

Brief Report

## Exploring psychosocial correlates of physical activity among children and adolescents with spina bifida

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### Abstract

**Background:** To enhance physical activity of children with spina bifida, it is important to investigate the correlates of physical activity to support the development of interventions to promote active lifestyles.

**Objective:** This study aimed to identify psychosocial correlates of physical activity among children and adolescents with spina bifida.

**Methods:** A survey was conducted with 31 students (15 boys), aged 10–17 years with spina bifida. A questionnaire was used to collect data of physical activity, demographic and psychosocial variables (attitudes, sports goal orientation and perceptions). Unadjusted and adjusted binary logistic regressions were performed to examine the relationship of psychosocial factors and physical activity participation. Data were collected in 2013.

**Results:** Only 38.7% reported to participate in both organized and non-organized physical activity. Results showed no relationship between participation in organized and non-organized physical activity and psychosocial correlates. The result of the adjusted regression analysis show that perception of competence (OR = 9.55, 1.06–85.99,  $p < 0.05$ ) was the only variable positively associated with participation in non-organized physical activity.

**Conclusions:** Most of the participants reported that they did not participate in physical activity regularly. Psychosocial variables were not related with physical activity, except perception of competence. Studies with bigger samples are needed, focused on the same and in others factors to identify the predictors of physical activity of young people with spina bifida. © 2015 Elsevier Inc. All rights reserved.

*Keywords:* Spina bifida; Physical activity; Disability; Correlates

The benefits of physical activity are well documented. Among children and adolescents, it improves bone mineral density, muscular strength and endurance, and mental health.<sup>1,2</sup> Regular participation in physical activity is also related with aerobic capacity, which is associated with lower risk factors of cardiovascular disease,<sup>3</sup> and it is recognized as a relevant marker of cardiovascular health.<sup>4</sup> Nevertheless, studies reported that many young people are not active enough to benefit their health.<sup>5–7</sup> The situation is concern among people with physical and intellectual disability. This group of people is more at risk of being less active or sedentary than people without disability,<sup>8,9</sup> because of their pathology and also, because facilities do not provide conditions for persons with disabilities to use them properly.

Among people with disabilities there are young people with spina bifida. Spina bifida is a congenital abnormality characterized by the incomplete closure of the spinal

column. In many cases this pathology results in nerve damage and physical disabilities, including lower limb paralysis and disrupted bladder or bowel function. These conditions limit the possibilities to engage in physical activity compared to nondisabled people,<sup>10</sup> and consequently people with spina bifida have low aerobic capacity and muscle strength,<sup>11</sup> which hinders the performance of daily tasks.

Given the low levels of physical activity and physical function<sup>12</sup> and the increasing presence of obesity,<sup>13</sup> Short and Frimberger<sup>10</sup> speculate whether the components of metabolic risk would be adversely affected by the presence of spina bifida. Thus, it is recommended that people with spina bifida should engage in habitual physical activity, since the literature supports that it improves physical functions.<sup>2</sup>

Recently in Portugal, the need to know more about physical activity practice and effects on populations with disabilities has emerged, especially since the special education law was declared in 2008, stating that all children should be in regular schools and have the same opportunities.<sup>14</sup> Because of this, the Portuguese educational setting is facing now several challenges. One of these challenges is to design, implement and monitor appropriate intervention

There are not any perceived financial conflicts of interest related to the research reported in the manuscript.

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for students with disabilities. Schools should offer equal opportunities for youngsters to engage in physical activities in order to promote social development and health benefits. Thus, it is expected that in a school context all school-age children should experience physical activity. To accomplish this goal, and, consequently, improve social participation, it is necessary to have a broader overview about what contents and skills should be taught and enhanced, providing instructions on physical activity or sport-related health benefits and special physical education programs and/or school sports.

To improve the levels of physical activity of children and adolescents with spina bifida, it is important to investigate the correlates of physical activity to support the development of effective interventions to promote active lifestyles. Although the calls for research of physical activity determinants among individuals with disabilities is now long standing,<sup>15</sup> so far little is known about the factors related to physical activity participation in different contexts among children and adolescents with spina bifida. Physical activity can take place in leisure time as non-organized activity (non-guided/supervised by a trainer or a teacher), or organized (guided/supervised by a trainer, teacher or other sports authority). The social cognitive theory<sup>16</sup> helps to understand physical activity behaviors by partitioning behavioral influences into different domains (e.g. demographic, psychological, and social factors). Therefore, the present study aimed to identify demographic and psychosocial correlates of physical activity in leisure time among children and adolescents with spina bifida in Portugal, in order to implement an appropriate school-based intervention to promote more active and healthier lifestyles in these populations.

## Method

### Participants

The present study was conducted through the Portuguese Association of Spina Bifida and Hydrocephalus (ASBHIP). The members of this association have a spina bifida diagnosis without cognitive impairment and attend regular elementary and secondary schools. It is part of an ongoing study to characterize the lifestyle of children and adolescents with intellectual and physical disabilities, in order to implement an appropriate school-based intervention to promote an active and healthy lifestyle among youth special populations. For the purpose of this study, participants included 31 children and adolescents with Spina bifida (15 boys, 16 girls), ranging in age from 10 to 17 ( $M_{\text{age}} = 13.9 \pm 2.4$ ). The study protocol received approval from institutional review board of the Faculty of Human Kinetics at University of Lisbon, Portuguese Minister of Education, and the Portuguese Commission of Data Protection. The study was conducted according to ethical

standards in sport and exercise science research.<sup>17</sup> The ASBHIP's ethics committee gave its consent, legal guardians gave written informed consent, and students provided assent. Data collection was during the springtime of 2013.

### Measures

#### Physical activity

In order to determine students' participation in physical activity a list of 21 leisure time activities that included participation in organized and non-organized physical activities was used. This instrument was developed by Telama et al,<sup>18</sup> and has been used in national and international studies.<sup>19,20</sup> Responses were dichotomous (yes or no). The test-retest reliability of the leisure time activities was carried out within a one-week interval. Using intraclass correlation coefficient (ICC), the reliability was high ( $ICC = 0.90-0.95$ ). Parents' physical activity practice was reported using one single item for the father and one for the mother, the same as used previously.<sup>21</sup> For the present study the responses were dichotomized ("practice every week" or "do not practice"). For the peers' physical activity, students were asked how often do their friends engage in physical activity, and how often do they engage in physical activity when they are with friends. Answers were given on a 5-point scale (1 = never to 5 = daily).

#### Body mass index (BMI)

Weight and height were reported by children's and adolescents' parents. The information was provided based on clinical reports. BMI was calculated by dividing weight by height square ( $BMI = m/h^2$ ).

#### Socioeconomic status (SES)

The SES was calculated according to parental occupation and educational level. Parents were classified as lower, middle and upper class. For that classification parents' occupation titles were regrouped. The lower class included skilled and unskilled manual workers, farmers, and fishermen; the middle class included service occupations such as nonprofessional health service workers, office clerks, and salespeople; the upper class consisted of business-owners, executives, university-educated specialists and professionals.<sup>22</sup>

#### Attitudes

Students' attitudes toward physical education and physical activity were asked via two questions. The questions asked were, respectively: "What do you think about your physical education lessons?", and "What do you think about practicing physical activity?", as used in other studies.<sup>23,24</sup> Answers were given on a 5-point scale ranging from, "I dislike it very much" to "I like it very much." These items have been shown to have high reliability, with intraclass correlation coefficients (one-week interval) of 0.9.<sup>25</sup>

### Sports Goal orientation

Sports Goal orientation was measured via the 12-item Task and Ego Orientation in Sport Questionnaire.<sup>26</sup> The answers were given using a 4-point scale and good Cronbach's alpha coefficients were obtained for both ego ( $\alpha = 0.9$ ) and task ( $\alpha = 0.9$ ) subscales.

### Perceptions

Physical competence was measured by Lintunen's Perceived Physical Competence Scale.<sup>27</sup> The 6-items, using a 5-point Likert scale, demonstrated a good internal consistency ( $\alpha = 0.9$ ). Perception of body image and perception of health were measured by the scaled from WHO study.<sup>23</sup> Perception of body image was assessed by 3-items, using a 5-point Likert scale, and the consistency was acceptable ( $\alpha = 0.7$ ). Perception of health was assessed with a selection on a 4-point scale ranging from "I am not feeling well" (=1) to "I am very healthy" (=4).

### Statistics

Descriptive statistics (means, standard deviation, and percents) were calculated for all variables. Continuous variables and ordinal variables (treated as continuous variables) were examined for normality, and frequency distributions were examined for categorical variables. Bivariate relationship between participation in organized and non-organized physical activity with gender, BMI, socioeconomic status, parents physical activity participation, goal orientation, perceptions and peers physical activity were tested by Fisher's exact test of independence and Mann–Whitney. Effects of each independent variable on participation in organized and non-organized physical activity were assessed by a logistic regression. Unadjusted and adjusted odds ratio (OR) with 95% confidence intervals (CI) were calculated. Adjustments were performed for all studied variables. Data analysis was performed using IBM SPSS Statistics version 20 (SPSS, Chicago, IL, USA). For all tests statistical significance was set at  $p < 0.05$ .

## Results

The general sample's characteristics are presented in Table 1. Only 38.7% reported to participate in both organized and non-organized physical activity. Parents' physical activity participation was reported by 16.1% participants. Most of the participants were of a healthy weight (74.2%) and were from lower socioeconomic population (74.2%).

Table 2 shows the comparison of demographic and psychosocial factors and participation in organized and non-organized physical activity. There were no statistical differences between those who reported participating in physical activity and those who reported not be involved. The exception was only for the perception of competence in non-organized physical activity participation. Participants

Table 1  
General characteristics of the study population

	Total	
	n	%
Gender		
Boys	15	48.4
Girls	16	51.6
BMI		
<25	23	74.2
≥25	8	25.8
SES		
Low	23	74.2
Medium/high	8	25.8
Organized PA		
Yes	12	38.7
No	19	61.3
Non-organized PA		
Yes	12	38.7
No	19	61.3
Father PA		
Yes	5	16.1
No	26	83.9
Mother PA		
Yes	5	16.1
No	26	83.9
		Mean ± SD
Ego orientation		3.0 ± 0.6 (1–4)
Task orientation		3.1 ± 0.4 (1–4)
Attitude toward PE		3.7 ± 1.3 (1–5)
Attitude toward PA		3.9 ± 1.0 (1–5)
Perception of competence		3.1 ± 0.8 (1–5)
Perception of body image		3.6 ± 1.3 (1–5)
Perception of health		2.5 ± 1.0 (1–4)
PA with friends		2.1 ± 1.1 (1–5)
Peers PA		2.9 ± 1.0 (1–5)

BMI, body mass index; SES, socioeconomic status; PA, physical activity; PE, physical education.

with higher perception of physical competence were significantly more involved in non-organized physical activity.

Table 3 shows the results of the unadjusted logistic regression analysis. The results show no relationship between participation in organized and non-organized physical activity and demographic and psychosocial correlates. The result of the adjusted regression analysis, when all variables were entered into the model shows that perception of competence (OR = 9.55, 1.06–18.60,  $p < 0.05$ ) was the only variable positively associated with participation in non-organized physical activity.

## Discussion

The purpose of this study was to examine correlations between psychosocial variables from children and adolescents with spina bifida and organized and non-organized physical activity. From the study a major finding appeared, perception of competence was related with non-organized physical activity participation among children and younger adolescents with spina bifida. In fact, perception of

Table 2  
The characteristic of the study population by participation in organized and non-organized physical activity

	Non-organized PA			Organized PA		
	No n (%)	Yes n (%)	p	No n (%)	Yes n (%)	p
Gender <sup>a</sup>			0.106			0.716
Boys	7 (36.8)	8 (66.7)		10 (52.6)	5 (41.7)	
Girls	12 (63.2)	4 (33.3)		9 (47.4)	7 (58.3)	
BMI <sup>a</sup>			1.000			0.676
<25 kg/m <sup>2</sup>	14 (73.7)	9 (75.0)		15 (78.9)	8 (66.7)	
≥25 kg/m <sup>2</sup>	5 (26.3)	3 (25.0)		4 (21.1)	4 (33.3)	
SES <sup>a</sup>			1.000			1.000
Low	14 (73.7)	9 (75.0)		14 (73.7)	9 (75.0)	
Medium/high	5 (26.3)	3 (25.0)		5 (26.3)	3 (25.0)	
Father PA <sup>a</sup>			1.000			0.350
No	16 (84.2)	10 (83.3)		17 (89.5)	9 (75.0)	
Yes	3 (15.8)	2 (16.7)		2 (10.5)	3 (25.0)	
Mother PA <sup>a</sup>			0.624			0.350
No	5 (78.9)	11 (91.7)		17 (89.5)	12 (75.0)	
Yes	4 (21.1)	1 (8.3)		2 (10.5)	3 (25.0)	
	No Mean ± SD	Yes Mean ± SD	p	No Mean ± SD	Yes Mean ± SD	p
Ego orientation <sup>b</sup>	2.8 ± 0.6	3.1 ± 0.6	0.264	2.9 ± 0.7	3.0 ± 0.5	0.478
Task orientation <sup>b</sup>	3.1 ± 0.4	3.2 ± 0.5	0.517	3.2 ± 0.4	3.1 ± 0.5	0.568
Attitude toward PE <sup>b</sup>	3.5 ± 1.3	4.0 ± 1.4	0.391	3.9 ± 0.8	3.5 ± 1.7	0.983
Attitude toward PA <sup>b</sup>	3.8 ± 1.1	4.3 ± 0.5	0.151	4.0 ± 0.7	3.9 ± 1.3	0.734
Perception of competence <sup>b</sup>	2.8 ± 0.8	3.6 ± 0.9	0.017	3.2 ± 0.8	3.1 ± 1.0	0.765
Perception of body image <sup>b</sup>	3.5 ± 1.3	3.8 ± 1.1	0.826	3.7 ± 1.1	3.5 ± 1.4	0.675
Perception of health <sup>b</sup>	2.4 ± 1.0	2.6 ± 0.9	0.646	2.4 ± 0.9	2.6 ± 1.0	0.346
PA with friends <sup>b</sup>	2.0 ± 1.2	2.2 ± 0.8	0.562	2.1 ± 1.2	2.1 ± 0.9	0.617
Peers PA <sup>b</sup>	2.8 ± 1.0	3.0 ± 0.9	0.611	2.9 ± 1.0	2.9 ± 0.8	0.983

BMI, body mass index; SES, socioeconomic status; PA, physical activity; PE, physical education.

<sup>a</sup> Tested by exact Fisher test.

<sup>b</sup> Tested by Mann–Whitney.

competence was the only studied variable significantly associated with physical activity and it was only associated with non-organized physical activity.

Most of the children and adolescents with spina bifida reported not participating in organized and non-organized physical activity. Although expected,<sup>8,9</sup> this finding is concerning, given that participation in regular physical activity is recommended for young people with physical disabilities,<sup>2</sup> and is related to health benefits<sup>10,28</sup> and full participation in the community.<sup>29</sup> Studies have shown that adolescents with spina bifida can participate successfully in physical activity, and should be encouraged to do so for physical and psychosocial reasons.<sup>30,31</sup> Thus, intervention strategies aiming to improve physical activity levels of adolescents with spina bifida are required, in order to improve the quality of life.<sup>29,31</sup>

For the organized physical activity category none of the psychosocial variables studied predicted physical activity participation. Taking into account that participation in organized physical activity is sometimes subject to a payment, this might explain the absence of relationship between physical activity and SES, because most of the adolescents from our sample were from lower SES. Murphy and

Carbone<sup>32</sup> also pointed out the high cost as a barrier for the participation of children with disabilities in sports and physical activity. Less diversity of formal activities for children with disability could also be one of the reasons for the nonparticipation in organized physical activity. For non-disabled adolescents, parents, as role model, and peers are not related with physical activity participation,<sup>33–35</sup> which is in line with this particular population. However, some psychological variables, such as attitude toward physical activity,<sup>25</sup> goal orientation,<sup>36</sup> and perception of competence<sup>37</sup> explained the reasons why non-disabled adolescents are involved with physical activity. It suggests that for these adolescents the reasons to participate in organized physical activity are independent of social and psychological factors.

Similar results were seen for non-organized physical activity participation. The only factor that was significantly related with physical activity participation was perception of physical competence. Similarly, in a review of correlates of physical activity in adults with disabilities it was found that self-efficacy was one of the few factors related with physical activity.<sup>38,39</sup> Perception of competence and self-efficacy are considered important facilitators of physical activity<sup>35,37</sup> and demonstrated the importance of

Table 3

	Unadjusted OR (95% CI)		Adjusted OR (95% CI)	
	Non-organized PA	Organized PA	Non-organized PA	Organized PA
Gender				
Boys	1.00 (ref)	1.00 (ref)	1.00 (ref)	1.00 (ref)
Girls	0.27 (0.06–1.19)	1.27 (0.33–4.93)	0.01 (0.00–9.29)	4.63 (0.27–7.40)
BMI				
<25	1.00 (ref)	1.00 (ref)	1.00 (ref)	1.00 (ref)
≥25 kg/m <sup>2</sup>	1.04 (0.20–5.34)	0.73 (0.15–3.59)	7.18 (0.10–51.81)	0.26 (0.03–2.51)
SES				
Low	1.00 (ref)	1.00 (ref)	1.00 (ref)	1.00 (ref)
Medium/high	1.11 (0.24–5.04)	1.40 (0.32–6.16)	0.02 (0.00–2.24)	0.27 (0.02–4.62)
Father PA				
No	1.00 (ref)	1.00 (ref)	1.00 (ref)	1.00 (ref)
Yes	1.27 (0.24–6.90)	4.25 (0.69–26.14)	1.82 (0.15–21.58)	1.82 (0.15–21.58)
Mother PA				
No	1.00 (ref)	1.00 (ref)	1.00 (ref)	1.00 (ref)
Yes	0.35 (0.04–3.58)	2.13 (0.31–14.73)	0.17 (0.01–2.75)	0.17 (0.01–2.75)
Ego orientation	2.23 (0.60–8.30)	1.19 (0.36–4.00)	5.51 (0.15–20.66)	1.65 (0.64–3.04)
Task orientation	1.44 (0.25–8.22)	0.69 (0.13–3.76)	0.13 (0.00–4.37)	0.11 (0.01–1.44)
Attitude toward PE	1.36 (0.75–2.46)	0.79 (0.45–1.37)	0.05 (0.00–8.14)	1.22 (0.11–13.46)
Attitude toward PA	2.10 (0.82–5.40)	0.93 (0.46–1.89)	9.25 (0.45–18.89)	0.78 (0.18–3.47)
Perception of competence	2.94 (1.13–7.70)	0.93 (0.43–2.01)	9.55 (1.06–18.60)*	0.73 (0.01–4.00)
Perception of body image	1.30 (0.71–2.36)	0.83 (0.47–1.46)	1.37 (0.11–17.72)	1.29 (0.34–4.88)
Perception of health	1.25 (0.58–2.69)	1.24 (0.59–2.62)	3.52 (0.14–8.30)	3.64 (0.52–25.72)
PA with friends	1.10 (0.58–2.09)	0.97 (0.51–1.83)	0.19 (0.02–2.09)	0.62 (0.18–2.06)
Peers PA	1.26 (0.57–2.77)	0.97 (0.46–2.06)	1.05 (0.13–8.80)	2.85 (0.42–19.28)

OR, odds ratio; BMI, body mass index; SES, socioeconomic status; PA, physical activity; PE, physical education.

\* $p < 0.05$ .

personal factors. Therefore, physical self-concept should be enhanced among adolescents, as a strategy for increasing physical activity motivation and enhance the levels of physical participation.

To our knowledge, this is the first study that tried to identify the psychosocial factors related with physical activity among a sample of Portuguese adolescents with spina bifida. Our results demonstrated that most of the participants did not participate in physical activity regularly. In order to improve the levels of participation, it is important to identify the factors (barriers and facilitators) that are related with physical activity participation. We only studied social and psychological factors and our results showed that these factors are not related with physical activity in non-organized and organized context. Therefore, more studies are needed, with bigger samples, focused on the same and in other factors to identify the predictors of physical activity participation of children and adolescents with spina bifida. Some of these factors could be the environmental factors, since there have been identified as correlates of physical activity in persons with spinal injury.<sup>40</sup> Moreover, since all children should be in regular schools and have the same opportunities, the type of physical activity provided in school sports could be also a correlate factor of physical activity. This is particularly important, because people with spina bifida have lower levels of musculoskeletal function and aerobic fitness<sup>11</sup> and literature supports that physical activity improves physical function and perceived quality of life.<sup>29</sup>

Some limitation from the present study should be acknowledged. First, the cross-sectional design limits the inference of cause and effect relationships. So, we recommend the development of longitudinal studies to identify the determinants of physical activity in children and adolescents with spina bifida. Besides that, longitudinal studies are essential to the identification of correlates of physical activity over the years. Second, data from participation in physical activity were collected via self-report rather than being objectively measured. Although the questionnaires have previously been demonstrated to be both reliable and valid, they could be subject to bias. Objective assessment of physical activity should preferentially be used because it is less prone to bias and provides more precise estimates of the associations between physical activity and the correlate factors. Third, the small sample could limit the validity of the results.

## Conclusion

Despite its limitations, this study adds to the literature some data regarding the socio-demographic and psychological correlates of physical activity participation of children and adolescents with spina bifida. Most of the children and adolescents did not participate in physical activity regularly, and socio-demographic and psychosocial variables were not related to organized and non-organized physical

activity, except perception of competence. More studies needs to be drawn in this area, in order to better understand physical activity correlates in students with disabilities, and outline more appropriate intervention strategies, to promote active and healthy lifestyle.

## Acknowledgments

We thank Professor Bruce Jones for revising the document.

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