OPEN ACCESS Freely available online

Internal Medicine: Open Access

Commentary

Could Physical Activity in Childhood be a Link in the Development of Cardiovascular Diseases in People Born Extremely Preterm: A Short Commentary

Jenny Svedenkrans*

Department of Neonatal Medicine, K78 Karolinska University Hospital, Huddinge, Stockholm, Sweden

ABSTRACT

Preterm birth implicates an increased risk of neonatal morbidity and mortality, but also of long-term consequences such as increased risk of cardiovascular and metabolic diseases. Fetal and neonatal programming is thought to be an important factor in this development; however environmental factors later in life may also affect the outcome on an individual level. Subgroups of children born extremely preterm exhibit lower levels of physical activity than children born at term, which could be a link in the development of cardiovascular diseases. Further studies are needed to investigate if interventions to increase physical activity could improve long term outcome in this vulnerable group.

Keywords: Exercise; Extremely premature; Accelerometry; Brain injury; Cardiovascular risk

BACKGROUND

Worldwide, around 10% of the children are born preterm, which means being born before 37 weeks of gestation. Preterm birth implicates an increased risk of neonatal morbidity and mortality, but also of long-term consequences such as increased risk of cardiovascular and metabolic diseases [1]. Fetal and neonatal programming is thought to be an important factor in this development [2]; however environmental factors later in life may also affect the outcome on an individual level. Low Physical Activity (PA) in childhood is associated with metabolic risk factors [3] and increased PA may prevent the development of cardiovascular diseases [4]. Given the increased risk of motor impairment, children born preterm could possibly exhibit lower levels of Physical Activity (PA); however the knowledge, especially about children born extremely preterm, is scarce. Most studies include only few children and the results are conflicting.

DESCRIPTION

We recently published a paper in JCM [5] where we investigated the correlation of extremely preterm birth to physical activity at 6.5 years of age. We included 71 children from the Extremely Preterm Infants in Sweden Study (EXPRESS) born before 27 weeks of gestation and 87 control children born at term. To objectively measure PA in daily life, the children were asked to wear an accelerometer on their non-dominant wrist for 7 consecutive days. The main outcome measure was average time per day in Moderate to Vigorous Physical Activity (MVPA). MVPA can be described as the intensity of a brisk walk or higher. It is the activity level that has been shown to be health promoting and children are recommended to spend at least 60 minutes per day in MVPA. We found a difference of 20 minutes spent in MVPA for boys born extremely preterm compared to boys born at term. Furthermore, we found that children born extremely preterm with a severe brain injury (Intraventricular hemorrhage grade III-IV and/or periventricular leukomalacia) spent in average 56 min less per day in MVPA compared with extremely preterm born children without severe brain injury. This group of extremely preterm born children, accounting for around 13% of the children in the index group, spent in average 38 minutes per day in MVPA which is clearly below the recommended 60 minutes per day. This difference was not explained by Cerebral Paresis (CP), only two of these children developed mild CP and, none of the tested children had severe CP. One possible explanation for the difference in PA levels in this group may be the high incidence of Developmental Coordination Disorder (DCD), which has been shown to affect 37% of the children without neurodevelopmental disabilities in this cohort [6] and is known to be correlated to lower PA levels in boys. However, this correlation has not been analyzed in this

Correspondence to: Jenny Svedenkrans, Department of Neonatal Medicine, K78 Karolinska University Hospital, Huddinge, Stockholm, Sweden, E-mail: jenny.svedenkrans@ki.se

Received: March 25, 2021; **Accepted**: April 08, 2021; **Published**: April 15, 2021

Citation: Svedenkrans J (2021) Could Physical Activity in Childhood be a Link in the Development of Cardiovascular Diseases in People Born Extremely Preterm: A Short Commentary. Intern Med. S5.001.

Copyright: © 2021 Svedenkrans J. This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

study. Other possible explanations for lower PA levels could be lower respiratory function or altered cardiovascular development [7], even though not mirrored in our data. More and larger studies are needed to explore physical activity levels, its correlations and implications, in children born preterm.

FUTURE PERSPECTIVES

To answer the question if physical activity could be a link in the development of cardiovascular diseases, more studies are warranted. Future studies should aim to further explore both the reasons and consequences of lower PA levels in children born preterm. Studies should also aim to identify groups of children that could benefit from interventions aiming to increase PA. Specifically, future studies could aim to investigate:

- Are PA levels in childhood related to markers of metabolic and cardiovascular risk factors such as blood pressure, blood-glucose levels and BMI in people born preterm?
- What else can explain differences in PA in children born preterm? What are the correlations to DCD, lung function and cognitive function?
- Do differences in PA persist over time? Are PA levels in childhood associated with cardiovascular and metabolic outcomes in adulthood also in people born preterm? Longitudinal studies would be of interest.

The most important rationale for studies on physical activity in children born preterm is the need for interventions after the neonatal period, which can improve the long-term health in this growing group of survivors of preterm birth. Since PA levels, hypothetically, could be a link to the development of cardiovascular diseases, interventions to increase PA could have an even more positive effect in this vulnerable group.

CONCLUSION

Subgroups of children born extremely preterm exhibit PA levels that are significantly lower than the levels exhibited by children born at term and children born extremely preterm but without severe brain injury. The average time in the health promoting physical activity level MVPA is clearly below the recommended, which could hypothetically imply an increased risk of metabolic and cardiovascular diseases later in life.

ACKNOWLEDGEMENT

To the EXPRESS study group for performing the perinatal data collection and for generously sharing data and to the co-authors of the original study; Orjan Ekblom, Magnus Domellöf, Vineta Fellman, Mikael Norman and Kajsa Bohlin.

CONFLICTS OF INTEREST

The author declares no conflicts of interest.

REFERENCES

1. Markopoulou P, Papanikolaou E, Analytis A, Zoumakis E, Siahanidou T. Preterm birth as a risk factor for metabolic syndrome and cardiovascular disease in adult life: A systematic review and meta-analysis. J Pediatr. 2019;210(7):69-80.
2. Nesterenko T H, Aly H. Fetal and neonatal programming: evidence and clinical implications. Am J Perinatol 2009;26(3): 191-198.
3. Riddoch CJ, Leary SD, Ness AR, Blair SN, Deere K, Mattocks C, et al. Prospective associations between objective measures of physical activity and fat mass in 12-14 year old children: The Avon Longitudinal Study of Parents and Children (ALSPAC). BMJ. 2009;339(11) :b4544.
4. Lee IM, Shiroma EJ, Lobelo F, Puska P, Blair SN, Katzmarzyk PT. Effect of physical inactivity on major non-communicable diseases worldwide: An analysis of burden of disease and life expectancy. Lancet. 2012;380(9838):219-229.
5. Svedenkrans J, Ekblom O, Domellof M, Fellman V, Norman M, Bohlin K. Physical activity in 6.5-year-old children born extremely preterm. J Clin Med. 2020;9(10):3206.
6. Bolk J, Farooqi A, Hafstrom M, Aden U, Serenius F. Developmental Coordination Disorder and Its Association With Developmental Comorbidities at 6.5 Years in Apparently Healthy Children Born Extremely Preterm. JAMA Pediatr 2018;172:765-774.
7. Mohlkert LA, Hallberg J, Broberg O, Rydberg A, Halvorsen CP, Liuba P, et al. The preterm heart in childhood: Left ventricular structure, geometry, and function assessed by echocardiography in 6-year-old survivors of periviable births. J Am Heart Assoc. 2018;7(2):e007742.