

Parent reported longstanding health problems in early childhood: a cohort study

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Arch Dis Child 2003;88:570-573

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Accepted
13 November 2002

Aim: To study changing prevalence and correlates of longstanding health problems across early childhood.

Methods: Of 2576 infants enrolled in the Coventry Cohort Study at birth, parents of 2157 at 8 weeks, 1752 at 8 months, 1521 at 18 months, and 1182 at 3 years completed the Warwick Child Health and Morbidity Profile.

Results: The prevalence of parent reported longstanding health problems was 4.3% at 8 months, 6.9% at 18 months, and 9.7% at 3 years. Congenital anomalies accounted for 42.1% of longstanding health problems at 8 months, 40.0% at 18 months, and 27.8% at 3 years. The proportion accounted for by asthma was 17.1% at 8 months, 21.9% at 18 months, and 24.3% at 3 years. In each age period, children reported to have longstanding health problems were at increased risk of impaired functional health, poorer general health, and reduced health related quality of life. Low birthweight infants were most at risk of longstanding health problems at 8 months. By 3 years, risk of longstanding health problems was associated with living in rented accommodation and living in a smoking household.

Conclusions: The prevalence of parent reported longstanding health problems increased across early childhood. Congenital anomalies constituted the major cause, particularly in infancy, with asthma and developmental delay becoming more prominent by 3 years of age. Social patterning of longstanding health problems and the association with smoking were clearly established by 3 years of age but the relation may have been mediated by low birth weight earlier in infancy.

With the decline in infectious diseases, longstanding conditions have increased in prevalence and importance in childhood¹ and have implications for health in early adulthood.² Prevalence studies have suggested rates of between 18.4% in 2-18 year olds in the USA³ and 15.7% in the Nordic countries.⁴ Eight per cent of the children with chronic conditions in the Nordic study were reported to have asthma, eczema, allergy, or a combination of these.⁴ Asthma associated with disability (a long term reduction in the ability to participate in children's usual activities because of a chronic condition) has been reported to affect 1.4% of US children with an increased risk among black and low income children.⁵ Prevalence studies include infants⁶ or children over 2 years of age,³ but most report prevalence rates for the whole of childhood. The Nordic study reports prevalence of 7% in 1984 and 14% in 1996 in the age group 2-6 years.⁴ Despite an extensive search of the recent literature, we have been unable to find published prospectively collected data on the changing prevalence or correlates of longstanding conditions in the first three years of life.

The links between childhood longstanding conditions and low socioeconomic status have been noted previously,^{4,7,8} but little is known about the changing influences on early childhood longstanding conditions.

Data from the Coventry Cohort Study enabled us to study the changing prevalence and sociodemographic correlates of longstanding health problems over the first three years of life.

METHODS

A total of 2576 infants were enrolled into the Coventry Cohort Study at birth. Details of the methodology of the study are reported elsewhere.⁹ Sociodemographic data were collected by the Family Health Visitor at the birth visit and health and illness data using the Warwick Child Health and Morbidity Profile¹⁰ at 8 weeks, 8 months, 18 months, and 3 years as part

of the routine child health surveillance programme. Data collected at 8 weeks were excluded from this study on the grounds that longstanding conditions will not have had time to become fully established.

Information on longstanding health problems was collected at each age using the following question: "Does your child have any longstanding illness, disabilities, health problems, or handicaps (such as developmental delay or speech problems)?" This question is based on those used in the General Household Survey¹¹ and the 2001 Census,¹² modified to include developmental problems. If the parent responded positively, the nature of the problem and its effect on daily living were ascertained.

For the purposes of the analysis, dichotomous variables were created for each time period as follows: longstanding health problems at 8 months (yes/no); longstanding health problems at 18 months (yes/no); and longstanding health problems at 3 years (yes/no). Dichotomous variables were created for functional health, general health status, and health related quality of life for each time period in the same way as for longstanding health problems.

Sociodemographic variables were dichotomised as follows: housing tenure (rented/owner occupied); smoking household (yes/no); low birth weight, <2.5 kg (yes/no); parity (primipara/multipara); ethnicity (Indian subcontinental origin/rest); marital status (single/married or cohabiting); maternal age (<20/20+); and mother's education (no qualifications/qualifications).

Period prevalence rates with 95% confidence intervals were estimated using CIA software¹³ for longstanding health problems at each time period. Total prevalence rates were corrected for differential attrition as follows: at 8 months, prevalence was corrected based on the percentage of low birthweight infants in the cohort at birth; at 18 months and 3 years the correction was based on the percentage of infants in

Table 1 Sociodemographic characteristics of cohort at different ages

Sociodemographic variables	Birth (n=2576) %	8 months (n=1752) %	18 months (n=1521) %	3 years (n=1182) %
Biosocial				
Low birth weight (<2.5 kg)	8.6	7.7	7.6	8.5
Gestational age (<37 weeks)	8.4	8.0	8.0	8.0
Parity (primipara)	39.9	42.8	42.3	43.9
Maternal age (<20)	6.4	5.0	5.4	4.7
Ethnicity (ISC origin)	10.8	8.4	8.3	8.8
Health related behaviour				
Smoking household	41.6	38.5	38.8	37.6
Socioeconomic status				
Housing tenure (rented)	35.3	29.7	29.1	26.0
Maternal education (no qualifications)	14.0	10.7	10.7	9.6
Marital status (single)	10.9	9.4	9.6	8.8

Table 2 Period prevalence and specific categories of longstanding health problem at 8 months, 18 months, and 3 years

	8 months [95% CI]	18 months [95% CI]	3 years [95% CI]
Period prevalence			
With no effects on daily living	(n=1752) 48 (2.7%)	(n=1521) 72 (4.7%)	(n=1172) 54 (4.6%)
With effects on daily living	28 (1.6%)	34 (2.2%)	60 (5.1%)
All	76 (4.3%) [3.5 to 5.4]	106 (6.9%) [5.8 to 8.4]	114 (9.7%) [8.2 to 11.6]
Corrected for differential attrition	77 (4.3%) [3.5 to 5.4]	110 (7.2%) [6.0 to 8.6]	121 (10.3%) [8.7 to 12.2]
Specific problem categories			
Asthma	(n=76) 13 (17.1%)	(n=106) 23 (21.7%)	(n=114) 28 (24.6%)
Eczema	22 (28.9%)	15 (14.2%)	5 (4.4%)
Other allergies	0	4 (3.8%)	6 (5.3%)
Congenital abnormalities	32 (42.0%)	42 (39.6%)	32 (28.1%)
Developmental delay	1 (1.3%)	7 (6.6%)	26 (22.8%)
Hearing loss	2 (2.6%)	4 (3.8%)	3 (2.6%)
Other	6 (8.1%)	11 (10.3%)	14 (12.2%)

households living in rented accommodation at birth. The contribution of different causes to prevalence over each time period was estimated.

The risk of impaired functional health status, general health status, and health related quality of life for children reported to have longstanding illness at each time period was calculated using odds ratios with 95% confidence intervals.

Table 3 Risk of poor general health, impaired functional health, and impaired health related quality of life associated with longstanding health problems at 8 months, 18 months, and 3 years

General health, functional health, quality of life at different ages	Risk associated with longstanding illness, OR (95% CI)
8 months	
General health status (not good, poor)	12.33 (5.76 to 26.38)
Functional health status (impaired)	64.66 (25.63 to 163.11)
Health related quality of life (impaired)	26.92 (12.96 to 55.93)
18 months	
General health status (not good, poor)	10.23 (4.62 to 22.66)
Functional health status (impaired)	61.94 (24.45 to 156.89)
Health related quality of life (impaired)	19.50 (9.68 to 39.28)
3 years	
General health status (not good, poor)	11.16 (4.63 to 26.90)
Functional health status (impaired)	70.73 (24.02 to 208.30)
Health related quality of life (impaired)	32.07 (13.22 to 77.79)

Sociodemographic variables were classified into biosocial (low birth weight; gestational age; maternal age; parity; ethnicity), health related behaviour (smoking), and socioeconomic status (housing tenure; maternal education; marital status). One variable from each group with the strongest relation on bivariate analysis with longstanding health problems was selected for entry into logistic regression models. Logistic regression models were fitted on longstanding health problems at each time period by low birth weight (biosocial), smoking (health related behaviour), and housing tenure (socioeconomic status). All analyses were carried out using SPSS version 10.¹⁴

Ethical approval for the study was obtained from the Coventry Research and Ethics Committee.

RESULTS

Sociodemographic data were available on 2576 infants at birth and health outcome data on 1752 infants at 8 months, 1521 at 18 months, and 1172 at 3 years. Table 1 shows the sociodemographic characteristics of cohort at these different ages. There was differential social attrition such that disadvantaged infants were more likely to drop out of the cohort at each age.

The prevalence of parent reported longstanding health problems was 4.3% (95% CI 3.5 to 5.4) at 8 months, 7.0% (95% CI 5.8 to 8.4) at 18 months, and 9.7% (95% CI 8.1 to 11.5) at 3 years. Rates corrected for differential attrition were 4.3% (95% CI 3.5 to 5.4) at 8 months, 7.2% (95% CI 6.0 to 8.6) at 18

Table 4 Bivariate analysis of sociodemographic variables on longstanding health problems at 8 months, 18 months, and 3 years

Sociodemographic variables	8 months (n=1752)	18 months (n=1521)	3 years (n=1182)
Biosocial			
Low birth weight (<2.5 kg)	1.92 (0.96 to 3.83)	1.98 (1.09 to 3.61)	1.06 (0.54 to 2.11)
Gestational age (<37 weeks)	1.62 (0.79 to 3.32)	1.69 (0.92 to 3.13)	1.39 (0.73 to 2.64)
Parity (primipara)	1.18 (0.74 to 1.87)	0.98 (0.66 to 1.47)	0.74 (0.50 to 1.11)
Maternal age (<20)	1.41 (0.56 to 3.60)	1.88 (0.91 to 3.89)	1.16 (0.48 to 2.77)
Ethnicity (ISC origin)	0.44 (0.14 to 1.42)	1.04 (0.51 to 2.11)	1.01 (0.51 to 1.20)
Health related behaviour			
Smoking household	1.10 (0.69 to 1.77)	1.60 (1.08 to 2.39)	1.90 (1.29 to 2.80)
Socioeconomic status			
Housing tenure (rented)	1.29 (0.79 to 2.11)	1.85 (1.24 to 2.78)	2.14 (1.44 to 3.20)
Maternal education (no qualifications)	1.07 (0.50 to 2.27)	1.33 (0.74 to 2.41)	1.59 (0.89 to 2.86)
Marital status (single)	1.51 (0.76 to 3.00)	1.51 (0.83 to 2.72)	1.95 (1.11 to 3.41)

Table 5 Adjusted odds ratios for longstanding health problems at 8 months, 18 months, and 3 years

Sociodemographic variables	8 months (n=1752)*	18 months (n=1521)*	3 years (n=1182)†
Biosocial			
Low birth weight (<2.5 kg)	1.92 (0.96 to 3.84)	1.77 (0.97 to 3.23)	0.98 (0.49 to 1.96)
Health related behaviour			
Smoking household	1.03 (0.62 to 1.73)	1.36 (0.88 to 2.09)	1.56 (1.03 to 2.37)
Socioeconomic status			
Housing tenure (rented)	1.17 (0.68 to 2.00)	1.63 (1.05 to 2.53)	1.74 (1.10 to 2.79)

*Sociodemographic variables adjusted for each other in the model.

†Marital status added into model as significantly related with longstanding illness on bivariate analysis.

months, and 10.3% (95% CI 8.7 to 12.2) at 3 years. Congenital anomalies accounted for 42.1% (95% CI 31.6 to 53.3) of longstanding health problems at 8 months, 40.0% (95% CI 30.8 to 49.1) at 18 months, and 27.8% (95% CI 20.6 to 36.9) at 3 years. The proportion accounted for by asthma was 17.1% (95% CI 10.3 to 27.1) at 8 months, 21.9% (95% CI 14.9 to 30.5) at 18 months, and 24.3% (95% CI 17.6 to 33.2) at 3 years (table 2).

Infants with parent reported longstanding health problems were at greater risk of impaired functional health and health related quality of life in each time period and their general health status was more likely to be reported as not good or poor by their parents (table 3). Table 4 shows unadjusted risks of longstanding health problems over each time period by sociodemographic variables. After adjustment in logistic regression (table 5), low birthweight infants were most at risk of longstanding health problems at 8 months (adjusted OR 1.92, 95% CI 0.96 to 3.83). At 18 months, low birthweight infants (adjusted OR 1.77, 95% CI 0.97 to 3.23) and those living in rented accommodation (adjusted OR 1.63, 95% CI 1.05 to 2.53) were most likely to be reported to have longstanding health problems. By 3 years of age, risk of longstanding health problems was associated with living in rented accommodation (adjusted OR 1.82, 95% CI 1.18 to 2.79) and living in a smoking household (adjusted OR 1.56, 95% CI 1.03 to 2.37). Low birth weight was no longer an independent risk factor by 3 years.

DISCUSSION

Prevalence of parent reported longstanding health problems increased from 4.3% at 8 months to 9.7% at 3 years. Few studies report prevalence of longstanding health problems in early childhood and we have found no others tracing prevalence through infancy and the first three years of life. By 3 years of age, 5.1% of parents were reporting longstanding health problems that had an effect on daily living. As would be expected in the study age group, congenital anomalies make up the

single most common group of problems, but asthma and developmental delay become increasingly prominent by the age of 3 years. By 3 years, asthma, eczema, and allergy account for almost a third of longstanding health problems.

The only comparable figures for longstanding health problems in young children are those reported from the five Nordic countries.⁴ They report a prevalence of 14% in the age group 2–6 years. Our results seem to be consistent with these findings as there appears to be an increasing prevalence over the early childhood years.

The strong association of longstanding health problems with general health status, functional health status, and health related quality of life at each collection point is confirmation of the construct validity of the Warwick Child Health and Morbidity Profile.¹⁰ It indicates that the question related to longstanding health problems was identifying children at greater risk of impaired general and functional health and poorer health related life quality.

Data based on the 1985–89 General Household Survey (a panel study in Great Britain) show social patterning of longstanding illness in childhood.¹⁵ Other studies have shown an association between chronic illness in childhood and low income,¹⁶ poverty,¹⁷ and poor maternal education.¹⁷ Our results suggest that the association between longstanding health problems and socioeconomic status as measured by housing tenure, a reliable marker of income and wealth in the UK,¹⁸ becomes more clearly established over the early years of life. Poor maternal education was not significantly associated with longstanding health problems at any of the data collection points. Children living in smoking households were more likely to be reported to have longstanding health problems. This may be partly explained by the association of passive smoking with asthma and other chronic respiratory conditions,¹⁹ and partly by the association of smoking with increasing levels of social disadvantage in the UK.²⁰

The study has important limitations that should be taken into account when interpreting the results. There was notable

differential attrition by social group over the three years, with low socioeconomic status and ethnic minority households more likely to drop out (table 1). This is likely to have resulted in an underestimation of the prevalence of longstanding health problems, although after correction for differential attrition (see table 2) the prevalence estimates at 18 months and 3 years increased slightly but remained within the 95% confidence intervals for the uncorrected rates. Socio-demographic variables were only collected at birth. Households with children with disabilities are known to be at higher risk of low income partly as a result of the child's condition.²¹ However, these findings relate to children with major disabilities and it is unlikely that the small numbers in this study with major functional problems would significantly bias the study results.

The results of this study indicate that the prevalence of longstanding health problems increases over early childhood, with 9.7% of children reported to have these problems by 3 years of age. The social patterning of longstanding health problems becomes clearly established by 3 years of age but may initially be mediated through low birth weight.

ACKNOWLEDGEMENTS

We thank the families who participated in the Coventry Cohort Study and the family health visitors who collected the data. Contributors: NJS wrote the paper; NJS and CC designed the Coventry Cohort Study and CC organised the data collection; NJS carried out the statistical analysis and will act as guarantor for the paper. Funding: the Coventry Cohort Study has received support from Coventry General Charities, "Babes in Arms" and Coventry Health Authority

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