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Original

LOS NIVELES DE DOLOR Y CATASTROFISMO EN LOS ATLETAS SEGÚN SU MODALIDAD DEPORTIVA: UN ESTUDIO TRANSVERSAL

PAIN AND CATASTROPHIZING LEVELS IN TRACK AND FIELD ATHLETES ACCORDING TO THEIR EVENT SPECIALIZATION: A CROSS-SECTIONAL STUDY.

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RESUMEN

Debido a las altas demandas físicas diarias, los atletas experimentan dolor frecuentemente. Sin embargo, su impacto en el rendimiento no ha sido examinado.

Este estudio examinó el dolor y el catastrofismo en atletas, considerando las características de su entrenamiento y el sexo.

Durante la pretemporada, 124 atletas respondieron a un cuestionario anónimo para recopilar información sobre sus características sociodemográficas (sexo, edad) y deportivas (volumen de entrenamiento, modalidad deportiva, experiencia deportiva). Además, informaron sobre el dolor actual (de 0 a 10 en nivel y localización), y respondieron a la escala de catastrofismo del dolor (PCS). También se recopilaron lesiones de la temporada anterior.

De todos los participantes, 35 atletas (28,2%) tenían dolor actual, principalmente en la rodilla (18,6%) y el tobillo (16,3%), con una mayor prevalencia en los atletas de modalidades explosivas ($p = 0,041$). Los atletas con dolor tenían volúmenes de entrenamiento más altos ($p = 0,007$) y valores de PCS más altos ($p < 0,001$). El nivel medio de catastrofismo fue de 14,52 ± 9,85 puntos, correlacionándose con el dolor ($r = 0,36$, $p < 0,001$) y la edad ($r = 0,25$, $p = 0,006$). En los atletas con dolor, se observó que las mujeres tenían puntuaciones más altas de impotencia que los hombres ($p = 0,011$).

En conclusión, el 28,2% de los atletas afirmó tener dolor, principalmente en la rodilla y el tobillo. Los atletas especializados en modalidades explosivas parecen experimentar más dolor que los de resistencia. El alto volumen de entrenamiento podría facilitar la existencia del dolor. El catastrofismo es más acentuado con la edad y el dolor, independientemente de la modalidad deportiva, mostrando las mujeres mayor niveles de impotencia.

Palabras clave: (Deporte, Rendimiento, Dolor, Psicología).

PAIN AND CATASTROPHIZING LEVELS IN TRACK AND FIELD ATHLETES ACCORDING TO THEIR EVENT SPECIALIZATION: A CROSS-SECTIONAL STUDY.

ABSTRACT

The high physical demands make athletes must cope with pain. However, its impact on performance has not been explored.

This study examined pain and catastrophizing in track and field athletes, considering training characteristics and sex.

During the preseason, 124 athletes responded an anonymous questionnaire to collect information about their socio-demographic (sex, age) and sports characteristics (volume training, event specialization, sport experience). Also, they informed about current pain (from 0 to 10 level, and location), and replied to the pain catastrophizing scale (PCS). Injuries from the previous season were also collected.

From all participants, 35 athletes (28.2%) had current pain, mainly in the knee (18.6%) and ankle (16.3%), with higher prevalence in explosive event athletes ($p = 0.041$). Athletes with pain had higher training volumes ($p = 0.007$) and PCS values ($p < 0.001$). The average catastrophizing level was 14.52 ± 9.85 points, correlating with pain ($r = 0.36$, $p < 0.001$) and age ($r = 0.25$, $p = 0.006$). In athletes with current pain, it was observed that female athletes reported higher helplessness scores than males ($p = 0.011$).

In conclusion, 28.2% of athletes affirmed to have pain, mainly in knee and ankle. Athletes specialized in explosive events experienced more current pain than endurance. Furthermore, volume of training could facilitate pain existence. Catastrophizing level increases with age and pain, regardless the athletic event specialization. Additionally, female athletes report higher helplessness than males.

Keywords: (Sport, Performance, Pain, Psychology).

INTRODUCTION

Track and field is a sport with high physical and cognitive demands (Hudgins et al., 2013; Maruo et al., 2018; Tønnessen et al., 2015). To reach maximal performance, athletes should cope with specific situations that depend on each event. While athletes specialized in sprint, hurdles, throws, jumps or combined events require to develop high speed and explosiveness, athletes specialized in middle and long-distance need to complete high volume of kilometers (Timpka et al., 2017). As consequence, previous studies have shown that acute and muscle injuries are more prevalent in athletes specialized in explosive events (Carragher et al., 2019). Due to the critical role of the hamstrings play in accelerating during sprints, injuries of these musculature are the most prevalent (Morin et al., 2015). In contrast, endurance athletes are more prone to overuse injuries, as their training involves many daily kilometers that continuously impact and stress their muscles and joints (Carragher et al., 2019).

Although each track and field event have its specific demands, many athletes adopt a common attitude of accepting pain during training routines. This reflects a mindset in which pain is often normalized as part to achieve performance goals, regardless of their event specialization (Timpka et al., 2019; Yokoe et al., 2021). A direct consequence of experiencing pain during training and competitions is the affection of the technical and physical capabilities, and thus, the sport performance (De Petrillo et al., 2009).

Other consequence of pain experience is the misunderstanding of pain, which is directly reflected in increases of catastrophizing level (Lee et al., 2016). Catastrophizing is an exaggerated negative appreciation of pain perception, which can affect pain experience and disability levels (Gatchel et al., 2007). In sport, the pessimist orientation during injury process may delay recovery process and decreases physical function of athletes (Sullivan, Tripp, Stanish, et al., 2000).

Scientific literature confirms that healthy female athletes often exhibit higher levels of catastrophizing compared to male athletes (Paller et al., 2009; Sullivan, Tripp, & Santor, 2000). This tendency can be concerning, as it may exacerbate the effects of pain and prolong recovery times (Gatchel et al., 2007; Sullivan, Tripp, & Santor, 2000). However, these findings are based on studies across various sports without specifically exploring these results in physically demanding sports like track and field. Moreover, previous studies with non-athletic population showed that this sex difference in catastrophizing may be influenced by a variety of factors (Bartley & Fillingim, 2013; Carragher et al., 2019).

To understand the influence of catastrophizing on recovery and performance in the context of sports is unclear. To date, very few studies have explored affection from catastrophizing in different sports, (Sullivan, Tripp, Stanish, et al., 2000), or potential relationship between catastrophizing and pain according to different sports modalities (Sastre-Munar et al., 2022; Sciascia et al., 2020). To know those potential differences would be useful to design appropriate and specific approaches. Previous studies indicate that monitoring levels of catastrophizing and pain is crucial for identifying athletes at risk for injury or those whose performance may be adversely affected (Sastre-Munar et al., 2022; Sciascia et al., 2020). Despite the importance of monitoring pain and catastrophizing level of athletes, to our knowledge, no studies to date have specifically explored it in track and field athletes. Thus, this study aimed to describe the intensity of pain and catastrophizing in track and field athletes according to their sex and training characteristics, including training volume, years of sports experience, and specific event specialization. We hypothesize that pain prevalence will be higher in those athletes that require explosiveness for their event specialization and that female athletes will have higher pain and catastrophizing levels than male athletes.

METHODS

Design

A cross-sectional study was designed during the preseason (September 2022). To participate, they filled out an anonymous web-based questionnaire while been present at High Performance Sports Center in the autonomous community. The STROBE guidelines for cross-sectional studies were used (Supplementary Table 1).

Participants

To be included in this study, participants should practice any track and field event, to have at least 16 years old, and to have at least 2 years of track and field experience. Additionally, participants who reported injuries sustained in a sporting context during last season were included in the study, while those with injuries from non-sporting contexts were excluded. The sample size was calculated through GRANMO application version 7.12 (Spain) (Marrugat et al., 1998.). After accepting 80% statistic power and a 5% significance level, 118 participants are required to obtain a correlation coefficient of 0.27, like previous studies (Paparizos et al., 2005; Sciascia et al., 2020). Athletes were invited to participate in the study by mailing from their regional track and field federation. Although an e-mail was sent to 1,245 athletes, 124 participated in the study. Before being enrolled, all participants were informed about the study, and signed the informed consent, according to the Declaration of Helsinki. In the case of minors, their legal tutors signed informed consent. The study was approved by the Ethical Committee of the local university (CER 222CER21).

Questionnaire

The questionnaire was divided into three sections. Section A, to collect anthropometric and socio-demographic information: age (years old), sex, height (m), weight (kg), sport experience (years), training volume (hours/week) and track and field event specialization (sprints and hurdles, jumps, throws, combined events, middle- and long-distance running). Weight and height were evaluated with a ± 100 g precision digital weight scale (Tefal, France) and a t201-t4 adult height scale (Asimed, Spain). Measurements were taken in the afternoon (17:00–19:00) during the month of September, with athletes wearing only underwear and no shoes. Events were also grouped into explosive category (sprints and hurdles, jumps, throws and combined events) or endurance category (middle- and long-distance running), as previous studies suggested (Carragher et al., 2019; Timpka et al., 2017). Section B, to collect information about the existence of injuries (in a sporting context) in past season and current pain, injury defined as “tissue damage or other derangement of normal physical function due to participation in sports, resulting from rapid or repetitive transfer of kinetic energy” (Bahr et al., 2020), and pain as “an unpleasant sensory and emotional experience associated with actual or potential tissue damage, or described in terms of such damage” (Hainline et al., 2017). Also information about pain location was collected (Lower limb: knee, ankle, upper leg, lower leg, hip, foot and fingers; Trunk: lower back, dorsal spine, cervical spine; Upper limb: shoulder, upper arm, lower arm, hand and fingers) (Sastre-Munar et al., 2022) and intensity of pain according to the Numerical Rating Scale (NRS) from 0 (no pain) to 10 points (worst pain) (Thong et al., 2018). Section C, to collect information about catastrophizing level throughout the Pain Catastrophizing Scale (PCS): this is a 13 4-point Likert items scale (from 0= not at all to 4= all the time), divided into three subscales to evaluate rumination, helplessness and magnification, with 52 points as the maximum score (Olmedilla Zafra et al., 2013).

Statistical analysis

Continuous variables are presented as mean and standard deviation, and categorical variables are presented as frequencies or percentages. To assess the normality of the data, we applied both the Shapiro-Wilk and Kolmogorov-Smirnov tests ($p > 0.05$). Anthropometric and sociodemographic information of athletes were compared according to sex, track and field specialization category (explosive vs endurance athletes) by using Student’s t-test. Also, all track and field events were compared by using Analysis of variance (ANOVA). To observe differences in the prevalence of current pain according to event and sex were explored by using Chi-square (χ^2) (Kim, 2017). Pearson correlation coefficient (r) was used to evaluate bivariate relations among continuous variables (age, PCS, pain intensity, and training characteristics) and interpreted as follows: small ($r = 0.1$), moderate ($r = 0.3$), large ($r = 0.5$), very large ($r = 0.7$) and extremely large ($r = 0.9$) (WG et al., 2009). Student’s t-test was used to evaluate differences of pain intensity between athletes injured in the previous season, and athletes without injuries. Also, to observe differences between explosive and endurance athletes in pain intensity, Student’s t-test was used. Furthermore, it was used to observe differences of PCS values and pain intensity according to sex, and we observed significant differences in PCS scores between male and female athletes with current pain. Odds ratios (ORs) and 95% confidence intervals (95%CI) were calculated. Cohen's d effect sizes (ES) were calculated to determine the magnitude of the differences between groups, interpreted as small ($d = 0.2$), medium ($d = 0.5$), or large ($d \geq 0.8$). Statistical significance was established as $p < 0.05$. All statistical calculation were performed using the International Business Machines (IBM) SPSS statistics, version 22.0 (Chicago, IL, USA).

RESULTS

Anthropometrics, sports characteristics and existence of injuries in past season for all the athletes, according to their event and category specialization, are shown in Table 1. No significant differences were observed according to the event, category and sex in anthropometric, sports characteristics and catastrophizing variables ($p > 0.05$).

---------------------Table 1--------------------------

According to demographic and anthropometric characteristics, Pearson correlation showed small correlations between age, PCS score, and pain intensity, with higher age showing a correlation of r = 0.25 (p = 0.006) and higher pain intensity correlating with r = 0.20 (p = 0.027).

Regarding catastrophizing level, all athletes showed an average of 14.52 ± 9.85 points. PCS score and their subscales were showed in table 2 for all the athletes, according to their event and category. The Pearson correlation was moderate, indicating that higher PCS score was associated with greater pain intensity in all athletes ($r = 0.36$, $p < 0.001$). This moderate positive correlation was also observed between PCS subscale scores and pain intensity (Rumination, $r = 0.40$, $p < 0.001$; Magnification, $r = 0.40$, $p < 0.001$; Helplessness, $r = 0.45$, $p < 0.001$). Also, a moderate positive correlation was found between the PCS score and its subscales with pain intensity specifically in female athletes (Catastrophizing, $r = 0.46$, $p < 0.001$; Rumination, $r = 0.40$, $p = 0.001$; Magnification, $r = 0.40$, $p = 0.001$; Helplessness, $r = 0.46$, $p < 0.001$). However, no correlation between catastrophizing and pain intensity was observed in male athletes ($p > 0.05$). Considering differences between females and males with current pain, female athletes had higher values in helplessness than male athletes (mean differences = 2.53, standard deviation difference = 0.93, p = 0.011, 95%CI = -4.43 to -0.63, d = 0.92). No other differences were found in catastrophizing scores ($p > 0.05$).

---------------------Table 2--------------------------

In terms of training characteristics, student's t-test showed that those athletes with current pain performed significantly higher volume of training (hours per week) than athletes without current pain (p = 0.035, 95%CI = -4.63 to -0.17, d = 0.37). Also, this study observed that athletes specialized in explosive category had higher pain intensity than endurance athletes on lower leg (mean difference = 4.00, standard deviation difference = 1.34, p = 0.041, 95%IC (-7.72 to -0.27), d = 4.63).

Regarding pain, of the 124 athletes, 35 (28.2%) affirmed to have current pain in any anatomic region, with average of pain intensity of 4.37 ± 2.02 points. Values of current pain and pain intensity according to the event and category of all athletes were showed in Table 2. A significant difference in the prevalence of pain between sprint and hurdles athletes was observed ($\chi^2 = 2.54$, p = 0.029). The lower limb was more affected by pain (83.8%: knee 18.6% and ankle 16.3%, lower leg 14.0%, upper leg 14.0%, hip 11.6% and foot and fingers 9.3%). Pain location is shown in supplementary Table 3. Also, we observed that athletes with current pain had higher PCS values than athletes without pain (mean differences = 6.17, standard deviation difference = 1.59, $p < 0.001$, 95%CI = -9.33- to -3.01, d = 0.1). Athletes that suffered an injury in the past season had higher pain intensity (mean differences = -1.32, standard deviation difference= 0.54, p = 0.019, 95%CI = -2.42 to -0.23, d = 0.52). Also, athletes with history of injury in the previous season had more current pain than those athletes without previous injury ($\chi^2 = 7.40$, p = 0.007). No differences were found in prevalence of current pain and pain intensity according to sex ($p > 0.05$). No other significant differences were observed ($p > 0.05$).

DISCUSSION

The main findings of the present study showed that 28.2% of athletes affirmed to have current pain, being knee (18.6%) and ankle (16.3%) the most frequent affected regions. Considering the event specialization of athletes, we observed that those participants specialized in explosive category had higher pain level on lower leg compared to those specialized in endurance category. Moreover, those female athletes with current pain had higher values of helplessness than male athletes with current pain.

According to pain existence in track and field athletes, our results are lower than the study by Timpka et al., (2019) (Timpka et al., 2019) who observed a 38.0% of athletes with pain. This difference may be due to the fact that Timpka et al., (Timpka et al., 2019) enrolled national youth and adult athletes who ranked in the top ten in each track and field event, resulting in sample characteristics that may differ from those in our study. Also, the study by Timpka et al., (2019) (Timpka et al., 2019) collected data on pain, noting that the experience of pain is directly and indirectly related to self-reported health, while our study used the definition of pain proposed in the International Olympic Committee consensus statement on pain management in elite athletes (Hainline et al., 2017). Future studies should use a consistent definition of pain to avoid potential discrepancies.

The two most prevalent painful anatomical regions in the present study were knee and ankle, in line with the study by Timpka et al., (2015) (Timpka et al., 2015). We should highlight that the knee and ankle are anatomical region with high biomechanical stress during most of the track and field events (Donelon et al., 2020). This fact makes these joints more susceptible to overuse injuries and acute traumas, which can result in pain, as we observed in our study (Petersen et al., 2014).

According to training characteristics, we observed that athletes with higher volume of training, in terms of hours per week, had more current pain. According to Fernández-Lázaro et al., (2020) (Fernández-Lázaro et al., 2020), the increments in hours of training may increase the number of inflammatory substances and produce muscular pain. The study by Timpka et al,. (2015) (Timpka et al., 2015), observed that track and field athletes often ignored pain during high-volume training routines to reach sports goals. As a result, this can lead to an increased risk of injury (Alemany et al., 2017). Therefore, educating athletes about the relationship between pain and injury during training may help prevent injuries and enhance their performance.

Furthermore, Kiely (2012) (Kiely, 2012) emphasizes the importance of periodizing training loads to reduce the risk of overuse injuries. His study suggests that inconsistent or sudden spikes in training volume, without proper recovery, lead to tissue fatigue and elevated injury risk. This aligns with the findings of Soligard et al. (2016) (Soligard et al., 2016), who noted that athletes with inadequate load management are more susceptible to musculoskeletal pain and injuries.

Although endurance athletes performed higher volume of training than explosive athletes, we observed that explosive athletes had higher pain intensity. This could be explained because of the relationship between volume and intensity of training. While explosive athletes perform high intensity training with less training hours, endurance athletes perform low intensity training with more training hours (Carragher et al., 2019; Edouard, 2015). Additionally, high-intensity exercise leads to rapid muscle acidosis and lactic acid accumulation, both of which are linked to muscle pain and delayed soreness (Sonkodi, 2022). This supports the notion that training intensity may account for the higher pain intensity experienced by explosive athletes compared to endurance athletes.

We also observed a significant positive correlation between higher pain intensity and higher age in those athletes. This result is in line with several studies that observed that older athletes suffered higher pain intensity than younger athletes (Ryan et al., 2014; Sastre-Munar et al., 2022). According to Farì et al., (Farì et al., 2021) having a longer sports career is associated with greater biomechanical strain and stress, which might lead to pain after several seasons.

We observed that those athletes who had had an injury in the previous season suffered more current pain and had more pain intensity than those without injuries. The higher current pain and pain intensity observed in athletes with previous injuries may be due to physiological and psychological factors. Effective rehabilitation is essential for full recovery, managing pain, and preventing re-injury. The presence of physical symptoms after an injury often signals the need for athletes to complete their rehabilitation process (Sheehan et al., 2024). Inadequate recovery from past injuries can leave athletes in a physically compromised state (Alghadir et al., 2020), while negative psychological perceptions can amplify their pain experience, creating a cycle of persistent and heightened pain (Ardern, 2015). Also, The International Association for the Study of Pain (IASP) notes that "pain is always a personal experience that is influenced to varying degrees by biological, psychological, and social factors" (Raja et al., 2020). This personal experience during an injury may increase pain intensity in athletes who have suffered a previous injury (Badiei et al., 2023).

Regarding catastrophizing levels, our results are in line with previous studies, which reported scores ranging from 7 to 17.1 points (Matylda et al., 2020; Paparizos et al., 2005; Sciascia et al., 2020; Sullivan, Tripp, Stanish, et al., 2000). In our study, the PCS scores of all athletes, categories, and most of the events were in line with previous studies. However, the catastrophizing levels for athletes specializing in throwing events and long-distance running were not consistent with the literature. This discrepancy may be attributed to the small sample sizes (throws, N = 2; long-distance, N = 3).

Sullivan et al. (2000) (Sullivan, Tripp, Stanish, et al., 2000) observed a mean score of PCS of 17.1 ±7.3 in athletes without distinguishing by sport. Paparizos et al., (2005) (Paparizos et al., 2005) reported PCS scores ranging from 12 to 15 points in ballet dancers. Similarly, male rugby players had a mean score of 12.4 ± 6.2 (Matylda et al., 2020). Sciascia et al. (2020) (Sciascia et al., 2020) showed an average score of 7 in 291 athletes across various sports, including 7 track and field athletes with a PCS score value of 7 points. However, the difference between our findings and Sciascia's track athletes could be due to the small sample size in their study. In contrast, Sastre-Munar et al., (2022) (Sastre-Munar et al., 2022) reported a higher mean score of 21.4 ± 10.0 in gymnasts, which may be attributed to the specific demands and culture of the sport. The similarity in PCS scores between our study and previous research suggests that the findings are reliable. This observation underscores the potential benefits of addressing catastrophizing in pain management strategies for track and field athletes, as reducing catastrophizing has been linked to better psychological resilience and pain outcomes (Quartana et al., 2009; Sullivan et al., 2001).

In our study, sex was influence in the catastrophizing level, with female athletes with current pain showing higher values of helplessness than male athletes with current pain. This result is in line with previous studies that observed higher values in female athletes of pain catastrophizing in rumination and helplessness subscales than male (Paller et al., 2009; Sullivan, Tripp, & Santor, 2000; Sullivan, Tripp, Stanish, et al., 2000). This difference may be influenced by societal expectations regarding gender roles and pain perception (Bartley & Fillingim, 2013). Helplessness, defined as the belief that pain cannot be mitigated, has been found to be less common among males (Sullivan, Tripp, & Santor, 2000). While the males are more likely to use behavioural distraction and problem-focused coping strategies. Females typically utilize a wider array of coping methods, such as social support, positive self-affirmations, emotion-focused techniques, and cognitive reinterpretation (Bartley & Fillingim, 2013; Racine et al., 2012). It could explain the differences of helplessness between sex.

In line with previous literature, we observed a positive correlation between pain intensity and catastrophizing and its subscales (Paparizos et al., 2005; Sciascia et al., 2020). Again, this correlation was observed for female athletes but not for male athletes. Since no previous literature differed results according to the sex of sports participants, we cannot compare this finding within the sport context. However, previous studies in non-athletic population have observed that females often engage in higher levels of rumination and emotional processing. This fact may exacerbate the perception of pain and make catastrophizing more impactful for females compared to males (Keogh & Eccleston, 2006). Additionally, social and cultural expectations may lead females to be more open about expressing pain and distress, resulting in a stronger reported correlation between catastrophizing and pain levels. In contrast, males may underreport pain due to societal norms emphasizing stoicism and toughness (Gijsbers & Nicholson, 2005).

Limitations and Future Directions

The present study has limitations. Firstly, due to the retrospective study design, we did not collect potential confounding variables such as internal training load variables, or psychological aspects that could have affected results. Secondly, the number of athletes specialized in jumps, throws, combined events and long-distance running was small. Although this situation is in line with a low number of federative licenses, a larger sample size would give more accurate results. Thirdly, although our study used the definition of pain proposed in the International Olympic Committee consensus statement on pain management in elite athletes (Hainline et al., 2017), the definition of pain used is outdated. The current definition is: “An unpleasant sensory and emotional experience associated with, or resembling that associated with, actual or potential tissue damage” (Raja et al., 2020). Moreover, we did not distinguish between different types of pain or between acute and chronic pain, which represents a potential bias to be addressed in future studies Finally, while the cut-off of catastrophizing is established as a low (PCS score ≤ 21), moderate (PCS score > 21 and ≤ 37), and high (PCS score > 37) in general population (Boonstra et al., 2016), this reference could be not appropriate for athletic population. Future studies should determine a specific cut-off for catastrophizing in sports population.

As practical applications, health and sports professionals should monitor levels of catastrophizing and the presence of pain to detect potential interferences with performance and the recovery process. Additionally, due to the differences in helplessness values between females and males, professionals should take this into account and use different strategies through educational programs focused on both athletes and trainers to address helplessness in female and male athletes.

CONCLUSIONS

As a conclusion, the 28.2% of athletes affirmed to have pain, mainly in knee and ankle. Athletes specialized in explosive categories experience more current pain than those specialized in endurance. Furthermore, a higher volume of training could facilitate pain existence. Catastrophizing level increases with age and pain, regardless the athletic event specialization. Also, higher helplessness was reported from female athletes compared to males.

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Journal of Sport and Health Research 2025, 17(1):59-72

Table 1 Socio-demographic characteristics and injuries for all athletes.

			EXPLOSIVE					ENDURANCE		
		All athletes (n = 124)	**Sprints and hurdles (n = 79)**	**Jumps (n = 19)**	**Throws (n = 2)**	**Combined events (n = 7)**	**All (n = 107)**	**Middle distance (n = 14)**	**Long-distance (n = 3)**	**All (n = 17)**
Sex	**Female (%)**	51.6	53.2	47.4	100.0	71.4	54.2	35.7	33.3	35.3
	Male (%)	48.4	46.8	52.6	0.0	28.6	45.8	64.3	66.7	64.7
	Age (years)†	17.91 ± 7.82	18.13 ± 8.52	17.74 ± 6.11	17.0 ± 0.0	16.71 ± 3.35	17.76 ± 7.98	17.50 ± 6.04	21.00 ± 6.24	18.88 ± 6.85
	Weigth (kg)†	59.30 ± 9.91	59.29 ± 10.00	59.04 ± 9.44	74.55 ± 3.18	60.10 ± 15.18	59.58 ± 10.31	58.34 ± 9.71	54.83 ± 4.65	57.52 ± 6.88
	High (cm)†	169.20 ± 9.15	168.46 ± 9.44	171.60 ± 7.93	170.00 ± 9.90	169.86 ± 14.58	169.13 ± 9.52	171.12 ± 8.01	166.67 ± 8.62	169.59 ± 6.47
	Track and field experience (years)	5.35 ± 4.87	5.34 ± 5.42	5.16 ± 3.10	6 ± 2.83	6.14 ± 6.12	5.37 ± 5.05	4.90 ± 3.23	4.33 ± 4.04	5.24 ± 3.63
	Training volume (hours/week)	8.79 ± 5.73	8.38 ± 6.24	10.36 ± 4.80	6.00 ± 2.83	7.40 ± 5.19	8.62 ± 5.92	10.06 ± 4.86	13.33 ± 5.51	9.82 ± 5.33
Injured in past season	**Yes (%)**	25.8	27.8	36.2	0.0	28.6	29.0	7.1	0.0	5.9
	No (%)	74.2	72.2	63.2	100.0	71.4	71.0	92.9	100.0	94.1

†, values are given as mean (standard deviation). *Statistical differences ($p \leq 0.05$)

Journal of Sport and Health Research 2025, 17(1):59-72

Table 2 Catastrophizing level and pain level for all athletes.

		EXPLOSIVE					ENDURANCE		
	All athletes (n = 124)	**Sprints and hurdles (n = 79)**	**Jumps (n = 19)**	**Throws (n = 2)**	**Combined events (n = 7)**	**All (n = 107)**	**Middle distance (n = 14)**	**Long-distance (n = 3)**	**All (n = 17)**
PCS (score)†	14.52 ± 9.85	13.77 ± 10.43	16.85 ± 9.25	3.00 ± 4.24	16.0 ± 8.91	14.26 ± 10.17	15.14 ± 7.79	21.33 ± 2.31	16.23 ± 7.48
PCS (rumination) (score)	5.91 ± 4.38	5.70 ± 4.62	5.70 ± 4.62	0.0 ± 0.0	0.0 ± 0.0	5.90 ± 4.54	5.57 ± 3.41	7.67 ± 1.15	5.94 ± 3.21
PCS (helplessness) (score)	5.22 ± 3.89	4.93 ± 4.06	4.93 ± 4.06	1.00 ± 1.41	1.0 ± 1.41	5.08 ± 3.97	6.00 ± 3.57	7.00 ± 1.00	6.17 ± 3.26
PCS (magnification) (score)	3.39 ± 2,61	3.14 ± 2.59	3.14 ± 2.59	2.00 ± 2.83	2.0 ± 2.83	3.28 ± 2.63	3.57 ± 1.99	6.67 ± 2.89	4.12 ± 2.39
Current pain (%)	28.2	21.4	52.6*	0.0	14.3	27.1	28.6	66.7	35.3
Pain level (0-10 score)†	4.88 ± 1.63	4.39 ± 1.88	3.9 ± 2.51	0.0 ± 0.0	6.00 ± 0.0	4.28 ± 2.08	5.0 ± 1.83	4.5 ± 2.12	4.83 ± 1.72

PCS, Pain Catastrophism Scale; †, values are given as mean (standard deviation). *Statistical differences compared to sprint and hurdles athletes.