JoDD
Journal on Developmental Disabilities
Volume 29 Number 1, 2024
On-Line First

Health Comparison: Special Olympics Athletes, Active and Inactive Individuals with Intellectual Disability

Author Information

Caroline Faust,[1]
Diane Morin [1]

[1]Department of Psychology, Université du Québec à Montréal, Montréal. QC Canada

Correspondence:

faustcaroline@hotmail.com

Keywords

Health behaviours,
Lifestyle,
Physical activity,
Sport

Author's Note

The study was supported by the *Chaire Dr William-Barakett de déficience intellectuelle et troubles du comportement* and the *Consortium national de recherche sur l'intégration sociale*.

Abstract

Special Olympics International has the world's largest database on the health of people with intellectual disability, but the data are limited to Special Olympics athletes only. To better understand the similarities and differences between people with intellectual disability participating in Special Olympics and other people with intellectual disability, the current exploratory study compared the demographic data and the health of Special Olympics Quebec (OSQ) athletes (N=122) to those of an active group (N=285) and an inactive group (N=226) of people with intellectual disability. We found differences related to age, intellectual disability severity, mobility, work status, medications, podiatry consultations, allergies, migraines, drinking and behavioural disorders. Our study suggests that the inactive group has more impairments and more behavioural disorders, and that the active group differs from the OSQ group only on a few variables. We discuss these results and the need for future research.

Introduction

The prevalence of certain physical health problems (Morin et al., 2012; Ward et al., 2019; Wilson et al., 2018) and mental health disorders (Snoeijen-Schouwenaars et al., 2019) in people with intellectual disability is higher than in the general population (van Timmeren et al., 2016). Various factors may account for these health disparities such as genetics, living environment, mobility and lifestyle (Krahn & Fox, 2014; Krahn et al., 2006). Some studies on people with intellectual disability have found that playing sports can: improve physical fitness (Wilski et al., 2012), enhance oral health (Karjalainen et al., 2002), help develop social skills and friendships (Grandisson et al., 2010), and is correlated with lower levels of anxiety and depression (Carmeli et al., 2009).

There is no question that physical activity is beneficial for both the physical and the mental health of people with intellectual disability, as it is for the general population (Pestana et al., 2018). Studies have shown that these benefits differ depending on the type of physical activity (Calders et al., 2011; Guidetti et al., 2010) and the frequency (Carmeli et al., 2009; Carraro & Gobbi, 2012) with which people with intellectual disability exercise. More specifically, people involved in a competitive sport rather than a recreational activity are generally in better health, as are people who are active more often (Pestana et al., 2018). Certain personal variables have also been shown to influence the amount of physical activity done by individuals with intellectual disability, such as age (Esposito et al., 2012), sex, and intellectual disability severity (Dairo et al., 2016). Special Olympics developed sports programs to encourage this population to be active and created the Healthy Athletes program to improve access to basic health services by offering free health screenings at Special Olympics events. Data collected at these health clinics constitute the world's largest database on the health of individuals with intellectual disability. However, the representativeness of these data is not established. We do not know if the data collected at these health clinics is representative of the general population with intellectual disability or only representative of athletes participating in the special Olympics, who are chosen according to their sport performance. Lloyd et al. (2018) noted that urgent action is needed and that a top priority for the research community is to "explore the similarities and differences between those participating in Special Olympics and those who are not participating with intellectual disabilities" (p. 63).

Better knowledge of the health status of people with intellectual disability promotes understanding of their health needs and increases the chances of developing effective adapted sports programs. Thus, the aim of our exploratory study was to compare demographic and health data of Special Olympics Quebec (OSQ) athletes (N=122) to those of an active group (N=285) and an inactive group (N=226) of people with intellectual disability with the hypothesis that all three groups would show differences on various measures of health.

Materials and Methods

Participants

The participants are divided into three groups: 1) inactive group, 2) active group, and 3) OSQ group. The participants of the first two groups come from a research project on the health of people with intellectual disability (see Morin et al., 2012). This database included 791 people with intellectual disability aged between 15 and 82 years residing in the province of Quebec. The

participants were recruited through specialized provincial agencies providing support for people with intellectual disability and autism spectrum disorders (87.0%), regional health and social services centers, and *Mouvement Personne d'Abord*, a world-wide association for individuals with intellectual disability. The questionnaire was completed by a family member (65.5%), a direct support staff member (26.5%) or the individual with intellectual disability (7.6%). For the present study, all the participants in this sample aged between 18 and 45 years (N=511) were assigned to two comparison groups, i.e., a group doing physical activity at least once a week (active group; M_{age} = 29.59, SD = 7.83) and a group doing physical activity less than once a week or not doing any physical activity at all (inactive group; M_{age}= 31.88, SD = 7.64). The frequency of physical activity was collected by a questionnaire asking the number of times per week that the person practiced physical activity for at least 20 to 30 minutes during the last three months. The third group consists of 122 athletes aged 18 to 45 years (M_{age} = 25.72, SD = 6.20) from across Quebec who took part in the 2017 OSQ Summer Games. A participation rate of 67.03 % (122/182) was obtained. See Table 1 for the participants' demographic data.

Procedure

Recruitment took place during the OSQ Games in Quebec City from June 29th to July 2nd, 2017. Six research assistants went to the different competition sites to recruit parents of athletes wishing to participate in the study. They explained the aims of the study to the parents and what their participation would entail, namely to complete two questionnaires on the health of their child (athlete) on their behalf to not disturb the athletes during the Games. Parents who agreed to participate in the study were given an envelope containing the questionnaires. They had until the end of the Games to return the completed questionnaires to one of the research assistants or they could mail the pre-addressed envelope. The two questionnaires took about 30 to 40 minutes to complete. This study was approved by the Research Ethics Committee on Student Projects involving Human Beings on May 26th, 2017.

Measures

Demographic and health information form

The demographic and health information form contained 46 items, developed by the research team for the previous study on the health of people with intellectual disability (Morin et al., 2012). It was used in the present study to record the athletes' demographic data (sex, age, living environment) and details about their physical and mental health diagnoses, their sexual health (e.g., sexual relations, use of contraceptives), their health-related behaviours (e.g., specialist consultations, tobacco and drug consumption) and their psychological well-being (e.g., physical abuse, psychological abuse), for a total of 113 health variables. In this questionnaire, parents were asked to mark the response or responses applicable to their child and provide further details if necessary. For example, participants were asked to select from a list and check off all physical and mental health diagnosis they had received from a health professional. The questionnaire also had multiple-choice questions such as the last consultation with a specialist (e.g., optometrist, general practitioner, audiologist, orthopedist). The choices were : never, more than 5 years ago, 1 to 5 years ago, less than 12 months ago. In addition to developing a general profile of the

participants, this form was used to compare data from the OSQ group and the other two groups (inactive and active).

Short Form-36 Health Survey, version 2

This measure was used to conduct a general assessment of the parents' perception of the athletes' health. The Short Form-36 Health Survey, version 2 (SF-36v2; Ware et al., 2007), is one of the most widely used standardized questionnaires measuring the physical and mental health of all clinical populations, including people with intellectual disability. This questionnaire assesses eight dimensions of the person's functioning related to health and well-being: physical functioning, role-physical, bodily pain, general health, vitality, social functioning, role-emotional and mental health. It also generates two physical and mental component summary measures. Participants had to check the one box that best describe their answer. Likert-type scales with either 3 points (e.g., very limited, slightly limited, not limited at all) or 6 points (e.g., none, very mild, mild, moderate, severe, very severe) are used, depending on the item, to assess how participants feel and how they were able to carry out their usual activities. The lower the score on each scale, the more severe the participant's physical or mental health problems, as perceived by the respondent. The SF-36v2 has been shown to have good psychometric properties (McHorney et al., 1993).

Data analysis

Demographic data

The statistical analyses were done using Excel 2016 and IBM SPSS Statistics version 25. Descriptive statistics and chi-square tests were performed to develop a profile and compare the demographic data of each group. Age, sex and intellectual disability severity were used as covariates on all analyses, since few studies have examined the influence of these personal variables on the amount of physical activity (Dairo et al., 2016; Esposito et al., 2012). Each diagnosis from the list was considered as a different health variable and the answer was analyzed as a binary variable (having or have not received the health problem).

Physical and mental health

To control for sex, age and intellectual disability severity, binary and multinomial logistic regressions were conducted to compare the results of the inactive, active, and OSQ groups for variables related to physical health (e.g., last annual exam, eating habits) and mental health (e.g., anxiety, psychosis) taken from the demographic and health information form as their items used binary or multinomial scales. Bonferroni corrections (pairwise comparisons) were used as post hoc tests. One-factor analyses of variance were performed to compare the scores of the inactive, active and OSQ groups on the eight scales (continuous dependent variables) and the two summary measures (continuous dependent variables) of the SF-36v2, while controlling for sex, age and intellectual disability severity. Bonferroni corrections (pairwise comparisons) were used as post hoc tests.

Results

The three groups were compared on 113 health variables from the demographic and health information form under the following themes: physical and mental health diagnoses, sexual health, health-related behaviours, and psychological well-being. Table 1 presents the demographic data of each group. Table 2 shows the ten variables where significant differences between the groups were identified. The inactive and active groups reported fewer podiatry consultations ($\chi^2(4) = 14.861$, $p = .005$), more allergies ($\chi^2(2) = 7.072$, $p = .028$) and more migraines ($\chi^2(2) = 8.288$, $p = .018$) than the OSQ group. The inactive group reported having fewer drinks in the previous week ($\chi^2(2) = 14.246$, $p = .007$) and presenting more defiant behaviours towards authority ($\chi^2(2) = 7.205$, $p = .027$), more physical aggression towards others ($\chi^2(2) = 6.521$, $p = .038$), more verbal aggression towards others ($\chi^2(2) = 17.604$, $p < .001$), more aggression towards the environment ($\chi^2(2) = 10.496$, $p = .005$), and more withdrawal behaviours ($\chi^2(2) = 7.079$, $p = .029$) than the OSQ group. Finally, multinomial logistic regressions demonstrated that the number of current medications was higher in the inactive ($\chi^2(1) = 6.245$, $p = .012$) and active groups ($\chi^2(1) = 3.612$, $p = .047$) than in the OSQ group.

Table 1

Comparison of the Demographic Data Between Groups

Variable	Inactive group *N* (%)	Active group *N* (%)	OSQ group *N* (%)	χ^2	*p*	φ
Age				32.41	.000***	.23
Youth (18-24 years old)	50 (22.1)	86 (30.2)	63 (51.6)			
Adults (25-45 years old)	176 (77.9)	199 (69.8)	59 (48.4)			
Sex				4.534	.104	.09
Female	114 (50.4)	131 (46.0)	47 (38.5)			
Male	112 (49.6)	154 (54.0)	75 (61.5)			
ID severity				33.10	.000***	.23
Mild	70 (32.0)	108 (39.0)	58 (47.9)			
Moderate	103 (47.0)	140 (50.5)	61 (50.4)			
Severe	28 (12.8)	22 (7.9)	2 (1.7)			
Profound	18 (8.2)	7 (2.5)	0 (0.0)			
Autism spectrum disorder				5.843	.054	.10
Yes	24 (10.8)	31 (10.9)	23 (18.9)			
No	199 (89.2)	254 (89.1)	99 (81.1)			
Behavioural disorders				12.697	.002**	.14
Yes	124 (56.1)	141 (50.0)	44 (36.1)			

No	97 (43.9)	141 (50.0)	78 (63.9)			
Mobility/getting around				44.339	.000***	.27
Walks independently	155 (68.6)	239 (83.9)	117 (95.9)			
Needs assistance in certain situations	44 (19.5)	34 (11.9)	5 (4.1)			
Needs constant assistance[a]	27 (11.9)	12 (4.2)	0 (0.0)			
Work status				24.749	.000***	.20
Employed	85 (37.8)	130 (45.8)	80 (65.6)			
Unemployed	140 (62.2)	154 (54.2)	42 (34.4)			

Notes. ID = intellectual disability; OSQ = Special Olympics Quebec. Sample sizes vary from 617 to 633.

*$p < .05$. **$p < .01$. ***$p < .001$

[a] Person always needs help to get around or needs an ambulation aid such as a walker or wheelchair, which can be self-propelled or pushed.

Table 2

Logistic Regression Results: Comparison of Health Variables Between Groups

Health variable	Inactive group *N* (%)	Active group *N* (%)	OSQ group *N* (%)	$\chi 2$	*p*
Allergies				7.072	.028*
Yes	65[a] (28.8)	80[a] (28.2)	22[b] (18.0)		
No	161 (71.2)	204 (71.8)	100 (82.0)		
Migraines				8.288	.018*
Yes	23[a] (10.2)	30[a] (10.6)	2[b] (1.6)		
No	203 (89.8)	254 (89.4)	120 (98.4)		
Podiatry				14.861	.005**
No	199[a] (89.6)	261[a] (92.6)	100[b] (82.0)		
< 1 year	13 (5.9)	12 (4.3)	18 (14.8)		
1 to 5 years	10 (4.5)	9 (3.2)	4 (3.3)		
Dentistry				9.861	.043*
No	58[ab] (26.0)	60[b] (21.2)	34[a] (27.9)		
< 1 year	143 (64.1)	181 (64.0)	82 (67.2)		
1 to 5 years	22 (9.9)	42 (14.8)	6 (4.9)		

Drinking (drinks during the last week)				14.246	.007**
None	207[a] (92.4)	242[b] (85.2)	94[b] (77.0)		
1 to 6	17 (7.6)	42 (14.8)	28 (23.0)		
Defiant behaviour towards authority				7.205	.027*
Yes	38[a] (17.2)	32[b] (11.3)	11[b] (9.0)		
No	183 (82.8)	250 (88.7)	111 (91.0)		
Physical aggression towards others				6.521	.038*
Yes	37[a] (16.7)	33[ab] (11.7)	7[b] (5.7)		
No	184 (83.3)	249 (88.3)	115 (94.3)		
Verbal aggression towards others				17.604	< .001***
Yes	43[a] (19.5)	21[b] (7.4)	13[b] (10.7)		
No	178 (80.5)	261 (92.6)	109 (89.3)		
Aggression towards the environment				10.496	.005**
Yes	28[a] (12.7)	21[a] (7.4)	2[b] (1.6)		
No	193 (87.3)	261 (92.6)	120 (98.4)		
Withdrawal behaviours				7.079	.029*
Yes	38[a] (17.2)	31[ab] (11.0)	9[b] (7.4)		
No	183 (82.8)	251 (89.0)	113 (92.6)		

Notes. OSQ = Special Olympics Quebec. Sample sizes vary from 625 to 633.

*$p < .05$. **$p < .01$. ***$p < .001$

[ab] = *N*s designated by different letters are significantly different.

Table 3 compares the scores for the three groups on the SF-36v2 scales and summary measures. There were significant differences between the inactive, active and OSQ groups for physical functioning ($F(2, 624) = 26.622$, $p < .001$) and role-physical ($F(2, 623) = 13.632$, $p < .001$), with the inactive group having the lowest score (e.g. more physical limitations causing more problems with work and other activities), and the OSQ group the highest (e.g less physical limitations and few or no problems with work and other activities). The results on the general health scale ($F(2, 624) = 10.310$, $p < .001$) showed that the inactive and active groups presented significantly poorer health than the OSQ group. On the social functioning scale ($F(2, 624) = 6.973$, $p = .001$), the health of the inactive and active groups had significantly more negative effects on their social activities than the OSQ group. Also, the inactive group presented significantly more limitations due to mental health than the OSQ group and significantly more feelings of depression and nervousness/anxiety compared to the active and OSQ groups, who reported more feelings of peace, happiness and calm ($F(2, 624) = 6.449$, $p = .002$). On the physical component summary ($F(2, 623) = 14.670$, $p < .001$), the inactive group reported more physical limitations, less energy and poorer health than the other two groups, and the OSQ group having fewer physical limitations, more energy and better general health than the two comparison groups.

Table 3

ANOVA Results: Comparison of SF-36v2 Scores Between Groups

SF-36 v2 scores	Inactive group (*N*=226) *M (SD)*	Active group (*N*=285) *M (SD)*	OSQ group (*N*=120) *M (SD)*	F	*p*	η_p^2
Physical Functioning	42.58[a] (12.82)	48.97[b] (10.00)	53.45[c] (6.88)	26.622	<.001***	.079
Role-Physical	46.61[a] (10.58)	49.42[b] (8.74)	52.81[c] (6.64)	13.632	<.001***	.042
Bodily Pain	52.44 (10.46)	53.02 (9.80)	53.66 (7.93)	0.023	.977	.000
General Health	51.12[a] (11.29)	53.79[a] (9.96)	57.61[b] (8.73)	10.310	<.001***	.032
Vitality	53.10[a] (9.75)	55.01[ab] (8.17)	57.40[b] (6.12)	5.508	.004**	.017
Social Functioning	47.96[a] (10.35)	49.62[a] (8.99)	52.66[b] (6.66)	6.973	.001**	.022
Role-Emotional	46.92[a] (12.19)	49.36[ab] (9.03)	51.17[b] (8.07)	4.464	.012*	.014
Mental Health	48.65[a] (9.71)	50.97[b] (8.42)	51.10[b] (7.24)	6.449	.002**	.020
Physical Component Summary	47.72[a] (9.88)	51.32[b] (9.40)	55.24[c] (6.42)	14.670	<.001***	.045
Mental Component Summary	50.11 (11.16)	51.23 (9.16)	51.88 (7.54)	1.302	.273	.004

Notes. OSQ = Special Olympics Quebec.

*$p < .05$. **$p < .01$. ***$p < .001$

[abc] = Means designated by different letters are significantly different

Discussion

The aim of this study was to compare the demographic data and the health of SO athletes to those of an active and an inactive group of people with intellectual disability using a demographic and health information form, and the SF-36v2.

For the demographic and health information form, we found that there are significant differences between groups on the demographic data (e.g. age, intellectual disability severity, mobility, medications). This result is not surprising since certain personal variables can influence the physical activity of individuals with intellectual disability, such as age (Esposito et al., 2012), and intellectual disability severity (Dairo et al., 2016). As expected, our study also showed that the OSQ group and the active group were in better health than the inactive group, who presented with more health problems. In other studies, people with more severe intellectual disabilities have been associated with more impairments (van Timmeren et al., 2016) and more behavioural

disorders (O'Dwyer et al., 2018). Indeed, there was a significant difference between the groups on the level of intellectual disability. However, the significant difference remained after we controlled for this variable on all our analyses. Hence, there may be an association between those with less impairments being more likely to engage in sport.

In our study, significant differences between groups were found on 10 out of 113 health variables analysed. Among these 113 variables, we would have expected to observe significant differences in the following variables: high blood pressure, arterial hypertension, cardiovascular diseases, diabetes, cancer, and obesity, since the practice of regular physical activity reduces the risks of presenting one of these health problems (Faust and Morin, 2022). However, these are not the variables in which we observed differences. In fact, we found that the OSQ group had more podiatry consultations than the inactive and active groups. This could be because the OSQ group has access to free health screenings for their feet (Fit Feet) in the Healthy Athletes clinics during competitions. As for migraines, the number of participants who had migraines was lower in the OSQ group than the other two groups. A plausible explanation is that physical exercise helps to reduce pain intensity (Luedtke et al., 2016) and the number of migraine days (Lemmens et al., 2019). It is also possible that those with migraines are less likely to engage in sport because of sensory factors associated to sport that may trigger these migraines. Concerning allergies, more in-depth analyses allowed us to see which type of allergy differed between the three groups. The only difference was in allergies to medication. More specifically, the inactive group had more allergies to medication than people in the OSQ group. Since the inactive and active groups took a higher number of medications, more allergies may have been detected in those groups since they may have tried more types of medication.

Regarding the number of drinks during the previous week, people in the inactive group consumed significantly less drinks than the two other groups. Mobility and autonomy could play an important role in being able to obtain alcohol without help. The last difference found related to behavioural disorders, which were greater in the inactive group than the active and the OSQ groups. These results could be explained by the fact that those who had behavioural disorders were not selected or did not perform well enough to go to the OSQ Games. Another explanation is that having physical or mental health problems is correlated with behavioural disorders (Crocker et al., 2014). Since those in the inactive group have more serious impairments, they have a higher risk of presenting behavioural disorders. Also, it is possible that someone presenting defiant behaviours towards authority may struggle to participate in organized sports. In addition, a review of the literature noted that people who withdraw socially usually report less physical activities (Salvy et al., 2012). Thus, it would not be surprising to find people presenting withdrawal behaviours in the inactive group. We also hypothesize that a person who presents aggressive behaviours has more difficulty getting into group sports. For all these reasons, it is not surprising to find more participants with behavioural disorders in the inactive group than in the other two groups.

On the SF-36v2, analyses showed that the three groups obtained different scores. The OSQ group was in better health than the active group, which was in better health than the inactive group. Our findings are consistent with the results obtained by Walsh (2016), who concluded that Special Olympics Ireland athletes had a higher (positive) health profile score than individuals who did not participate in Special Olympics Ireland. In the present study, the differences found between the three groups on the physical functioning, role-physical, and general health scales may be partly attributable to there being more people with mobility limitations in the inactive

group (31.4%) than in the active group (16.1%), and in the OSQ group (4.1%), as shown in Table 1. People who have more difficulty getting around alone, inevitably have more physical limitations causing more problems at work or in daily activities, and they rate their health (Benner et al., 2017) and quality of life as poorer than those whose mobility is not limited (Jiang et al., 2016). Another possible explanation is that sport is correlated to a better health in people with intellectual disability (Tint et al., 2016). Hence, people in the OSQ group obtained better results than the other two groups on the physical functioning (e.g., does your health limit you in vigorous activites) and role-physical (i.e., how your physical health has impacted your work or your daily activites) scales. For the mental component summary, there was no difference between the groups which is consistent with the non-significant results obtained from the demographic and health information form, concerning the presence or absence of mental health disorders. In addition, as expected, we found more limitations due to mental health having an impact on work, daily activities (role-emotional scale) and social functioning of people with intellectual disability in the inactive group than the OSQ group. These results correspond with the rate of employability obtained by the demographic and health information form shown in Table 1, which is significantly lower in the inactive group (37.8%) than the OSQ group (65.6%). These results are also in line with our previously discussed results, indicating that there were more behavioural disorders in the inactive group, which had a negative impact on their social functioning and their readiness to participate in sports organizations like the OSQ.

In summary, our findings highlighted differences in age, intellectual disability severity, mobility, work status, medications, podiatry consultations, allergies, migraines, number of drinks per week and the manifestation of different types of behavioural disorders between the inactive group, the active group and the OSQ group. Our study also suggests that the inactive group presented with more impairments and more behavioural disorders than the other two groups, and that the active group differs from the OSQ group only on a few variables. The results on the SF-36v2 showed that the OSQ group was in better health than the other two groups, which is consistent with the theory that being active is associated with less health problems. It would now be relevant to carry out a large-scale study with the Special Olympics Healthy Athletes database to examine if the demographic data and the health differences we obtained are similar. Using the health data from this database to determine if these data could be eventually generalizable to the broader population with intellectual disability is crucial for studying the health needs of all people with intellectual disability and then developing a plan to meet those needs. Henceforth, more studies could be done using this database, which will improve our knowledge on the health of people with intellectual disability. The next step would be to use the data from the Special Olympics Healthy Athletes database and compare them with direct measures (e.g., visual acuity test, analysis of foot structure and gait, dental screening) from people with intellectual disability who do not participate in the Special Olympics. This could determine if the data from this database are applicable to the whole population with intellectual disability and not just Special Olympics athletes. Following the results of these studies, adjustments could be made based on the information collected at the health clinics in order to offer appropriate services for the population with intellectual disability that has specific health needs.

Limitations of the study

Our study has a few limitations which must be considered when interpreting the results. First, this study is exploratory in nature and does not allow for generalization. Second, the data for the inactive and active groups came from a previous database, which means that our samples were collected at different times. Third, the respondents differed from one group to the next, i.e., parents for the OSQ group and a family member, a staff member or the individual him/herself for the inactive and active groups. Parents may have a perception of their child's health that differs from that of a staff member and from what the person with intellectual disability really feels, which may have influenced the results on the SF-36v2. Fourth, some people in the active group may participate in a Special Olympics sports program and therefore their health may be comparable to that of the athletes in the OSQ group. Finally, the data were derived from indirect measures, namely questionnaires.

Key Messages

People with disabilities: You deserve to have access to free health screenings and many sports programs. It is important to know that physical activity improves your physical and mental health.

Professionals: Helping people with disabilities to better understand the benefits of physical activity on their health is crucial to reduce the percentage of inactivity in this population.

Policy makers: Policy to promote a healthy lifestyle among people with disabilities is necessary to help them understand the positive impact of healthy behaviours and physical activity on their health.

Acknowledgments

The authors acknowledge the research assistants from the *Chaire Dr William-Barakett de déficience intellectuelle et troubles du comportement* for their substantial contribution to the data gathering. A special thank you to all the Special Olympics families for their participation.

REFERENCES

Benner, J. L., Hilberink, S. R., Veenis, T., Stam, H. J., van der Slot, W. M. et Roebroeck, M. E. (2017). Long-term deterioration of perceived health and functioning in adults with cerebral palsy. *Archives of Physical Medicine and Rehabilitation, 98*(11), 2196-2205. https://doi.org/10.1016/j.apmr.2017.03.013

Calders, P., Elmahgoub, S., de Mettelinge, T. R., Vandenbroeck, C., Dewandele, I., Rombaut, L., Vandevelde, A. et Cambier, D. (2011). Effect of combined exercise training on physical and metabolic fitness in adults with intellectual disability: a controlled trial. *Clinical rehabilitation, 25*(12), 1097-1108. https://doi.org/10.1177/0269215511407221

Carmeli, E., Barak, S., Morad, M. et Kodesh, E. (2009). Physical exercises can reduce anxiety and improve quality of life among adults with intellectual disability. *International SportMed Journal, 10*(2), 77-85. https://hdl.handle.net/10520/EJC48373

Carraro, A. et Gobbi, E. (2012). Effects of an exercise programme on anxiety in adults with intellectual disabilities. *Research in Developmental Disabilities, 33*(4), 1221-1226. https://doi.org/10.1016/j.ridd.2012.02.014

Crocker, A. G., Prokic, A., Morin, D. et Reyes, A. (2014). Intellectual disability and co-occurring mental health and physical disorders in aggressive behaviour. *Journal of Intellectual Disability Research, 58*(11), 1032-1044. https://doi.org/10.1111/jir.12080

Dairo, Y. M., Collett, J., Dawes, H. et Oskrochi, G. R. (2016). Physical activity levels in adults with intellectual disabilities : A systemic review. *Preventive medecine reports, 4*, 209-219. https://doi.org/10.1016/j.pmedr.2016.06.008

Esposito, P. E., MacDonald, M., Hornyak, J. E. et Ulrich, D. A. (2012). Physical activity patterns of youth with Down syndrome. *Intellectual and developmental disabilities, 50*(2), 109-119. https://doi.org/10.1352/1934-9556-50.2.109

Faust, C., & Morin, D. (2022). Relationship between physical activity and health in individuals with intellectual disability. *British Journal of Learning Disabilities*, 50(4), 532–543. https://doi.org/10.1111/bld.12434

Grandisson, M., Tétreault, S. et Freeman, A. R. (2010). Le sport : promoteur de la santé et de la participation sociale en Déficience Intellectuelle. *Revue Francophone De La Déficience Intellectuelle, 21*, 54-65. https://rfdi.org/index.php/1/article/view/148

Guidetti, L., Franciosi, E., Gallotta, M. C., Emerenziani, G. P. et Baldari, C. (2010). Could sport specialization influence fitness and health of adults with mental retardation? *Research in Developmental Disabilities, 31*(5), 1070-1075. https://doi.org/10.1016/j.ridd.2010.04.002

Jiang, B., Walstab, J., Reid, S. M., Davis, E. et Reddihough, D. (2016). Quality of life in young adults with cerebral palsy. *Disability and Health Journal, 9*(4), 673-681. https://doi.org/10.1016/j.dhjo.2016.04.006

Karjalainen, S., Vanhamäki, M., Kanto, D., Kössi, L., Sewón, L. et Salo, M. (2002). Long-term physical inactivity and oral health in Finnish adults with intellectual disability. *Acta Odontologica Scandinavica, 60*(1), 50-55. https://doi.org/10.1080/000163502753472005

Krahn, G. L. et Fox, M. H. (2014). Health disparities of adults with intellectual disabilities: what do we know? What do we do? *Journal of Applied Research in Intellectual Disabilities, 27*(5), 431-446. https://doi.org/10.1111/jar.12067

Krahn, G. L., Hammond, L. et Turner, A. (2006). A cascade of disparities: health and health care access for people with intellectual disabilities. *Mental Retardation and Developmental Disabilities Research Reviews, 12*(1), 70-82. https://doi.org/10.1002/mrdd.20098

Lemmens, J., De Pauw, J., Van Soom, T., Michiels, S., Versijpt, J., van Breda, E., Castien, R. et De Hertogh, W. (2019). The effect of aerobic exercise on the number of migraine days, duration and pain intensity in migraine: a systematic literature review and meta-analysis. *The Journal of Headache and Pain, 20*(1), 16-24. https://doi.org/10.1186/s10194-019-0961-8

Lloyd, M., Foley, J. T. et Temple, V. A. (2018). Maximizing the use of Special Olympics International's Healthy Athletes database: A call to action. *Research in Developmental Disabilities, 73*, 58-66. https://doi.org/10.1016/j.ridd.2017.12.009

Luedtke, K., Allers, A., Schulte, L. H. et May, A. (2016). Efficacy of interventions used by physiotherapists for patients with headache and migraine - systematic review and meta-analysis. *Cephalalgia, 36*(5), 474-492. https://doi.org/10.1177/0333102415597889

McHorney, A. C., Ware Jr., J. E. et Raczek, A. E. (1993). The MOS 36-Item Short-Form Health Survey (SF-36): II. Psychometric and Clinical Tests of Validity in Measuring Physical and Mental Health Constructs. *Medical Care, 31*(3), 247-263. https://doi.org/10.1097/00005650-199303000-00006

Morin, D., Mérineau-Côté, J., Ouellette-Kuntz, H., Tassé, M. J. et Kerr, M. (2012). A comparison of the prevalence of chronic disease among people with and without intellectual disability. *American Journal on Intellectual and Developmental Disabilities, 117*(6), 455-463. https://doi.org/10.1352/1944-7558-117.6.455

O'Dwyer, C., McCallion, P., Burke, É., Carroll, R., O'Dwyer, M. et McCarron, M. (2018). Prevalence and associated factors of problem behaviours among older adults with intellectual disabilities in Ireland. *Research in Developmental Disabilities, 80*, 192-204. https://doi.org/10.1016/j.ridd.2018.05.007

Pestana, M. B., Barbieri, F. A., Vitorio, R., Figueiredo, G. A. et Mauerberg-deCastro, E. (2018). Effects of physical exercise for adults with intellectual disabilities : a systematic review. *Journal of Physical Education, 29*(1). https://doi.org/10.4025/jphyseduc.v29i1.2920

Salvy, S. J., de la Haye, K., Bowker, J. C. et Hermans, R. C. (2012). Influence of peers and friends on children's and adolescents' eating and activity behaviors. *Physiology & behavior, 106*(3), 369-378. https://doi.org/10.1016/j.physbeh.2012.03.022

Snoeijen-Schouwenaars, F. M., van Ool, J. S., Tan, I. Y., Aldenkamp, A. P., Schelhaas, H. J. et Hendriksen, J. G. (2019). Mood, anxiety, and perceived quality of life in adults with epilepsy and intellectual disability. *Acta Neurologica Scandinavica, 139*(6), 519-525. https://doi.org/10.1111/ane.13085

Tint, A., Thomson, K. et Weiss, J. A. (2016). A systematic literature review of the physical and psychosocial correlates of Special Olympics participation among individuals with

intellectual disability. *Journal of Intellectual Disability Research, 61*(4), 301-324. https://doi.org/10.1111/jir.12295

van Timmeren, E. A., van der Schans, C. P., van der Putten, A. A., Krijnen, W. P., Steenbergen, H. A., van Schrojenstein Lantman-de Valk, H. M. et Waninge, A. (2016). Physical health issues in adults with severe or profound intellectual and motor disabilities: a systematic review of cross-sectional studies. *Journal of Intellectual Disability Research, 61*(1), 30-49. https://doi.org/10.1111/jir.12296

Walsh, D. (2016). *A comparison of physical activity, physical fitness levels, BMI, and blood pressure of adults with intellectual disability, who do and do not take part in Special Olympics Ireland programmes* [mémoire de maîtrise, Université de Dublin]. Doras. http://doras.dcu.ie/21005/1/Final_thesis_Denise_Walsh.pdf

Ward, L. M., Cooper, S. A., Hugues-McCormack, L., Macpherson, L. et Kinnear, D. (2019). Oral health of adults with intellectual disabilities: a systematic review. *Journal of Intellectual Disability Research, 63*(11), 1359-1378. https://doi.org/10.1111/jir.12632

Ware, J. E. J., Kosinski, M., Bjorner, J. B., Turner-Bowker, D. M., Gandek, B. et Maruish, M. E. (2007). *User's manual for the SF-36v2® Health Survey (2nd ed.)* QualityMetric Incorporated.

Wilski, M., Nadolska, A., Dowling, S., McConkey, R. et Hassan, D. (2012). Personal development of participants in Special Olympics unified sports teams. *Human Movement, 13*(3), 271-279. https://doi.org/10.2478/v10038-012-0032-3

Wilson, N. J., Lin, Z., Villarosa, A. et George, A. (2018). Oral health status and reported oral health problems in people with intellectual disability: A literature review. *Journal of Intellectual and Developmental Disability, 44*(3), 292-304. https://doi.org/10.3109/13668250.2017.1409596