

IS CHILD WEIGHT TO BAG WEIGHT THE BEST WAY TO ASSESS RISK OF LOW BACK PAIN IN CHILDREN DUE TO BACKPACK USE?

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INTRODUCTION

Studies of lower back-pain caused by the carrying of school bags have typically been investigated by using the weight of the bag, the weight of the person, or the height of the person as predictors of low back pain. It is possible that an interaction of these variables such as a body mass index (BMI) to weight of the bag ratio could be more effective in understanding what causes back pain.

METHODS

In this study, 119 children were measured for height, weight, mass of school bag, type of bag, method of carrying, method of getting home, distance from home and self-perceived lower back pain (due to running carrying and lifting), were recorded.

The validated questionnaire [1] was administered to volunteer students (as well as parents/guardians). The study addressed a representative sample of francophone students within grades 4-6 from the Conseil Scolaire du Grand Nord de l'Ontario. Students and their backpacks were weighed at the school on the testing day with a calibrated spring scale. At this time, students also completed the questionnaire. The questions asked were as follows:

How do you get to school?

How long does take to travel from home to school?

How long do you carry your bag for?

How do you carry your bag?

Are there days when you bring your bag home and don't use the contents?

Does carrying your bag make you tired?

Do you think your bag is too heavy?

If you have back pain is it made worse by carrying, lifting or running with your bag?

Each question had a limited selection of answers. Prior to the testing day the parents had consented to participation.

RESULTS AND DISCUSSION

A linear regression showed that, in the children tested, lower back pain could be predicted ($R^2=0.41$) from variables such as weight, height, bag weight, BMI, BMI/bag weight. Among the

physiological measures, the BMI to bag weight ratio had the greatest effect on the linear regression equation (Standardized beta weight=1.11).

Lower back pain due to carrying could also be predicted ($R^2=0.48$). In this case, among the physiological measures, the BMI to bag weight ratio again had the greatest effect on the linear regression equation (Standardized beta weight=1.19).

Lower back pain due to lifting could also be predicted ($R^2=0.36$), however in this case, of the physiological measures the weight of the person had the greatest effect on the linear regression equation (Standardized beta weight=1.815), but only slightly better than the BMI to bag weight ratio (Beta=1.41).

Lower back pain due to running was not found to be significantly predictable. When a discriminant analysis was performed to distinguish between those that had back pain and those that did not, the generated function correctly predicted 80.4% of the cases and the BMI to bag weight ratio was found to be the variable that contributed the most to the equation (s.c.c.c. 2.207).

CONCLUSIONS

The results suggest that considering the ratio of backpack weight to body weight may not be sufficient. A more complex interaction of variables which account, at least partially, for activity level seems to provide a better indicator of LBP risk in children.

REFERENCES

1. Negrini S, et al. *Spine* **27(2)**, 187-95, 2002.

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