, A.J. The effect of contextual variables on match performance across different playing positions in professional Portuguese soccer players. *Int. J. Environ. Res. Public Health* **2021**, *18*, 5175. [CrossRef] [PubMed]
43. Andersson, H.Å.; Randers, M.B.; Heiner-Møller, A.; Krustrup, P.; Mohr, M. Elite female soccer players perform more high-intensity running when playing in international games compared with domestic league games. *J. Strength Cond. Res.* **2010**, *24*, 912–919. [CrossRef]
44. Mohr, M.; Krustrup, P.; Andersson, H.; Kirkendal, D.; Bangsbo, J. Match activities of elite women soccer players at different performance levels. *J. Strength Cond. Res.* **2008**, *22*, 341–349. [CrossRef] [PubMed]
45. Gabbett, T.J.; Mulvey, M.J. Time-motion analysis of small-sided training games and competition in elite women soccer players. *J. Strength Cond. Res.* **2008**, *22*, 543–552. [CrossRef] [PubMed]
46. FIFA. Informe Técnico Copa Mundial Femenina de la FIFA 2019. 2019. Available online: https://digitalhub.fifa.com/m/7d1102076dfba3b5/original/swdlsvqbvhroevxsyxqt-pdf.pdf. (accessed on 1 September 2019).
47. Passos Ramos, G.; Datson, N.; Mahseredjian, F.; Lopes, T.R.; Coimbra, C.C.; Prado, L.S.; Nakamura, F.Y.; Penna, E.M. Activity profile of training and matches in Brazilian Olympic female soccer team. *Sci. Med. Footb.* **2019**, *3*, 231–237. [CrossRef]
48. De Albuquerque Freire, L.; Merino-Muñoz, P.; Aedo-Muñoz, E.; Soto, A.S.; Brito, C.J.; Miarka, B. Soccer pacing strategy: Chronological intracomparison of the same soccer athletes, disputing with the same opponent during the same year. *J. Phys. Educ. Sport* **2022**, *22*, 1333–1339. [CrossRef]
49. Impellizzeri, F.M.; Rampinini, E.; Marcora, S.M. Physiological assessment of aerobic training in soccer. *J. Sports Sci.* **2005**, *23*, 583–592. [CrossRef] [PubMed]