Effects of child long-term illness on maternal employment: longitudinal findings from the UK Millennium Cohort Study

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Introduction

Over recent decades, government policies in a number of European countries have promoted the uptake of paid work among parents as a route out of poverty.¹ In UK, as in many other European countries, the number of mothers in employment has increased.² However, as the primary carer in most families, mothers may have problems balancing the demands of caring for children and paid employment, particularly if a child has a long-term illness.³ Chronic health problems in children are associated with low maternal labour market participation. This association has been shown with a range of health conditions and definitions of poor health status.⁴⁻⁶

Two potential mechanisms through which an association between childhood long-term limiting illness and low maternal labour market participation might arise are considered. First, there is a common cause, where socio-demographic and maternal health characteristics increase risks of both childhood illness and maternal non-employment.⁹,¹⁰ The relationship between childhood illness and maternal employment status is likely to be complicated by the fact that socio-economic disadvantage is associated with both disability in childhood¹¹ and non-employment;¹² and maternal disability predicts both employment status¹³ and child health problems.¹⁴ Second, having a child with a limiting illness may restrict maternal employment opportunities or precipitate departure from the labour market directly, as a consequence of the complex caring responsibilities required when raising a child with a chronic health condition.¹⁴ Children with a long-term illness are likely to have additional needs compared with other children,¹⁵ which may in turn create difficulties for parents who wish to enter the labour market or remain in employment.¹⁶

Most studies investigating the relationship between childhood illness and maternal employment have used small, cross-sectional or non-representative samples, providing little opportunity to properly investigate mechanisms.⁹ Although there has been some longitudinal research,¹⁷ there is very little European evidence.⁹,¹⁰,¹⁸ In order to investigate these two potential mechanisms, we used longitudinal data from Millennium Cohort Study, a large, contemporary cohort of UK children born in 2000, with information on childhood long-term limiting illness and maternal employment recorded in early to middle childhood. We investigated the extent to which: (i) mothers of children with a limiting long-term illness were less likely to enter or maintain undisrupted employment, after taking account of potential socio-demographic and health covariates indicative of a common cause and (ii) the development of a childhood limiting long-term illness is associated with an increased likelihood of employed mothers leaving the labour market.

Methods

Subjects and design

We examined data from the Millennium Cohort Study (MCS), a longitudinal study of children born in UK in 2000–2002.¹⁹ Survey interviews were carried out in the home with the main respondent (almost always the mother). Our analyses used data from successive
data collection waves when the child was aged 3, 5, 7 and 11 years. The families of 15,381 singleton children were interviewed when the child was 3 years of age. Attrition is a problem common to all cohort studies, and by age 11 years the number of families who had participated in all subsequent waves had declined to 10,702 (70% of the sample at 3 years).

Further exclusions were made when the main respondent was someone other than the mother at one or more waves (in order to investigate maternal employment status and to have a consistent rater of child limiting illness) reducing the sample to 9,973. Of these families, only those with complete data on child limiting illness status (9,831) and maternal employment (9,747) were retained. In logistic regression models including time-invariant and time-varying covariates recorded at the 3 year wave, those with missing data on covariates were excluded, reducing the sample to 9,634. In fixed effects models, full data were required for time-varying covariates between 3 and 11 years, reducing the sample to 9,636 children. The analytic sample for fixed effects analyses was based on 4,004 children where there was a change in maternal employment status during the course of the study. Data were obtained from the UK Data Archive, University of Essex on 14th February 2014.

Limiting long-term illness
At ages 3, 5, 7 and 11 years, mothers reported whether their child had any long-term conditions that limited their ability to perform daily activities. A binary measure was derived based on whether the child had a reported limiting long-term illness at any wave between ages 3–11 years.

Maternal employment
Mothers of the children reported their current employment status at each of the data collection waves. Cross-sectionally, from 3 to 11 years, the risk of not being in employment (compared with being employed) was greater for mothers of children with a limiting illness. However, there were no differences according to intensity of employment (full-time vs. part-time) and so full-time and part-time were combined into a single employed group for further analyses.

In order to examine stability and change in employment status during the period when the child was between 3 and 11 years of age, three summary trajectories for maternal employment were derived: those who entered or maintained employment, those who experienced disruption (characterised by at least one transition out of employment) and those who were not employed at any wave.

‘Common cause’ factors
To account for ‘common cause’, or confounding, factors for both child limiting long-term illness and maternal employment, we adjusted for a number of covariates. Time-invariant maternal characteristics were captured at baseline: mothers’ highest qualification and age at the birth of the cohort child. Other factors that were more likely to vary between waves were: maternal long-term illness, and household characteristics (lone parent family, number of children in the household). In multinomial logistic regression analyses, we adjusted for these at 3 years of age. As a sensitivity analysis, we repeated these analyses adjusting for covariates at 11 years. There was no difference in the pattern of results, and so only those for covariates at 3 years are presented.

Statistical analysis
All analyses were conducted in Stata/SE 13 (Stata Corporation, TX), ‘svy’ commands to allow for clustered sampling design and attrition up to 11 years. Weighted percentages (using survey and non-response weights) and 95% confidence intervals (CIs) of childhood limiting illness and covariates were calculated according to employment trajectories. We used logistic regression to estimate odds ratios (ORs) and 95% CIs for non-employment by childhood limiting illness at each wave.

Multinomial logistic regression models were used to estimate Relative Risk Ratios (RRRs) and 95% CIs for employment disruption or continuous non-employment between ages 3–11 years (baseline continuous employment or entering employment), according to any occurrence of childhood limiting illness across the same period. Analyses were conducted unadjusted and adjusted for potential ‘common cause’ covariates at baseline.

We also tested whether the development of a childhood limiting illness was associated with a subsequent labour market exit. We used fixed effects models to estimate ORs and 95% CIs for exiting employment associated with a change in child limiting illness, unadjusted and adjusted for time-varying covariates (maternal lone parent status, long-term illness and number of children in the household).

Results
Cross-sectional analyses
The prevalence of reported child limiting long-term illness increased from 3% (284) at 3 years to 8% (700) at 11 years. Over the same period, maternal employment increased from 49% (5036) to 67% (6691). However, at every age, mothers of children with a limiting illness were less likely to be employed than other mothers. This discrepancy in proportion of mothers in employment increased with every wave, from 3 years (no child limiting illness: 50% mothers employed vs. child limiting illness: 39% mothers employed) to 11 years (no child limiting illness: 69% employed vs. child limiting illness: 53% employed), with an increase in the odds of non-employment associated with child limiting illness from OR = 1.53 [CI: 1.17, 2.01] at 3 years to OR = 1.91 [CI: 1.59, 2.30] at 11 years.

Continuous non-employment
The majority of mothers entered or maintained employment (59%), while similar proportions either experienced disruption (20%) or never entered paid employment (21%) during the study period. Compared with mothers who entered or maintained employment, those who never entered employment had a higher prevalence of having a child with a limiting illness between 3 and 11 years (table 1). They were also more likely to have a long-term illness themselves, to have three or more children in their household, to live in a lone parent household, to have been younger at the birth of the cohort child and to have lower or no educational qualifications. In a multinomial model, with mothers who entered or maintained employment as the baseline group (table 2), those who reported a child with a limiting long-term illness had a raised risk of never being employed. Adjusting for ‘common cause’ factors attenuated this association, but it remained elevated (RRR = 1.46 [CI: 1.21, 1.76]).

Disrupted employment
Prevalence of child limiting illness between 3 and 11 years was also greater among mothers who had experienced disrupted employment during this period, compared with those who entered or maintained employment (table 1). The ‘common cause’ factors reported by mothers with disrupted employment histories tended to fall between those of the other two employment trajectory groups, with a greater likelihood of possessing characteristics indicative of ill health and lower socio-economic circumstances than those who entered or maintained employment, but a lower likelihood than those who had never been employed. Differences between the disrupted and never employed trajectories were greatest for
number of children in the household (three or more), lone parent status, maternal age at birth (14–19 years) and highest qualification achieved (no qualifications). In the multinomial model (Table 2) there was a significantly elevated risk of disrupted maternal employment among those who had a child with a limiting illness, which remained after adjusting for the covariates (RRR = 1.26 [CI: 1.06, 1.49]).

Impact of the development of child limiting long-term illness on leaving the labour market

The previous analysis identified that child limiting illness occurring at any point throughout early to middle childhood was associated with disrupted employment over the same period. We also used fixed effects models to examine whether the reporting of a new limiting illness in a cohort child between two data collection points was associated with an increased risk of exiting employment over the same two points in time. If a child developed a limiting illness between waves, the odds of their mother exiting employment was increased (OR = 1.28 [CI: 1.06, 1.54]) compared with children who did not develop a limiting illness. This result was not attenuated by adjustment for time-varying covariates: maternal long-term illness, number of children in the household and lone parent status (OR = 1.27 [CI: 1.05, 1.54]).

### Table 1

Prevalence of child limiting long-term illness and covariates, according to maternal employment trajectories when child aged between 3 and 11 years (n = 9634)

<table>
<thead>
<tr>
<th>Child limiting long-term illness reported at 3, 5, 7 or 11 years</th>
<th>Entered or maintained employment (n = 5892) Percent [95% CIs]</th>
<th>Experienced disrupted employment (n = 1830) Percent [95% CIs]</th>
<th>Never entered employment (n = 1912) Percent [95% CIs]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>12.6 [11.6, 13.7]</td>
<td>16.6 [14.6, 18.8]</td>
<td>20.3 [17.9, 22.8]</td>
</tr>
<tr>
<td>No</td>
<td>97.4 [96.3, 98.5]</td>
<td>83.4 [81.2, 85.5]</td>
<td>80.7 [77.2, 84.3]</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Covariates</th>
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<tbody>
<tr>
<td>Number of children in household at 3 years</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
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<tr>
<td>Lone parent household at 3 years</td>
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<tr>
<td>Maternal highest qualification at 3 years</td>
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</tbody>
</table>

### Table 2

Relative risk ratios [95% CIs] for disrupted employment or never entering employment, according to child limiting long-term illness (3, 5, 7 or 11 years) (n = 9634)

<table>
<thead>
<tr>
<th>Unadjusted</th>
<th>Entered or maintained employment</th>
<th>Experienced disrupted employment</th>
<th>Never entered employment</th>
</tr>
</thead>
<tbody>
<tr>
<td>No limiting long-term illness</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Child limiting long-term illness</td>
<td>1.00</td>
<td>1.38 [1.18, 1.61]</td>
<td>1.76 [1.48, 2.09]</td>
</tr>
</tbody>
</table>

Adjusted for covariates

| No limiting long-term illness | – | – | – |
| Child limiting long-term illness (adjusted for covariates) | 1.00 | 1.26 [1.06, 1.49] | 1.46 [1.21, 1.76] |

*a: Mothers’ age at cohort child birth, maternal highest qualification, maternal long-term illness, number of children in household (all measured at baseline).
Discussion

Using a national cohort of UK children followed from 3 to 11 years, we found evidence of an association between childhood limiting long-term illness and maternal labour market participation. Levels of maternal employment increased over time as children in the sample entered middle childhood. During the same period, prevalence of limiting illness in the cohort children also increased. Levels of employment did not increase to the same extent for mothers in families containing a child with a limiting illness.

These results are in line with the existing literature, much of which is cross-sectional. However, we hypothesised two potential causal pathways between childhood illness and maternal employment. First, ‘common cause’ posits that there would be common socio-demographic and health predictors of both childhood illness and maternal employment. Mothers who were never employed or who exited employed were more likely to be socio-economically disadvantaged or to report health problems than those who were continuously employed or entered and remained in employment. Our results, however, showed that the relationship between childhood illness and maternal employment remained, although attenuated, after adjustment for the covariates, which indicates that ‘common cause’ does not offer a full explanation. Nevertheless, it is possible that other, unmeasured, ‘common cause’ factors may underlie these results.

Second, we proposed that having a child with a limiting illness may restrict maternal employment opportunities or precipitate a departure from the labour market. Our findings support this hypothesis. We found that mothers who reported that their child had a limiting illness at one or more data collection waves were at an increased risk of never having been employed or having had an unstable employment history during this period. In addition, results from fixed effects models showed that the development of a limiting illness was associated with mothers exiting employment. These findings suggest that having a child with a limiting illness may reduce opportunities both for mothers to maintain employment and, for non-employed mothers, to seek employment.

This study is novel in providing European evidence on the relationship between childhood illness and maternal employment among children progressing from early to middle childhood. A particular strength of our study is the use of the large, UK-representative MCS, which allowed us to follow children over time and to distinguish between the two competing mechanisms. However, most longitudinal studies, including the MCS, are subject to attrition and, for non-employed mothers, to seek employment.

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**Disclaimer**

The views expressed in the publication are those of the authors and not necessarily those of the Department of Health.

**Conflicts of interest:** None declared.

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**Key Points**

- We used longitudinal data to examine the effects of child limiting long-term illness on maternal employment, testing whether any relationship could be explained by ‘common cause’ factors vs. the direct impacts caring responsibilities may have on mothers’ employment opportunities.
- Childhood illness was associated with non-employment and disrupted employment, after adjusting for covariates, suggesting that a ‘common cause’ hypothesis does not offer a full explanation.
- The findings suggest that there needs to be consideration of how to support the employment decisions of parents of children with a chronic health problem or disability.

**References**