

## Original articles

# Early hospital admissions and subsequent behaviour problems in 6 year olds

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**SUMMARY** The relation between admission to hospital during the preschool years and teacher and maternal ratings of child behaviour problems at age 6 years was studied in a birth cohort of New Zealand children. There was a slight but consistent trend for reported behaviour problems to increase with increasing length of hospital stay, however, control for family and social factors suggested that this correlation was spurious. Children admitted to hospital tended to come from socially disadvantaged backgrounds and from families reporting large numbers of life events, and independently of this, social background and life events were related to childhood behaviour problems. When the effects of family social background and life events were controlled for, there was no significant association between duration of hospital stay and reports of child behaviour problems. It is concluded that there is little evidence to suggest that in a modern paediatric setting, admission to hospital has any significant effect on the child's subsequent behavioural pattern.

As a result of the work of Bowlby<sup>1-4</sup> there has been considerable interest in the effects of maternal deprivation on child development and personality. Various studies have suggested that early mother and child separation caused by admission to hospital, marital breakdown, or death may have both short and long term effects on behaviour.<sup>4-9</sup> A major review of this topic by Rutter<sup>10</sup> concluded, however, that early hospital stay had little association with subsequent long term development. Notwithstanding this conclusion, Douglas<sup>8</sup> was able to show an association between duration of hospital admission during the preschool years and behaviour and adjustment during adolescence, even when the confounding effects of hospital selection factors were taken into account. Douglas suggested, however, that this relation might operate in older, clinical, and restrictive hospital environments only, and in modern hospitals with a more liberal and humane approach these effects might not be present.

We report the results of a six year longitudinal study of the relation between duration of hospital stay in the preschool years and behaviour at 6 years

in a birth cohort of New Zealand children. The aims of the study were:

- (a) To examine the extent of any correlation between childhood behaviour problems and early hospital stay in a population of children serviced by a hospital system in which there is unlimited parental visiting and facilities for mothers to stay.
- (b) To determine the extent of any correlation between length of hospital stay and child behaviour problems that could be explained by the effects of confounding social and family factors.

## Method

The data were collected during the first eight stages of the Christchurch child development study<sup>11-14</sup> in which a birth cohort of 1265 children born in the Christchurch (New Zealand) urban region has been studied at birth, four months, and at annual intervals to the age of six years. At each point information about the health, family conditions, and social background of the children has been collected by a structured interview with the child's mother supplemented by information from other sources in-

cluding hospital records, general practitioner notes, a diary record kept by the mother of the child's medical attendances, and information obtained from the child's class teacher. The method of data collection and quality control of the data has been described in previous papers.<sup>11-14</sup> The following measures were used in the analysis:

**Measures of child behaviour.** These were based on the Rutter Child Behaviour Questionnaire.<sup>15</sup> This is available in two comparable versions, one for completion by the child's mother and the other by the child's teacher. When the children were aged 6 years, the questionnaires were given to their mothers and class teachers. (In all cases the teacher's descriptions of the child's behaviour were obtained only after the signed consent of the child's parent had been obtained).

From the completed questionnaire two scores were constructed:

*(a) Maternal child behaviour score*

This was based on a total of 30 items which described the child's behaviour at home. The total score ranged from 0 for the child with no problem behaviour to a maximum of 60 for the child with every possible behaviour problem. The reliability of the questionnaire was measured using coefficient alpha<sup>16</sup> and was found to be 0.71 which is similar to the test and retest reliability of 0.74 reported by Rutter, Tizard, and Whitmore.<sup>15</sup>

*(b) Teacher behaviour score*

This was based on a sum of 26 items describing the child's behaviour at school. The score had a minimum of 0 for the child with no behavioural problems and had a maximum of 52 for the child with all possible behaviour problems. Coefficient alpha for the teacher rating was 0.79. It should perhaps be observed that maternal and teacher ratings of child behaviour were not highly correlated ( $r=+0.24$ ;  $P<0.0001$ ) and this fact has been commented on by Rutter, Tizard, and Whitmore.<sup>15</sup> This lack of correlation, however, is perhaps not surprising since mothers and teachers describe child behaviour occurring in quite different situations which are governed by quite different rules and expectations.

**Duration of hospital stay during the period from birth to 5 years.** From the information provided by the maternal child health diary and direct interviewing of the child's mother it was possible to identify those children who had been admitted to hospital during their early years. For each admission complete case note material was obtained. In all cases

this information was released to the study only after signed and informed consent from the child's mother.

It was possible to check the reporting accuracy of the mother by comparing the reports of hospital admission with the central record system held at the Christchurch Public Hospital. This check showed that only five admissions were unreported during the five year study period and all of these were of short duration and for relatively trivial reasons.

For each child a measure of the length of hospital experience was given by the total number of nights spent in hospital during the period up to age 5 years. After the work of both Douglas<sup>8</sup> and Quinton and Rutter,<sup>9</sup> consideration was given to analysing the extent of hospital experience both in terms of the number of admissions and the number of admissions of duration greater than one week. Both of these measures were highly correlated ( $r>0.80$ ) with the total number of nights spent in hospital and their associations with behavioural disturbance very similar (if anything the associations with the total nights in hospital were slightly stronger than those based on the number of admissions). Since the number of nights spent in hospital gave a more exact estimate of the child's total exposure to hospital it was used in preference to data relating to the number of hospital admissions.

A total of 417 of 632 hospital admissions (66%) were to Christchurch Public Hospital. While details of parental visiting and contact during the hospital stay were not collected for the children studied, the paediatric unit at Christchurch Hospital has no limitations on parental visiting and liberal provisions for living-in mothers. Conscientious efforts are made to limit the duration of inpatient care. The remainder of admissions were to a variety of hospitals spread throughout New Zealand and while some of these would have less than optimal living-in facilities for mothers, all would follow the same policies designed to minimise the upset of a hospital stay.

**Control factors.** These were selected from a previous study of the social factors associated with hospital admission in this birth cohort.<sup>17</sup> This analysis identified two broad groups of factors related to rates of hospital admission: family social background and life events. To control for these factors in the analysis two measures were used:

*(a) Family social position*

This comprised:

(i) Maternal education level, classified as: mother lacked formal educational qualifications; mother had secondary educational qualifications (that is

- (i) New Zealand School Certificate, University Entrance; mother had tertiary qualifications (university degree, tertiary professional qualifications).
- (ii) Child's ethnic status: Maori, Pacific Island, or Caucasian.
- (iii) Family socioeconomic status: this was based on the Elley and Irving<sup>18</sup> scale of socioeconomic status for New Zealand.
- (iv) Child's family placement at birth: whether the child entered an adoptive family, a (natural) two parent family, or a single parent family.
- (v) Maternal age.

To obtain a single index of family social position, a weighted sum of these measures was used. The method of index construction has been described by Fergusson *et al*<sup>19</sup> and involved factor analysis of the items and then using the resulting factor score coefficients to estimate a family social position score for each subject.

*(b) Family life events from age 2 to 5 years*

Each year, mothers were interviewed using a reduced version of the Holmes and Rahe social readjustment rating scale.<sup>20</sup> A measure of the amount of adversity or social readjustment faced by the family was created by a simple count of the number of life events reported throughout the preschool years. A count was used in preference to a weighted sum of these measures since previous analysis<sup>17</sup> had shown a very high correlation between weighted and unweighted measures and because an unweighted sum was easier to interpret.

Table 1 Mean teacher and maternal child behaviour ratings by number of nights spent in hospital during the preschool years

No of nights in hospital (0-5 years)	No	Mean maternal rating score	Mean teacher rating score
0	719	6.63	4.39
1-8	272	7.48	4.08
9-16	28	8.25	5.75
17+	29	8.47	5.83
Significance		( $F_{3,1044}=4.05$ ) P<0.01	( $F_{3,1044}=2.18$ ) P<0.10

Table 2 Multiple regression analysis of duration of hospital admission, life events, and social position on maternal and teacher behaviour rating scores

Variable	Maternal score				Teacher score			
	r	β	F	P	r	β	F	P
Duration of hospital admission	0.105	0.049	2.651	NS	0.035	-0.003	0.009	NS
Life events	0.286	0.246	58.604	<0.0001	0.173	0.133	16.334	<0.0001
Family social position	0.180	0.085	7.108	<0.01	0.160	0.112	11.841	<0.001

**Sample sizes.** The analysis is based on a sample of 1048 children for whom complete data was available on history of hospital admissions and life events throughout the preschool years. This reduced sample represented 83% of the total cohort and 89% of those children who were alive and resident in New Zealand during their preschool years. This reduced sample did not differ significantly from the original sample of 1265 children in terms of family social background and perinatal history.

**Results**

Table 1 shows the relation between mean maternal and teacher behaviour rating scores and the number of nights spent in hospital during the preschool years. There is a slight but nonetheless clear trend for maternal and teacher behaviour rating scores to increase with the number of nights spent in hospital. For maternal behaviour rating scores this trend is significant (P<0.01). Teacher behaviour rating scores show a marginally significant trend (P<0.1) to increase with the number of nights spent in hospital. Children who spent 17 or more nights in hospital during their preschool years had mean maternal behaviour rating scores of 8.5 in comparison with 6.6 for those who spent no nights in hospital. For teacher rating scores children who spent 17 or more nights in hospital had a mean of 5.8 whereas children who spent no nights in hospital had a mean of 4.4.

The findings in Table 1 do not take account, however, of the fact that rates of hospital admissions are correlated with other social and family factors which may be associated independently with child behaviour. Therefore, the results were analysed again using multiple regression methods in which the teacher and maternal ratings scores were dependent variables and the number of nights spent in hospital, the family social position index, and the number of life events were explanatory variables. The results are shown in Table 2 which gives for each variable: (a) the bivariate correlation between that variable and the behaviour problems score; (b) the corresponding standardised regression coefficient; (c) the F test of significance.

It is clear from Table 2 that the apparent correlations between behaviour rating scores at the age of 6 years and duration of hospital admission during the preschool years are almost entirely explained by the effects of family life events and family social position and that when these factors are taken into account no significant correlation exists between duration of hospital stay and rates of behaviour problems reported by either the child's mother or class teacher. The major implication is that the social factors associated with the risk of hospital admission rather than the admission *per se* account for the apparent correlation between length of hospital admission and child behaviour.

### Discussion

This six year longitudinal study shows a slight correlation between hospital admission during the preschool years and ratings of child behaviour at age 6 years. This correlation seems to have arisen, however, from social factors related to hospital admission.<sup>17</sup> In particular, children from socially disadvantaged backgrounds and children from families reporting large numbers of life events tended to have a higher risk of hospital admission and independently of this, social background and life events contributed to the variability in behaviour ratings: when the effects of social background and life events were taken into account statistically, there was no association between hospital admission and child behaviour at 6 years.

These findings are broadly consistent with Rutter's conclusions<sup>10</sup> that transient separations during the preschool years have no long term psychological sequelae. At the same time it must be remembered that the hospital admissions described occurred in an enlightened paediatric setting in which there is an awareness of the possible effects of separation on the child's emotional and psychological development. Thus, although the findings do not show that transient separation cannot have adverse effects in some circumstances, in a modern paediatric hospital providing appropriate facilities, there is little reason to believe that early separation will have any adverse effect on the child's subsequent emotional or social development.

Comparison with the results reported by Douglas<sup>8</sup> suggests the presence of a possible shift in the effects of early hospital experience on child development. On the basis of a study of a cohort of children born in 1946 Douglas was able to show associations between early hospital experience and social and emotional development during adolescence. He conjectured, however, that such an association might only exist for the less humane

system of care provided for this cohort and that similar effects might not be present for subsequent cohorts exposed to more liberal paediatric inpatient regimens. The data in this study are consistent with this conjecture and it seems possible that the differences between our findings and those of Douglas have arisen from the shift in hospital policies which has occurred over the last few decades.

These conclusions, however, are not entirely consistent with the findings reported by Quinton and Rutter<sup>9</sup> who found a similar association in a sample of children born in a generation after the cohort studied by Douglas. These findings suggest that, for British data at least, shifts in hospital policies occurring up to mid 1960 were not sufficient to expunge the apparent association between early hospital admission and behaviour problems. On the other hand, it is possible that changes occurring in the generation subsequent to that studied by Quinton and Rutter may have had this effect and that this change is reflected in our results.

There are, of course, other factors that must be taken into account. In both Douglas' and Quinton and Rutter's studies, the children were older, and it may be that the effects of hospital stay do not manifest themselves until the child is older. In addition, there are many other factors including changes in patterns of illness, the severity of illness and duration of hospital stay that may influence the association. Notwithstanding these reservations, the findings of this study clearly provide support for the view that contemporary paediatric inpatient care has little effect on the subsequent behavioural development of children who are admitted to hospital during their preschool years.

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