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Scientific Research

The Enjoyment of Physical Activity Determines Body Mass Index in Young People with Physical Disabilities

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Abstract

Objective: This study aimed to 1) compare the body mass index (BMI) and patterns of out-of-school activity participation in young people with and without physical disabilities, and 2) examine the relationship between BMI and the activity participation patterns among young people with physical disabilities. Methods: Thirty-nine young persons with physical disabilities (mean age ± standard deviation: 18.79 ± 1.99 years) and 70 healthy individuals (mean age ± standard deviation: 18.64 ± 0.74 years) participated in the study. The diversity, intensity, companionship, location and enjoyment of participation in activities were evaluated using the Children's Assessment of Participation and Enjoyment (CAPE) scale. Body height and weight were obtained and BMI was calculated. Results: People with physical disabilities, regardless of their gender, had significantly lower CAPE-derived scores in almost all types of activity than the control participants ($p < 0.05$). Moreover, BMI was significantly higher in the group with physical disabilities than in the control group ($p < 0.001$). Regression analysis further showed that the CAPE score for physical activity explained 17.2% of the variance in BMI ($p = 0.021$). Conclusion: Young people with physical disabilities generally had lower levels of activity participation and a higher BMI than their healthy counterparts. The perception of enjoyment during physical activities was an important determinant of BMI in this group of participants.

Keywords

Exercise, Obesity, Happiness, Disabled Persons

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1. Introduction

Overweight and obesity in young people with physical disabilities are an important issue because they generate many negative health consequences, such as high blood pressure and hyperlipidaemia, which may persist throughout life [1]. The prevalence of overweight (defined as a body mass index (BMI; an index of weight status) greater than 29.9) and of obesity (defined as a BMI greater than 30) [2] among young people with physical disabilities is currently increasing worldwide, with average rates of 16.7% for overweight and 34% for obesity [1] [3]. Compared with the prevalence of overweight (16.9%) and obesity (3.6%) among healthy individuals [4], the occurrence of obesity is much higher in the physically disabled, and it is therefore essential to identify solutions for this global health problem, particularly in young people with physical disabilities.

Participation in activities, especially physical activities, has been suggested to be an effective intervention for the prevention of obesity in able-bodied populations [5]. However, people with physical disabilities were found to participate less effectively in physical activities [6], and to participate in fewer activities and less frequently than their healthy counterparts [7]. To date, it seems that there is only one study which has proposed that a lower level of participation in activities might be associated with a higher BMI (including overweight and obesity) among people with disabilities [8]. Whitt-Glover and colleagues [8] found that children with Down syndrome participated in fewer physical activities and had higher BMI levels, but did not perform any correlational analyses between these two variables. In addition, their subject group included children with both physical and cognitive impairments (Down syndrome), and mental retardation may have confounded the results. Therefore, it is necessary to evaluate a more homogenous sample (children with physical disabilities only) and determine the direct relationship between patterns of activity participation and BMI.

Because of the complexity of participation, it is also essential to understand its unique pattern—in addition to that of less frequent and participation in fewer activities—among people with disabilities to develop effective intervention strategies to combat obesity. Previous studies have reported that children with physical disabilities had less stable levels of enjoyment [9] and less involvement in community-based activities [6]. However, to our knowledge, little research has systematically assessed and compared the patterns of activity participation (e.g., enjoyment and location) between young people with and without physical disabilities.

This study aimed to address the knowledge gap and the possible limitations of previous studies in this research area. The objective of this study was twofold: to 1) compare the BMI and patterns of out-of-school activity participation in young people with and without physical disabilities, and 2) examine the relationship between BMI and patterns of out-of-school activity participation among young people with physical disabilities.

2. Methods

2.1. Study Design

Although this was a case-control study, because its second aim was to examine the associations between BMI and the patterns of out-of-school activity participation in young people with physical disabilities, it was also cross-sectional in nature.

2.2. Participants

All sample size calculations were based on an alpha of 0.05 (two-tailed) and power of 0.80. According to a previous study that used the Children's Assessment of Participation and Enjoyment (CAPE) questionnaire to assess participation patterns in children with and without physical disabilities [10], the effect sizes of the diversity, intensity, companionship, location and enjoyment scores of activities ranged from 0.22 to 1.20. The mean ± standard deviation of BMI was 19.5 ± 3.4 for the group with disabilities and 16.7 ± 3.4 for the control group [10], which translates into a large effect size (0.82). Assuming an overall effect size of 0.82, the minimum sample size needed was 25 for each group (objective 1). Regarding the regression analysis (objective 2), Dencker *et al.* [11] reported that the percentage of body fat was correlated with vigorous participation in activities ($R^2 = 0.21$) in children. Therefore, a medium to large effect size ($F^2 = 0.27$) was estimated. As a result, a total sample size of 40 was anticipated if two predictors were included in the regression model.

Young people with physical disabilities were recruited by convenience sampling from the Hong Kong Red Cross John F. Kennedy Centre, which is a special school for children with physical disabilities. In addition to studying at a special school, other inclusion criteria were: 1) had major physical disabilities/motor deficits, 2)

were aged 15 years or older (senior students), 3) were of Chinese ethnicity and 4) resided in Hong Kong. Exclusion criteria were: 1) had intellectual disabilities, severe emotional disorder or communication impairment, 2) could not follow instructions, 3) had severe contractures that could affect the measurement of height, 4) were taking medications (e.g., diuretics) or 5) participated in a weight-loss programme that could affect body weight. Control participants (age- and gender-matched) were recruited from the community. The eligibility criteria used for the participants with physical disabilities were also applied to the control group participants, with the exception of the criterion on physical disabilities.

Ethical approval was obtained from the research ethics committee of the administering institute. The study was explained to the participants and their therapists. Written informed consent was obtained from each participant if they agreed to participate in the study and fulfilled the inclusion and exclusion criteria stated above. All procedures were conducted in accordance with the Declaration of Helsinki in 1995.

2.3. Measurements

Relevant information on medical history, mobility status, body height (m) and weight (kg) was obtained from interviews with the participants and their therapists. Patterns of participation in out-of-school time activities were measured using the CAPE. This questionnaire was selected because it is a reliable (test-retest reliability: ICC = 0.65 - 0.75; internal consistency of CAPE intensity scores: Cronbach's alpha = 0.30 - 0.77) and valid (sufficient content and construct validities) self-report measure of participation in out-of-school activities for people aged 6 - 21 years, and generates detailed quantitative outcomes [12] [13]. CAPE includes 55 activities that are categorised under seven types/domains of activity, namely informal activities, formal activities, recreational activities, physical activities, social activities, skill-based activities and self-improvement activities. A detailed classification and the names of the 55 specific activities are presented in Fong *et al.* [14].

In CAPE, participation in activities in each domain is quantified according to five dimensions: diversity, intensity, location, companionship and enjoyment [13]. The following points are a brief description of the five dimension scores of participation; detailed calculation procedures can be found in King *et al.* [13].

1) The diversity score is representative of the number of activities in a domain in which a person has participated during the previous 4 months.

2) The intensity score is the sum of item frequency divided by the total number of items in each activity domain, and reflects the participation frequency for a set of activities.

3) Companionship (participation in activities with others) is measured on a 5-point scale. Lower scores (close to 1) indicate more solitary activities while higher scores (close to 5) indicate greater social engagement. The companionship score is the sum of the "with whom" scores of all activities within an activity domain divided by the person's diversity score within the same domain.

4) Location of participation is scored on a 6-point scale with low scores (close to 1) indicating participation closer to home and high scores (close to 6) indicating greater community-based participation. Similar to the companionship score, the location score is the sum of the "where" scores of all activities within an activity domain divided by the person's diversity score within the same domain.

5) Enjoyment of participation in activities is also measured on a 5-point scale ranging from 1 (do not enjoy at all) to 5 (love it). The enjoyment score is the sum of the item enjoyment scores divided by the person's diversity score within an activity domain [13].

The diversity, intensity, companionship, location and enjoyment scores of the seven activity domains were used for the analyses.

2.4. Data Analysis

Descriptive statistics are reported for all of the relevant variables. The normality of the data was checked using the Kolmogorov-Smirnov test. Differences in the demographic characteristics of the participants with and without physical disabilities were compared using the independent t-test (for continuous data) and the chi-square test (for nominal data). BMI was computed by the equation weight/height^2; the between-group difference was assessed by the independent t-test. Multivariate analysis of variance (MANOVA) was used to compare the CAPE-derived scores (*i.e.*, patterns of activity participation) between groups to avoid an inflated type I error associated with multiple t-tests. In the secondary analysis, the aforementioned statistical procedures were repeated after separation of the data collected from male and female participants.

Pearson's correlation coefficient (r) was used to determine the bivariate association of the BMI with the CAPE-derived scores in participants with physical disabilities. Multiple linear regression analyses were then performed, using BMI as the dependent variable. The selection of predictor variables was primarily based on the results of the correlation analysis, and biological and clinical relevance. In addition, to guard against possible multicollinearity, the degree of association among the predictors was examined using Pearson's r. When a strong correlation existed ($r > 0.5$), the two predictors were not entered into the same regression model [15]. Potential confounding factors, such as age, gender and mobility status, were first entered into the regression model, followed by the relevant CAPE-derived scores. All statistical analyses were performed with IBM SPSS Statistics 20 software (IBM Corporation, NY, USA) and the significant level was set at 5% (two-tailed).

3. Results

3.1. Participant Characteristics and Body Mass Index

The demographic characteristics and BMI of the group with physical disabilities (n = 39) and control group (n = 70) are presented in **Table 1**. The mean age, gender ratios and body weight of the two groups did not differ ($p > 0.05$). However, the group with physical disabilities was significantly shorter in terms of height and had a higher BMI than the control group ($p < 0.001$). Gender-specific analysis revealed similar patterns of differences in height and BMI between the two groups (**Table 1**).

Table 1. Demographic characteristic of participants.

	Group with physical disabilities(mean ± SD)			Control group (mean ± SD)			p value
	All (n = 39)	Male (n = 23)	Female (n = 16)	All (n = 70)	Male (n = 44)	Female (n = 26)	All
Age, years	18.79 ± 1.99	18.74 ± 1.81	18.88 ± 2.28	18.64 ± 0.74	18.64 ± 0.75	18.65 ± 0.75	0.648
Gender (male/female), n	23/16	-	-	44/26	-	-	0.688
Height, cm	150.94 ± 10.22	152.05 ± 5.80***	149.34 ± 14.51***	168.09 ± 7.74	172.25 ± 5.44	161.04 ± 5.70	<0.001***
Weight, kg	49.92 ± 10.49	51.08 ± 9.59**	48.26 ± 11.80	52.96 ± 6.39	56.30 ± 5.04	47.31 ± 4.03	0.063
Body mass index, kg/m^2	21.35 ± 3.09	21.67 ± 3.31***	20.89 ± 2.78***	18.70 ± 1.40	18.98 ± 1.48	18.24 ± 1.15	<0.001***
Mobility status, n							
Wheelchair user	13			0			
Walk with walking aids	6			0			
Independent walker	20			0			
Major causes of physical disabilities/medical diagnosis, n							
Duchennemuscular dystrophy	2			0			
Spinal muscular atrophy	2			0			
Cerebral palsy	16			0			
Spina bifida	1			0			
Stroke	2			0			
Achondroplasia	2			0			
Osteogenesisimperfecta	1			0			
Mucopolysaccharidoses	2			0			
Abnormal muscle tone	1			0			
Unknown	10			0			

Between-group difference: *p < 0.05; **p < 0.01; ***p < 0.001.

3.2. Patterns of Participation in Out-of-School Activities

Young people with physical disabilities, regardless of their gender, had significantly lower CAPE scores of diversity, intensity, companionship, location and enjoyment in almost all types of activity than the control group ($p < 0.05$). Non-significant between-group differences were found in the CAPE companionship scores for formal activities, recreational activities and physical activities only ($p > 0.05$), and the CAPE enjoyment score for recreational activities also demonstrated no significant difference ($p > 0.05$) between the two groups (**Table 2**). Because male and female participants had similar patterns of activity participation, we did not split the group with physical disabilities and control group into gender subgroups in the following correlation and regression analyses.

3.3. Relationships between BMI and CAPE Patterns of Activity Participation in Young People with Physical Disabilities

Although most of the CAPE-derived outcomes were lower in the group with physical disabilities than in the control group (**Table 2**), correlation analysis revealed that BMI was negatively correlated with the CAPE location score ($r = -0.372$, $p = 0.020$) and enjoyment score ($r = -0.429$, $p = 0.006$) for physical activities, and the location score for self-improvement activities ($r = -0.367$, $p = 0.022$) only among young people with physical disabilities. Moreover, the two potential BMI predictors namely, the CAPE location and enjoyment scores for physical activities were highly correlated with each other ($r = 0.700$, $p < 0.001$). Therefore, two separate regression models were used in the subsequent analysis.

In regression model 1, the CAPE enjoyment score for physical activities was used to predict BMI among young people with physical disabilities. After taking age, gender and mobility status into account, the CAPE enjoyment score for physical activities explained 17.2% of the variance ($p = 0.021$) in the BMI (**Table 3**). In regression model 2, as in the previous model, we took age, gender and mobility status into account because these factors may affect BMI [14]. The results showed that the CAPE location score for physical activities was not a significant predictor of BMI ($p = 0.062$) (**Table 3**).

4. Discussion

4.1. Lower Participation in Out-of-School Activities and Higher Body Mass Index in Young People with Physical Disabilities

Young people with physical disabilities had significantly lower CAPE diversity, intensity, companionship, location and enjoyment scores in almost all types of activity than their healthy counterparts (**Table 2**), which showed that they participated in fewer types of activity and were less frequently involved in all of the CAPE activities. In addition, they tended to stay close to their family members and relatives during participation in informal, social, skill-based and self-improvement activities. The location of activity was also closer to their home and they experienced less enjoyment during most of the CAPE activities. Our results are generally in line with the findings from previous studies of children and adolescents with cerebral palsy [12] [16], Duchenne muscular dystrophy [10], acquired brain injury [7] and complex physical disabilities [9] [17]. This consistency in findings was expected because our physically disabled participants included these patient populations (**Table 1**).

Previous studies have suggested many factors that could affect patterns of activity participation in physically disabled persons [18] [19], including environmental resources and support, family income and support, personal preferences for recreation/activity, the gross motor function of an individual [18], age and motivation [19]. Regardless of these complex interrelated causes, the major drawbacks of restricted activity participation, especially in physical activities, of persons with physical disability are a tendency towards obesity, poor fitness and poor health [8]. Indeed, participants in our group with physical disabilities had a higher BMI than those in the control group. Therefore, it is essential to identify directly the participation-related determinants of overweight in young people with physical disabilities.

4.2. Determinants of Body Mass Index in Young People with Physical Disabilities

To the best of our knowledge, this is the first study to examine directly the relationship between weight status and patterns of activity participation in activities among young persons with physical but not intellectual dis-

Table 2. Differential patterns of participation in activities in children with and without physical disabilities.

CAPE-derived outcomes	Group with physical disabilities (mean ± standard deviation)			Control group (mean ± standard deviation)			p value
	All (n = 39)	Male (n = 23)	Female (n = 16)	All (n = 70)	Male (n = 44)	Female (n = 26)	All
Informal activities							
Diversity score	14.85 ± 6.82	13.09 ± 0.49***	17.38 ± 6.68***	23.54 ± 4.00	23.20 ± 3.87	24.12 ± 4.24	<0.001***
Intensity score	1.56 ± 0.73	1.43 ± 0.72***	1.76 ± 0.72**	2.39 ± 0.54	2.43 ± 0.52	2.31 ± 0.58	<0.001***
Companionship score	2.35 ± 0.78	2.53 ± 0.88	2.09 ± 0.52***	2.82 ± 0.48	2.78 ± 0.39	2.87 ± 0.61	<0.001***
Location score	2.74 ± 0.81	2.74 ± 0.66***	2.74 ± 1.00*	3.49 ± 0.67	3.49 ± 0.49	3.49 ± 0.90	<0.001***
Enjoyment score	3.41 ± 0.75	3.45 ± 0.81***	3.35 ± 0.66**	4.00 ± 0.65	3.92 ± 0.45	4.16 ± 0.88	<0.001***
Formal activities							
Diversity score	3.10 ± 2.55	2.96 ± 2.55***	3.31 ± 2.63**	5.31 ± 1.99	5.14 ± 2.06	5.62 ± 1.86	<0.001***
Intensity score	0.80 ± 0.70	0.75 ± 0.65***	0.88 ± 0.78**	1.44 ± 0.71	1.38 ± 0.69	1.53 ± 0.74	<0.001***
Companionship score	3.24 ± 1.44	3.09 ± 1.56	3.46 ± 1.27	3.48 ± 1.15	3.46 ± 1.15	3.50 ± 1.17	0.348
Location score	3.37 ± 1.78	3.06 ± 1.97*	3.80 ± 1.42	4.55 ± 1.64	4.61 ± 1.78	4.46 ± 1.40	0.001***
Enjoyment score	2.88 ± 1.54	2.83 ± 1.56	2.95 ± 1.57**	4.15 ± 1.26	4.04 ± 1.19	4.33 ± 1.37	<0.001***
Recreational activities							
Diversity score	4.28 ± 2.50	3.70 ± 2.40***	5.13 ± 2.47**	6.31 ± 1.81	5.84 ± 1.66	7.12 ± 1.82	<0.001***
Intensity score	1.51 ± 0.91	1.33 ± 0.88***	1.77 ± 0.92	2.05 ± 0.66	1.99 ± 0.65	2.14 ± 0.68	0.001***
Companionship score	2.33 ± 1.17	2.72 ± 1.21	1.78 ± 0.87*	2.66 ± 0.87	2.71 ± 0.80	2.59 ± 1.00	0.099
Location score	1.98 ± 1.36	2.09 ± 1.45*	1.83 ± 1.25*	2.84 ± 1.12	2.86 ± 1.05	2.80 ± 1.26	0.001***
Enjoyment score	3.78 ± 1.37	3.99 ± 1.68	3.50 ± 0.70	4.04 ± 1.29	3.94 ± 1.11	4.21 ± 1.55	0.336
Physical activities							
Diversity score	2.41 ± 2.24	2.39 ± 2.39***	2.44 ± 2.10***	6.06 ± 1.68	6.41 ± 1.67	5.46 ± 1.56	<0.001***
Intensity score	0.78 ± 0.75	0.84 ± 0.86***	0.69 ± 0.56***	1.80 ± 0.65	1.98 ± 0.64	1.50 ± 0.58	<0.001***
Companionship score	2.88 ± 2.08	2.94 ± 2.36	2.78 ± 1.67	3.39 ± 1.01	3.26 ± 0.69	3.61 ± 1.39	0.089
Location score	2.82 ± 1.96	2.81 ± 2.15***	2.84 ± 1.73***	4.85 ± 1.49	4.66 ± 0.79	5.18 ± 2.20	<0.001***
Enjoyment score	2.61 ± 2.01	2.70 ± 2.30***	2.48 ± 1.57***	4.32 ± 1.37	4.17 ± 0.68	4.57 ± 2.07	<0.001***
Social activities							
Diversity score	4.92 ± 2.39	4.39 ± 2.10***	5.69 ± 2.63**	7.47 ± 1.43	7.45 ± 1.41	7.50 ± 1.50	<0.001***
Intensity score	1.99 ± 0.93	1.81 ± 0.84***	2.26 ± 1.00**	3.16 ± 0.75	3.18 ± 0.73	3.14 ± 0.81	<0.001***
Companionship score	2.73 ± 1.24	2.98 ± 1.39	2.37 ± 0.90***	3.23 ± 0.51	3.16 ± 0.48	3.34 ± 0.55	0.004**
Location score	3.15 ± 1.50	3.15 ± 1.52	3.16 ± 1.53	3.66 ± 0.73	3.65 ± 0.71	3.67 ± 0.78	0.020*
Enjoyment score	3.51 ± 1.11	3.57 ± 1.14*	3.43 ± 1.08**	4.12 ± 0.50	4.03 ± 0.45	4.25 ± 0.55	<0.001***
Skill-based activities							
Diversity score	1.67 ± 1.69	1.57 ± 1.65*	1.81 ± 1.80*	2.67 ± 1.39	2.48 ± 1.36	3.00 ± 1.41	0.001***
Intensity score	0.68 ± 0.73	0.56 ± 0.66*	0.84 ± 0.80	1.07 ± 0.71	1.00 ± 0.67	1.19 ± 0.77	0.008**
Companionship score	2.33 ± 1.90	2.27 ± 1.94	2.41 ± 1.90	3.27 ± 2.42	3.53 ± 2.87	2.85 ± 1.34	0.038*
Location score	2.81 ± 2.21	2.58 ± 2.29*	3.14 ± 2.10	4.21 ± 2.81	4.44 ± 3.34	3.83 ± 1.54	0.008**
Enjoyment score	2.37 ± 2.02	2.40 ± 1.99**	2.32 ± 2.12**	4.00 ± 2.08	3.96 ± 2.36	4.09 ± 1.53	<0.001***

Continued

Self-improvement activities							
Diversity score	4.67 ± 2.08	4.00 ± 2.07***	5.63 ± 1.75	6.34 ± 1.56	6.16 ± 1.52	6.65 ± 1.60	<0.001***
Intensity score	1.96 ± 0.97	1.78 ± 0.98***	2.22 ± 0.93	2.68 ± 0.92	2.67 ± 0.80	2.70 ± 1.12	<0.001***
Companionship score	1.85 ± 0.68	1.89 ± 0.74*	1.81 ± 0.60***	2.43 ± 0.76	2.30 ± 0.76	2.65 ± 0.70	<0.001***
Location score	2.87 ± 1.16	2.95 ± 1.10	2.75 ± 1.26*	3.32 ± 0.87	3.32 ± 0.77	3.46 ± 1.01	0.024*
Enjoyment score	2.91 ± 1.02	2.79 ± 1.09***	3.07 ± 0.93***	3.76 ± 0.83	3.63 ± 0.65	3.99 ± 1.04	<0.001***

Between-group difference: *p < 0.05; **p < 0.01; ***p < 0.001 CAPE, Children's Assessment of Participation and Enjoyment.

Table 3. Multiple regression analysis for determining the body mass index in children with physical disabilities.

Model	Predictors	F	R^2 change	Unstandardized regression coefficient (B)	95% confidence interval	Standardized regression coefficient (β)	p value
Model 1	Age	4.436	0.288	0.566	0.136 - 0.997	0.472	0.013*
	Gender (boy = 1, girl = 2)			0.271	−1.452 - 1.994	0.056	0.746
	Mobility status (wheelchair = 1, walking aids = 2, independent = 3)			−0.532	−1.143 - 0.080	−0.350	0.085
	CAPE enjoyment score for physical activities		**0.172**	**−0.537**	**−0.984 - −0.090**	**−0.488**	**0.021***
Model 2	Age	3.573	0.288	0.592	0.142 - 1.043	0.494	0.013*
	Gender (boy = 1, girl = 2)			0.315	−1.494 - 2.124	0.065	0.719
	Mobility status (wheelchair = 1, walking aids = 2, independent = 3)			−0.371	−0.968 - 0.226	−0.244	0.209
	CAPE location score for physical activities		**0.118**	**−0.444**	**−0.913 - 0.025**	**−0.375**	**0.062**

*p < 0.05 CAPE, Children's Assessment of Participation and Enjoyment.

abilities. Our results showed that although the BMI of people with physical disabilities was negatively correlated with the location and enjoyment of physical activities and the location of self-improvement activities, regression analysis showed that only enjoyment of physical activity explained 17.2% of the variance in the BMI (**Table 3**). This finding was not entirely surprising, because enjoyment is determined by the actual engagement in activities among people with physical disabilities [20]. In other words, the level of engagement of an individual in physical activities is proportional to the level of enjoyment s/he would perceive. In addition, the CAPE intensity (*i.e.*, exercise frequency) and enjoyment of participation in activities are related [21]. If a frequency of exercise of 3 - 5 days per week could be achieved and the heart rate could be maintained at 77% - 90% of the maximum for 30 min or more during engagement in physical activities, weight loss could be achieved [2]. In brief, increased enjoyment of physical activities is related to increased engagement therein and greater frequency of exercise, and could thereby reduce the BMI of people with physical disabilities.

Our results also revealed that the location of physical activities was not a significant predictor of BMI, perhaps because, no matter how far the destination was, the mode of transportation was the same. Young people with and without physical disabilities would normally use public transport to go to the venue because in Hong Kong, it is wheelchair accessible, cheap and convenient [22]. As a consequence, energy expenditure or BMI may not be affected.

The major finding of this study—that the enjoyment of physical activity was significantly associated with BMI, accounting for 17.2% of its variance—has important clinical implications. Our results suggested that when designing exercise programmes for weight loss for young people with physical disabilities, one should consider "enjoyment", "preferences of participants" and "fun" in addition to the frequency, intensity, type and duration of exercise [2]. Mere engagement in physical activities cannot combat obesity, especially in persons with physical

disabilities.

4.3. Limitations

This study was cross-sectional in design and causal inferences based on the results could not therefore be established. Moreover, our regression model accounted for only 17.2% of the variance in BMI—that is, enjoyment of physical activity only partially explained BMI in young people with physical disabilities. Many factors that may potentially affect BMI, such as eating behaviour [23], were not measured. These correlates should also be examined in future studies.

5. Conclusion

Young individuals with physical disabilities had generally lower levels of activity participation and a higher BMI than their healthy counterparts. Enjoyment during physical activities is a significant predictor of BMI in this particular group of persons. Our results could lead to improvements in the design of activity programmes to combat obesity in people with physical disabilities.

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