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ORIGINAL ARTICLE

Participation in sport in persons with spinal cord injury in Switzerland

A Rauch[1], C Fekete[2], C Oberhauser[1], A Marti[2,3] and A Cieza[1,2,4]

Study design: Secondary data analysis of a questionnaire-based, cross-sectional survey in persons with spinal cord injury (SCI) in Switzerland.
Objective: To describe the frequency of participation in sport (PiS) and to identify correlates for PiS in persons with SCI in Switzerland.
Setting: Community sample
Methods: Frequency of PiS was assessed retrospectively for the time before the onset of SCI and the time of the survey using a single-item question. A comprehensive set of independent variables was selected from the original questionnaire. Descriptive statistics, bivariate analyses and ordinal regressions were carried out.
Results: Data from 505 participants were analyzed. Twenty independent variables were selected for analyses. PiS decreased significantly from the time before the onset of SCI to the time of the survey ($P<0.001$). Sport levels were significantly lower in women than men for the time of the survey ($P<0.001$), whereas no difference was observed before onset of SCI ($P=0.446$). Persons with tetraplegia participated significantly less often in sport than persons with paraplegia ($P<0.001$). Lesion level, active membership in a club, frequency of PiS before the onset of SCI and the subjective evaluation of the importance of sport correlate with PiS. When controlling for gender differences, only the subjective importance of sport for persons with SCI determines PiS, particularly among women.
Conclusions: Persons with tetraplegia and women need special attention when planning interventions to improve PiS. Furthermore, the subjective importance of sport is important for PiS, particularly among women, whereas most other factors were only weakly associated with PiS.
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INTRODUCTION

Persons with spinal cord injury (SCI) are at high risk of developing secondary conditions. The decreased physical capacity caused by the loss of physical functions leads to lower energy expenditure and metabolic changes[1] that contribute to the development of cardiovascular diseases.[2] Furthermore, people with SCI have more psychological disorders than the general population.[3] In this population, a healthy lifestyle, including regular physical activity (PA), plays an important role.

In general, the concept of PA comprises work- and household-related, as well as leisure-time PAs (LTPAs). The latter includes recreational activities, sport and exercise. Sport in SCI is an effective means to reduce health risks[4] when performed regularly, to improve quality of life and life satisfaction[5] and to increase social integration.[6] To date, only few studies have investigated participation in sport (PiS) and its determinants and correlates. Those existing investigated either LTPA or sport using different assessment instruments. Findings showed that the respective participation levels were low in that sense that 37–50% of persons with SCI did not engage in any LTPA[7,8] or sport.[9] It has also been shown that PiS decreased after the onset of SCI.[10] With respect to correlates and determinants for PiS in SCI, evidence is widely lacking. Findings regarding the more general concept of participation in PA show that the environment has a higher impact on PA levels than socio-demographic or SCI characteristics.[11] This leads to the assumption that PiS may depend on environmental characteristics, such as different physical and cultural contexts.

Persons with SCI living in Switzerland experience many barriers to participating in PA.[12] Thus, we assume that PiS in SCI is low and differs from the general population. The survey on sport behavior in the general Swiss population assessed PiS with a question on the frequency (never, sometimes/rarely, once a week, several times a week, daily) and found that PiS has increased over the last decades, and gender differences have nearly disappeared.[13] For persons with SCI, there is a lack of data on the frequency of PiS and factors influencing PiS in Switzerland. Such information is, however, indispensible when developing interventions to improve PiS in persons with SCI.

[1]Chair of Public Health and Health Service Research, Research Unit for Biopsychosocial Health, Department of Medical Informatics, Biometry and Epidemiology–IBE, Ludwig-Maximilians-University, Munich, Germany; [2]Swiss Paraplegic Research (SPF), Nottwil, Switzerland; [3]Department of Health Sciences and Health Policy, University of Lucerne and SPF, Nottwil, Switzerland and [4]Faculty of Social and Human Sciences, University of Southampton, Southampton, UK
Correspondence: A Rauch, Chair of Public Health and Health Service Research, Research Unit for Biopsychosocial Health, Department of Medical Informatics, Biometry and Epidemiology—IBE, Ludwig-Maximilians-University, Marchioninistrasse 17, 81377 Munich, Germany.
E-mail: alexandra.rauch@med.lmu.de
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The objective of this study was to provide initial insights into PiS in persons with SCI in Switzerland. The specific aims were (1) to present figures on the frequency of PiS in the study population and (2) to identify factors associated with PiS.

MATERIALS AND METHODS

Study design

This study was a secondary data analysis of a questionnaire-based, cross-sectional survey on labor-market participation performed in the SCI population in Switzerland.[14]

Participants

A total of 2097 members of the Swiss Paraplegic Association (national association of persons with SCI) with traumatic or non-traumatic SCI older than 18 years and living in the community for at least 1 year were invited to participate in the study by mail. Announcements were also placed in the consumer magazine 'Paracontact' and on the Swiss Paraplegic Association homepage. A total of 559 of the invited persons (27%) completed the questionnaire.

Data collection

The original questionnaire comprised 86 variables. A detailed description of the survey is reported by Marti *et al.*[14] PiS was assessed with a single-item question asking participants about their frequency of PiS during a week respectively a month: 'How often do you perform sport (for at least half an hour)?' The five response options included 'less than several times a month', 'several times a month', 'once a week', 'several times a week' and 'daily'. PiS was assessed for the time of the survey and retrospectively for the time before the onset of SCI. The current PiS level was used as the dependent variable.

Based on evidence from the literature and expert opinion by two of the researchers (AR, AM), a set of independent variables considered as likely to be associated with PiS was selected for the analysis. These variables cover 5 socio-demographic, 10 disease-specific and 5 health-behavior-related characteristics.

Data analysis

Only participants who answered the dependent variable were included in the analysis. Cases with more than three missing values in the independent variables were excluded from the analysis.

First, descriptive statistics were used to characterize the study population and to describe PiS before the onset of SCI and at the time of the survey. Second, bivariate analyses were conducted: (1) Mann–Whitney *U*-tests to identify differences in PiS (for the two time points, for socio-demographic and SCI-related characteristics at the time of the survey) and (2) Spearman correlations to identify those variables associated with PiS at the time of the survey (correlation coefficient >0.2). The correlation analysis was conducted separately for men and women because of identified gender differences in PiS in the Mann–Whitney *U*-test analysis. Finally, a multivariate analysis (stepwise ordinal regression) was carried out: in the first model, only variables with a Spearman correlation coefficient >0.2 were included. In the second model, socio-demographic factors known to be associated with PiS in the Swiss general population[13] were also included. In the third model, interaction terms with gender were additionally considered for all variables that were included in model 1. The level of statistical significance was set at a *P*-value ≤ 0.05 in all analyses. Data were analyzed using SPSS V18 (SPSS Inc., Chicago, IL, USA).

RESULTS

In total, data from 505 subjects were included. An overview on the characteristics of the study population is presented in Table 1.

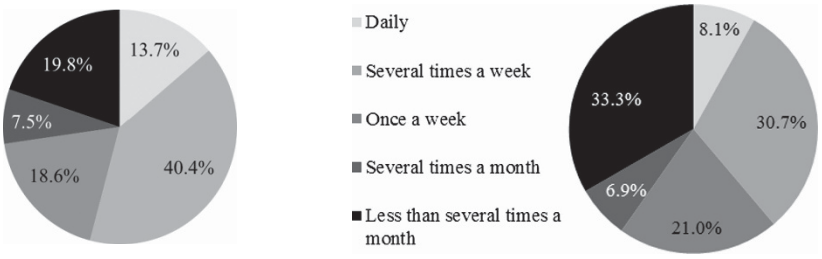
PiS decreased significantly after the onset of SCI: although before the onset of SCI, 72.7% of subjects participated in sport at least once a week, this proportion decreased to 59.8% at the time of the survey. In all, 33.3% of subjects performed sport fewer than several times in a month after the onset of SCI in comparison to 19.8% before the onset. The precise distribution of PiS levels is shown in Figure 1.

The analysis of differences in PiS in the independent variables (Table 2) showed that the decrease of PiS was exceptionally high in women: before the onset of SCI, 74.9% of females performed sport at least once a week (once a week, several times a week or daily), whereas at the time of the survey only 47.3% participated at least once a week. A total of 45.0% participated even fewer than several times a month. This trend was less pronounced in males: 72.9% of males performed sport at least once a week (once a week, several times a week or daily) before the onset of SCI, and 64.2% still did at the time of the survey. Only 29.1% engaged in sport fewer than several times a month. This unequal decrease is reflected in a significant gender difference in PiS at the time of the survey, which did not exist before the onset of SCI.

Table 1 Characteristics of the study population ($n = 505$)

Variable	n *(%)*	*Mean (s.d.; min, max)*	*Missing,* n *(%)*
Gender			0 (0.0)
Male	374 (74.1)		
Age (in years)		49.4 (12.6; 19,88)	0 (0.0)
Living situation			7 (1.4)
Living together (Cohabitating/ married/living together)	293 (58.0)		
Living alone (living alone/married but living separated/divorced/ widowed)	205 (40.7)		
Formal education (years)			4 (0.8)
6	64 (12.7)		
8–9	320 (63.4)		
11–12	117 (23.1)		
Employment rate (%)			20 (4.0)
0	206 (40.8)		
1–33	56 (11.1)		
34–50	126 (25.0)		
51–66	19 (3.8)		
67–100	78 (15.4)		
Time since onset of SCI (in years)		18.3 (11.8; 1.50)	5 (1.0)
Cause for SCI			5 (1.0)
Traumatic (total)	425 (84.2)		
Traffic accident	183 (36.3)		
Fall	94 (18.6)		
Sport accident	99 (19.6)		
Violence	8 (1.6)		
Non-traumatic	75 (14.8)		
Not defined	41 (8.1)		
Level of SCI			3 (0.6)
Paraplegia	361 (71.3)		
Tetraplegia	142 (28.1)		
Severity of SCI			13 (2.6)
Motoric complete	247 (48.9)		
Motoric incomplete	245 (48.5)		
Length of first rehabilitation (in months)			25 (4.9)
Paraplegic		7.2 (4.5; 1,50)	
Tetraplegic		11.0 (7.0; 1,60)	
Wheelchair use			3 (0.6)
No wheelchair	63 (12.5)		
Manual wheelchair	406 (80.4)		
Power wheelchair	33 (6.5)		

Abbreviations: max, maximum; min, minimum; SCI, spinal cord injury.



Frequency of PiS before onset of SCI **Frequency of PiS at time of survey**

Figure 1 Frequency of participation in sport (PiS) before the onset of spinal cord injury (SCI) and at the time of the survey.

Table 2 Frequency of PiS related to time-point, socio-demographic and SCI-related characteristics

Variables (n)	*n (%) for frequency of PiS*					*Median (IQR)*	P
PiS-related to…	*Less than several times a month (1)*	*Several times a month (2)*	*Once a week (3)*	*Several times a week (4)*	*Daily (5)*		
Time point							<0.001*
Before onset of SCI (505)	100 (19.8)	38 (7.5)	94 (18.6)	204 (40.4)	69 (13.7)	4.00 (2.00;4.00)	
Time of survey (505)	168 (33.3)	35 (6.9)	106 (21.0)	155 (30.7)	41 (8.1)	3.00 (1.00;4.00)	
Gender, before SCI							0.468
Men (367)	77 (21.0)	28 (7.6)	62 (16.9)	151 (41.1)	49 (13.4)	4.00 (2.00;4.00)	
Women (131)	23 (17.7)	10 (7.7)	24 (18.5)	53 (40.8)	20 (15.4)	4.00 (2.00;4.00)	
Gender, time of survey							0.003*
Men (374)	109 (29.1)	25 (6.7)	87 (23.2)	120 (32.0)	34 (9.1)	3.00 (1.00;4.00)	
Women (130)	59 (45.0)	10 (7.6)	19 (14.5)	36 (27.5)	7 (5.3)	2.00 (1.00;4.00)	
Living situation[a]							0.578
Living alone (205)	71 (34.6)	16 (7.8)	41 (20.0)	62 (30.2)	15 (7.3)	3.00 (1.00;4.00)	
Living together (293)	96 (32.8)	19 (6.5)	64 (21.8)	89 (30.4)	25 (8.5)	3.00 (1.00;4.00)	
Formal education[a] *(years)*							0.434
6–9 (388)	131 (33.8)	20 (5.2)	83 (21.4)	118 (30.4)	36 (9.3)	3.00 (1.00;4.00)	
11–12 (117)	37 (31.6)	15 (12.8)	23 (19.7)	37 (31.6)	5 (4.3)	3.00 (1.00;4.00)	
Employment rate[a] *(%)*							0.901
0–50 (388)	139 (35.8)	24 (6.2)	74 (19.1)	115 (29.6)	36 (9.3)	3.00 (1.00;4.00)	
51–100 (97)	25 (25.8)	9 (9.3)	30 (30.9)	31 (32.0)	2 (2.1)	3.00 (1.00;4.00)	
Cause for SCI[a]							0.978
Traumatic (425)	138 (32.5)	31 (7.3)	92 (21.6)	131 (30.8)	33 (7.8)	3.00 (1.00;4.00)	
Non-traumatic (75)	27 (36.0)	35 (7.0)	105 (21.0)	155 (8.4)	40 (8.0)	3.00 (1.00;4.00)	
Level of SCI[a]							<0.001*
Paraplegic (362)	101 (27.9)	23 (6.4)	78 (21.5)	128 (35.4)	32 (8.8)	3.00 (1.00;4.00)	
Tetraplegic (143)	67 (46.9)	12 (8.4)	28 (19.6)	27 (18.9)	9 (6.3)	2.00 (1.00;4.00)	
Severity of SCI[a]							0.599
Motoric complete (247)	79 (32.0)	17 (6.9)	56 (22.7)	76 (30.8)	19 (7.7)	3.00 (1.00;4.00)	
Motoric incomplete (245)	86 (35.1)	18 (7.3)	50 (20.4)	70 (28.6)	21 (8.6)	3.00 (1.00;4.00)	

Abbreviations: IQR, interquartile range; PiS, participation in sport; SCI, spinal cord injury.
IQR = 25th to 75th percentile.
P-value resulting from Mann–Whitney *U*-test on differences in PiS between each of the two groups: *Significant (<0.05).
[a]Presented for the time of survey.

Persons with tetraplegia and persons with motoric incomplete lesions participated less often in sport than persons with paraplegia and motoric complete lesions. However, these differences were only significant for the level, but not for the severity of the lesion.

The correlation analysis (Table 3) showed that males who suffer from tetraplegia, who have spent longer time in first rehabilitation and who have performed sport more frequently before the onset of SCI had lower PiS at the time of the survey. Evaluating sport as important at the time of the survey and being an active member of a club correlated with higher PiS at the time of the survey. In women, only the latter two correlated with higher PiS at the time of the survey. For both genders, none of the socio-demographic characteristic correlated with PiS.

The stepwise ordinal regression (Table 4) explained up to 34% of the variance and showed that lesion level, active membership in a club, frequency of PiS before the onset of SCI and the subjective importance of sport at the time of the survey were significantly linked to PiS in model 1. Controlling for socio-demographic characteristics (model 2)

Table 3 Spearman correlations of socio-demographics, disease-specific and health-behavior-related aspects with PiS at the time of the survey

Variable group	*Independent variables*	*Specification*	*PiS at the time of the survey (less than several times a month/several times a month/once a week/several times a week/daily)*			
			Men		*Women*	
			Corr Coeff	P	*Corr Coeff*	P
Socio-demographic	Age	In years	0.024	0.641	0.026	0.764
	Living situation	Living alone/living together	0.028	0.593	−0.005	0.957
	Children	No/yes	0.023	0.656	0.126	0.154
	Formal education	In years	0.029	0.592	−0.053	0.564
	Remunerative employment	Percentage of 100%	0.019	0.714	0.005	0.956
Disease specific	Time since onset of SCI	In years	−0.047	0.366	−0.153	0.086
	Level of SCI	Paraplegic/tetraplegic	**−0.238**	<0.001*	−0.108	0.225
	Severity of SCI	Motoric complete/incomplete	−0.050	0.340	0.074	0.412
	Cause for SCI	Traumatic/non-traumatic	0.030	0.559	0.012	0.887
	Length of first rehabilitation	In months	**−0.241**	<0.001*	−0.194	0.034*
	Rehospitalizations	No/yes	013	0.803	0.052	0.559
	Use of wheelchair	No/manual/electrical	−0.075	0.147	−0.127	0.148
	Performance of activities of daily living	Time in minutes to perform self-care activities in the morning	−0.195	0.001*	−0.042	0.668
	Subjective physical health/pain	1 (no pain)–10 (strongest pain)	−0.027	0.610	0.001	0.990
	Subjective general health	Very bad/rather bad/medium/rather good/very good	0.145	0.005*	0.111	0.208
Health behavior	PiS before onset of SCI	Less/several times a month/ several times a week /once a week/daily	**−0.242**	<0.001*	−0.106	0.228
	Importance of sport before onset of SCI	Subjective rating in percent on a scale from 0 to 100	0.179	0.001*	0.033	0.714
	Importance of sport at the time of survey	Subjective rating in percent on a scale from 0 to 100	**0.560**	<0.001*	**0.530**	<0.001*
	Active membership in a club before onset of SCI	No/yes	−0.115	0.027*	0.091	0.301
	Active membership in a club at the time of survey	No/yes	**0.234**	<0.001*	**0.241**	0.006*

Abbreviations: Corr coeff, correlation coefficient; PiS, participation in sport; SCI: spinal cord injury.
Bold letters: correlation coefficients considered as relevant for further analysis (>0.200).
P=*Significant (<0.05).

only slightly improved the explanatory power. When controlling for gender differences by adding interaction terms in model 3 (gender with all variables included in model 1), only the subjective importance of sport at the time of the survey remained significantly associated with PiS. In addition, the subjective importance of sport had a stronger relationship with PiS in women than in men.

DISCUSSION

This study showed that PiS in persons with SCI in Switzerland significantly decreased after the onset of SCI, in particular in women and persons with tetraplegia. The subjective evaluation of the importance of sport was the only aspect that explained PiS after controlling for various influences. The characteristics of the study population corresponded to the well-known distribution of other SCI populations with respect to level and severity of SCI and gender distribution. This is one of the very few studies with a large sample size and presents results, which are shown in this manner for the first time.

Corresponding to results by Tasiemski *et al.*,[10] PiS significantly decreased after the onset of SCI. In comparison to existing evidence, where 37–50% do not engage in LTPA or sport[7–9] at all, the proportion of those who seldom or never participate in sport in Switzerland was lower (33.3%). No explanation for these differences in different countries and cultures has been discovered. In comparison to the general population in Switzerland, where 66.7% of the general population participated in sport at least once a week in 2008,[13] 59.8% in the SCI population participated in sport with this frequency. However, looking into gender differences provided more details.

The identified lower PiS in women confirms findings from one of the few studies with a large study population[7] that reports on gender differences based on the average duration of LTPA during the 3 days previous to the interview. Other studies with smaller sample sizes did not report on gender differences.[15–19] In the general Swiss population, gender differences in PiS disappeared almost completely in the able-bodied population.[13] Accordingly, no gender differences in PiS were observed in the study population at the time before the onset of SCI. This study revealed gender differences in PiS after suffering a SCI, which require a closer look into aspects that potentially explain this phenomenon that has arisen in connection with a disability.

Table 4 Regression coefficients of the stepwise ordinal regression using frequency of PiS at the time of the survey as an ordinal outcome

Included variables	*Model 1*		*Model 2*		*Model 3*	
	B *(s.e.)*	P	B *(s.e.)*	P	B *(s.e.)*	P
Intercept 1 (sport daily)	−0.538 (0.341)	<0.001	0.018 (0.681)	<0.001	0.127 (0.850)	<0.001
Intercept 2 (sport several times a week)	−0.137 (0.339)	0.005	0.422 (0.681)	0.024	0.539 (0.851)	0.050
Intercept 3 (sport once a week)	0.968 (0.342)	0.686	1.537 (0.683)	0.535	1.671 (0.854)	0.401
Intercept 4 (sport several times a month)	3.420 (0.391)	0.114	4.015 (0.714)	0.979	4.145 (0.877)	0.022
Level of lesion (paraplegic)	0.578 (0.203)	0.004*	0.542 (0.205)	0.008*	−0.127 (0.396)	0.748
Active membership in a club at the time of survey (no)	−0.511 (0.178)	0.004*	−0.488 (0.179)	0.006*	−0.510 (0.360)	0.157
Length of first rehabilitation	−0.024 (0.018)	0.171	−0.026 (0.018)	0.138	−0.038 (0.037)	0.301
Frequency of PiS before onset of SCI	−0.216 (0.065)	0.001*	−0.242 (0.066)	<0.001*	−0.080 (0.135)	0.554
Importance of sport at the time of survey	0.087 (0.009)	<0.001*	0.090 (0.007)	<0.001*	0.138 (0.023)	<0.001*
Gender (male)			0.278 (0.199)	0.162	0.567 (0.751)	0.450
Age			0.013 (0.007)	0.063	0.012 (0.007)	0.095
Formal education			−0.023 (0.046)	0.611	−0.029 (0.046)	0.526
Level of lesion*gender (male paraplegic)					0.876 (0.464)	0.059
Length of first rehabilitation*gender (male)					0.018 (0.042)	0.661
Frequency of PiS before onset of SCI*gender (male)					−0.216 (0.154)	0.161
Importance of sport at the time of survey*gender (male)					−0.057 (0.024)	0.019*
Active membership in a club at the time of survey*gender (no, male)					0.024 (0.415)	0.954
R^2 (Nagelkerke)		0.315		0.325		0.338

Abbreviations: PiS, participation in sport; SCI, spinal cord injury.
B: Regression coefficient; s.e.: Standard error.
P = *significant (<0.05).
Reference values for Intercept 1, 2, 3 and 4: 'Less than several times a month', for Level of lesion: 'Tetraplegic', for Active membership in club at the time of survey: 'Yes, member', for gender: 'female'.

Our finding of fewer PiS in persons with tetraplegia confirms existing evidence.[7,17] The greater loss of physical capacity in persons with tetraplegia may lead to a more frequent experience of barriers to performing sport. It is assumed that these experiences are related to lower perceived behavioral control, which is known to influence the intention to perform sport in persons with tetraplegia.[20] Results are inconsistent for the impact of the severity of the lesion and the time since the onset of SCI.[7,15] In this study population, these two characteristics made no difference in PiS. The inconsistent findings suggest that these characteristics cannot be applied to explain PiS universally and that more insight is required to understand when they influence PiS.

The bivariate analysis showed that the lesion level (tetraplegia) correlated with lower PiS in men only. Given the generally lower PiS levels in women, one could assume that lower physical capacity related to a more severe lesion determines PiS in males, whereas in women, suffering from a disability in general—irrespective of physical capacity—influences PiS. There is some evidence that athletic identity (being competitively oriented) is typically male[12,21] and that this phenomenon does not change over time. A loss of physical capacity caused by more severe levels of SCI may thus contribute to less interest in sport when a person loses the capacity to perform sport on a high level. If, in contrast, the motivation for sport is more associated with maintaining fitness or socializing, as it was shown for women,[12] the level of SCI may have less impact on PiS.

Although in this study 50% of the participants had a time since onset of SCI longer than 17 years, the number of years living with SCI did not correlate with PiS in both genders. Thus, this study found no hints that aging contributes to a decrease in PiS.

The correlation between more frequent PiS before the onset of SCI with less frequency at the time of the survey in men has already been observed by Tasiemski *et al.*[22] Anneken *et al.*[9] found the same phenomena, but did not report on gender differences. It is assumed that the comparison between the experience of able-bodied sport before the onset of SCI and a rather negative experience of disabled sport might cause this decrease. Based on the identified gender differences in our and a previous study,[12] one could again assume that performing sport on a high level is more important in men, whereas women perform sport for other reasons.

Interestingly, none of the socio-demographic characteristics correlated with PiS in either gender, which confirms evidence from other studies with SCI populations.[11] In comparison to the general population in Switzerland, where age, gender and formal education correlate with PiS,[13] respective findings from the SCI population provide interesting hints that disability shifts the correlates for PiS from socio-demographic to other factors.

Active membership in a sports club at the time of the survey and evaluating sport more important at the time of the survey correlated with higher PiS in both genders. The former connection is also known to associate with better social integration,[6] whereas it is not known whether persons become members in a club to become better integrated, for example, to socialize, and thus are physically more active, or whether persons who want to perform sport become a member in a club more often and are thus better integrated. However, recent research has found that programs offered by wheelchair clubs do not always meet the needs of all persons with SCI.[12] This deficiency may contribute to lower levels of PiS in women and tetraplegics.[12] Identifying individuals' reasons for becoming a member of a club may provide important information for programs developed to increase PiS through sports clubs.

The evaluation of the subjective importance of sport was the only item that explained PiS after controlling for the impact of gender, and it was shown that the impact is higher in women. The subjective evaluation of sport may be based on a person's knowledge regarding

risks and benefits related to sport, pre-existing norms, values, attitudes and preferences, but also to the need to socialize, to maintain health or to have fun.[12] In any case, achieving a positive personal evaluation of the importance of sport may positively influence the intention to perform sport, which could contribute to higher PiS.

Limitations

Some limitations to this study should be noted. First, the selection of a convenience sample of members of the Swiss Paraplegic Association who are possibly more active in general and the low response rate (27%) may limit the generalizability of our findings. As no data were collected from the non-responders, there is no information whether the study sample is representative for the population invited to this study. Second, a single-item question was used to assess the frequency in PiS. Although similar single-item questions on PA showed acceptable reliability,[23] information is limited to the frequency of PiS, whereas information on the type, intensity and duration of sport activities is lacking. However, the analysis of this item allowed a comparison with data from the general Swiss population. Third, a recall bias, in particular in persons with long disease duration may have affected the results. Finally, aspects that may additionally relate to PiS (for example, environmental and additional personal factors) were not included in the original questionnaire and thus could not be investigated.

CONCLUSION

This study detected that women and persons of both genders with tetraplegia rarely participate in sport. This finding paves the way for future research that should investigate gender aspects in PiS in persons with SCI. Furthermore, we showed that disease-specific and socio-demographic characteristics do not explain PiS, but the personal evaluation of the importance of sport does. Studies are needed to better understand the evaluation of the importance of sport from the individual's perspective. We also recommend that information on the type (for example, aerobics or muscle-strengthening activities), intensity (low, moderate or intense) and duration (for example, minutes per day) of sport needs to be collected in the future to allow for additional investigation of the impact of PiS on the reduction of health risks.

DATA ARCHIVING

There were no data to deposit.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

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