Growth of working boys in Jordan: a cross-sectional survey using non-working male siblings as comparisons

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Abstract

Objectives To study the effects of work on growth of Jordanian boys, aged 10–16 years, using non-working male siblings as controls.

Setting The Jordanian areas of Irbid, Jarash and the North Jordan Valley.

Study design Cross-sectional survey of working boys and their non-working brothers.

Main outcomes Height-for-age z-score; weight-for-age z-score.

Methods Working boys (103) and non-working male siblings (103) (nearest in age to the working child) were interviewed, with their mothers, in the family home. Heights and weights of the working boys and their non-working male siblings were measured, and capillary blood was taken for packed-cell volume estimation. Heights and weights were converted to z-scores, and means for all three outcomes were compared between working boys and non-working siblings, using independent sample $t$-tests. The effect of the proportion of household income contributed by the working child’s income on the main outcomes, among non-working siblings, was estimated by simple linear regression.

Results Means for height-for-age z-score ($p < 0.001$), weight-for-age z-score ($p < 0.001$), and packed-cell volume ($p < 0.001$) among working boys were significantly lower than means for their non-working siblings. The main outcomes among non-working siblings were not significantly correlated with the proportion of household income contributed by the working child.

Conclusions The results of this study suggest that work among boys aged 10–16 years in Jordan puts them at increased risk of stunting, wasting and anaemia. Previous studies have suggested this relationship but have suffered from confounding by socioeconomic status. Comparison with non-working siblings reduces the chances of socioeconomic status confounding.

Keywords child labour, growth, siblings, socioeconomic status

Introduction

The International Labour Organization has estimated that globally 100–200 million children are economically active (Habenicht 1994). Previous studies (Satayanarayana et al. 1985; Ellen & Janice 1994; Gross et al. 1996) suggest an association between working and growth, but methodological problems, notably, inadequate accounting for confounding, make these results difficult to interpret. One study suggests that the association between working and growth might be as a result of confounding by socioeconomic status (De La Paz 1990, unpublished PhD thesis). The aim of this study was to overcome the potential for confounding by socioeconomic status of the association of work...
and poor health by comparing growth and packed-cell volume among working children and their non-working siblings.

Methods

The study was carried out in the Jordanian areas of Irbid, Jarash and the North Jordan Valley. These areas contain approximately 20% of the Jordanian population. Irbid is an industrial area; service industries, particularly tourism, predominate in Jarash and the Jordan Valley is the country’s main agricultural area. A sample of 135 working boys, aged 10–16 years, who were not attending school and were either waged or unwaged, was selected using a systematic procedure based on information on child labour in the area, provided by key local informants. Stratification of the sample ensured inclusion of all kinds of work undertaken by boys in the study area. With the permission of their employers, boys were enrolled into the study and, subsequently, interviewed with their mothers in the home, after full explanation of the purpose of the study. Out of this sample, 103 working boys had non-working male siblings who were attending full- or part-time education. Weight and height were measured for index children and non-working siblings (the nearest in age to the working child) in the family home and blood taken by finger-prick for packed-cell volume estimation. Z-scores for height and weight were calculated using the LMS software based on British standards (Child Growth Foundation 1996). Differences between means for working children and siblings were estimated using the independent sample \( t \)-test. To explore the possibility that the health of non-working siblings might be improved by income contributed to the household by the working child, the correlation between the proportion of household income contributed by the working child and health parameters among non-working siblings was estimated by simple linear regression. All analyses were undertaken in SPSS v.8.0 (SPSS Inc. 1998).

Results

The mean age of the index children was 13.4 years (range: 11–15 years) and the siblings 12.9 years (range: 10–15 years). Mean height and weight z-scores and packed-cell volume among working children were significantly lower than those of their siblings (Table 1). No statistically significant correlation was found between weight z-scores \((p = 0.70)\), height z-scores \((p = 0.15)\) and packed cell volume \((p = 0.95)\) among non-working siblings and the proportion of household income contributed by the working child.

Discussion

Confounding by current family socioeconomic status, maternal height and other familial factors is minimized by the use of a sibling comparison group. A study, undertaken in the Philippines, appeared to have adjusted adequately for the confounding effects of socioeconomic status and reported that the differences in growth among working children disappeared on adjustment (De La Paz 1990, unpublished PhD thesis). The findings of this study, however, suggest that child labour is associated with relative impairment of growth and lower packed-cell volume independent of socioeconomic status. Poverty in the Philippines is probably more profound than in Jordan, with the result that its effects on growth may outweigh those of work. It is also possible that the effects of child labour on growth are different in different populations.

It is possible that the income working children contribute to the household might be sufficient to increase food intake among younger siblings.

Table 1. Comparisons of means for growth and packed-cell volume (PCV) of working boys and their non-working male siblings

<table>
<thead>
<tr>
<th>Growth and PCV</th>
<th>Working boys (n = 103)</th>
<th>Non-working male siblings (n = 103)</th>
<th>t-statistic</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Height z-score</td>
<td>-0.277</td>
<td>0.670</td>
<td>-6.42</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>Weight z-score</td>
<td>-0.063</td>
<td>0.701</td>
<td>-5.93</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>PCV</td>
<td>37.05</td>
<td>40.41</td>
<td>-6.74</td>
<td>&lt; 0.001</td>
</tr>
</tbody>
</table>
leading to a differential improvement in growth and packed-cell volume. The outcomes studied, however, were not correlated with the proportion of total household income contributed by the earnings of the working child. It is also possible that the relationship is confounded by a systematic tendency for non-working siblings to receive preferential treatment compared with working children. Although data related to this potential confounder were not collected, the child labour literature does not support this interpretation. It suggests that these children are valued by the families for their economic contribution and are differentially selected by employers for their physical fitness and reduced chance of falling ill (Asogwa 1986). This study suggests that the previously noted association between child labour and impaired growth and health is probably independent of confounding by socioeconomic status, although confounding by other factors cannot be fully excluded.

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HH and NS jointly designed the study. HH collected the data. HH analysed the data with guidance from NS. NS and HH jointly wrote the paper.

**References**


