

Chronic Diseases, Exercise, and Physical Activity in Childhood: 2016 in Review

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In this year's review I want to make a case for exercise and physical activity in children with chronic disease or disability. Using two 2016 papers I will illustrate the infancy of the field, especially children who are wheelchair using. More efforts are needed to develop better methods to measure physical activity and exercise capacity in this population. In addition, effective interventions are needed to stimulate a healthy active lifestyle in children with disability. I sincerely hope that the 2016 review will stimulate other researchers to investigate physical activity and exercise in children with chronic disease and disability.

Also in this year's review I want to make a case for exercise and physical activity promotion in children with chronic disease or disability. Since it is very difficult for typically developing youth to develop and maintain sufficient levels of physical activity (1), this might be even harder for wheelchair-using youth with disabilities. These children often experience a large number of barriers such as lack of support from people and lack of suitable physical activity infrastructure. Firstly it is important to measure physical activity in children with disability. The motto "once it becomes measurable, it becomes manageable" is also applicable for this topic. This is not always easy. How

to measure physical activity in a 12-year-old boy who is a household walker and uses a wheelchair for longer distances outside the house? This might be a challenge using our current activity monitors. Also many of our activity monitors have difficulties detecting physical activity in children with disability because of their low speed of locomotion, and if they pick up locomotion, they might classify the movement as low intensity but for the child the physiological demand of the activity might be very strenuous.

I hope that the 2016 review will stimulate other researchers to investigate physical activity and exercise in children with chronic disease and disability.

Citation

O'Brien TD, Noyes J, Spencer LH, Kubis HP, Hastings RP, Whitaker R. Systematic review of physical activity and exercise interventions to improve health, fitness and well-being of children and young people who use wheelchairs. *BMJ Open Sport Exerc Med*. 2016 Nov 15;2 (1):e000109.

Aim: To perform a systematic review establishing the current evidence base for physical activity and exercise interventions that promote health, fitness and well-being, rather than specific functional improvements, for children who use wheelchairs. **DESIGN:** A systematic review using a mixed methods design. **Data Sources:** A wide range of databases, including Web of Science, PubMed, BMJ Best Practice, NHS EED, CINAHL, AMED, NIKAN, PsychINFO, were searched for quantitative, qualitative and health economics evidence. **Eligibility:** participants: children/young people aged < 25 years who use a wheelchair, or parents and therapists/carers. **Intervention:** home-based or community-based physical activity to improve health, fitness and well-being. **Results:** Thirty quantitative studies that measured indicators of health, fitness and well-being and one qualitative study were included. Studies were very heterogeneous preventing a meta-analysis, and the risk of bias was generally high. Most studies focused on children with cerebral palsy and used an outcome measure of walking or standing, indicating that they were generally designed for children with already good motor function and mobility. Improvements in health, fitness and well-being were found across the range of outcome types. There were no reports of negative changes. No economics evidence was found. **Conclusions:** It was found that children who use wheelchairs can participate in physical activity interventions safely. The paucity of robust studies evaluating interventions to improve health and fitness is concerning. This hinders adequate

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policymaking and guidance for practitioners, and requires urgent attention. However, the evidence that does exist suggests that children who use wheelchairs are able to experience the positive benefits associated with appropriately designed exercise.

Comment

In this systematic review of the literature of O'Brien et al. (2) sought to determine the effects of physical activity promotion programs and exercise interventions on health, fitness and well-being in wheelchair-using children and young adults. This review is a very informative read, especially the methods section, also for researchers and students who want to conduct a systematic review. Using an extensive search in about a dozen databases, only 31 applicable publications were identified. Using very informative Harvest plots, intervention effects were visualized. Because of the heterogeneity of outcomes, interventions and populations, only general conclusions could be drawn. The available literature demonstrate that youth who are wheelchair using, are able to participate

in various physical activities and exercise. In addition, no adverse events were reported in the available studies, suggesting that it was safe for the participants to participate in these programs. Furthermore, it seems that youth who are using a wheelchair, can have the same improvements in fitness, strength, mobility and quality of life as is usually found in comparable interventions of abled bodied youth. On the other hand, this research shows that a lot of work still needs to be done in this field. Firstly, a core-set of outcome measures for measuring fitness and activity has to be established for this population. Secondly, interventions should be more systematically described so they become more repeatable by clinicians and more detailed recommendations beyond "physical activity seems to be safe and effective" can be provided.

Citation

Shields N, Synnot A. Perceived barriers and facilitators to participation in physical activity for children with disability: A qualitative study. *BMC Pediatr*. 2016 Jan 19;16:9. doi: 10.1186/s12887-016-0544-7.

Background: Children with disability engage in less physical activity compared with their typically developing peers. Our aim was to explore the barriers and facilitators to participation in physical activity for this group. **Methods:** Ten focus groups, involving 63 participants (23 children with disability, 20 parents of children with disability and 20 sport and recreation staff), were held to explore factors perceived as barriers and facilitators to participation in physical activity by children with disability. Data were analyzed thematically by two researchers. **Results:** Four themes were identified (1): similarities and differences (2), people make the difference (3), one size does not fit all, and (4) communication and connections. Key facilitators identified were the need for inclusive pathways that encourage ongoing participation as children grow or as their skills develop, and for better partnerships between key stakeholders from the disability, sport, education, and government sectors. Children with disabilities' need for the early attainment of motor and social skills and the integral role of their families in supporting them were considered to influence their participation in physical activity. Children with disability were thought to face additional barriers to participation compared with children with typical development including a lack of instructor skills and unwillingness to be inclusive, negative societal attitudes toward disability, and a lack of local opportunities. **Conclusions:** The perspectives gathered in this study are relevant to the many stakeholders involved in the design and implementation of effective interventions, strategies and policies to promote participation in physical activity for children with disability. We outline ten strategies for facilitating participation.

Comment

Shields and Synnot (3) conducted a qualitative study among children with disability, parents of children with disability and sport and exercise professionals working with this population. Using focus groups they explored the factors perceived as barriers and facilitators to participation in physical activity by children with disability. Based on the thematic analysis of the data they identified four themes (1) similarities and differences (2), people make the difference (3), one size does not fit all, and (4) communication and connections. What is really great about this paper is that they provide 10 practical strategies to facilitate participation in physical activity and

sports in children with disability. The *individual level strategies* are: Incorporate practical based instructor training in disability; Ask children with disability and their families their preferred activity choices, Introduce flexible or subsidized payment options for families of children with disability, and Encourage children with disability to participate in physical activity from early childhood. The *social level strategies* are lessen the burden on parents of children with disability through financial or social support or incentives, introduce flexible funding arrangements for sports organizations, promote physical activity programs that children with disability can participate in, and ensure children with disability meaningfully participate in physical education at school. At *policy level strategies* develop

partnerships between the sport and disability sectors, local government, and schools, and encourage positive societal attitudes to disability.

References

1. Tremblay MS, Barnes JD, Gonzalez SA, et al. Global Matrix 2.0: Report Card Grades on the Physical Activity of Children and Youth Comparing 38 Countries. *J Phys Act Health*. 2016; 13(11, Suppl. 2):S343–S66. [PubMed](#) doi:10.1123/jpah.2016-0594
2. O'Brien TD, Noyes J, Spencer LH, Kubis HP, Hastings RP, Whitaker R. Systematic review of physical activity and exercise interventions to improve health, fitness and well-being of children and young people who use wheelchairs. *BMJ open sport & exercise medicine*. 2016;2(1):e000109. PubMed PMID: 27900176. Pubmed Central PMCID: 5125427. doi:10.1136/bmjsem-2016-000109
3. Shields N, Synnot A. Perceived barriers and facilitators to participation in physical activity for children with disability: a qualitative study. *BMC Pediatr*. 2016; 16:9. [PubMed](#) doi:10.1186/s12887-016-0544-7