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The barriers perceived by Chilean athletes with disability at different social ecological levels

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People with disabilities face various barriers that hinder or prevent access to physical activity, impacting their quality of health and life. This study aimed to examine the barriers to physical activity experienced by Chilean athletes with disability. The sample consisted of 35 Chilean athletes with disability. The participants answered the Physical Activity Questionnaire for People with Mobility Impairments (BPAQ-MI) to assess perceptions of social ecological subdivided into four levels. Sex, the type of sport practice, the region where live, the type of disability, and the physical disability were considered. The organizational level was the main barrier according to the ecological level, with the lack of adaptation of outdoor spaces and the lack of information or inclusive advertising in the sports center being the main barriers identified. An effect of the type of disability on the social ecological barriers was observed, with differences between the non-wheelchair user and wheelchair user groups. The organizational and community context were the main perceived barriers. Thus, it is considered relevant to generate actions for specific interventions in order to promote the practice of physical activity and reduce the main barriers identified in the different contexts within the community.

Keywords Social barriers, Social participation, Physical disability, Adapted sports

According to the latest survey carried out by the Ministry of Social Development of Chile, 16.7% of the population between 2 years of age and older are disabled, totaling close to 3 million people[1]. In the adult population with a disability, 30.1% presented a perception of poor or very poor health status and only 14% of the population aged 13 years or older declared themselves to be physically active[1].

Physical inactivity is considered one of the main mortality risks in the world[2]. According to the new guidelines proposed by the World Health Organization[2]people with disabilities should perform at least between 75 and 150 min/week of vigorous physical activity (PA) or 150 and 300 min/week of moderate PA, composed of aerobic activities, muscle strengthening (at least 2 times a week) and/or multicomponent PA, to consider yourself physically active and avoid risks associated with diseases caused by a sedentary lifestyle[2].

The disability situation, on many occasions, ends up favoring a sedentary lifestyle, due to specific factors of each disability[3]– [4]related to access to physical exercise spaces, programs and motivational factors. As a result of this lifestyle, these people tend to have increased body fat and cholesterol, promoting the risk of heart and

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obesity-related diseases[5]. The literature indicates benefits of PA such as better cardiorespiratory fitness, decreased risk factors for heart disease, increased strength levels, greater respiratory muscle functionality, and improved psychological, cognitive, and social functions[6–10].

However, people with disabilities face various barriers that make it difficult or prevent them from accessing physical exercise programs, including the social barriers that directly imply the practice of PA and, in turn, the quality of health and life. McDermott et al.[11] describe that the barriers presented by young people with disabilities are the lack of opportunities that are truly accessible and inclusive. For Sidiropoulos et al.[12] people with disabilities face numerous barriers to participating in adapted sports, such as accessibility, transportation, awareness, finances, and the characteristics of physical and/or cognitive deficiencies. In another study, the physical environment was the main barrier to participation in PA for people with physical disabilities[13].

The barriers to access to physical exercise are different and are determined by different locations and populations. The diagnosis of the main structures that hinder access to PA and/or sports opportunities are relevant aspects to promote facilitating actions through the development of public policies. In this sense, Vasudevan, Rimmer & Kviz[14] developed an instrument to identify the main barriers perceived by this group based on social ecological theory, known as Physical Activity Questionnaire for People with Mobility Impairments (BPAQ-MI). Years later, Úbeda-Colomer, Pérez-Samaniego & Devís-Devís[15] proposed the reduced and validated version for the Spanish language. The questionnaire mentions four social dimensions, being: (i) Intrapersonal Dimension that refers to individual factors and motivation, (ii) Interpersonal Dimension that focuses on the attitude of friends and family or colleagues, (iii) Organizational Dimension that refers to the aspects of the infrastructure of spaces for the practice of PA and, the fourth level (iv) Community Dimension that highlights factors related to urban violence and public transportation[14,16–18].

Hansen et al.[16] applied the questionnaire to wheelchair users and found that interpersonal and community barriers were the most prevalent, organizational and community barriers were the most severe, and that health-related barriers were inversely related to the level of mobility PA.

Úbeda-Colomer et al.[19] used the questionnaire with university students with disabilities with different socio-ecological levels, where they found that the most important barriers were intrapersonal (e.g. fatigue, pain, lack of motivation), followed by organizational ones (e.g. lack of adapted programs, economic cost). At an interpersonal level, the inactivity of friends and family were the main barriers. Potholes in streets or other public spaces were found to be the most important barriers at the community level. Significant differences were found in the barriers by sex, age, degree of disability, acquired congenital disability and type of disability. The groups most affected by the barriers were, in general, those with multiple disabilities and a higher degree of disability.

Eliminating the barriers perceived by people with disabilities must be prioritized in public policies in different countries, factors that will influence a better quality of life and social participation. Due to the above, the objective of the present study was to measure the barriers to PA experienced by Chilean athletes with disability comparing sex, the sport they practice and type of disability. The relevance of the study focuses on identifying the main barriers that hinder the practice of PA, as well as providing valuable information for specific interventions with the aim of promoting the practice of PA of this group, in different contexts within the community.

Methods

Sample

The sample was intentional and non-probabilistic. It consisted of 35 Chilean athletes with disabilities (both male and female), with a mean age of 26.0 ± 10.5 years, who competed in the 2021 Para Araucanía Games held in Temuco, Chile. All athletes trained for 60 min per session. A total of 54 athletes participated in the tournament in the Para athletics and Para swimming categories. Of these, five athletes with intellectual disabilities were excluded due to the absence of a confirmed diagnosis and/or the unavailability of their legal representatives to provide consent for study participation. In Chile, a legal representative for a person with an intellectual disability is responsible for making legal, administrative, and care-related decisions, as regulated by the Civil Code and Law 21.120. Additionally, 14 athletes were excluded for not meeting one or more of the following inclusion criteria: (a) participation as for athletes in the Para Araucanía 2021 Games, (b) present physical or visual disability, (c) completely fill out the online questionnaire (Google Forms) and (d) have the study participation consent form signed (via Google Forms) in accordance with the Declaration of Helsinki, authorizing the use of the data for research purposes. The study was developed based on the premises of the Declaration of Helsinki (2013), being approved by the Bioethics Committee of the University of [blinded for review].

All participants will receive informed consent through the Google Forms electronic platform. For this, participants should indicate "yes" to authorize the use of data for academic-scientific purposes, their understanding of the research procedures and objectives. The absolute and percentage values of the sample according to sex, sport played, type of disability, Chilean regions represented and weekly training frequency, are described in Table 1.

Procedures

During the event, two researchers contacted the heads of the delegations, requesting authorization to invite the Chilean athletes with disability to participate in the study. The athletes with disability were informed about the procedures for data collection and were designated on days and times against shifts or after their participation in the competition.

In order to promote greater comfort, concentration and focus during data collection (filling out the questionnaire), an isolated room was used in the same lodging facility as the Chilean athletes with disability. Before starting the questionnaire, the athletes with disability were again informed of the procedures and instructed to communicate with the researcher present in the room without him being able to interfere or

Variables	*N*	%
Sex		
Men	20	57.1
Woman	15	42.9
Type of para sports		
Para athletics	24	68.6
Para swimming	11	31.4
Disability type		
Non-Wheelchair Users (NWU)	22	62.9
Wheelchair Users (WU)	9	25.7
Visual Impairment*	4	11.4
Regions of Chile		
Araucanía	5	14.3
Bío-Bío	8	22.9
Los Lagos	5	14.3
Los Ríos	4	11.4
Magallanes	6	17.1
Ñuble	7	20.0
Weekly training frequency		
Twice/week	3	8.6
Three times/week	27	77.1
Five times/week	5	14.3

Table 1. Demographic variables of the participants. *NWU* non-wheelchair user, *WU* wheelchair user. *Two para athletes with ophthalmological sports classification B1, one B2 and one B3.

influence any response. The questionnaire was developed on the Google Forms platform and participants could respond from their available notebook or personal cell phone.

Demographic variables

First, the sex of the Chilean athletes with disability, their age, the type of sport they practice, the region where they live, the type of disability (physical or visual), and weekly training frequency were consulted. In relation to physical disability, the participants were questioned regarding whether or not they used a wheelchair for their daily transportation.

BPAQ-MI questionnaire

With the objective of measuring the barriers to PA experienced by Chilean athletes with disability, the reduced version in Spanish of the questionnaire BPAQ-MI, originally developed by Vasudevan, Rimmer & Kviz[14]. The reduced version proposed by Úbeda-Colomer, Pérez-Samaniego & Devís-Devís[15] was adapted and validated for the Spanish context using a sample of 791 Spanish university students with different types of disabilities. The confirmatory factor analysis presented good fit indices (Comparative Fit Index = 0.97, Root Mean Square Error of Approximation = 0.064, Confidence Interval 90%=0.061-0.067) and excellent internal consistency determined by Cronbach's alpha. ($\alpha = 0.920$). The BPAQ-MI reduced version in Spanish presents 30 items, subdivided into four levels of the social ecological model proposed by the corresponding theory (intrapersonal = 7 items, interpersonal = 7 items, organizational = 8 items, community = 7 items) that measure the barriers in a balanced way (Table 2). For each item (question), a perception measure is presented based on the Likert scale, rated between 0 ("It has not been a barrier for me") to 4 ("It has been a very important barrier for me"). From the results generated by the study participants, the average value for each social level of the ecological model (total sum of two items/number of items) and the total average value (total sum of two items/number of items) were calculated.

The present study did not develop cultural adaptations. The reduced and Spanish-translated version of the questionnaire by Úbeda-Colomer, Pérez-Samaniego & Devís-Devís[15] was deemed appropriate and relevant for the Spanish-speaking and Latin American sociocultural context. As part of this process, items with low percentages and minimal impact on the factors considered during the original instrument's validation were removed. Additionally, items that did not align with the context of most Spanish-speaking countries, due to sociocultural differences, were either replaced or eliminated. Given these sociocultural differences and the potential impact of the reduction on the balance between the original instrument's eight factors, it was decided to focus only on the four levels of the socioecological model as theoretical factors. It is important to note that the instrument was reviewed by a multidisciplinary committee of experts in various fields, including psychology, sports sciences, and scale validation, all of whom were proficient in both English and Spanish.

	X	SD	MED	IQR
Intrapersonal	1.05	1.27	0.00	2.00
Were you tired or fatigued?	1.20	1.28	1.00	2.00
Did you have pain?	1.06	1.21	1.00	2.00
Did you have little free time?	1.77	1.48	2.00	3.00
Were you afraid of getting injured while practicing physical-sports activity?	0.94	1.21	0.00	2.00
Lack of motivation to practice physical-sports activity?	1.00	1.21	1.00	1.75
Lack of confidence in your ability to practice physical-sports activity?	0.80	1.08	0.00	2.00
Are you worried about your physical appearance while practicing physical-sports activity?	1.20	1.43	1.00	2.75
Don't you see a reason to stay physically active?	0.40	0.81	0.00	0.00
Interpersonal	0.87	1.40	0.00	1.00
Didn't your friends help you stay physically active?	0.69	1.25	0.00	1.00
Your friends are not physically active?	1.17	1.40	1.00	2.00
Did your friends not encourage/support your efforts to stay physically active?	0.74	1.36	0.00	1.00
Didn't your family help you stay physically active?	0.74	1.34	0.00	1.00
Are your family members not physically active?	1.46	1.67	0.00	3.00
Did your family not encourage or support your efforts to stay physically active?	0.71	1.43	0.00	0.75
Did your family not believe that physical-sports activity could be useful to improve your health?	0.60	1.22	0.00	0.75
Organizational	1.56	1.58	1.00	3.00
Lack of adapted sports equipment/material in the sports center	1.49	1.46	1.00	2.75
Lack of accessible bathrooms/showers/changing rooms in the sports center	1.69	1.62	1.00	3.00
Lack of adaptation of the facilities (hallways, doors, elevators, etc.)	1.46	1.75	0.00	4.00
It represents a very high economic cost	1.37	1.46	1.00	2.75
Lack of inclusive advertising in the sports center	1.80	1.57	2.00	3.00
Lack of adapted sports programs or activities in the sports center	1.57	1.60	1.00	3.00
Lack of adaptation in outdoor spaces (parks, paths, etc.)	2.06	1.66	2.00	4.00
Lack of help or training from sports center staff	1.09	1.46	0.00	1.75
Community	1.27	1.52	1.00	2.00
Sidewalks are not accessible (lack of ramps, potholes, too narrow, etc.)	1.46	1.72	0.00	3.00
Streets, paths or parking lots have potholes	1.63	1.57	2.00	3.00
Pedestrian crossings do not have traffic lights or are not adapted	1.14	1.52	0.00	2.00
Lack of adapted means of transport to go to the sports center	1.63	1.73	1.00	4.00
Lack of support staff to help you and accompany you to the sports center	0.86	1.26	0.00	1.75
Your city traffic is dangerous for you	1.11	1.28	1.00	2.00
Crosswalk traffic lights turn red very quickly	1.09	1.46	1.00	1.00
Total barriers	1.20	1.47	0.00	2.00

Table 2. Descriptive statistics for each barrier according to the social ecological level. *X* mean, *SD* standard deviation, *MED* median, *IQR* interquartile range.

Statistical analysis

The data were presented as mean (X), standard deviation (SD), median and interquartile range (IQR). The Shapiro-Wilk and Levene test was used to verify the distribution and homogeneity of the data.

For comparisons between sex and the type of sport practiced, the Mann-Whitney U test was used. The effect size r was used for intragroup comparisons between sex and sport practiced. This index is indicated for non-parametric comparisons between two independent groups[20]. The r value is obtained by: $r = \frac{z}{\sqrt{N}}$, where z is the Mann-Whitney test index and N is the sum of the members of the analyzed groups. The interpretation of the r was: ≤0.09 trivial; ≥0.10 small; ≥0.30 moderate and ≥0.50 large[20]. To compare the groups according to the type of disability, the Kruskal-Wallis test was used with the posthoc comparison between pairs. The effect size was calculated using the ordinal eta-squared index (η2[h]). This index is indicated for non-parametric comparisons between k independent groups[21] through the equation: $\eta\, 2\,[\mathrm{h}] = \frac{\mathrm{H}-\mathrm{K}+1}{\mathrm{N}-\mathrm{K}}$, where H is the Kruskal-Wallis statistical value. K represents the number of groups and N is the total sample sum. The interpretation of η2[h] was: ≥0.01 small; ≥0.06 moderate and ≥0.14 large[22]. The classification of the results for the internal consistency (Cronbach's alpha) of the scale in general and according to the moments was based on what was proposed by Cronbach (1951): α≥0.90 excellent; ≤0.89 to ≥0.80 good; ≤0.79 to ≥0.70 acceptable; ≤0.69 to ≥0.60 questionable; ≤0.59 to ≥0.50 poor and ≤0.49 unacceptable. Relationships between social ecological levels were assessed using Spearman correlation. The following magnitude scale was used to evaluate the correlation coefficients: ≤0.09 trivial; ≥0.10 and ≤0.29 small; ≥0.30 and ≤0.49 moderate; ≥0.50 and ≤0.69 strong; ≥0.70 and ≤0.89 very strong; ≥0.90 almost perfect.

Factor	Intrapersonal	Interpersonal	Organizational	Community
Intrapersonal	1			
Interpersonal	0.39*	1		
Organizational	0.67**	0.36*	1	
Community	0.39*	0.32*	0.66**	1

Table 3. Correlations between of different social ecological levels. Rho Spearman values. *$p < .05$ and **$p \leq .01$.

	Sex					Para-sport				
Variables	W ($n = 15$)	M ($n = 20$)	U	p	ES (r)	PA ($n = 24$)	PS ($n = 11$)	U	p	ES (r)
Intrapersonal	0.87(1.00)	1.12(0.84)	97.5	0.080	0.30	0.87(0.75)	1.12(1.13)	120.0	0.687	0.08
Interpersonal	0.14(0.57)	0.71(1.68)	95.0	0.069	0.31	0.43(1.21)	0.14(1.86)	126.0	0.847	0.04
Organizational	0.75(2.63)	1.50(2.28)	120.0	0.330	0.17	1.00(2.09)	1.62(2.75)	124.5	0.793	0.05
Community	0.14(2.14)	1.42(2.29)	132.0	0.564	0.10	1.35(2.29)	1.43(2.29)	125.5	0.820	0.04
Total	0.76(1.50)	1.23(1.03)	102.0	0.114	0.27	0.99(1.19)	1.12(1.58)	127.0	0.875	0.13

Table 4. Comparison (median [IRQ]) of barriers according to the social ecological level between sex and type of sport. *W* woman, *M* men, *PA* para athletic, *PS* para swimming, *U* Mann–Whitney U test, *ES* effect size, *$p < .05$.

	PD					
Variables	NWU ($n = 20$)	WU ($n = 9$)	VI ($n = 6$)	H-Kruskal-Wallis	p	η^2[h]
Intrapersonal	0.75(1.00)	1.37(0.75)	1.87(1.69)	10.18	**0.006**	0.26
Interpersonal	0.50(1.39)	0.29(0.50)	1.43(3.00)	1.21	0.547	0.02
Organizational	0.75(1.38)	2.00(2.69)	2.12(2.63)	6.17	**0.046**	0.13
Community	1.14(1.96)	2.71(3.00)	1.29(0.71)	1.42	0.492	0.02
Total	0.88(1.19)	1.82(1.15)	1.70(1.63)	4.58	0.101	0.08

Table 5. Comparison (median [IRQ]) of barriers according to the social ecological level between visual disability and physical disability wheelchair users and non-users. *PD* physical disability, *NWU* non-wheelchair user, *WU* wheelchair user, *VD* visual impairment.

Data analyzes were performed using Excel (Microsoft Excel, version 16.58 for Mac) and the Statistical Package for Social Sciences, v.25 (version SPSS Inc., IBM Corp., Armonk, New York, NY, USA). The adopted significance level was $p < .05$.

Results

The internal consistency of the scale in general was excellent ($\alpha = 0.91$). as well as for the interpersonal ($\alpha = 0.91$) and organizational ($\alpha = 0.90$) social levels. For the intrapersonal and community levels the consistency was good, being $\alpha = 0.83$ and $\alpha = 0.87$, respectively.

The results of the descriptive statistics for each barrier and for the four social ecological levels calculated are presented in Table 2. Significant moderate and strong positive correlations were also found between the social ecological levels (Table 3).

The results showed that the organizational level was the main barrier according to the ecological level, with the lack of adaptation of outdoor spaces and the lack of information or inclusive advertising in the sports center being the main barriers identified. The community level was the second most important level, with the lack of adapted transportation for travel and potholes in the streets, roads or parking lots being the main barriers mentioned. In third place was the intrapersonal level, for reasons of little free time available, concern about physical appearance while practicing physical-sports activity and feeling tired and/or fatigued and, at the interpersonal level, it was mainly mentioned that the main barriers. They are due to the fact that family members and/or friends are not physically active (Table 3).

No significant differences were observed ($p < .05$) for social ecological barriers, total and different levels, between sex and type of sport practiced. The effect sizes were classified between small and moderate between sex and trivial and small for comparisons between the type of sport practiced (Table 4).

An effect of the type of disability on social ecological barriers was observed. The results pointed out differences for the Intrapersonal level [$H(2) = 10.10$; $p = .006$; $\eta 2[h] = 0.26$; ¨large¨] with differences between the non-wheelchair user (NWU) and the wheelchair user (WU) group ($p = .015$) and between NWU and visual disability (VD) ($p = .012$) and, at the Organizational level [$H(2) = 10.10$; $p = .046$; $\eta 2[h] = 0.14$; ¨large¨] with differences between the NWU and WU groups ($p = .033$) (Table 5).

Discussion

The aim of this study was to assess the perceived barriers to PA among Chilean athletes with disabilities, considering the variables of sex, type of sport, and type of disability in relation to the different levels of the socioecological model. This model incorporates multiple factors that influence behavior, including intrapersonal, interpersonal, organizational, and community levels. Such an approach provides a comprehensive understanding of the barriers faced and supports the development of effective strategies to promote adherence to PA, increase motivation, and reduce high levels of sedentary behavior within this population.

The main results of the study pointed to the organizational level as the main barrier according to the ecological level, with the lack of adaptation of outdoor spaces and the lack of information or inclusive advertising in the sports center being the main barriers identified, followed by the community level, such as the lack of transportation adapted for travel and potholes in the streets, roads or parking lots. In third place was the intrapersonal level for reasons of little free time available, concern about physical appearance while practicing physical-sports activity and feeling tired and/or fatigued and, lastly, the interpersonal level, in which the members of family and/or friends are not physically active.

The results differ from the study developed by Vasudevan[18]which examined a total of 150 people with physical disabilities and mobility limitations (use of cane, walker and wheelchair users), in which the main barrier occurs in the community level, where the obstacles are related to crime, excessive vehicle speed and the lack of accessibility of public transport to sports venues.

On the other hand, Úbeda-Colomer et al.[19]who evaluated 1,079 Spanish university students, identified that the intrapersonal level, with lack of knowledge of PA and demotivation, being the main barriers to participation. Secondly, the interpersonal level, where family and friends are not active or encourage the participation of students. Third place was for the organizational level, with the lack of accessible sports services being the main barrier, and finally the community level, where the lack of accessibility within the university limits the participation of people with disabilities.

Poonsiri et al.[23]who diagnosed the barriers perceived by 422 people with lower limb amputation, highlights how the greatest barrier was at the intrapersonal level, with lack of motivation, presence of pain, and feeling tired as the main obstacles to performing PA. Then, the organizational and community level is equally weighted as barriers to participation and the interpersonal level presented a low limitation for people who practice cycling.

In the study developed by Walker et al.[24] with seven adolescents with cerebral palsy and eight parents from the rural sector of the United States, the community and intrapersonal levels were observed as the main barriers, where the built environment, lack of accessibility, belief and attitudes towards PA were considered the main ones. obstacles, followed by the interpersonal level, where the family was not considered a promoting agent for carrying out PA.

In the work developed by Hansen et al.[16]which analyzed the barriers perceived by 181 wheelchair users, coincides with the results of our research, where the predominant level was the organizational level, with the main limitation being the lack of accessible equipment within the sports center, followed by the community level, finding barriers in the lack of access to bathrooms, the sidewalks were inaccessible to the community and the lighting did not allow attendance at night. In third place is the interpersonal level, where respondents mention that they felt tired or had no energy. At the last level is the interpersonal level, where the greatest limitation was the lack of interest or support from their family in relation to PA.

An important factor that must be considered for the interpretation of the information in the reviewed articles and their relationship with the present research is the difference between the people interviewed in each article, the above due to motivation, experience, nationality, lifestyle and type of disability. Therefore, it cannot be assumed that the barriers presented at the different levels of the ecological model are universal for all people with a disability. Therefore, it is recommended to carry out future studies that are related to the population covered in this research and to be able to compare the results of athletes in our country, considering their age range, type of disability and specific sport. Furthermore, it is important to evaluate the barriers perceived by people with disabilities to carry out PA, in order to propose and develop proposals that minimize the obstacles to participation or dropout.

Furthermore, it will be relevant to consider the results obtained to develop sports proposals that affect people's motivation, where they are informed and know the benefits of doing PA and/or practicing sports, involving their family and close friends in the activities. proposals to encourage the continuity of the person with disabilities in the execution of physical exercise, execute the proposals at times and spaces accessible to the beneficiaries in order to minimize organizational and community barriers.

No significant differences were observed when the type of sport (Para swimming vs. Para athletics) and sex (female vs. male) were compared, according to the social ecological levels. In the type of sport, the results were similar where community and organizational levels were the main barriers mentioned. Meanwhile, men presented as main barriers aspects associated with the organizational and community level and women, the intrapersonal and community level. The lack of significant differences in perceived barriers related to sex and sport type may be attributed to the homogeneity of experiences faced by athletes with disabilities, regardless of these variables. Structural challenges, such as lack of accessibility, limited organizational support, and social prejudices, may be common to all participants, diminishing the influence of gender or sport type. Furthermore, the type of disability may have a more substantial impact on perceived barriers, potentially overshadowing differences related to sex or the specific sport practiced.

In the study by Úbeda-Colomer et al.[25] significant differences in barriers were observed depending on sex. In men, the main barriers were associated with interpersonal and organizational levels, while in women they were intrapersonal and community barriers. The distinction of barriers between the sexes is considered relevant since it makes it possible to more specifically target interventions, opportunities and public policy actions, according to sex. These results differ from those of our study, which may be attributed to cultural and social differences

between the Spanish and Chilean contexts. These differences likely influence perceived barriers in distinct ways, shaped by varying gender norms, social expectations, and the sample composition and socio-cultural characteristics of the participants.

In relation to the type of disability, it was observed that athletes with disability with VD and WU presented higher and significant values for the barrier associated with the intrapersonal level compared to NWU. It was also observed that the WU presented superior results of perceived barriers at the organizational level in relation to the NWU. Regarding the first point, factors such as limited free time and aesthetic concerns, which are linked to the intrapersonal level, were highlighted. These challenges may stem from difficulties in time management due to additional daily demands and social pressures that affect self-esteem and body image perceptions. These findings underscore the need for targeted strategies that address psychological factors and personal organization, with the goal of increasing sports participation and adherence among these groups. At the organizational level, wheelchair users reported more significant barriers, such as the lack of accessible spaces and inadequate information and publicity, compared to non-wheelchair users. These findings emphasize the importance of architectural accessibility and more inclusive communication to broaden opportunities for sports participation. The absence of adapted facilities and universally designed information remains a major challenge, necessitating increased awareness and investment.

The results of this study demonstrate that perceived barriers vary depending on the type of disability, highlighting the need for tailored interventions. Programs that address psychosocial factors, such as self-esteem and time management, are essential to reduce intrapersonal barriers. At the same time, public policies and organizational actions should prioritize physical accessibility and inclusive communication. This integrated approach is crucial for the effective inclusion of athletes with disabilities in various sports and social contexts. Additionally, it is important to emphasize the relevance of the socioecological model, which considers the impact of both social and physical environments on individual behavior. This model provides insight into how different factors influence PA, supporting the development of strategies and initiatives that promote sports participation and PA.

Additionally, the results showed positive and significant correlations between the socioecological levels of perceived barriers, aligning with findings from previous studies that used the same model. This suggests that, as observed in different populations, intrapersonal, interpersonal, organizational, and community factors are interconnected and collectively influence the perception of barriers to PA. The significance of this analysis lies in identifying the interactions between these levels to better understand the challenges faced by athletes with disabilities, based on their socio-geographical context. It also highlights the interdependence of these factors in promoting inclusion and encouraging adherence to sports participation.

As a limitation of the study, the need for greater dissemination and promotion of the Para Araucanía games was observed for an expressive increase in the participation of athletes with disabilities and the possibility of presenting a representative sample of the population of athletes with disabilities in Chile. Also, it is worth mentioning that it was the first national competition held after the pandemic, and had to consider sports absences due to poor preparation, medical, health and logistical aspects of the participating regions. It is important to note that the pandemic context may have influenced the perception of barriers to PA, due to increased health concerns, changes in lifestyle habits, and the disruption of regular sports activities. Therefore, this information should be interpreted with caution. Although data collection was conducted in an isolated room to minimize external influences, we acknowledge that self-reported data is inherently susceptible to response bias. To address this, participants were assured of complete anonymity, and the confidentiality of their responses was emphasized before data collection. Additionally, clear and neutral instructions were provided to encourage honest and accurate reporting. Despite these measures, the possibility of social desirability or recall bias cannot be entirely ruled out, which represents a limitation of the present study. Finally, not finding research that is related to knowing the barriers perceived by people with disabilities, considering athletes, restricts relating the results obtained with those raised in the research, since these considered people who were not related to the systematic practice of PA or a sport, university students or people with a physical limitation.

As a strength of the study, this is the first work that sought to identify the barriers perceived by athletes to the practice of PA, which may direct and support future studies carried out in that context. Furthermore, it encourages the search for barriers to participation or practice of sports for a specific population, thus being able to design sports proposals for the community that eliminate these barriers.

Conclusion

This study aimed to identify the primary barriers limiting PA participation among athletes with disabilities in the central-southern region of Chile. The findings revealed that organizational and community-level barriers - such as limited institutional support, inadequate infrastructure, and social stigma - were the most commonly reported obstacles. These results are consistent with international evidence, suggesting that such barriers are not unique to the local context and may reflect broader structural challenges faced by athletes with disabilities worldwide.

Given the global relevance of these barriers, the findings may be generalizable to other geographic regions with similar socioeconomic and institutional conditions. They underscore the need for targeted interventions - such as inclusive public policies, partnerships with community organizations, and awareness campaigns - to create more supportive and accessible environments for athletes with disabilities.

Future research should expand to other regions within Chile and internationally, employing diverse methodologies to better understand how perceived barriers relate to PA participation. Such efforts will contribute to the development of more effective, context-sensitive strategies aimed at promoting equity and inclusion in sport.

Data availability

The data that support the findings of this study are available on request from the corresponding author.

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Author contributions

L.F.C.C.C., N.F., M.F. and L.G.T.F.S. contributed to the design of the research study. N.F and M.F. collected data. L.F.C.C.C., L.G.T.F.S., J.M.G., C.L-R., F.M-H., L.G.P, G.F., E.R. P.d.V.M., and C.W. contributed to the discussion, wrote the manuscript and reviewed/edited the manuscript. G.F. and E.R. translated, edited, commented on, and reviewed the manuscript. L.F.C.C.C., G.F., J.M.G. and C.L-R. provided statistical analyses and reviewed/edited the manuscript. All authors revised and agreed on the views expressed in the manuscript.

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Declarations

Competing interests
The authors declare no competing interests.

Ethics approval and consent to participate
The study was developed based on the premises of the Declaration of Helsinki (2013), being approved by the Bioethics Committee of the University of Extremadura (Registration number 79/2022). All participants will receive informed consent through the Google Forms electronic platform. For this, participants should indicate "yes" to authorize the use of data for academic-scientific purposes, their understanding of the research procedures and objectives.

Additional information
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