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ORIGINAL ARTICLE

Health service utilisation of a regional cohort of very preterm infants over the first 2 years of life

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Aim: Very preterm infants represent major consumers of health services following neonatal discharge. We examined the health service utilisation of a regional cohort of very preterm infants over the first 2 years of life, including the association with neurodevelopmental outcome.
Methods: A regionally based 2-year cohort of 100 very preterm infants along with a comparison sample of 104 full term control infants matched for sex, time and place of birth were recruited. Perinatal and social background factors that predispose very preterm infants to increased risk of subsequent general practitioner (GP) and hospital service use were identified. At 2 years, all children underwent a neurodevelopmental assessment, Bayley Scales of Infant Development (BSID-II). Details of children's medical contacts obtained by parent interview were cross-checked against GP and hospital records/databases.
Results: Very preterm infants had a similar number of GP visits to term infants but more outpatient hospital visits. Fifty-three (55%) very preterm infants were admitted to hospital on 131 occasions compared with 26 (26%) term infants on 37 occasions ($p < 0.001$). The main reason for hospitalisation in the preterm cohort was respiratory disorder. The frequency of hospital admissions was significantly related to birthweight ($P = 0.01$), gestational age ($P < 0.001$) and the number of people living in the family household ($P = 0.02$). No associations were found between hospital admission and neurodevelopment at 2 years.
Conclusion: Very preterm infants had higher rates of hospital admissions and visits than term infants unrelated to neurodevelopmental outcome at 2 years of age. These findings highlight that very preterm birth is associated with ongoing health morbidity.

Key words: health; hospitalisation; infant; prematurity; very low birthweight, very preterm.

Infants born very prematurely and with very low birthweight are at increased risk of ongoing morbidity.[1–4] Hospitalisation and frequent medical contacts have been used as indicators of morbidity and/or poor health status.[5] However, few current studies have compared the frequency and nature of general practitioner (GP) and hospital medical contacts of children born very preterm with children born at term, or examined if the effects of ongoing health morbidity has any impact on longer-term neurodevelopmental outcome.

There is evidence to suggest that very preterm infants are characterised by high health service utilisation following their discharge from the neonatal unit.[6,7] This continued morbidity not only results in additional costs in health-care resources, but also has implications for both the children and their families financially, emotionally and socially.[7] Morbidity in the first 2 years of life is an important outcome from the parent's perspective and hence it is important to understand as fully as possible the issues faced by these children and their families.

Previous studies have documented increased hospital admission among very preterm infants, but few have compared these with representative term controls.[8–10] Recent advances in neonatal medicine have continued to alter morbidity. However, survival rates have tended to plateau over the past 5 years.[11,12] It is, therefore, possible that these demographic changes may have altered the pattern of health service utilisation of these high-risk children during the first few years of life. Furthermore, reviews of morbidity have, to date, tended to focus primarily on disorders associated with significant long-standing disability.[5,13–15] This study aims to review the more moderate and possibly temporary morbidities that nevertheless cause financial and social stress to children and families. It also considers the role that such morbidity may play in shaping early child developmental outcome by the age of 2 years. The specific study aims are as follows:

1 To describe the health services utilisation of a regional cohort of very preterm or very low birthweight infants over the first 2 years of life from initial hospital discharge to the age of 2 years (corrected for prematurity).

Key Points

1 Over half of very preterm infants are admitted to hospital in the first 2 years, at twice the rate of term infants.
2 The main diagnosis at hospital admission was respiratory disorder.
3 Health utilisation of very preterm infants remains high to age 2 years.

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2 To compare their health status with a group of full term normal birthweight comparison children. The indices of health status examined included presentations to a GP, hospital emergency or specialist visits, and frequency and nature of hospital admissions.
3 To examine the extent to which the frequency and type of hospital admissions could be predicted by perinatal and family social background factors.
4 To examine the relationship of health status during the first 2 years of life and children's developmental outcome at 2 years of age.

Methods

Sample

Two groups of children were included in this study. The first group consisted of a regional cohort of 100 children born very preterm (<32 weeks gestation) and/or very low birthweight (<1500 g) (referred to as 'preterm'). These infants were recruited consecutively as they were admitted to a level III neonatal intensive care unit at Christchurch Women's Hospital (New Zealand) between November 1998 and December 2000. This neonatal service is the primary unit serving Canterbury, South Canterbury and the West Coast of the South Island of New Zealand. The unit has a total of 37 cots, of which nine are ventilated intensive care cots. Approximately 80 babies were ventilated per year during the time of the study of which 50 were less than 32 weeks gestation.

For the purposes of this study, all very preterm infants meeting the above criteria and who had no congenital abnormalities, whose parents spoke English, and who were resident in the region at term were included. Over the recruitment period, 119 preterm infants were eligible for inclusion in the study. Of these infants, 10 died prior to discharge, five declined to participate and four were not recruited. Excluding those who died, 92% of all eligible infants were recruited. All infants in the preterm group were assessed throughout the perinatal period, at term, 1 and 2 years using a combination of measures, including magnetic resonance imaging, medical records, parent interviews and clinical assessments of physical and cognitive functioning. Retention to the age of 2 years was 93% for the full 2-year review, with three preterm infants unable to attend follow up, one child living abroad and three deaths (at 1, 4 and 23 months corrected age, two due to infection and one during sleep/cot death). Hospital outpatient and admission data could be retrieved for 96.

In addition to the group of very preterm infants, a second group of 104 (56 male : 48 female) full term comparison infants was recruited at 2 years. These term born (38–41 weeks gestation) infants were identified from hospital birth records ($n = 7200$ total births) by alternately selecting for each preterm infant, the second previous or next infant of the same sex in the hospital delivery schedule. Consistent with the preterm group, term born infants with congenital abnormalities and from non-English speaking families were excluded. The recruitment response from potential control families at 2 years was 62%. Reasons for non-participation were as follows: untraced (47%); moved overseas (12.5%); refused (12.5%); agreed but were unable to attend clinic appointment within the assessment window (24 months + 2 weeks) due to child illness or family circumstances (28%).

A descriptive profile of the infant medical and family characteristics of the preterm and full term comparison groups is provided in Table 1. As shown, infants in the preterm group had a mean gestational age of 27.8 ± 2.4 weeks and a mean birthweight of 1064 ± 321 g compared with infants in the full term group who had a mean gestational age of 39.7 ± 1.1 weeks and a mean birthweight of 3599 ± 399 g. Not unexpectedly, preterm infants were more often from multiple births ($P < 0.0001$) and had a median score on the Critical Risk Index for Babies of 2 (inter-quartile range 1–5). Preterm infants spent an average of 40 days on a ventilator, median 2 days (range 0–78 days) and reached full feeding by a median of 9 (inter-quartile range 5–14) days. Comparison of the two groups across a range of family social background characteristics revealed a number of between-group differences. Specifically, infants in the preterm group were more likely to have been born to a mother with no formal educational qualifications ($P < 0.001$), to be raised in a lower socio-economic status family ($P < 0.0001$), and to have a mother who smoked during pregnancy ($P < 0.01$). During their first 2 years of life, preterm infants were more likely to live in a larger family household compared with their full term counterparts ($P = 0.02$). This may in part have been influenced by the higher rate of multiple pregnancies in the very preterm group

Measures

Information relating to each child's antenatal, perinatal and postnatal course was collected from clinical notes and hospital databases, as well as supplementary questions asked in the parent interview at term (preterm) and 2 years (preterm and full term). In addition, at 2 years (corrected for prematurity), all infants underwent a comprehensive medical and psychological evaluation. Parents were also questioned about a range of child health issues with details of all medical contacts recorded. All procedures and measures were approved by the Canterbury Ethics Committee.

Health service utilisation

At the age of 2 years, all parents were questioned about the number of occasions that their child had visited a doctor or hospital about a range of child health issues over the period from (i) discharge to 1 year and from (ii) 1–2 years. Information was obtained about a wide range of health issues ($n = 20$), including for example, colds/flus with and without chest involvement, asthma, ear infections, diarrhoea, vision problems, hearing, sleep and immunisation. An 'other' category was also included and details sought. For each visit, information about the reason for the visit, the doctor's diagnosis and treatment advised was collected. Details of all hospital visits and admissions were recorded, including the date and age at the time of hospital contact, the reason for contact, the hospital and department, treatment received, and when an admission occurred, the number of nights spent in hospital. Incidents where a child was admitted as a boarder baby with a parent or sibling were not included.

Following the 2-year assessment, each child's GP was then contacted to obtain copies of their medical records. In addition, hospital records were also accessed, with both of these records being cross-checked against parental reports of GP and hospital visits to ensure an accurate record of all health contacts. Where discrepancies occurred, clinical data were given preference. However, the use of

Table 1 Clinical and family characteristics of very preterm and full term infants

Measure	Preterm ($n = 100$)	Full term ($n = 104$)	t/χ^2	P
Child clinical characteristics				
Birthweight (g): mean (SD)	1064 (321)	3599 (399)	–49.880	<0.0001
Gestational age (weeks): mean (SD)	27.8 (2.4)	39.7 (1.1)	–45.190	<0.0001
% Male	50.0	53.8	0.300	0.6000
% Singletons	67.7	98.1	34.280	<0.0001
% SGA (SD < –2)	8.0	1	–	–
Median (IQR) CRIB score	2 (1–5)	–	–	–
Median (range) ventilator days	2 (0–78)			
Median (IQR) days oxygen therapy	18 (2–64)	–	–	–
Median (IQR) age full enteral feeding	9 (5–14)	–	–	–
Intraventricular haemorrhage grade III/IV (*n*)	4	–	–	–
Family characteristics				0.8000
Maternal age (years): mean (SD)	30.8 (5.3)	31.0 (4.6)	–0.290	0.8000
% European ethnicity	89	91.3	0.526	0.3300
% Single parent family	12.5	10.4	0.230	0.6000
% Mother no school qualifications	39.6	20.0	9.020	<0.0010
% Family income <$25 000/year (2 years)†	25.5	17.5	1.820	0.2000
% Un/semi-skilled socio-economic status (2 years)†‡	37.5	11.0	18.870	<0.0001
People in household (2 years)†: mean (SD)	3.21 (1.15)	2.97 (1.02)	5.450	0.0200
% Maternal smoking in pregnancy	34	14.4	9.2	0.002

†Based on 96 very low birthweight and 100 full term children with complete medical contact data up to the age of 2 years. ‡Assessed using the revised Elley and Irving Socio-economic Index.[16] CRIB, Critical Risk Index for Babies; IQR, inter-quartile range; SD, standard deviation; SGA, small for gestational age.

both information sources proved valuable in obtaining a detailed and clear database of information on the full range of children's health contacts.

For the purposes of this analysis, this combined database of information was used to record the following health contact information: (i) the number of and reasons for GP visits and (ii) the number and reasons for children's presentation to hospital. All hospital visits were recorded, including routine follow up, specialist referral and emergency visits. All hospital admissions were recorded, with the reason for admission and the length of hospital stay recorded in each case. Reasons for hospital admission were classified using nine categories. The number of hospital day visits was also recorded and the reason for each visit classified as outpatient, emergency, or for investigation.

Hospital Anxiety and Depression Scale

As part of the parent interview administered at 2 years, the Hospital Anxiety and Depression Scale (HADS) was completed by all mothers. The HADS provides a measure of the presence and severity of both anxious and depressive symptoms and is suitable for use with hospital, outpatient and community samples.[17] Both scales consist of seven items, six of which are coded from 0 to 3, and eight of which are coded from 3 to 0 (reverse scored). Examples of anxiety items include 'I feel tense or wound up', 'I get a sort of frightened feeling as if something awful is about to happen' and 'I get sudden feelings of panic'. A total score for both depression and anxiety can be computed to provide a measure of symptom severity. In addition, respondents can be classified as showing normal (score 0–7), mild (8–10), moderate (11–14) or severe (15–21) levels of anxiety symptomatology. Given possible links between maternal anxiety and health-seeking behaviour, only the anxiety scale was included in this analysis. The total anxiety symptom score was used as even subclinical levels of anxiety may lead to increased concern about child health and intervention. The HADS has been shown to be reliable (Cronbach's alpha 0.68–0.93) and to correlate well with other commonly used screening measures such as the General Health Questionnaire.[18]

Bayley Scales of Infant Development-II

At the age of 2 years, all study infants were assessed by a registered psychologist using the Bayley Scales of Infant Development (second edition),[19] which provides a measure of infant cognitive and psychomotor development. The cognitive scale (Mental Development Index (MDI)) assesses responsivity to environmental stimulation, as well as an array of sensory/perceptual, memory, learning and early language/communication abilities. The psychomotor scale (Physical Development Index (PDI)) assesses both gross and fine motor skills. These scales represent the most widely used standardised measure of infant cognitive and psychomotor development.

Results

General Practitioner Visits

Information on visits to the GP was complete for 91% of the preterm cohort. The reason for data loss in the preterm group was the

inability to corroborate the information gathered for children who now live outside the region and the GP's refusal despite parental consent. Information about GP visits was complete in the control group (48%) for similar reasons. As shown in Table 2, preterm infants had on average 20 GP visits per child (1765 in 88) over 2 years. This comprised of 8.5 visits per child in the first year and 11.8 visits per child in the second year. Full term infants had a total of 18.3 visits per child (878 in 48), with 9.3 visits per child in the first year and 12.7 visits per child in the second year (not significant). It was difficult to sub-analyse the reason for visit to the GP. Immunisations were only recorded twice for most children yet in the first 2 years our schedule has four immunisation visits, three in year 1 and one in year 2.

Hospital Visits

The preterm group had a total of 567 hospital visits during the first 2 years at an average of six visits per child. This information was uncorroborated in two children who had moved out of the region during this time. Information for these two children was gathered from the parent questionnaire alone. The term control group had only 64 visits, less than one visit per child. Of the 567 hospital visits in the preterm group, 22 episodes (3.9%) were for emergency or day stay visits in a total of 13 children. In total, 20 episodes (3.5%) were for investigations in 15 children. The remaining 525 visits (92.6%) were outpatient visits, both paediatric and other specialities in 90 children. Only five children did not have any hospital visits.

Table 2 Visits to the hospital and general practitioner (GP) in the first 2 years of life for very preterm and full term control infants

Measure	Preterm	Full term	*P*
Hospital visits	*n* = 96	*n* = 100	
% Children who had hospital visit(s)	91 (95)	24 (24)	<0.001
No. visits/child: mean (SD)	6.0 (7.0)	0.6 (1.6)	<0.001
GP visits			
0–1 year	*n* = 89	*n* = 35	
GP visits/child: mean (SD)	8.5 (8.3)	9.3 (6.5)	0.350
1–2 years	*n* = 90	*n* = 68	
GP visits/child: mean (SD)	11.8 (8.0)	12.7 (12.3)	0.350
Total 0–2 years	*n* = 88	*n* = 48	
GP visits/child: mean (SD)	20.0 (13.7)	18.3 (10.0)	<0.090

SD, standard deviation.

Hospital Admissions

Table 3 compares the frequency and duration of hospital admissions for very preterm and full term infants. Results show that 55% of very preterm infants had a hospital admission during the first 2 years of life. Over the first year, almost half (41.7%) of these children were readmitted at least once. This decreased to 30% of children during the second year. This was a significantly higher rate than the term control infants, who had a readmission rate of only 26% over the first 2 years ($P < 0.001$). The rate of admission during each year in this group was very comparable: 12% in the first year and 15% during the second year. Results also indicate that among those children admitted to hospital, children in the preterm group had almost twice as many admissions ($P = 0.001$) and tended to be admitted for about twice as many nights ($P < 0.001$) as their full term counterparts.

To further examine the reason for hospital admission across the two groups, Table 4 provides a breakdown of all admissions. As shown, the most common reason for hospital admission within the preterm group was respiratory disorders (41.2%), including both infectious and non-infectious disorders. The vast majority were infectious. In the preterm group 28 children had a total of 54 respiratory admissions versus only three children with a total of four admissions in the control group. Total days of oxygen as a measure of severity of lung disease did not correlate with total admission days. The next two frequent reasons in the preterm group were feeding problems at 18.3% and infections other than respiratory. The majority of this group included admissions for observation and investigation of non-specific febrile illnesses and upper respiratory tract infections. In the control group the most common reason for admission was infections other than respiratory and gastrointestinal, followed by surgical admissions and feeding problems. Only one child in the preterm group was admitted for inguinal hernia repair after discharge.

Perinatal and Social Background Factors Associated with the Frequency of GP Visits, Hospital Visits and Admissions

Table 5 shows the relationship between a range of medical and social background factors and the total nights children later spent

Table 3 Rates of hospital admission for very preterm and full term control infants

Measure	Preterm (*n* = 96)	Full term (*n* = 100)	t/χ^2	*P*
% Children admitted, year 1 (*n*)	41.7 (40)	12 (12)	22.11	<0.001
% Children admitted, year 2 (*n*)	30 (29)	15 (15)	6.50	0.010
% Total children admitted	55.2 (53)	26 (26)	17.37	<0.001
No. admissions/child	1.34 (1.38)	0.37 (0.54)	–	<0.001
No. admissions/child admitted	2.5 (1.5)	1.4 (0.65)	–	0.001
No. nights admitted/child	3.9 (4.58)	0.97 (1.44)	–	<0.001
No. nights/child admitted	7.1 (5.6)	3.8 (3.5)	–	<0.001

SD, standard deviation.

in hospital post discharge. Results showed that although there was a trend for the duration of hospital admission to increase with larger family households ($P = 0.10$) and where a child was a twin ($P = 0.08$), none of the other variables showed a significant association with increased number of nights spent in hospital. Further analysis revealed that infants with long neonatal admissions were significantly more likely to have more hospital outpatient visits ($P = 0.02$) and more frequent GP visits ($P = 0.01$)

Frequency of Hospital Admissions and Visits and Infant Neurodevelopmental Outcome at the Age of 2 years

The preterm group had significantly lower Bayley cognitive (MDI) and psychomotor (PDI) developmental scores at 2 years as compared with their term matched controls. The mean Bayley MDI score for infants in the preterm group was 86.4 (±13.9) compared with 94.4 (±12.5) for infants in the control group ($P < 0.0001$). The mean Bayley PDI score for preterm infants was 91.6 (±14.8) and for term infants 99.7 (±11.20) ($P < 0.0001$). The frequency of hospital admission and other hospital visits were not associated with lower Bayley scores ($P > 0.05$).

Table 4 Reasons for all hospital admissions

	Preterm ($n = 96$)	Term controls ($n = 100$)
Total admissions	131	37
Respiratory disorders	54 (41.2) (in 28 children (29))	4 (10.8) (in 3 children (3))
Surgical	19 (14.5)	5 (13.5)
Feeding problems	24 (18.3)	5 (13.5)
Gastrointestinal infection	6 (4.6)	4 (10.8)
Other infections	21 (16)	13 (35.0)
Neurological	3 (2.3)	2 (5.4)
Trauma	1 (0.7)	3 (8.0)
Other	2 (1.5)	2 (5.4)

Discussion

Very preterm infants in this regional cohort were characterised by a high incidence of subsequent health service utilisation following their neonatal hospital stay. The high rates of hospital admission documented in this study were similar to previously reported figures ranging from 30% to 50%.[5,8,9,20] This high rate of readmission suggests that the ongoing improvements in neonatal care, although decreasing morbidity and possibly severe long-term morbidity,[11,12,21] have not reduced the more temporal morbidities, which remain a very real entity. In fact Xu *et al*. suggest that there is an ongoing higher risk of rehospitalisation for low birthweight children during the first 14 years of life.[16] Both Leijon *et al*.[20] and van Zeben-van der Aa *et al*.[8] also note a high use of health services other than hospital admission in their studies. This is in agreement with our study, which comprised a different geographical community. It stands to reason that these high-risk infants remain vulnerable past their discharge from the neonatal unit and understanding the effect of this vulnerability is important in our follow up and management of these infants and their families. This study did not include details about early intervention services attended nor that of alternative practitioners and hence may well underestimate the time and cost of health-care services for these infants and their families.

Infants most likely to be receiving early intervention (the younger, smaller and initially more unwell infants) are those who have a generalised increase in health service utilisation, as already discussed. Although we expect very preterm infants to have more frequent follow-up visits, they also had more frequent subspecialist referrals. We concur with Leijon *et al*.[20] who found no increase in the amount of GP visits among the very preterm group as opposed to the term controls. This may be explained by the fact that these infants are receiving a lot of support from other services during the first few years of life.[22–24] In our preterm group all infants in the Christchurch and surrounding area received visits from a neonatal outreach nurse after discharge for periods of 4 weeks–6 months depending on need. They all attended regular neonatal follow up with a neonatal

Table 5 Relationship between perinatal variables and duration of hospital admissions in the preterm group

	None ($n = 43$)	1–7 nights ($n = 36$)	>7 nights ($n = 16$)	*F*	*P*
Birthweight (g): mean (SD)	1083 (323)	1074 (276)	1080 (313)	0.01	0.99
Gestation (weeks): mean (SD)	28.2 (2.7)	27.7 (2.0)	27.5 (2.4)	0.60	0.53
% Twin	19	33	48	4.90	0.08
% Male	50	58	50	0.60	0.98
Length of neonatal admission (days): mean (SD)	76 (26)	74 (24)	92 (40)	2.40	0.09
Total days on oxygen: mean (SD)	37.8 (47.8)	41.5 (43.8)	37.3 (53.1)	0.10	0.93
CRIB score: mean (SD)	2.5 (2.8)	2.9 (2.6)	2.9 (3.5)	0.20	0.82
Maternal age (years): mean (SD)	31.3 (5.8)	30.5 (4.7)	29.3 (5.3)	0.80	0.46
Maternal anxiety score: mean (SD)	1.7 (0.5)	1.8 (0.4)	1.8 (0.4)	0.02	0.98
Total income: mean (SD)	3.6 (1.5)	3.7 (1.4)	3.8 (1.5)	0.07	0.94
No. people in household: mean (SD)	3 (1.2)	3.2 (0.9)	3.7 (1.2)	2.30	0.10

CRIB, Critical Risk Index for Babies; SD, standard deviation.

paediatrician or their local paediatrician. In total, 40% of the group received developmental monitoring and 40% were enrolled in an early intervention multidisciplinary programme.

A weakness with our first-year GP data is that 52% of the control group data were not corroborated with GP records. As noted, across both groups, parental recall of GP attendance was not always consistent with infant's official health records, as a result we only included corroborated results in this analysis. However, the resulting smaller numbers of infants studied may have reduced statistical power and possibly an underestimation of group differences. The 2-year data, however, were much more complete.

Respiratory illness being the most frequent reason for admission in the very preterm group corresponds with expectation.[8–10] We expected to find a correlation between admission and oxygen dependency as other studies have found.[5,8] The reason we did not may be related to the process of weaning from oxygen, which occurs in the home by outreach nurses in consultation with the neonatologist and may occur more quickly than in the past and did not require admission to hospital. However, the incidence of feeding difficulties in this group was higher than anticipated. The decreased incidence of surgical admissions as compared with previous studies is explained by the fact that in our unit most infants have their inguinal hernia surgery prior to discharge from the unit, negating the need for readmission for that reason. This might also explain why male sex was not an independent risk factor for readmission, which has been shown in previous studies.[4,8,9]

In our study we did not find any of the perinatal or social risk factors to be strong independent predictors of the total nights very preterm infants were readmitted to hospital.[25] This may partially reflect the extent of support of outreach and early intervention services provided for these infants. The association between increased health service attendance and larger households probably reflects the exposure of the infant to more infectious agents following general principles of overcrowding.[26] Although larger households are associated with increased GP and hospital visits it is not significantly associated with longer hospital stays, suggesting that it is not associated with more severe illness. It may also reflect the time that parents have to spend on the child and possible subsequent social stresses.

The length of the initial neonatal admission has previously been found to be a significant factor in the ongoing morbidity of very preterm infants.[5] We also found this to be associated with increased hospital and GP visits and a trend towards longer admissions. This is not surprising given that the most fragile and more premature infants in the cohort are identified using this criterion and are hence also the most likely to need ongoing input.

Although the very preterm infants had significantly lower cognitive and psychomotor Bayley scores at 2 years, this did not appear to be associated with the length of hospital admissions nor the amount of other hospital visits. This is reassuring and suggests that the increased health service utilisation is indeed an indicator of more temporal morbidity and does not contribute to further cognitive and physical impairment. However, the effect of the time spent within the health services must not be underestimated. It is quite likely that there are significant parental, sibling and infant stresses associated with this, both physically and emotionally.[22,26]

Although the increased use of health service utilisation is something we instinctively know, it is important to document this within our own community. Understanding the extent of health service utilisation helps to plan appropriate services and allows for more thorough counselling of families. It is reassuring that this utilisation is not associated with neurodevelopmental outcome at 2 years. However, it does highlight a significant expenditure of time, money and emotional energy on the part of health services and the families of these high-risk children. It is also a further indicator of the ongoing impact of prematurity on the health status of these children.

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