Back Pain and Back Injuries in School-aged Children

With a Special Focus on Physical Activity

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Ph.D. Thesis
Odense 2015

Summary in English

Background: Back pain is a common, costly and disabling condition in the general population. Previous studies reported that the occurrence of back pain is already present in childhood and accelerates with increasing age, until by around the age of 18, the condition is as frequent in adolescents as adults. Furthermore, reported back pain in adolescents has increased steadily over the past decades, which might pose a future health challenge given the postulated link between back pain in adolescence and adulthood. It therefore seemed reasonable to investigate the epidemiology of back pain already presenting in childhood in order to gain more knowledge about the condition in a younger population. Another major topic in society today is "physical activity". Physical activity is essential for normal development in children, is important for the prevention of a number of health-related diseases besides being a contributor to social relations and wellbeing of the child. However, the evidence regarding whether physical activity is associated with back pain in children and in what direction is conflicting. An explanation could be that data collection of physical activity in children is a challenging process. Commonly studies used self-reported physical activity as the method of activity measurement. Some limitations to this method is the subjectivity when children are asked to respond to questions about their behaviour, issues of recall errors, the exaggerated perception of time and effort and social desirability.

Objectives: The objectives of this thesis were to describe reported back pain and clinically diagnosed back pain in the form of back injuries and to investigate the association between physical activity and back pain in a cohort of school children.

Methods: To address these objectives, data from the Childhood Health, Activity and Motor Performance School Study Denmark (CHAMPS Study DK) August 2008 to July 2011 was used. In total, 1240 school children, aged 6-12, were surveyed each week with an automated mobile phone text message that asked questions about the presence of any musculoskeletal pain. A telephone consultation served as an initial screen to identify children with trivial back pain complaints and persisting symptoms. If the latter was the case, a clinician assigned to the study examined the child and back pain was diagnosed as a back injury and further classified into a non-traumatic or a traumatic back injury using the International Classification of Diseases (ICD-10). To gain a complete recording of back injuries in the sample, injuries diagnosed in other clinical settings (e.g. emergency departments) were collected in the same period. Physical activity data was collected from text messages and accelerometer measurements.

Results: In total**,** 1240 children participated and a total of 108.283 observations were recorded in the 2.5-year period. The overall weekly incidence and prevalence estimates of reported back pain were 1.1% and 2.4%, respectively and 0.3% and 1%, respectively for diagnosed back pain. Duration of 1-2 weeks was most common and covered 80% of the reported back pain episodes. 60% never reported any back pain throughout the 2.5 years.
When data was presented per survey year, 75% never reported any pain in the cervical, mid back and/or lower back region throughout one survey year. The mean proportion of reported back pain at least once a survey year was 25% halving to 13%, when reported back pain at least twice a year was

considered. The prevalence of reported back pain at least twice was more common in girls with increased age compared to boys, and a trend for reported back pain at least twice a survey year also increased with age.

During the study period 218 children experienced a total of 315 clinically diagnosed back injuries, of these 186 were without specific aetiology (a non-traumatic back injury) and 129 resulted from a specific identifiable event (a traumatic back injury). The incidence rate ratio for a non-traumatic back injury was 1.5 compared to a traumatic back injury. Some children experienced more than one back injury; the range was from zero to four back injury episodes. 14.5% experienced one back injury episode and 3.3% two or more back injury episodes. The overall back injury incidence rate was 0.20 per 1000 PA units (95% CI 0.18 to 0.23). The cervical spine was the most common site for non-traumatic injuries. Girls had a significantly higher risk of sustaining a non-traumatic or traumatic back injury and thus also an overall higher risk of back injury compared to boys. The number of back injuries was highest in sports schools, but when exposure per 1000 physical activity units was taken into consideration, no significant difference in the risk of sustaining a back injury was found between school types. The number of traumatic back injuries was highest in leisure time physical activity. However, when exposure per 1000 physical activity units was taken into consideration, the back injury incidence rates were highest in sports e.g. rates of 2.45 (95% CI 1.28-3.61) in horse riding and 1.25 (95% CI 0.48-2.03) in tumbling gymnastics. In horse riding most traumatic back injuries occurred from falls.

No association was found between any of the different back outcomes and overall mean PA intensity (CPM). There was a tendency towards a protective association between moderate PA and a reported back pain/diagnosed back injury episode. Estimates suggested that children who spent more time in vigorous PA had an increased risk of sustaining a back injury episode (OR 1.22 (1.04-1.42)).

Conclusions and perspectives: This thesis has supplemented the overall knowledge to the area concerning reported and diagnosed back pain in school children aged 6 to 12, by using weekly text messages and evaluation through clinical examination. From a public health viewpoint and for most children the low number of diagnosed “non-trivial” back pain in the form of back injuries is good news. It would have been desirable that larger subsamples of children with back outcomes had been available in order to allow investigation of more potentially associated factors with back pain. As pain assessment in children is complex, health professionals should be vigilant if children (with their parents) seek healthcare for back pain. One direction for future research is to re-conceptualise comprehensive and useful pain assessment in children. Another primary goal for future research is to determine the long-term effects of the association between physical activity and diagnosed back pain/injuries. Longitudinal studies are recommended in larger samples of children using more frequent physical activity measures. Studies also need to focus on behavioural attitudes of the children and the underlying type of physical activity (e.g. high risk sport). This would allow evaluation and intervention in a more refined context of factors potentially influencing children with back pain.