2024, Retos, 61, 392-399

Sociodemographic characterisation of the endurance runner: risk of injury and psychosocial profile. A contemporary sample

Caracterización sociodemográfica del corredor de resistencia: riesgo de lesión y perfil psicosocial. Una muestra contemporánea

*Pedro Ángel Latorre Román, *Mario Romero Plaza, *José Carlos Cabrera Linares, *Juan Antonio Párraga Montilla, **Jesús Salas Sánchez

*Universidad de Jaén (España), Universidad, **Universidad internacional de la Rioja (España), **Universidad autónoma de Chile (Chile)

Abstract. The aim of this study was to analyse and describe the sociodemographic and psychosocial profile, also to identify the risk of injury of a contemporary sample of Spanish amateur endurance runners regarding individual variables, training volume and personality. A total of 147 endurance runners (114 males and 33 females; age: 42.66 ± 11.54 years old; BMI: 22.83 ± 2.47 kg/m^2) completed an ad hoc questionnaire designed for athletes older than 18 years old. Significant differences ($p<0.001$) were observed for the fact of having a personal trainer, with women reporting a higher percentage than men. Most of the athletes (68%) have been injured in the last 3 years, and no significant differences between sexes were found. The profile of the endurance runner is a normotypical 40-year-old male with some anxiety and low mood, who has studied at the university, he/she is married or has a couple. He has been training for 16 years, doing 51 kilometres per week, joining into 12 annual competitions, and has been injured 2 times in the last 3 years. The most common injury is tendonitis, being the causes of injuries found in this study the footwear and the personal goal achievement.
Keywords: Endurance athletes, runners, injuries, socio-demographics

Resumen. El objetivo de este estudio fue analizar y describir el perfil sociodemográfico y psicosocial, así como identificar el riesgo de lesión de una muestra contemporánea de corredores de resistencia aficionados en relación con variables individuales, volumen de entrenamiento y personalidad. Un total de 147 corredores de resistencia (114 hombres y 33 mujeres; edad: 42,66 ± 11,54 años; IMC: 22,83 ± 2,47 kg/m^2) completaron un cuestionario ad hoc diseñado para deportistas mayores de 18 años. Se observaron diferencias significativas ($p<0.001$) por el hecho de contar con un entrenador personal, reportando las mujeres un porcentaje mayor que los hombres. La mayoría de los deportistas (68%) se han lesionado en los últimos 3 años, y no se encontraron diferencias significativas entre sexos. El perfil del corredor de resistencia es el de un varón normotípico de 40 años, con cierta ansiedad y bajo estado de ánimo, que ha estudiado en la universidad y trabaja, está casado o tiene pareja. Lleva 16 años entrenando, recorriendo 51 kilómetros semanales, participando en 12 competiciones anuales y se ha lesionado 2 veces en los últimos 3 años. La lesión más común es la tendinitis, siendo las causas de lesiones encontradas en este estudio el calzado y la consecución de objetivos personales.
Palabras Clave: Atletas de resistencia, corredores, lesiones, socio-demográfico

Fecha recepción: 02-07-24. Fecha de aceptación: 07-09-24
José Carlos Cabrera Linares
jccabrer@ujaen.es

Introduction

Physical activity (PA) is a very promising non-pharmacological approach to health promotion and is available to all people. Indeed, there is sufficient evidence for the effectiveness of regular PA is associated with a longer health span, delaying the onset of 40 chronic conditions/diseases, including cardio-vascular disease, diabetes, cancer, hypertension, obesity, depression and osteoporosis, as well as premature death (Ruegsegger & Booth, 2018; Warburton et al., 2006). In turn, regular physical exercise enhances immune system (Campbell & Turner, 2018). Despite all these benefits, worldwide, 1 in 4 adults currently do not meet the global PA recommendations established by the World Health Organization (WHO) that adults should accumulate a minimum of 150-300 minutes of moderate-intensity aerobic PA, or a minimum of 75-150 minutes of vigorous-intensity PA, or an equivalent combination of moderate- and vigorous-intensity activities, during the week to obtain significant health benefits. Notice that, adults can exceed these values or an equivalent combination of moderate- and vigorous-intensity activities each week to obtain greater health benefits (WHO, 2020). Therefore, physical inactivity has become a major public health issue, and consequently, the motivation for a healthy lifestyle has increased; as a result, the popularity of recreational sports, such as running, has now gained widespread acceptance, due ease of practice, and potential health benefits (Menheere et al., 2020).

From a public health point of view, predominantly cardiovascular exercise that primarily involves the action of lower limb muscles such as running, may be the most cost-effective life-style choice, even more important than the prevention of other health risk factors such as smoking, obesity, hypertension, and diabetes (Duck-Chul et al., 2017). Running participation is associated with 27%, 30% and 23% lower risk of all-cause cardiovascular and cancer mortality, respectively, compared with no running; although, no significant dose–response trends for weekly frequency, weekly duration, pace and the total volume of running were found (Pedisic et al., 2020. Therefore, it is unclear how much running training is safe and effective and whether it is possible to do an excessive amount of exercise. In addition, running is not the best exercise for everyone, as medical, orthopaedic or other conditions may restrict its practice in many people (Duck-Chul et al., 2017). However, today, running has become an immensely popular pastime pursued in the public sphere by millions of recreational participants

worldwide (Scheerder, Breedveld, & Borgers, 2015). Specifically, the number of participants in popular endurance races has increased, along with the number of organized races, for example, in the Valencia Trinidad Alfonso EDP Marathon, there has been an increase in the number of participants, as in 2014 there were 11,348 runners; however, in this latest 2023 edition, there were 25,908 runners, which means that in just 10 years, participation has doubled.

The reasons for starting to run are diverse and depend on various sociodemographic variables (i.e., gender and age), running habits (e.g., experience, frequency, relative performance) and in the runners' attitudes, interests and opinions (Menheere et al., 2020). Intrinsic motives, goal-setting, and other self-regulation skills seem to be the key antecedents of regular running (Pereira et al., 2021). Young recreational runners decide to run to achieve a personal goal, while among the oldest runners, the most important motive was health orientation (Gerasimuk et al., 2021).

There is diverse profile of 'the runner' shows that running can demand to many people (regardless of age, gender, motives, experience or running context) and demonstrates the potential of running even more available for an even bigger group of people (Menheere et al., 2020). The most comprehensive study conducted to date on running in Europe indicates that, in 2009-2010, up to 15% of Finns (including children, adolescents, and older adults) practiced running. Meanwhile, in Denmark, in 2011, 31% of adult citizens reported regularly training for running. The situation is different in Spain and England. In 2010, 45% of the Spanish population between the ages of 15 and 65 reported engaging in PA, while only 6.2% of people in this age group practiced running. However, in England, 5% of adults regularly practiced running (data from 2011-2012) (Scheerder, Breedveld, & Borgers, 2015).

Four types of amateur runners are distinguished: the first is the individual runner (41% of the running population), focused on fitness, mainly appreciating the simplicity and flexibility of running. This group primarily includes well-educated and affluent men of various ages. The second category (26% of the population) is the competitive runner, this group is typically composed of men who often finish secondary education. The third type (18% of the population) is the social-community runner, who appreciates the sporting and health benefits of running but remains very willing to abandon this discipline in favor of other activities. In this group, the proportion of men and women is equal, and it is dominated by people under 30. The fourth type (9% of the population) is the health and fitness runner. Here, too, there is a gender balance, with a predominance of younger individuals (under 40). Finally, the fifth category (7% of the population) is the performance runner, who strongly identifies with the discipline they practice and appreciates the individualism and sense of freedom it provides. This group mainly consists of middle-aged men. The proposed classification of runners in Spain is essentially a list of ideal types (the solitary hedonist, the competitive individualist, the social animal, the disciplined group runner) without indicating the frequency of their occurrence in the running population and without assigning socio-demographic traits to these types (Scheerder, Breedveld, & Borgers, 2015).

Especially, in Spain, the sociodemographic profile of the senior athlete includes the following descriptors: he is a male around 40 years of age, with a university education, who work outside of home, lives with his partner, and he goes running 4 days/week. The predominant level of training sessions is medium intensity and he runs around 50 kilometres per week, most of which are on tarmac. Also, he wears expensive shoes (over 100 euros), 85.1% are not federated, 93.6% do not have a trainer, and complete about 11 competitions per year. In addition, injury is frequent in this athlete, affecting 53.7% of runners, being the factors that predispose to injury: a) the number of weekly training sessions; b) the number of kilometers runs per week. Notice that tendonitis is the most common injury in this population (Salas et al., 2013). Moreover, it should be notice that many of the runners do not have a sports background throughout their lives or Sports have not been a big part of their lives. Moreover, we must add that some of them start from situations of overweight or obesity, are ex-smokers or smokers. Also, at these ages there is certain environmental factors that could generate added stress such as family and work responsibilities (Salas et al., 2013). Another study highlights that senior runners were mostly male, had 7 or more years of running experience, ran more than 30 miles/week, 6 or more times/week and used more orthopaedic devices than younger runners (McKean et al., 2006). They tend to perform vigorous PA and show high levels of cardiorespiratory fitness, which has benefits in the prevention of obesity, hypertension, dyslipidemia, type 2 diabetes, osteoarthritis and hip arthroplasty, benign prostatic hypertrophy, respiratory disease, cancer and disability (Lavie et al., 2015).In this regard, the senior athlete (men and women over 35 of age who participate in competitive sports) has been proposed as an ideal model of ageing due to involvement in high-intensity activities being a rapidly growing population (McKean et al., 2006; Lavie et al., 2015). These athletes represent the human capacity to maintain certain physical performance and physiological functions despite age (Lepers & Stapley, 2016).

Regarding to physical preparation, some of these amateur runners up these demanding sports without any prior clinical study to determine their health conditions such as blood pressure, lipid profile, presence of orthopedic or postural alterations or other contraindications that can have an influence in the sports performance. Furthermore, they are not usually evaluated by sports professionals to determine their functional capacity, response to effort, and they do not have a personal trainer (Latorre-Román et al., 2022). All this factors, can expose these athletes to undesirable risks such as musculoskeletal injuries, cardiac alterations and psychosocial problems, making exercise in some cases harmful (Hausenblas & Symons, 2002). In many cases, the

recreational runner mimics the professional runner, but injury rates and risks in recreational athletes are likely to be higher since professional athletes have better physical conditioning, use permanent protective equipment, their training is controlled, and they have better sport technique (Salas et al., 2013). Last but not least important, it is necessary to keep in mind the negative effect that the practice of endurance running can have on the psychosocial sphere, fundamentally referring to the processes of dependence and addiction to vigorous exercise (Salas et al., 2013). All of them could be related to the motivational factors of runners when practicing endurance racing. For example, introjected regulation is a common predictor for exercise dependence and body dissatisfaction (Latorre et al.2016). In addition, different psychological risk profiles were linked to the risk of running-related injuries and chronic fatigue in long-distance runners, the high-risk profile, featured high obsessive passion, low physical, cognitive, and emotional recovery, as well as low physical resources (van Iperen, de Jonge, Gevers, & Vos, 2022).

The COVID-19 pandemic may have affected the sporting habits of the population, in particular those related to running; moreover, previous studies carried out in Spain to characterize endurance runners are outdated. Taking into account the above information, a contemporary characterisation of the socio-demographic and psychosocial profile of Spanish runner population is necessary to determine whether the practice of endurance running is an interesting alternative to promote health. Therefore, the aim of this study was to analyze and describe the sociodemographic and psychosocial profile, also to identify the risk of injury of a contemporary sample of Spanish amateur endurance runners regarding sex, as well as, to identify the risk of injury of a contemporary sample of amateur endurance runners in relation to individual variables, training patterns and personality.

Materials and methods

Participants

A total of 147 endurance runners participated voluntarily in this cross-sectional study (114 males and 33 females), belonging to different athletics clubs in Spain. The average age of the respondents was 42.66 ± 11.54 years (age range: 18-74 years), body mass index (BMI)= 22.83 ± 2.47 kg/m^2). The inclusion criteria were: a) Participants were over 18 years old; b) They have to train at least 3 days per week; c) Currently competed in endurance running with at least two years of experience. All participants signed an informed consent (clicking in a box situated at the end of the 1st page of the questionnaire). In addition, they were informed of the purpose of the study, the confidentiality of the information collected, as well as the anonymous processing of the data collected. Moreover, the principles of the Declaration of Helsinki (2013) were followed.

Materials and instruments

An ad-hoc questionnaire was developed. The questionnaire was sent via a link (https://docs.google.com/forms/d/e/1FAIpQLSdsj7ecQw5evecvlcLu23dPIkOghgO2ldXbq-X-REAdSuYaw/viewform) that was disseminated through social networks, and the athletic clubs in Spain. The questionnaire was available to respond from 01/23/2022 to 06/18/2023. A total of 180 athletes completed the questionnaire, of which 26 of them were excluded since they not meet the inclusion criteria. Furthermore, 8 athletes had to be excluded due to errors made during submission process or due to some questions were not answered or were incomplete (7). The questionnaire was divided by two sections. The first section included sociodemographic questions asking for information on age, sex, marital status, socioeconomic level, type of training, sports footwear and injury history. To complete the second section, 3 questionnaires were incorporated.

The first one was based on the study by Latorre et al. (2016) where they analysed motivations towards sport using the Exercise Behaviour Regulation Questionnaire (BREQ-3) (Wilson et al., 2006), the Spanish version was used in this study (González-Cutre et al., 2010). The questionnaire is composed by 23 items that are divided into 6 factors; 1) Intrinsic regulation 2) Integrated regulation 3) Identified regulation 4) Introjected regulation 5) External regulation 6) Demotivation. Responses were scored on a Likert scale from 0 (not true at all) to 4 (completely true).

The second questionnaire used was the Portrait Values Questionnaire (PVQ) by Schwartz (2003), validated to Spanish languaje by Beramendi & Zubieta (2017). Thanks to it, data can be obtained on the person's ambitions, illusions or desires. Each question is measured between three and six items. Each item contains two statements describing a person. The first statement describes the importance of a particular value (e.g., "It is important for him/her to be rich"). The second statement describes the desire to achieve that value (e.g., "He/she wants to have a lot of money and valuable things"). For each item, respondents answer, "How much like you is this person?" on a scale from 1 (not like me at all) to 6 (very much like me).

The last questionnaire incorporated was the Eysenck Personality Questionnaire Revised-Abbreviated (EPQR-A) (Francis et al., 1992), the Spanish version validated by Sandín et al. (2002) was used. This questionnaire consists of 24 items and four subscales (Extraversion, Neuroticism, Psychoticism, and Sincerity), with 6 items corresponding to each subscale. The response format is Yes (1) vs. No (0), with a score range for each subscale between 0 and 6. The first three subscales measure personality traits, while the last one evaluates the tendency to lie. Specifically, it evaluates the tendency to emit socially desirable responses. Regarding this subscale it should be notice that although in the original version the level of lies is evaluated, in the Spanish version, just like with the EPQ questionnaire, it is evaluated inversely, consequently, the level of sincerity is calculated.

Statistical analysis

Data were analysed using SPSS, v.22.0 for Windows (SPSS Inc., Chicago, USA). Tests of normal distribution and homogeneity (Kolmogorov-Smirnov and Levene's test, respectively) were conducted on all data after the analyses. Descriptive data are reported in terms of means and standard deviations (SD) and percentage (%). The relationship between categorical variables was analyzed using contingency tables and the χ^2 test was applied. And for the quantitative variables, the U Mann Whitney and t test were used. In addition, to verify the relationship between several parameters, correlations were sought between the number of injuries and quantitative factors related to personality traits or training volume (kilometres run, weekly sessions), price of shoes, age, etc…, Spearman and Pearson correlation analysis and binary logistic regression using injury status levels as the dependent were performed. Odds Ratios (OR) and 95% confidence intervals (CI) were calculated. The magnitude of correlation between measurement variables was designated as: < 0.1 (trivial), 0.1–0.3 (small), 0.3–0.5 (moderate), 0.5–0.7 (large), 0.7–0.9 (very large), and 0.9–1.0 (almost perfect) (Hopkins et al., 2009). The significance level was set at $p < 0.05$.

Results

Table 1 shows the socio-demographic characteristics of the participants in relation to sex. The majority of amateur endurance runners are men (77%) and 60.5% of them do not have a medical check-up before or regularly for training. Most of the athletes have a university education (62.7%) and a weight status classified as normal weight (76.1%). Prevalence of overweight and obesity was higher in men than in women (p<0.001). Significant differences (p<0.001) were observed for the fact of having a personal trainer, with women reporting a higher percentage than men. Mostly of the athletes (68%) have been injured in the last 3 years and no significant differences between sexes were found.

Table 1.
Qualitative socio-demographic and training typology characteristics of participants in relation to sex.

		Men N (%)	Women N (%)	p-value
Weight status	Underweight	1 (0.9)	7 (21.2)	<0.001
	Normoweight	90 (79.6)	24 (72.7)	
	Overweight	21 (18.6)	2 (6.1)	
	Obesity	1 (0.9)	0.0 (0.0)	
Level of education	Primary	15 (13.2)	2 (6.1)	0.501
	Secondary	32 (28.1)	9 (27.3)	
	University	67 (58.8)	22 (66.7)	
Occupation	Work	99 (86.8)	24 (72.7)	0.053
	Does not work	15 (13.2)	9 (27.3)	
Marital status	Divorced	13 (11.4)	4 (12.1)	0.896
	Single	27 (23.7)	9 (27.3)	
	Married or in a couple	74 (64.9)	20 (60.6)	
Do you have a personal trainer?	Yes	37 (32.5)	23 (69.7)	<0.001
	No	77(67.5)	10 (30.3)	
Train alone or in a group	In groups	43 (37.7)	12 (36.4)	0.887
	Alone	71 (62.3)	21 (63.6)	
Have you been injured in the last 3 years?	Yes	81 (71.1)	19 (57.6)	0.144
	No	33 (28.9)	14 (42.4)	
Are you federated?	Yes	58 (50.9)	18 (54.5)	0.710
	No	56 (49.1)	15 (45.5)	
Do you regularly change your training route?	Yes	83 (72.8)	17 (51.5)	0.021
	No	31 (27.2)	16 (48.5)	
Do you stretch daily?	Yes	44 (38.6)	18 (54.5)	0.102
	No	70 (61.4)	15 (45.5)	
Have you had a medical check-up before or regularly for training?	Yes	45 (39.5)	16 (48.5)	0.355
	No	69 (60.5)	17 (51.5)	

Table 2 shows aspects related to injuries and type of training in relation to sex. Significant differences were found between both sexes in training years (p=0.030) also with the number of kilometres run per week (p=0.018), both values were higher in men than women. The majority of athletes use sessions that last between 31 and 60 minutes, without significant differences between sexes (54.4% men vs. 51.5% women, p=0.255).

Table 2.
Quantitative aspects related to injuries and training typology in relation to sex.

	Men N=114 Mean (SD)	Women N= 33 Mean (SD)	p-value
Age (Years)	43.68 (1.18)	39.12 (12.23)	0.045
Weight (kg)	72.13 (8.87)	57.09 (9.59)	<0.001
BMI (Kg/m^2)	23.83 (5.63)	21.08 (2.73)	0.008
How many years have you been training?	17.58 (12.22)	10.69 (8.50)	0.030
Kilometers you run per week	54.34 (24.75)	41.96 (20.86)	0.018
If you have been injured in the last 3 years, how many times?	2.33 (1.30)	2.05 (1.17)	0.384
How many injuries were minor?	2.00 (1.03)	1.72 (1.00)	0.418
How many injuries have been moderate?	1.27 (0.55)	1.66 (0.98)	0.830
How many injuries have been serious?	1.44 (0.85)	1.14 (0.37)	0.383
Number of annual competitions	12.34 (10.33)	12.57 (11.15)	0.911
Number of weekly training sessions	5.10 (1.66)	5.21 (1.26)	0.734
Number of weekly soft sessions	2.44 (1.12)	2.20 (0.81)	0.288
Number of weekly hard sessions	1.44 (0.83)	1.58 (0.80)	0.438
Number of very hard weekly sessions	1.31 (0.69)	1.00 (0.00)	0.940
Price of the shoes you are currently wearing (Euros)	112.64 (43.61)	110 (32.42)	0.826
Average shoe life in months	10.50 (6.87)	9.69 (4.95)	0.529
Percentage of training on asphalt	58.13 (28.47)	57.72 (29.04)	0.943
Percentage of training on grass	44.34 (27.58)	41.71 (28.44)	0.641

BMI: Body mass index

Figure 1 shows the type of injuries listed by the participants. Half of the endurance athletes (51%) reported that tendonitis was the most frequent injury followed by contractures (33%), and muscle tears (18%). On a qualitative level, the fact of have to work outside of home shows significant differences in the prevalence of injury. Athletes who have to work outside of their home are more likely to be injured (p=0.038) than those that does not have to work (88% vs. 12%).

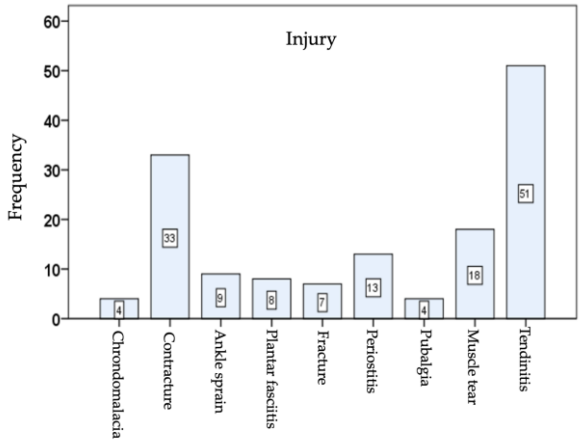

Figure 1. Type of injuries reported by participants

In relation to the personality aspects of the athletes (Table 3) statistically significant differences has been found in neuroticism (p<0.001) showing men higher levels than women. This results, also occurs in demotivation (p=0.043) and conformity (p=0.010). On the other hand, significant differences were found in sincerity (p=0.035), self-direction (p=0.011), and benevolence (p=0.038) in all these traits, with females scoring higher than males. Furthermore, universalism item showed significant differences (p=0.050) scoring females higher than males.

Table 3.
Motivations and personality-related aspects of the athletes taking into account sex.

		Men N=114 Mean (SD)	Women N=33 Mean (SD)	p-value
BREQ-3	Introduced	3.47 (3.13)	4.79 (4.22)	0.158
	External	0.44 (1.69)	0.15 (0.61)	0.194
	Demotivation	0.66 (1.75)	0.18 (1.04)	0.043
EPQR-A	Extraversion	2.46 (1.02)	2.06 (0.74)	0.061
	Neuroticism	4.22 (1.55)	3.00 (1.96)	<0.001
	Psychoticism	3.67 (0.87)	3.61 (0.86)	0.659
	Sincerity	3.29 (1.34)	3.85 (1.52)	0.035
PVQ-21	Self-direction	9.71 (1.49)	10.45 (1.43)	0.011
	Stimulation	7.95 (2.32)	8.55 (2.51)	0.183
	Hedonism	9.35 (1.75)	9.42 (2.13)	0.621
	Benevolence	10.61 (1.31)	11.09 (1.07)	0.038
	Universalism	15.42 (1.92)	16.18 (1.70)	0.050
	Security	7.68 (2.17)	8.03 (2.55)	0.326
	Compliance	7.11 (2.26)	5.88 (2.42)	0.010
	Tradition	8.94 (1.79)	9.00 (2.20)	0.847
	Goal achievement	5.98 (2.67)	5.39 (1.99)	0.319
	Power	5.89 (2.18)	5.52 (2.10)	0.435

PVQ= Portrait Values Questionnaire; BREQ-3= Behavioural Regulation in Exercise Questionnaire; EPQR-A= Eysenck Personality Questionnaire Revised-Abbreviated.

The binary logistic regression analysis revealed that age was a risk factor for injury (odds ratio = 1.039, 95% CI = 1.004–1.076, p = 0.030) and the duration of shoes a protective factor (odds ratio = 0.929, 95% CI = 0.872–0.990, p = 0.024). Adjusted for age and sex, the number of weekly KM and number of weekly training sessions shows significant correlations with serious injuries (r=0.427, p<0.001; r=0.314, p=0.002, respectively). In addition, the achievement goal shows a significant correlation with the number of injuries suffered (r=0.232, p=0.013). Finally, after adjusting for the effect of potential confounding variables (age and sex), the multi-variate analysis, using the binary logistic regression analysis to determine the OR for athletes with and without injury, the model show an association between a musculoskeletal injury history with the achievement goal, duration of the shoes, price of the shoes, and number of shoes used in training (Table 4).

Table 4.
Results of binary logistic regression model with potential risk factors.

	B	S.E.	Wald	p-value	OR	95% CI for OR	
						Lower limit	Upper limit
Personal goal achievement	-0.182	0.082	4.997	0.025	0.833	0.710	0.978
Duration of the shoes	0.063	0.029	4.747	0.029	1.065	1.006	1.127
Price of the shoes	-0.014	0.006	5.892	0.015	0.986	0.975	0.997
Number of shoes used in training	0.772	0.273	8.024	0.005	2.164	1.269	3.693

S.E: Standard error; O.R.: Odds ratio

Discussion

The aim of this study was to analyze and describe the sociodemographic and psychosocial profile, also to identify the risk of injury of a contemporary sample of Spanish amateur endurance runners regarding individual variables, training patterns and personality.

In relation to the sociodemographic data characterizing the amateur runners analyzed in this study, most of the findings of the present study coincide with those found by Salas et al. (2013) in Spanish senior runners The profile of the amateur runner is a male around 40 years of age, with university studies, who works outside of home, lives with a partner, trains 4 days/week, and runs around 50 kilometers per week. Men run more kilometers than women, and a higher percentage of them do not have a coach. Likewise, a recent study, conducted in Spanish amateurs runners, showed the following sociodemographic pattern: runners practice one to three days per week, running from three to five hours overall plus additional stretching and high intensity training; participated in less than one running event per month, most of them did not belong to an athletic club, did not have a coach, were not federated and have more than four years' experience of running, finally, men trained more than the women (Manzano-Sánchez et al., 2020). Regarding running-related injuries, these are multifactorial since it is related with a combination of variables including personal data, training load, anatomic malalignments, and

injury history (Benca et al., 2020). The prevalence of injuries was 68% and no significant differences were found between male and female runners. The injury prevalence obtained in this study is higher than those obtained in previous research such as the study of McKean et al. (2006), who established values of 46% or Latorre et al. (2022) with a rate of 50%. A recent systematic review indicated a minor prevalence (37%), showing females a greater mean incidence of injury than males (39.7% vs 34.3%). Also, the risk factors for developing injury were; having <5 years running experience, being previously injured in the last 12 months and running >3 times per week (Dempster et al., 2021). In addition, the risk of injury could be related to age, type of training in terms of intensity, frequency, and training method used (Beramendi & Zubieta, 2017; Francis et al., 1992). Not having a sports coach may be another factor leading to athlete injury (Manzano-Sánchez et al., 2020; Benca et al., 2020). Moreover, differences in a runner's sex and level of competition may influence the connection between biomechanical factors and the occurrence of running-associated injuries (Dempster et al., 2021). However, the current study did not find that having a coach, age, and sex of the athletes were related to having a higher number of injuries. The most relevant findings of this study show that out of all the analyzed factors, four of them have the ability to discriminate the prevalence of injury risk: 1) Achievement goal 2) The duration of shoes; 3) Price of shoes, and 4) Number of shoes used in training. Additionally, training volume correlates with the number of serious injuries.

In the current study, footwear is the main factor that predicts injuries in amateur runners. Runners who use inexpensive shoes (under 100 euros), who use them for a longer period of time and use different shoes in regular training, are exposed to a lower risk of injury. Likewise, it should be noted that a previous study showed higher injury frequency in users of expensive athletic shoes, which could be due to deceptive advertising of protective devices of shoes and may represent a public health hazard (Robbins & Waked, 1997). However, footwear is frequently perceived as a risk factor for running related injuries, but experimental evidence be unsuccessful to support such (Ramsey et al., 2022). In this regard, amateurs' runners generally pay a great deal of consideration to choosing their running shoes and attributed their injury risk to their shoes, which were thought to be the main extrinsic risk factor. Many of these beliefs possibly linked to the selling arguments put forward by the running shoe industry. Today, no evidence indicates that prescribing shoes according to foot morphology reduced the injury risk, in addition, in relation to the age of the shoes, there are no solid findings and no association has been established between the brand or cost of the shoes and the risk of injury. Therefore, the role of running shoes technology in injury prevention may have been greatly overrated (Andrade & Santos, 2022).Therefore, despite over 50 years of industry investment in distance running shoe design, it remains unclear whether modern running shoes are true musculoskeletal injury prevention devices or whether they simply protect the plantar surface of the foot (Richards, 2020). However, in the current study, runners using concomitantly more than one pair of shoes had a lower risk of running-related injury. A possible explanation would be that the alternation of running shoes induces a variation in the type of physical load applied to the musculoskeletal system (Malisoux et al., 2015).

Regarding the most frequent types of injury the results in this research agree with the study of Lazari et al. (2022) identifying tendonitis as the most common injury, the second most common type of injury are contractures, and to a lesser extent muscle ruptures, periostitis and sprains. All the injuries mentioned are along the same lines as those found in systematic reviews such as that of Kakouris et al. (2021), where the results confirm that the most common injuries in runners are tendonitis and muscle injuries.

Finally, another important finding of this study related to personality traits, was that, women score higher on sincerity, self-directedness, benevolence and universalism than men. The latter trait refers to equality, understanding, and loyalty. On the other hand, men score higher on neuroticism, so they are more nervous, apathetic, frustrated, more susceptible, and/or have higher levels of anxiety than women. They also score higher on demotivation and conformity. In terms of demotivation, it refers to a greater apathy and/or disinterest in exercising, and conformity means that men are more compliant, obedient and correct. All these aforementioned personality aspects are similar to the symptoms of depression, which directly influence the injury, also slowing down the recovery process (Lazari et al., 2022; Cardozo et al., 2023). However, in this research, of all the personality traits analyzed, only personal goal achievement is shown as a risk factor for injury. In this regard, Struwig indicated that achievement goal orientation may be risk factors for running addiction, which may contribute to increased injury incidence in distance runners (Struwig, 2016). Moreover, amateur long-distance runners with a high level of intrinsic motivation tend to suffer a greater number of injuries (León-Guereño et al., 2020).

Limitations and strength

The present study has some limitations that should be taken into account when interpreting it. Firstly, it is necessary to highlight that only a few people who completed the questionnaire were women, thus, the representation of this gender suppose a small representation in the overall sample of participants, although the proportion of men and women analyzed in this study is similar to what we find in participation in various endurance running events (for example, the Valencia Marathon 2023).

Secondly, the questionnaire was sent online to the participants, therefore, it is difficult to know the level of involvement and interest of the participants at the time of completing it. Nevertheless, a strength of this study is that it has allowed us to know the socio-demographic profile, risk of injury and psychosocial profile of the Spanish

amateur endurance runner. It is a fundamental factor to know this type of athlete in order to prevent harmful PA and to promote, by sports clubs, government sports organizations or even within educational environments, healthy sports practice, guided and programmed by sports professionals.

For future research it would be appropriate to expand the sample size in terms of number and geographical locations inside and outside Spain in order to identify the types of endurance runner profiles and to analyse the differences at an international level.

Conclusion

In conclusion, the current amateur endurance runner can be defined as an athlete with normal weight, middle-aged, around 40 years old, with a university education, usually work outside of home, and he/she is married or live with a couple. As far as training is concerned, he does not have a personal trainer, trains alone, changes his training routes, has been training for 16 years, runs 51 kilometres per week and join in 12 competitions per year. He has been injured twice in the last 3 years, wears expensive shoes (over 100€) that last about 10 months. The most common injury is tendonitis, being the causes of injuries found in this study the footwear and the personal goal achievement.

Referencias

Andrade, R., & Santos, T. (2022). Selection of running shoes by amateur runners: Characterization and association with the self-reported history of injury. *Fisioterapia e Pesquisa*, *29*, 386–396. https://doi.org/10.1590/1809-2950/22016129042022en

Benca, E., Listabarth, S., Flock, F. K. J., Pablik, E., Fischer, C., Walzer, S. M., Dorotka, R., Windhager, R., & Ziai, P. (2020). Analysis of Running-Related Injuries: The Vienna Study. *Journal of Clinical Medicine*, *9*(2), Article 2. https://doi.org/10.3390/jcm9020438

Beramendi, M., & Zubieta, E. (2017). Validation of the 40 and 21 items versions of the portrait values questionnaire in Argentina. *PSYCHOLOGIA*, *60*(2), 68–84. https://doi.org/10.2117/psysoc.2017.68

Campbell, J.P.; Turner, J.E. (2018). Debunking the Myth of Exercise-Induced Immune Suppression: Redefining the Impact of Exercise on Immunological Health Across the Lifespan. *Front. Immunol, 9*, 648, doi:10.3389/fimmu.2018.00648.

Cardozo, L. A., Lara, M. V., Jiménez, J. G., Villamil, S. B., & Reina-Monroy, J. L. (2023). Análisis de la carga de entrenamiento previo a una lesión en atletismo de media distancia: Estudio de caso. *SPORT TK-EuroAmerican Journal of Sport Sciences*, *12*(6).

Dempster, J., Dutheil, F., & Ugbolue, U. C. (2021). The prevalence of lower extremity injuries in running and associated risk factors: A systematic review. *Physical Activity and Health*, *5*(1), 133–145. https://doi.org/10.5334/paah.109

Duck-chul, L.; Brellenthin, A.G.; Thompson, P.D.; Sui, X.; I-Mind, L.; Lavie, C.J. (2017). Running as a Key Lifestyle Medicine for Longevity. Progress in Cardiovascular Diseases, 60, 45–55, doi:10.1016/j.pcad.2017.03.005.

Francis, L. J., Brown, L. B., & Philipchalk, R. (1992). The development of an abbreviated form of the revised Eysenck personality questionnaire (EPQR-A): Its use among students in England, Canada, the U.S.A. and Australia. *Personality and Individual Differences*, *13*(4), 443–449. https://doi.org/10.1016/0191-8869(92)90073-X

Gerasimuk, D., Malchrowicz-Mośko, E., Stanula, A., Bezuglov, E., Achkasov, E., Swinarew, A., & Waśkiewicz, Z. (2021). Age-related differences in motivation of recreational runners, marathoners, and ultra-marathoners. *Frontiers in psychology*, *12*, 738807.

Global Recommendations on Physical Activity for Health Available online: https://www.who.int/publications-detail-redirect/9789241599979 (accessed on 23 December 2023).

González-Cutre, D.; Sicilia, álvaro; Fernández, Alberto. (2010). Hacia una mayor comprensión de la motivación en el ejercicio físico: medición de la regulación integrada en el contexto español. Psicotema, 22, 841–847.

Hausenblas, H. A., & Symons Downs, D. (2002). Exercise dependence: A systematic review. *Psychology of Sport and Exercise*, *3*(2), 89–123. https://doi.org/10.1016/S1469-0292(00)00015-7

Hopkins, W.G.; Marshall, S.W.; Batterham, A.M.; Hanin, J. (2009). Progressive Statistics for Studies in Sports Medicine and Exercise Science. Medicine and science in sports and exercise, 41, 3–13, doi:10.1249/MSS.0b013e31818cb278.

Kakouris, N., Yener, N., & Fong, D. T. P. (2021). A systematic review of running-related musculoskeletal injuries in runners. *Journal of Sport and Health Science*, *10*(5), 513–522. https://doi.org/10.1016/j.jshs.2021.04.001

Latorre Román, P.Á.; Obra Jiménez, A.; Párraga Montilla, J.; García Pinillos, Felipe. (2016) Dependencia al ejercicio físico e insatisfacción corporal en diferentes deportes de resistencia y su relación con la motivación al deporte. *Revista de Psicología del Deporte*, *25*, 113–120.

Latorre-Román, P.Á.; Salas Sánchez, J.; Consuegra-Gonzalez, P.J.; Aragón Vela, J.; Párraga-Montilla, J.A. (2022). Training Load Measures and Biomarker Responses Using a Multilevel Approach during a Training Week: A Study Comparing Young and Master Cyclists. *Med Sport, 75*, doi:10.23736/S0025-7826.22.04057-1.

Lavie, C.J.; Lee, D.; Sui, X.; Arena, R.; O'Keefe, J.H.; Church, T.S.; Milani, R.V.; Blair, S.N. (2015). Effects of Running on Chronic Diseases and Cardiovascular and All-Cause Mortality. *Mayo Clinic Proceedings*, *90*, 1541–1552, doi:10.1016/j.mayocp.2015.08.001.

Lazari Gomes, T., Oliveira Viana, L., Miranda Ferreira, D., Mitsuo Inada, M., Muraro Laurito, G., & Rocha Piedade, S. (2022). The Aging Athlete: Influence of Age on Injury Risk and Rehabilitation. In *Management of Track and Field Injuries* (pp. 329–338). Springer International Publishing. https://doi.org/10.1007/978-3-030-60216-1_31

León-Guereño, P., Tapia-Serrano, M. A., & Sánchez-Miguel, P. A. (2020). The relationship of recreational runners' motivation and resilience levels to the incidence of injury: A mediation model. *PloS One*, *15*(5), e0231628. https://doi.org/10.1371/journal.pone.0231628

Lepers, R.; Stapley, P.J. (2016). Master Athletes Are Extending the Limits of Human Endurance. *Front. Physiol*, *7*, 613, doi:10.3389/fphys.2016.00613.

Malisoux, L., Ramesh, J., Mann, R., Seil, R., Urhausen, A., & Theisen, D. (2015). Can parallel use of different running shoes decrease running-related injury risk? *Scandinavian*

Journal of Medicine & Science in Sports, *25*(1), 110–115. https://doi.org/10.1111/sms.12154

Manzano-Sánchez, D., Postigo-Pérez, L., Gómez-López, M., & Valero-Valenzuela, A. (2020). Study of the Motivation of Spanish Amateur Runners Based on Training Patterns and Gender. *International Journal of Environmental Research and Public Health*, *17*(21), Article 21. https://doi.org/10.3390/ijerph17218185

McKean, K. A., Manson, N. A., & Stanish, W. D. (2006). Musculoskeletal Injury in the Masters Runners: *Clinical Journal of Sport Medicine*, *16*(2), 149–154. https://doi.org/10.1097/00042752-200603000-00011

Menheere, D., Janssen, M., Funk, M., Van Der Spek, E., Lallemand, C., & Vos, S. (2020). Runner's perceptions of reasons to quit running: Influence of gender, age and running-related characteristics. *International journal of environmental research and public health*, *17*(17), 6046.

Pedisic, Z., Shrestha, N., Kovalchik, S., Stamatakis, E., Liangruenrom, N., Grgic, J., ... & Oja, P. (2020). Is running associated with a lower risk of all-cause, cardiovascular and cancer mortality, and is the more the better? A systematic review and meta-analysis. *British journal of sports medicine*, *54*(15), 898-905.

Pereira, H. V., Palmeira, A. L., Encantado, J., Marques, M. M., Santos, I., Carraça, E. V., & Teixeira, P. J. (2021). Systematic review of psychological and behavioral correlates of recreational running. *Frontiers in psychology*, *12*, 624783.

Ramsey, C. A., Lamb, P., & Ribeiro, D. C. (2022). Factors Influencing Runner's Choices of Footwear. *Frontiers in Sports and Active Living*, *4*. https://www.frontiersin.org/articles/10.3389/fspor.2022.829514

Richards, C. E. (2020). *Effect of shoe design on distance running injury risk and performance* [University of Newcastle]. https://ogma.newcastle.edu.au/vital/access%20/manager/Repository/uon:36501?view=null&f0=sm_creator%3A%22Richards%2C+Craig+Edward%22&sort=sort_ss_title%2F

Robbins, S., & Waked, E. (1997). Hazard of deceptive advertising of athletic footwear. *British Journal of Sports Medicine*, *31*(4), 299–303. https://doi.org/10.1136/bjsm.31.4.299

Ruegsegger, G. N., & Booth, F. W. (2018). Health benefits of exercise. *Cold Spring Harbor perspectives in medicine*, *8*(7), a029694.

Salas Sánchez, J.; Angel Latorre Roman, P.; Soto Hermoso, V.M. (2013). Negative Dependence to the Career of Resistance and Corporal Dimorphism in Veteran Athletes. *Medicina dello Sport*, *66*, 375–387.

Salas Sánchez, J.; Latorre Román, Pedro A.; Soto Hermoso, V.M; Santos e Campos, Mª. A.; García Pinillos, Felipe. (2013). Características sociodemográficas del corredor popular veterano español. *Cronos*, *XII*, 80–89.

Sandín, B.; Valiente, R.M.; Chorot, P.; Olmedo Montes, M.; Santed Germán, M.A. (2002). Versión española del cuestionario EPQR-ABREVIADO (EPQR-A) (I) : análisis exploratorio de la estructura factorial. *RPPC*, *7*, doi:10.5944/rppc.vol.7.num.3.2002.3933.

Schwartz, S.H. .(2003). A Proposal for Measuring Value Orientations across Nations. *Questionnaire package of the european social survey, 259*, 261.

Scheerder, J., Breedveld, K., & Borgers, J. (Eds.). (2015). *Running across Europe: the rise and size of one of the largest sport markets*. Springer.

Struwig, G. A. (2016). *Health risks of distance running: Modelling the predictors of running addiction, overuse injuries, and infectious illness* [University of South Africa]. https://www.semanticscholar.org/paper/Health-risks-of-distance-running%3A-modelling-the-of-Struwig/54c443c3b3ee1bad05e6744114cd64df59eaf44a

van Iperen, L. P., de Jonge, J., Gevers, J. M., & Vos, S. B. (2022). Linking psychological risk profiles to running-related injuries and chronic fatigue in long-distance runners: A latent profile analysis. *Psychology of Sport and Exercise*, *58*, 102082.

Warburton Darren, E.R.; Crystal Whitney, Nicol; Shannon S.D. (2006). Bredin Health Benefits of Physical Activity: The Evidence. *Canadian Medical Association Journal*, *174*, 801–809, doi:10.1503/cmaj.051351.

Wilson, P.M.; Rodgers, W.M.; Loitz, C.C.; Scime, G. (2006). "It's Who I Am … Really!' The Importance of Integrated Regulation in Exercise Contexts1. *J Appl Biobehavioral Res*, *11*, 79–104, doi:10.1111/j.1751-9861.2006.tb00021.x.

World Health Organization. (2020).. *WHO guidelines on physical activity and sedentary behaviour. World Health Organization.*

Datos de los/as autores/as:

Pedro Ángel Latorre Román	platorre@ujaen.es	Autor/a
Mario Romero Plaza	mrp00052@red.ujaen.es	Autor/a
Jose Carlos Cabrera Linares	jccabrer@ujaen.es	Autor/a
Juan Antonio Párraga Montilla	jparraga@ujaen.es	Autor/a
Jesús Salas Sánchez	jesus.salassanchez@unir.net	Autor/a