The effect of a transition into poverty on child and maternal mental health: a longitudinal analysis of the UK Millennium Cohort Study

Sophie Wickham, Margaret Whitehead, David Taylor-Robinson, Ben Barr**

Summary

Background Whether or not relative measures of income poverty effectively reflect children's life chances has been the focus of policy debates in the UK. Although poverty is associated with poor child and maternal mental health, few studies have assessed the effect of moving into poverty on mental health. To inform policy, we explore the association between transitions into poverty and subsequent mental health among children and their mothers.

Methods In this longtitudinal analysis, we used data from the UK Millennium Cohort Study, a large nationally representative cohort of children born in the UK between Sept 1, 2000, and Jan 11, 2002, who participated in five survey waves as they progressed from 9 months of age to 11 years of age. Our analysis included all children and mothers who were free from mental health problems and not in poverty when the children were aged 3 years. We only included singletons (ie, not twins or other multiple pregnancies) and children for whom the mother was the main respondent to the study. The main outcomes were child socioemotional behavioural problems (Strengths and Difficulties Questionnaire) at ages 5 years, 7 years, and 11 years and maternal psychological distress (Kessler 6 scale). Using discrete time-hazard models, we followed up families without mental health problems at baseline and estimated odds ratios for subsequent onset of maternal and child mental health problems associated with first transition into poverty, while adjusting for confounders, including employment transitions. We further assessed whether or not change in maternal mental health explained any effect on child mental health.

Findings Of the 6063 families in the UK Millennium Cohort study at 3 years who met our inclusion criteria, 844 (14%) had a new transition into poverty compared with 5219 (86%) who remained out of poverty. After adjustment for confounders, transition into poverty increased the odds of socioemotional behavioural problems in children (odds ratio 1·41 [95% CI 1·02–1·93]; p=0·04) and maternal psychological distress (1·44 [1·21–1·71]; p<0·0001). Controlling for maternal psychological distress reduced the effect of transition into poverty on socioemotional behavioural problems in children (1·30 [0·94–1·79]; p=0·11).

Interpretation In a contemporary UK cohort, first transition into income poverty during early childhood was associated with an increase in the risk of child and maternal mental health problems. These effects were independent of changes in employment status. Transitions to income poverty do appear to affect children's life chances and actions that directly reduce income poverty of children are likely to improve child and maternal mental health.

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*Contributed equally

Department of Public Health and Policy, University of Liverpool, The Farr Institute @ the Health eResearch Centre, Liverpool, UK (S Wickham PhD, Prof M Whitehead PhD, Prof D Taylor-Robinson PhD, Ben Barr PhD)

Correspondence to: Dr Sophie Wickham, Department of Public Health and Policy, University of Liverpool, The Farr Institute @ the Health eResearch Centre, Liverpool L69 3GL, UK **slw@liverpool.ac.uk**

Introduction

Child mental health is poor in the UK.[1,2] Roughly one in eight children in the UK aged 10–15 years reported symptoms of mental ill health between 2011 and 2012.[3] Maternal mental health is an important determinant of child physical and mental health outcomes.[4] Maternal depression and anxiety is experienced by around 10–15% of women in the UK and other high-income countries.[5] The public health consequences of poor mental health in childhood are complex and far-reaching. Poor child mental health is associated with absence from school, poor educational attainment,[6] impaired cognitive development, social isolation, low self-esteem, discrimination, poor mental and physical health in adulthood, and a shortened lifespan.[4,7,8] Child and subsequent adult mental health problems were estimated to cost £105 billion in 2009–10 in England, incorporating human costs, output losses, and health and social care costs.[9]

Child poverty is an important risk factor that might partly explain poor mental health outcomes in UK children.[10,11] 19% of children in the UK are living in poverty (below 60% of the national median household income before housing costs), and this proportion is projected to rise substanitally up to 2020,[12] with 200 000 additional children moving into poverty in 2014–15.[13] Findings from a systematic review[14] have shown how socioeconomically disadvantaged children and adolescents were two-times to three-times more likely to develop mental health problems than were

Research in context

Evidence before this study

Three previous systematic reviews have assessed the effect of poverty and income on child and adult mental health outcomes. The authors did extensive searches of databases (EconLit, the International Bibliography of the Social Sciences, MEDLINE, PsychInfo, SocIndex, the British Education Index, PubMed, Embase, the Social Science Citation Index, and Psyndex), including published and grey literature between 1988 and 2013, for all studies using validated measures of both income or financial resources and mental health. Two of the reviews focused on studies designed to establish a causal link between income and mental health. These reviews suggest a causal relationship between child poverty and adverse health outcomes. We updated the search using PubMed up to Oct 31, 2016, searching for articles published in English, with the search terms ("socioeconomic" OR "socio-economic" OR "disadvantage" OR "poverty" OR "social class" OR "SES" OR "poor" OR "deprivation") AND ("mental health" OR "wellbeing" OR "well-being" OR "socioemotional" OR "socio-emotional" OR "behaviour*" OR "depression" OR "anxiety"). We found that investigators of studies to date that have examined poverty transitions have predominantly been based in the USA and assessed specific so-called natural experiments in the reverse direction—ie, looking at the effect on health of movement of people out of poverty. No studies included in these reviews or in our updated search have investigated the effect of transitions into poverty during the early life of children on their and their parents' mental health.

Added value of this study

In a contemporary UK cohort, we assessed the effect on mental health of a first transition into poverty in a nationally representative sample of mothers and children who did not have pre-existing mental health problems and were not previously in poverty. First transition into income poverty was associated with a significant increase in the risk of child and maternal mental health problems. The effect of poverty on child mental health was partly explained by increases in maternal psychological distress.

Implications of all the available evidence

This study has strengthened the argument for a causal relationship between poverty and adverse mental health outcomes. Findings from our study indicate that predicted increases in child poverty in the UK and elsewhere are likely to negatively affect child and maternal mental health. Our findings reinforce the need to maintain income-based measures of child poverty to monitor trends and effects on health of policies that affect children's lives.

non-disadvantaged children and that low socioeconomic status that persisted over time was strongly related to higher rates of mental health problems.

Very few studies have investigated the effect of transitions into poverty on child or adult mental health in particular.[15–17] Authors of two systematic reviews[4,18] have suggested that improvements in household financial resources are associated with improved children's outcomes and adult mental health. The studies to date that have examined poverty transitions have predominantly been based in the USA and assessed specific so-called natural experiments in the reverse direction—ie, looking at the effect on health of movement of people out of poverty.[15] Findings from these studies are not necessarily generalisable to other contexts outside of the USA, such as the UK, and do not address the question of the effect on health of moving into poverty.

Policy debate in the UK has focused on use of child poverty measures for policy purposes and on whether or not they meaningfully reflect children's life chances. Early in 2016, the UK Government proposed replacing its statutory child poverty targets based on income with indicators of child disadvantage that were not specifically related to income, namely living in workless households, low educational attainment, family instability, and addiction.[19] In particular, the Government has argued that strategies to improve children's life chances should focus on an increase of parental employment rather than welfare cash transfers, which can reduce income poverty without changing employment status.[19] We therefore assess whether or not movement into poverty during a child's early life is relevant for children's and mothers' mental health, independent of any effect of employment status, using the UK Millennium Cohort Study (MCS).[20]

Methods

Study design and population

In this longtitudinal analysis, we used data from the MCS, a large nationally representative cohort sample of children born in the UK between Sept 1, 2000, and Jan 11, 2002, who have been followed up through five survey waves, when the children were aged 9 months (wave 1), 3 years (wave 2), 5 years (wave 3), 7 years (wave 4), and 11 years (wave 5).[21] The study oversampled children living in disadvantaged areas and in those with high proportions of ethnic minority groups by means of a stratified cluster sampling design. Our analysis included all children and mothers who were free from mental health problems and not in poverty when children were aged 3 years (wave 2), the first wave when child and maternal mental health data were collected. We only included singletons (ie, not twins or other multiple pregnancies) and children for whom the main respondent to the study was the mother to ensure reliable and consistent comparisons over time. This analysis did not require additional ethical approval.

Procedures

The main outcomes were child socioemotional behavioural problems and maternal psychological distress. We assessed children's socioemotional behaviour using the Strengths and Difficulties Questionnaire (SDQ) when the children were aged 3 years, 5 years, 7 years, and 11 years on the basis of maternal report. The SDQ is a 25 item measure that asks parents to rate their child's behaviour over the previous 6 months using five subscales, each with five items: peer problems, conduct disorders, hyperactivity, emotional problems, and prosocial behaviour. We used the total difficulties score (which excludes the prosocial behaviour items) using validated cutoffs widely used in previous studies[22] for which a score of 0–16 indicates normal to borderline behaviour and 17–40 indicates socioemotional behavioural problems.[23] The SDQ has good internal consistency (Cronbach α 0·77) in the study sample. We used the Kessler 6 (K6) scale to identify psychological distress in mothers. This measure asks in the last month how often respondents felt depressed, hopeless, restless or fidgety, worthless, or that everything was an effort. Respondents answered on a five-point scale from 1 (all the time) to 5 (none of the time). We reversed and rescaled all items from 0 to 4 for analysis purposes, so that high scores indicate high levels of psychological distress. We used validated cutoffs, contrasting normal (0–5) and distress (6–24) scores.[24] The K6 scale has good internal consistency (α 0·81) in the study sample.

The main exposure of interest was relative income poverty, defined as household equivalised income of less than 60% of national median household income equivalised according to the Organisation for Economic Co-operation and Development household equivalence scale (appendix pp 1–2).[25] We were able to capture first transition into poverty by comparing children and mothers (who were not previously in poverty) who moved into poverty at ages 5 years, 7 years, or 11 years (coded as 1) with those who remained out of poverty (coded as 0). Once participants have transitioned into poverty we subsequently considered them to be exposed.

Statistical analysis

We considered the following baseline variables as potential confounding factors associated with the exposure of interest (poverty)[26] and outcomes (child and maternal mental health):[22] child and maternal ethnicity (white or non-white), child sex, age of the mother at cohort child birth, household setup (whether living in a single-parent or single-carer household or in a two-parent or two-carer household), and previous diagnosis of depression or anxiety. We included the number of children (siblings plus cohort child) in the household and employment status as potential time-varying confounders as birth of an additional child will affect the equivalised household income and might influence the mental health of the mother. We controlled for employment to distinguish the effects of transitions into income poverty from those of employment transitions. We modelled the duration that the mother and child were free from mental health problems on the basis of the child's age.

We estimated discrete time hazards survival models[27,28] to follow up families that were free of mental health problems at baseline (as measured by the SDQ and K6 scale) and investigate whether or not first transition into poverty was associated with onset of new mental health problems conditional on being free of mental health difficulties up to that time. Mothers and children that were free of mental health problems at baseline are included in the dataset until they either develop a mental health problem, reach the end of the time period of the study, or were lost to follow-up. Logistic regression in this context provides a discrete time equivalent to a continuous time survival model,[27,28] estimating the relative risk of development of mental health problems associated with first transition into poverty (appendix p 3). Initially, we estimated survival curves showing the proportion of children and mothers remaining free of mental health problems at each wave. We also estimated survival curves indicating the proportion of children and mothers entering poverty at each wave.

We then estimated three regression models. First, we assessed the unadjusted relationship between first transition into poverty and new-onset mental health

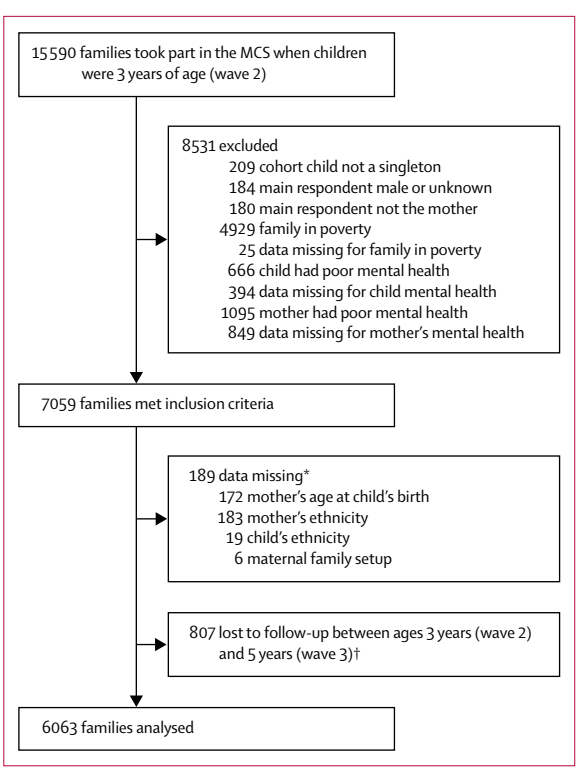

Figure 1: **Study flow diagram**
MCS=Millennium Cohort Study. *Data could be missing for more than one category. †A further 657 families were lost to follow-up between ages 5 years (wave 3) and 7 years (wave 4) and a further 732 were lost between ages 7 years (wave 4) and 11 years (wave 5). We included these participants in the analysis because they provided data at age 5 years (wave 3).

See Online for appendix

outcomes for mothers and children separately (model 1); second, we included confounders in this model (model 2); and third, we included maternal psychological distress in the adjusted model to test if this attenuated any effect of poverty transitions on child mental health (model 3).[29] Further statistical analysis detail is given in the appendix (pp 3–5). We did all analyses in Stata version 14. We compared the study sample characteristics with the total possible sample on the basis of our inclusion criteria.

To test the robustness of the main analysis, we repeated these models under different specifications: first, using longitudinal weights to account for attrition and response bias; second, excluding maternal employment from the model; third, lagging the exposure (poverty) by one wave; and fourth, using a linear random-effects model with continuous SDQ and K6 scale scores as outcomes. We further analysed the level of attrition from the MCS to investigate whether or not development of mental health problems was associated with loss to follow-up (appendix p 15).

	Remained out of poverty (n=5219)	Moved into poverty (n=844)	p value
Child socioemotional behavioural problems*	..	..	<0·0001
No behavioural difficulties	5002 (96%)	774 (92%)	..
Difficulties	217 (4%)	70 (8%)	..
Maternal psychological distress†	..	..	<0·0001
No distress	4331 (83%)	589 (70%)	..
Distress	888 (17%)	255 (30%)	..
Previous diagnosis of depression or anxiety	..	..	<0·0001
No	3977 (76%)	555 (66%)	..
Yes	1242 (24%)	289 (34%)	..
Child's sex	..	..	0·42
Male	2657 (51%)	417 (49%)	..
Female	2562 (49%)	427 (51%)	..
Mother's age at child's birth (years)‡	..	..	<0·0001
14–24	397 (8%)	200 (24%)	..
25–29	1252 (24%)	224 (27%)	..
30–34	2149 (41%)	286 (34%)	..
≥35	1421 (27%)	134 (16%)	..
Child's ethnicity	..	..	0·002
White	4957 (95%)	780 (92%)	..
Non-white	262 (5%)	64 (8%)	..
Mother's ethnicity	..	..	0·01
White	5001 (96%)	792 (94%)	..
Non-white	218 (4%)	52 (6%)	..
Number of carers in household at age 3 years	..	..	<0·0001
Two carers or parents	5039 (97%)	735 (87%)	..
Single carer or parent	180 (3%)	109 (13%)	..
Number of children in household‡§	..	..	<0·0001
1	817 (16%)	132 (16%)	..
2–3	4100 (79%)	591 (70%)	..
4–5	291 (6%)	111 (13%)	..
≥6	11 (<1%)	10 (1%)	..
Maternal employment§	..	..	<0·0001
No	520 (10%)	183 (22%)	..
Yes	4699 (90%)	661 (78%)	..

Data are n (%). MCS=Millennium Cohort Study. *Assessed with the Strengths and Difficulties Questionnaire. †Assessed with the Kessler 6 scale. ‡Categorised here, but modelled as a continous variable in the analysis. §Time-variant variables in the main analysis.

Table 1: **Baseline characteristics**

Role of the funding source

The funders of the study had no role in study design, data collection, data analysis, data interpretation, or writing of the report. The corresponding author had full access to all the data in the study and had final responsibility for the decision to submit for publication.

Results

Of the 15 590 familes in the MCS at 3 years, 7059 (45%) met our inclusion criteria (figure 1). 6063 (86%) of this sample had complete data and the minimum number of two observations required for comparison and were taken forward for analysis. The analysis sample is broadly similar to the total possible inclusion sample (appendix pp 6–7). Table 1 shows the baseline characteristics of the population stratified by first transition into poverty over the course of the study. All variables of interest for the analysis showed significant differences between those who did and did not have a first transition into poverty, with the exception of child sex. 844 (14%) children had a new transition into poverty compared with 5219 (86%) who remained out of poverty. 217 (4%) children and 888 (17%) mothers who did not transition into poverty experienced new onset of mental health problems compared with 70 (8%) children and 255 (30%) mothers who did transition into poverty.

Figure 2 shows survival curves for our two outcomes indicating the proportion of mothers and children who remain free of mental health problems over time. Alongside these curves we have plotted the proportion of families that remained out of poverty over time (exposure). Of the families with no problems at age 3 years, 82 (1%) of 6063 had developed socioemotional behavioural difficulties by age 5 years, an additional 106 (2%) had by age 7 years, and a further 99 (2%) had by age 11 years. 467 (8%) of 6063 mothers had developed psychological distress by the time their child was 5 years old, an additional 327 (5%) had by the time their child was 7 years old, and a further 349 (6%) had by the time their child was 11 years old. 844 (14%) of 6063 children had entered poverty at some point by the age of 11 years. These children comprised 546 (9%) who had transitioned into poverty by age 5 years, 261 (4%) who had by age 7 years, and 37 (1%) who had by age 11 years.

The unadjusted odds ratio (OR) for movement into poverty between the ages of 3 years and 11 years compared with remaining out of poverty on children's socioemotional behavioural difficulties was 1·84 (95% CI 1·37–2·47; p<0·0001; table 2, figure 3). Adjustment for baseline confounders reduced the odds to 1·41 (1·02–1·93; p=0·04).

Male sex, young maternal age, the mother not being in employment, and the mother having a previous diagnosis of depression were associated with greater odds of child socioemotional behavioural difficulties. The unadjusted OR for movement into poverty compared with remaining out of poverty on maternal psychological distress was 1·84 (1·57–2·16; p<0·0001). Adjustment for baseline confounders reduced the odds to 1·44 (1·21–1·71; p<0·0001). Non-white ethnicity, not being in employment, being a single carer, and having a previous diagnosis of depression were associated with increased odds of psychological distress in mothers, whereas being an older mother at the child's birth and having a female child were protective (table 2, figure 3). Addition of maternal psychological distress into the model for children's socioemotional behavioural difficulties rendered the association between transitions into poverty and child socioemotional behaviour non-significant and attenuated the OR by 27% from 1·41 (1·02–1·93; p=0·04) to 1·30 (0·94–1·79; p=0·11; calculated as ([OR−adjusted OR]/[OR−1])*100).[30] Maternal distress was highly associated with child socioemotional behavioural difficulties in this model (OR 4·26 [95% CI 3·27–5·55]; p<0·0001; table 2).

We tested the robustness of our estimates using alternative assumptions and model specifications. We found similar point estimates when using longitudinal weights to account for attrition and response bias (appendix p 9). When we excluded maternal employment from the model, effect sizes were larger (appendix p 11). In models estimated with the exposure (transition into poverty) lagged by one wave, we found that initial transition into poverty increased the risk of the child developing mental health problems in the subsequent wave by a similar amount as it did in the original wave (appendix p 13). The effect on maternal mental health in the subsequent wave was reduced slightly but remained significant. Linear models assessing the association between transitions into poverty and continous SDQ and K6 scale scores showed similar results (appendix pp 14–15). This analysis is, however, more succeptible to reverse causation (mental health affecting poverty) than is the main analysis since we could not select out the population free from mental health problems in previous waves as in our main analysis. We explored the potential effect of attrition from the cohort by investigating factors associated with attrition from the cohort and found that although movement into poverty was associated with dropout, neither child nor maternal mental health were significantly associated with dropout (pp 15–16).

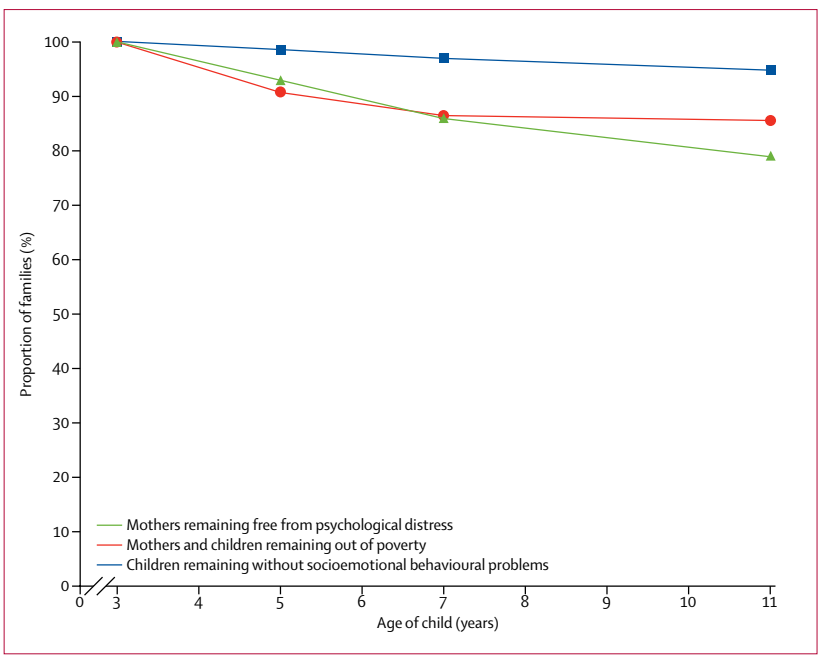

Figure 2: **Survival curve for children remaining without socioemotional behavioural difficulties, mothers remaining free from psychological distress, and families remaining out of poverty**

Discussion

Using the MCS, a contemporary dataset of UK children born between 2000 and 2002, we found that a first transition into income poverty was associated with a deterioration in child and maternal mental health. The impact on maternal mental health was large; however, the 95% CIs for the effect on child mental health were wide, indicating some uncertainty concerning the size of the effect on child mental health. When we adjusted for maternal psychological distress, the increased odds of child socioemotional behavioural problems associated with movement into poverty was reduced by about 27% and became non-significant. To our knowledge, this research is the first to assess the effect of movement into poverty during a child's early years on family mental health problems. This research extends previous work,[4,14,18,31,32] which has been predominantly US-focused and based on assessment of natural experiments in which populations have moved out of poverty. Our analysis has strengthened the argument for a causal relationship between poverty and adverse mental health outcomes using data from a longitudinal observational study with robust confounder adjustment.

We used a large contemporary birth cohort study, representative of the UK population, with rich data for family income, childhood circumstances, and mental health outcomes. Our results are likely to be generalisable to populations in high-income countries who have a new transition into poverty in the first 11 years of their child's life. Our study design reduces the possibility that our results reflect reverse causation (ie, that mental health affects poverty) as we selected families without mental health problems at baseline and followed them up until the end of the study or until they developed mental health problems. This conclusion was strengthened in the lagged analysis showing similar effects of transitions into poverty on risk of mental health difficulties in the subsequent survey wave.

	Model 1*		Model 2†		Model 3‡	
	OR	p value	OR	p value	OR	p value
Child's socioemotional behaviour						
Transitioned into poverty						
No transition	1	..	1	..	1	..
Moved into poverty	1·84 (1·37–2·47)	<0·0001	1·41 (1·02–1·93)	0·04	1·30 (0·94–1·79)	0·11
Child's age	1·07 (1·02–1·12)	<0·0001	1·08 (1·03–1·13)	0·001	1·06 (1·01–1·11)	0·02
Previous maternal diagnosis of depression or anxiety						
No	..	..	1	..	1	..
Yes	..	..	1·76 (1·38–2·25)	<0·0001	1·39 (1·08–1·79)	0·01
Child's sex						
Male	..	..	1	..	1	..
Female	..	..	0·6 (0·47–0·77)	<0·0001	0·61 (0·48–0·78)	<0·0001
Child's ethnicity						
White	..	..	1	..	1	..
Non-white	..	..	0·94 (0·53–1·65)	0·83	0·9 (0·51–1·59)	0·72
Mother's age at child's birth	..	..	0·96 (0·93–0·98)	0·0003	0·96 (0·94–0·98)	<0·0001
Total number of children in household	..	..	0·97 (0·84–1·12)	0·69	0·96 (0·84–1·11)	0·59
Maternal employment						
Yes	..	..	1	..	1	..
No	..	..	1·47 (1·12–1·93)	0·006	1·31 (1·00–1·73)	0·052
Number of carers in household						
Two	..	..	1	..	1	..
One	..	..	1·45 (0·92–2·29)	0·11	1·38 (0·87–2·18)	0·17
Mother's mental health						
No distress	..	..	..	..	1	..
Distress	..	..	..	..	4·26 (3·27–5·55)	<0·0001
Mother's psychological distress						
Transitioned into poverty						
No transition	1	..	1	..	..	..
Moved into poverty	1·84 (1·57–2·16)	<0·0001	1·44 (1·21–1·71)	<0·0001	..	..
Child's age	1·02 (0·99–1·04)	0·15	1·04 (1·01–1·06)	0·005	..	..
Previous diagnosis of depression or anxiety						
No	..	..	1	..	..	..
Yes	..	..	2·79 (2·47–3·17)	<0·0001	..	..
Child's sex						
Male	..	..	1	..	..	..
Female	..	..	0·87 (0·77–0·99)	0·03	..	..
Mother's ethnicity						
White	..	..	1	..	..	..
Non-white	..	..	1·58 (1·21–2·06)	0·0007	..	..
Mother's age at child's birth	..	..	0·98 (0·97–0·99)	0·003	..	..
Total number of children in household	..	..	1·03 (0·96–1·10)	0·47	..	..
Maternal employment						
Yes	..	..	1	..	..	..
No	..	..	1·49 (1·29–1·71)	<0·0001	..	..
Number of carers in household						
Two	..	..	1	..	..	..
One	..	..	1·25 (0·97–1·63)	0·09	..	..

Data in parentheses are 95% CIs. OR=odds ratio. MCS=Millennium Cohort Study. *Assesses the unadjusted relationship between transition into poverty and mental health outcomes, conditional on being free of mental health difficulties up to that timepoint. †Additionally adjusts for potentially confounding factors. ‡Additionally adjusts for maternal psychological distress.

Table 2: **Maternal and child mental health in the three-stage model**

Missing data and attrition are ubiquitous problems in cohort studies. Repetition of our analysis with attrition weights did not alter our conclusions and our analysis of attrition showed that neither child nor maternal mental health were significantly associated with dropout, suggesting that this factor was unlikely to bias our results. Although mental health status was assessed with validated tools (SDQ[23] and K6 scale[24]), they could be susceptible to reporting bias and shared variance. Both the K6 scale and SDQ were reported by mothers, and a change in the mother's mental health could possibly lead them to report a deterioration in their child that does not reflect an objective decline in the child's mental health. Studies have, however, reported good inter-rater agreement between parent and teacher versions of the SDQ, suggesting that maternal mental health does not have large effects on SDQ score reporting.[33] Furthermore, measurement error affecting maternal and child mental health is likely to attenuate any associations. Additionally, employment status and number of children in the household might reflect how a parent responds to these questions, but we have adjusted for these factors in the analysis. In our main analysis, we used dichotomised mental health outcome measures with validated cutoffs, as commonly used in other studies, which entailed some loss of information.[22] Nevertheless, when repeating the analysis using continuous scores, we found similar results.

Our primary aim was to assess the effect of a first transition into income poverty in the context of discussions in the UK about the relevance of this measure as an indicator of children's life chances.[34] Transitions to and from income poverty are a simplication of complex underlying income trajectories that we have not sought to investigate in this study. We did not have information for poverty status between waves and thefore our analysis cannot include short periods of poverty that occurred between waves and might only be generalisable to enduring periods of poverty. We were unable to investigate the effect of movement out of poverty (the reverse transition) as the sample size was insufficient for this analysis.

Mental health problems, many of which have their origins in childhood, are a substantial cause of morbidity globally, and improvement of child mental health is a policy priority.[10] Findings from our study indicate that increases in child poverty in the UK are likely to negatively affect child and maternal mental health, independent of employment transitions and other important confounders. This finding is important in the UK policy context because use of income-based poverty measures have been the subject of debate and child poverty levels are predicted to rise by 50% by 2020.[12,35]

Receipt of tax credits in the UK, which operate below the 60% household income threshold, could have possibly minimised the fall in income experienced by people entering poverty during this time and declines in income and mental health effects could have been greater in the absence of this policy than with this policy. The Government plans to replace tax credits with a new benefit—Universal Credit—reducing payments to low-income families.[12] Future research should investigate whether or not these changes in welfare policy modify the relation between poverty transitions and mental health observed in this study.

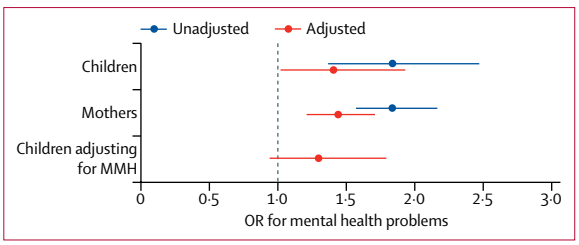

Figure 3: **ORs for development of childhood socioemotional behavioural difficulties and maternal psychological distress by transition into poverty**
MMH=maternal mental health. OR=odds ratio.

Our findings reinforce the need to maintain an income-based measure of child poverty and use it to monitor trends and the effects on health of policies that affect children's lives. A switch to a non-income measure of child disadvantage, as proposed by the UK Government,[19,36] could hinder development of effective strategies for tackling child poverty and health. Policy action is needed to address the upstream determinants of child mental health, with a focus on parental income, employment,[37] and high-quality early childcare.

Contributors

All authors contributed to conception of the study, statistical analysis, interpretation of data, and critical revision of the manuscript for important intellectual content. SW led the analysis and drafting of the manuscript. All authors have seen and approved the final version of the manuscript for publication.

Declaration of interests

We declare no competing interests.

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