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ORIGINAL ARTICLE

Prevalence of musculoskeletal pain and associated factors in footvolley players in Brazil

Prevalência de dores musculoesqueléticas e fatores associados em jogadores de futevôlei no Brasil

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ABSTRACT

BACKGROUND AND OBJECTIVES: Footvolley is a new sport that is gaining popularity in Brazil. Several factors contribute to the scarce literature about this sport, such as recent popularization, still-growing practice in the international sphere, and low financial incentives. This study aimed to analyze the prevalence of musculoskeletal pain and associated factors in footvolley players in Brazil.
METHODS: This is a cross-sectional observational study carried out with 629 footvolley players using an online form. Sociodemographic and anthropometric data, time spent practicing, psychosocial factors and pain intensity were collected.
RESULTS: Of the 629 individuals, 450 (71%) were male. More than half of the sample, n=368 (58%), reported being injured while playing footvolley matches, with the lumbar region (41%) being the most affected. Most footvolley players reported pain (54%), and low back pain was the main prevalent condition (46%). Multiple logistic regression analysis showed an association between previous injuries while playing footvolley (OR= 1.56; 95% CI: 1.08-2.25; P= 0.017), being a practitioner of the master category (OR= 8.68; 95% CI: 1.01–74.44; P= 0.049) and the prevalence of pain. Also, it was found that the age group between 18 and 22 years (OR= 0.41; 95% CI: 0.19-0.88; P= 0.023) was a protective factor.
CONCLUSION: Low back pain was prevalent in footvolley players. Players with previous injuries and those in the master category were more likely to report pain. Being aged between 18 and 22 was a protective factor against pain compared to being over 43.
KEYWORDS: Musculoskeletal pain, Epidemiology, Sport, Footvolley, Sports medicine, Trauma in athletes.

RESUMO

JUSTIFICATIVA E OBJETIVOS: O futevôlei é um esporte novo que vem ganhando popularidade no Brasil. Vários fatores contribuem para a escassa literatura sobre o esporte, como a popularização recente, a prática ainda crescente no âmbito internacional e o baixo incentivo financeiro. O objetivo deste estudo foi analisar a prevalência de dores musculoesqueléticas e fatores associados em jogadores de futevôlei no Brasil.
MÉTODOS: Trata-se de um estudo observacional transversal realizado com 629 jogadores de futevôlei por meio de um formulário online. Foram coletados dados sociodemográficos, antropométricos, tempo de prática, fatores psicossociais e intensidade da dor.
RESULTADOS: Dos 629 indivíduos, 450 (71%) eram do sexo masculino. Mais da metade da amostra, n=368 (58%), relatou ter se lesionado durante partidas de futevôlei, sendo a região lombar (41%) a mais afetada. A maioria dos jogadores de futevôlei relatou dor (54%), sendo a dor lombar a principal condição prevalente (46%). A análise de regressão logística múltipla mostrou associação entre lesões prévias ao jogar futevôlei (OR= 1,56; IC 95%: 1,08-2,25; p= 0,017), ser praticante da categoria master (OR= 8,68; IC 95%: 1,01-74,44); p= 0,049) e a prevalência de dor. Além disso, constatou-se que a faixa etária entre 18 e 22 anos (OR= 0,41; IC 95%: 0,19-0,88; p= 0,023) foi um fator de proteção.
CONCLUSÃO: A dor lombar foi prevalente em jogadores de futevôlei. Jogadores com lesões anteriores e da categoria master tiveram maior probabilidade de relatar dor. Ter idade entre 18 e 22 anos foi um fator de proteção contra a dor em comparação com ter mais de 43 anos.
DESCRITORES: Dor musculoesquelética, Epidemiologia, Esporte, Futevôlei, Medicina esportiva, Traumatismos em atletas.

HIGHLIGHTS

- Low back pain is prevalent in footvolley players
- Players with previous injuries and in the master category were more likely to report pain
- Being aged between 18 and 22 years was a protection factor to pain compared with being over 43 years

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INTRODUCTION

Footvolley is a sport that originated in the 1960s and became popular worldwide. In the last years new rules, professional athletes, and official competitions have emerged[1]. Footvolley has similar rules to beach volleyball. However, contact between the upper limbs and the ball is not allowed[2]. Benefits have been attributed to footvolley practice, such as socialization, stress management, body flexibility, and muscle strengthening[3]. Footvolley is played on the sand, and footvolley players are exposed to lower limb overload[4,5]. Any sports modality presents injury risk. However, factors such as being overweight and mechanical overload are relevant[1]. Another important factor associated with musculoskeletal injuries is the sports training load. The longer the exposure time, the greater the risk[6].

Musculoskeletal pain is a health condition that can affect joints, muscles and tendons and is prevalent in many sports, leading to a decrease in performance[7,8]. Severe pain generates critical disabilities in the domains of activities and participation, according to the International Classification of Functioning, Disability and Health, leading to absenteeism from training and sports practice interruption[9,10]. Psychosocial factors, such as fear and avoidance and kinesiophobia, have been associated with pain, especially chronic pain, but there is still a need to investigate the association between pain and psychosocial factors[11]. Studies involving soccer players have shown that psychosocial factors can increase injury risk, injury recurrence or delay in sports returning[12-14].

Limited literature on footvolley can be explained by recent modality popularization and low financial incentives. Few studies have investigated the prevalence of musculoskeletal pain, and an inadequate sample size was observed. Moreover, these studies did not report the prevalence of pain considering the body segments[1,15]. This study aimed to investigate the prevalence of musculoskeletal pain and associated psychosocial factors in footvolley players.

METHODS

Study design

This cross-sectional study was approved by the Ethical Board Committee of the Augusto Motta University Center (Centro Universitário Augusto Motta - CAAE: 39430720.7.0000.5235). This study was reported according to the recommendations of The Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) Statement[16].

Participants

Footvolley players (women and men) were recruited via social media and word of mouth. Data was collected from January 2021 to July 2021 by an online survey created on the Google Form platform˙. The following inclusion criteria were adopted: age between 18 and 60 years old and practicing footvolley at any level. Participants were excluded from the study if they were not Brazilians or could not fill out the form due to physical or mental conditions.

Instruments and measures

Participants were invited to answer a survey of demographic, health-related data, and information about their practice using an online form. The questionnaire, prepared in the Google Form platform, was filled out by the participant, and sent via email, cell phone, or social media in organic dissemination through a link made available to professional athletes, training center teachers, and recreational practitioners of footvolley. The survey of the practitioner's gender, age, and level (beginner, amateur, professional, master) made up the introductory part of the self-completion questionnaire. Anthropometric data such as weight and height were also obtained by self-report.

For the prevalence and classification of musculoskeletal pain, participants answered the following question: "Do you feel any pain today?" with two possible answers: "Yes" or "No". Concerning the affected region, there were eleven answers, and the participant could choose more than one answer (none, foot or ankle, calf, knee, thigh, hip, groin, lumbar spine, cervical spine, shoulder and head). Pain intensity was assessed using the Numerical Rating Scale (NRS). This scale has the advantage of facilitating the subject's understanding and, therefore, the choice of the appropriate response[17].

The volunteers answered the following question, "How intense was your last pain?", and responded on a scale from zero to 10, where (0) is no pain, and (10) the worst pain ever felt.

The assessment of pain-related psychosocial factors was performed through 9 questions extracted from two questionnaires[18,19], to assess the existence of these components in footvolley players, covering: the presence of anxiety symptoms - "Do you feel anxious?"; social isolation - "Do you feel socially isolated?"; catastrophizing - "When I feel pain, it's terrible and I feel it will never get better." and "When I feel pain, I feel like I can't take it anymore."; depression - "In the past month were you frequently bothered by having little interest or pleasure in doing things?"; kinesiophobia - "Physical activity can harm my body." and "I shouldn't do physical activities that could make my pain worse."; stress - "Do you feel stressed?"; and sleep quality - "Did you have trouble sleeping in the last month?". Each question can be assigned a response between 0 and 10. The value 0 (zero) represents "no, not at all/I never do that/I completely disagree," gradually increasing to 10 (ten), which means "quite a lot/I always do this/I completely agree". Only the question regarding sleep quality had 4 response options: "None, A little, Some, or Serious".

Sample size

The sample was designed through sample size calculation using the Epi InfoTM version 7.2 program to calculate the sample size, with a confidence interval of 95%. Due to the lack of epidemiological studies that indicate the approximate number of footvolley practitioners throughout the national territory, there is an estimate of a population of 100,000 practitioners throughout

the Brazilian territory, thus requiring a representative sample of 383 participants.

Statistical analysis

The sample characteristics were described through absolute values, proportions, means, and standard deviations. Logistic regression models were used to verify the association between the independent variables and the prevalence of musculoskeletal pain (dependent variable). Potential associated factors (age, gender, height, weight, time of practice, weekly frequency, performance level, depression, sleep quality, social isolation, stress, and if you have been injured playing) with p<0.2 in the univariate analysis were also included in the multiple logistic regression models. The significant level adopted in the study was 95%. All analyses were performed in RStudio version 0.99.486.

RESULTS

The sample consisted of 629 participants, 71% (n=450) male. The age group with the highest number of practitioners, 27% (n=168), was between 28-32 years. Other characteristics presented were the time of sports practice, in which a large part had less than 6 months (36%, n=226), followed by more than 3 years (30%, n=188). About the weekly practice, 31% (n=193) played 3 times a week, and 52% (n=330) considered themselves at the intermediate level. The dominant limb side of most participants was the right side (86%, n=544 - Table 1).

Regarding injury prevalence, (58%, n=368) reported having been injured while playing, being the lumbar region (41%, n=150), foot and ankle (32%, n=117), knee (29%, n=108) and groin (28%, n=103) the most affected ones. During form filling, 54% (n=341) of the individuals complained of at least some pain, with the lower back (46%, n=156) being the most prevalent, followed by the foot and ankle (18%, n=61) and the neck (13%, n=46). The mean of pain intensity was 4.37 ± 1.82. The majority of these practitioners with pain sought a health professional (63%, n=215) and stopped playing footvolley for some period (62%, n=213). The mean of anxiety was 4.72 ± 3.21, and of stress was 3.72 ± 2.91. Of the total, 56% (n=353) have reported at least some difficulty with sleep (Table 2).

The multiple logistic regression analysis showed an increase in the chance of reporting pain by those who had previous injuries - they had already been injured while playing – (OR= 1.56; CI 95%: 1.08–2.25; p=0.017) as well as practitioners of the master level (OR= 8.68; 95% CI: 1.01–74.44; p=0.049) and a protection factor for the age group between 18 and 22 years (OR= 0.41; CI 95%: 0.19–0.88; p=0.023) when compared to practitioners older than 43 years (Table 3).

DISCUSSION

The main findings indicated that most participants had experienced injuries while playing footvolley. The lower back, foot and ankle, knee, and groin were the main anatomical regions

Table 1. Demographic characteristics of the participants.

Variables	Values
Gender, male, n (%)	450 (71.5)
Age, n (%)	
18-22 years old	105 (16.69)
23-27 years old	107 (17.02)
28-32 years old	168 (26.71)
33-37 years old	108 (17.17)
38-42 years old	70 (11.12)
>43 years old	71 (11.29)
Height (cm)	173.25 (8.97)
Weight (kg)	75.67 (13.75)
Practice time, n (%)	
< 6 months	226 (35.93)
6 months – 1 year	72 (11.45)
1-2 years	86 (13.67)
2-3 years	57 (9.07)
> 3 years	188 (29.88)
Right-handed dominance, n (%)	544 (86.48)
Weekly attendance, n (%)	
< 1 day	13 (2.07)
1 day	26 (4.13)
2 days	165 (26.23)
3 days	193 (30.69)
4 days	129 (20.51)
5 days	62 (9.85)
6 days	23 (3.65)
7 days	18 (2.87)
Level, n (%)	
Beginner	267 (42.44)
Intermediate	330 (52.46)
Master	15 (2.39)
Professional	17 (2.71)
Other sports participation, n (%)	474 (75.35)

Continuous variables are presented as mean (standard deviation) and categorical variables in absolute values (percentage); cm = centimeters; kg = kilograms.

affected. A substantial proportion of participants reported experiencing pain, with the lower back being the most affected body region. Furthermore, it was also observed that pain-related issues temporarily led footvolley players to discontinue training routines. Additionally, this research revealed that participants with a history of previous injuries and being in the master category were more likely to report pain. At the same time, younger age was a protective factor.

Table 2. Prevalence of musculoskeletal pain and associated factors.

Variables	Values
Got hurt playing, yes, n (%)*	368 (58.5)
Foot and ankle	117 (31.79)
Calf	26 (7.06)
Knee	108 (29.34)
Thigh	64 (17.39)
Groin	103 (27.98)
Hip	34 (9.23)
Lower back	150 (40.76)
Shoulder	18 (4.89)
Neck	50 (13.58)
Head	12 (3.26)
Pain prevalence, n (%)	341 (54.21)
Pain intensity, mean (standard deviation)**	4.37 (1.82)
Sought healthcare professional, n (%)**	215 (63.04)
Missed practice because of the pain, n (%)**	213 (62.46)
Body locations with pain, n (%)	
None	252 (40.07)
1	254 (40.39)
2	89 (14.15)
3	28 (4.46)
4	2 (0.31)
5	3 (0.47)
6	1 (0.15)
Pain location, n (%)**	
Foot and ankle	61 (17.88)
Calf	28 (8.21)
Knee	133 (39)
Thigh	30 (8.79)
Groin	35 (10.26)
Hip	36 (10.55)
Lower back	156 (45.74)
Shoulder	19 (5.57)
Neck	46 (13.48)
Head	1 (0.29)
Psychosocial factors, mean (standard deviation)	
Anxiety	4.72 (3.21)
Social Isolation	1.49 (2.4)
Catastrophization**	2.67 (2.54)
Depression	2.12 (2.69)
Kinesiophobia**	2.84 (2.55)
Stress (0-10)	3.72 (2.91)
Sleep disorder, n (%)	
None	276 (43.88)
Little	256 (40.69)
Some	82 (13.04)
Serious	15 (2.39)

Continuous variables are presented as mean (standard deviation) and categorical variables in absolute values (percentage); *Data calculated with total n=368 (referred to getting injured while playing); **Data calculated with total n=341 (referred to have pain).

This study presented the largest sample size among prevalence pain studies in footvolley players. Most studies with smaller sample sizes had different objectives[1,2,15,20,21]. Although online data collection may facilitate access to a larger number of people, it can also limit the process of solving doubts while filling out the questionnaire, which may be a limitation of this study. There was a low number of responses from professional athletes, despite the efforts made to request the leagues for participation of professional athlete groups and active search for the main footvolley players via social media. Pain prevalence could be influenced by participants' sports participation. Most of the participants were enrolled in sports other than footvolley.

Age and player level seem to be relevant among footvolley players. Low age was a protective factor for musculoskeletal pain. Also, footvolley players from the master level were more likely to present musculoskeletal pain. In older adults, somatosensory thresholds for non-noxious stimuli increased, while pressure pain thresholds decreased[22]. Furthermore, age differences in exercise-induced hypoalgesia emerged after both isometric and aerobic exercise, with younger adults experiencing greater pain relief compared to older adults, suggesting that the response to exercise-induced pain may also be modulated by age[23].

Only two studies investigated the prevalence of pain or injuries in footvolley players[1,15]. One study, which included 26 footvolley players to identify the injuries prevalence, found the knee and the lower back as the two main affected areas, corroborating in parts with the findings of the present study[15]. Another study showed that 39% reported having suffered injury during footvolley practice, as compared to this study, where 58% of participants reported being injured[1]. When the results of the two studies was compared with the results of this research, was observed that the lower back and knees were the most prevalent locations of pain[21].

The most prevalent pain region in the individuals who participated in the present study was the lower back (46%), representing a very high percentage of the sample. Secondly, foot and ankle (18%) demonstrated a large discrepancy in the prevalence of pain in the reported regions. However, the onset of pain experienced by this study subject was not necessarily during sports practice. A recent systematic review sought to study the prevalence of low back pain in sports practitioners, demonstrating that this condition is persistent in several sports, but the prevalence can vary greatly depending on the sport practiced, requiring even more studies with the same focus on some specific divisions of each sport[24]. In addition, the lower back was the most prevalent body region (41%) in relation to the history of injuries, being an important risk factor for new episodes of low back pain[25].

Other factors that may be related to low back pain are stress and anxiety[26]. The sample of this research had moderate anxiety and stress scores, although no association was found between the presence of musculoskeletal pain and these variables. More than half of the participants reported sleep disorder (56%), ranging from mild to severe problems[27,28], however, sleep disorders were not associated with a higher prevalence.

Conducting longitudinal studies to investigate the incidence of musculoskeletal pain and risk factors in footvolley is necessary. A research field emerges from the present study considering the footvolley popularity and lack of information from sports professionals.

Table 3. Association between musculoskeletal pain and associated factors.

	OR adjusted	CI 95%	p-value
Gender (Female)	0.81	0.47-1.38	0.434
Age (years)			
18-22	0.42	0.19-0.89	0.023*
23-27	0.97	0.49-1.95	0.942
28-32	0.70	0.37-1.33	0.282
33-37	0.63	0.32-1.25	0.188
38-42	1.33	0.63-2.81	0.460
Height	1.00	0.98-1.03	0.809
Weight	1.01	0.99-1.03	0.115
Practice time			
< 6 months	0.90	0.50-1.63	0.736
6 months-1 year	1.03	0.52-2.03	0.938
2-3 years	0.69	0.33-1.44	0.318
> 3 years	0.63	0.35-1.14	0.125
Weekly attendance (days)			
1	1.60	0.38-6.63	0.519
2	0.80	0.33-1.96	0.630
3	1.58	0.65-3.81	0.310
4	1.53	0.62-3.79	0.357
5	1.26	0.47-3.38	0.645
6	2.91	0.82-10.28	0.098
7	1.60	0.38-6.63	0.519
Level			
Intermediate	1.31	0.83-2.05	0.247
Professional	1.05	0.33-3.32	0.935
Master	8.68	1.01-74.44	0.049*
Psychosocial factors			
Social Isolation	1.03	0.95-1.12	0.480
Depression	1.05	0.97-1.13	0.197
Stress	1.07	0.99-1.14	0.076
Trouble sleeping			
None	0.82	0.45-1.50	0.517
A little	0.74	0.41-1.32	0.312
Serious	2.91	0.71-11.97	0.138
Got hurt playing	1.56	1.08-2.25	0.017*

OR = Odds ratio; CI = Confidence interval; *p<0.05.

Limitations of this study

The main limitation regarding the prevalence of pain in footvolley practice is the fact that this assessment was investigated based on participants' self-reports. Most participants (75%) practiced other sports besides footvolley. Therefore, it is possible that some reported pain, although exacerbated during footvolley, may have originated in other activities. The results of this study should be interpreted with caution, since data collection was based on an instrument that was not fully validated.

CONCLUSION

Low back pain is prevalent in footvolley players. Players with previous injuries and in the master category were more likely to report pain. Being aged between 18 and 22 years was a protection factor to pain compared with being over 43 years.

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