Contemporary Themes

Why are children admitted to hospital?

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Summary

The criteria for admitting children to hospital for medical care were examined in 399 consecutive, non-planned admissions to the Nottingham Children's Hospital between October 1975 and January 1976. Sixty-one per cent of the children were referred direct to the casualty department by their parents. Over 20% were admitted primarily for social reasons, and many of the remainder came from homes judged to be at a disadvantage. The hospital medical services for children should be aware of the needs of parents as well as of the needs of sick children in their catchment area.

Introduction

Staff and facilities provided for children admitted to hospital are directed towards treating the diseases precipitating admission. Hospital Activity Analysis reports support this approach by placing children in apparently clear-cut diagnostic categories. The decision to admit, however, is often influenced more by the lack of capacity of the parents to care for their child at home than by the severity of the disease, and clearly different facilities and a different approach by the staff are needed.

As a prelude to considering alternative and more appropriate modes of inpatient care in Nottingham, we assessed how far social factors influence the decision to admit a child to hospital. As frequent infections, inadequate care, and poor nutrition are all associated with poverty and may affect growth we also measured each child carefully on admission.

Methods

The records of 399 consecutive, non-planned acute medical admissions to the Nottingham Children's Hospital were examined prospectively from October 1975 to January 1976. The hospital serves a population of some 700 000 and admits 65-75 % of children with medical problems.

In each case the medical and social histories were taken by the senior paediatric house officer on duty and a diagnosis usually made. One of us (JW) gave an opinion on whether the admission was medically necessary or primarily due to social factors. Admission was thought to be medically necessary when the care needed was greater than that which could be reasonably expected of competent parents. A note was made of the referring agency—that is, general practitioners, emergency call service, social services, or the child's own parents—and inquiries were made about the housing and amenities of the family, the occupations and marital status of the parents, and the position of the child in the family. This information was then compared with statistics for the Nottingham City Borough[1 2] and for England and Wales as a whole.[3 4]

All the children were weighed and measured with standard techniques and the results compared with standard values. Children with longstanding organic disease—for example, Down's syndrome or cyanotic heart disease—were excluded from the height and weight survey.

Statistical evaluation was carried out with the χ^2 test.

Results and comment

Over 61 % of the children admitted were brought direct to the hospital either by their parents or by ambulance after a 999 call. Of the remainder, 36 % had seen their general practitioners, 2 % were referred by the emergency call service, and 1 % were brought direct to the hospital by members of the social services. During the study period many children were seen in the receiving room but not admitted. The age distribution of the children who were admitted was: under 12 months 28 %, 1-3 years 27 %, 4-9 years 35 %, and over 10 years 10 %. Table I lists the diagnoses made on discharge. Most infants with gastroenteritis requiring admission were transferred to another hospital in the city. Few of the children who had taken poisons had been seen by their general practitioner, although some had been directed to the hospital after the parents had telephoned the surgery or hospital for advice. The most common poisoning agents were aspirin (25 % of cases), amitriptyline (11 %), and turpentine (9 %).

The reasons for admission are shown in table II. Twenty-two per cent of the children referred by their parents and 9 % referred by the general practitioner or emergency call service were admitted primarily because of problems and limitations in the home. Table III gives the social class distribution of the local population as a whole and of the children admitted to hospital. Few of the children admitted were in classes I and II, and there was an excess of children in the lower socioeconomic groups. Children referred to the hospital by their

TABLE I—*Diagnosis at time of discharge of children referred by general practitioner (GP) or emergency call service (ECS) or their parents*

	Referred by GP or ECS (totals 100%)	Referred by parent (totals 100%)
Seizures (including febrile convulsions and epilepsy)	15%	23%
Upper respiratory tract infections (including colds, otitis media, croup)	7%	13%
Lower respiratory tract disease (including asthma)	17%	15%
Poisonings	<1%	18%
Gastroenteritis	3%	5%
Meningitis	6%	2%
Social problems	3%	5%
Feeding problems	5%	2%
Other diagnoses	43%	17%

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TABLE II—*Reasons for admission of children referred by general practitioner (GP) or emergency call service (ECS) or their parents*

	Referred by GP or ECS (totals 100%)	Referred by parent (totals 100%)
Need for nursing or medical care or both	91%	77%
Lack of "normal" parental competence	5%	17%
Social problems	4%	5%

TABLE III—*Social class distribution of local population as a whole and of the children admitted to hospital*

Social class	All people in catchment area		Proportion of children in sample	
	No	%	No	%
I	8 790	3·5	2	0·5
II	32 960	13·2	28	7·0
III	131 100	52·4	132	33·1
IV	57 270	22·9	103	25·8
V	20 240	8·1	134	33·6

general practitioner tended to be more severely ill when brought to the receiving room than those admitted after being referred to the casualty department by their parents. This was because the general practitioner had seen the child at home and so could critically assess the child's needs in the context of the family and home background. In the casualty department the medical officer had less information available and was more likely to be cautious, admitting the child if there was any doubt about the parents' ability to look after him; this was particularly so during the night.

Social admissions were occasionally arranged by general practitioners, and a similar proportion were arranged in the casualty department. Parental anxiety, tiredness, inability to cope, or a suspicion of child abuse were the usual reasons for admission, and the child was often an infant. The similarity in proportions of social admissions in each group suggests that parents need a "medical excuse" before coming to hospital.

More children from rented accommodation were admitted than might be expected from analysis of the 1971 housing data (table IV).[3 6]

TABLE IV—*Details of housing of children admitted to hospital*

	Catchment area 1971 (%)	Proportion of children in sample*	
		No	%
Owner-occupied	45·4	150	39·3
Council house	31·8	108	28·3
Rented unfurnished	19·6	88	23·0
Rented furnished (lodgings)	3·0	36	9·4
Other	0·2		
Total	100·0	382	100·0
Without bath	11·1	40	10·5
Outside WC or other type	17·3	57	14·9

*In 17 cases the type of accommodation was unknown.

Eighteen per cent of the children were from single-parent families, compared with a national average for England and Wales of 5%. More than 11% of the fathers were unemployed, compared with a local average of 4·6%, and just under 2% were in prison, although the expected number of men in places of detention was about 0·3%. Thirty-four per cent of the mothers and 23% of the fathers were aged 24 years or under, which accounts for the relatively high proportion of first-born infants admitted (table V). In larger families it was the younger children who tended to be admitted to hospital. In the group referred by general practitioners only 13% of the mothers worked full-time and 8% part-time. In the group of "parent-referrals" these proportions were 8% and 6% respectively. These figures were lower than expected from the known statistics, which include all women irrespective of childbearing age. Though there is a large immigrant population in the catchment area, 91% of the children admitted were White, less than 6% were Asian (mainly born in the UK), and 3% were West Indian.

TABLE V—*Child's position in the family*

	England and Wales %	Proportion of children in sample*	
		No	%
Only child	22·15	127	31·9
First of two	17·81	45	11·3
Second of two	17·81	79	19·8
First of three	7·33	9	2·3
Second of three	7·33	13	3·3
Third of three	7·33	39	9·8
First of four	2·76	4	1·0
Second of four	2·76	5	1·3
Third of four	2·76	18	4·5
Fourth of four	2·76	14	3·5
First of five or more	1·63	0	0·0
Second of five or more	1·62	2	0·5
Third of five or more	1·62	5	1·3
Fourth of five or more	1·62	8	2·0
Fifth and more of five or more	2·71	30	7·5

*In one case the position in the family was unknown.

The heights and weights of all the children admitted, excluding those with known chronic organic disease, are shown in table VI. The proportion of boys who were underweight and short was higher than expected. Of the girls aged under 1 year, more than expected were overweight, whereas of those aged over 1 year, more than expected were both short and underweight.

The weights of boys aged up to 1 year, from 1 to 3 years, and from 3 to 9 years differed significantly (P 0·001) from the standard values (table VII).[7] There were too few boys aged over 9 years for meaningful analysis. The weight of girls aged under 12 months was not significantly different from standard values, but that of older girls differed significantly (P 0·01). Boys and girls aged under 12 months were significantly taller than standard values (P 0·05 and P 0·01 respectively), though older children were not.

TABLE VI—*Percentages of children in three groups on percentiles of height and weight of less than 50 and less than three*

		Age (years)		
		<1	–3	–9
Boys				
Height percentile	<50	50	61	50
	<3	11	13	4
Weight percentile	<50	66	67	69
	<3	18	16	8
Girls				
Height percentile	<50	36	54	50
	<3	7		8
Weight percentile	<50	48	63	67
	<3	12	6	18

TABLE VII—*Analysis of heights and weights of children admitted compared with standard values*[7]

Age in years:	<1	–3	–9	–18
Boys				
Height χ^2	15·0	6·0	7·0	STS
Height P	0·05	NS	NS	
Weight χ^2	30·7	40·9	22·2	STS
Weight P	0·001	0·001	0·001	
Girls				
Height χ^2	17·0	STS	2·9	STS
Height P	0·01		NS	
Weight χ^2	6·6	STS	22·6	STS
Weight P	NS		0·01	

STS = Sample too small for analysis. NS = Not significant.
Combined weights of all boys and girls aged 9-18 years: $\chi^2 = 16·2$; P 0·01.

Discussion

The effect of a poor home environment on health in childhood was emphasised in the 1976 report *Fit for the Future*.[8] As the hospital is in a large industrial town with a population of around 700 000 we expected to find that some of the children came from homes where the parents were unable to cope with the child's illness, through either lack of facilities or lack of their own

ability. In this study, however, some 20% of the children were admitted primarily for social reasons, the disease symptom being the excuse rather than the reason for admission. In general few children admitted to the hospital came from advantaged homes, suggesting that many of the others might have been nursed at home if the parents had had advice and support from domiciliary services.

The influence of the home background on the decision to admit is reinforced by a preliminary analysis of the geographical distribution of a 20% sample of all admissions to the hospital during 1975-6. From some parts of the city as many as one in four children were admitted to hospital in the first year of life, and it was these same areas that were judged to be deprived with respect to income, employment, housing, education, socio-cultural background, and crime.[9] In contrast, the rate of admission from relatively privileged areas was less than one in 20. In the deprived areas the rates of infant death[10] and child abuse were also well above the city average. Most of the children came from the underprivileged areas of the city, and 20% were admitted because of limited facilities in the home; these proportions reflect the effect of poor backgrounds on the well-being of children. In this study we measured only physical indices of height and weight. When compared with the Tanner and Whitehouse centiles there was a disturbing excess of short and underweight children. Some of the infants were admitted because of their "failure to thrive" or their parents' "failure to rear," but many of the infants and most of the children who were undersized were not. The average duration of stay in the hospital was three days, so in most cases "thinness" was not recognised as a problem.

Many reports have recommended adjustments to the hospital environment so that the special needs of children are met. The admission of one or both parents with the sick child has been strongly advocated, primarily because the presence of a parent helps in the child's management and speeds his recovery. It might be argued that parents with problems at home might be less willing or able to stay with their children; a survey of Nottingham parents gave no support to this view, however, nor did their willingness to stay with the sick child lessen when they had other children at home or when the mother had a whole- or part-time job.[11] There can be few hospital wards in the country, however, that can cope with sickness in both parent and child or with a breakdown in the ability of the parents to cope with a fractious child due to their own ill health. Parents who stay in hospital often feel that they should be, or are expected to be, on duty at the bedside of their sick infant throughout most of the day. In practice, the need of the parents for care may be as great or greater than that of the child.

Parents who take their children to casualty departments to seek admission clearly have different needs from those whose children are admitted with complex or life-threatening disorders. In hospital they would benefit from a quiet, relaxed atmosphere, where the staff have a clear appreciation of the reasons for admission and there is full participation of the community and social agencies in the management decisions. Such admissions present opportunities for general family counselling, guidance, and support, which are being missed.

In this survey lack of home facilities and parental capacity was judged to be the major factor in the decision to admit over 20% of the children and an important factor in many of the remaining cases. While such circumstances persist, primary care services should be strengthened in the city areas of greatest need, and the hospital supporting services should be directed more towards recognising and meeting the real problems.

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A 50-year-old patient has to undergo an operation, when he may need blood transfusions. He has, however, allergies (in particular, to eggs) and reacted in his early 20s to an injection of gammaglobulin by developing rigors. (He also had serum sickness after tetanus immunisation.) How should his almost certain adverse reaction to protein injection in the form of blood transfusion be managed?

Allergic or anaphylactic-type reactions are usually due to an interaction between immunoglobulin (IgA) in the transfused blood or plasma and an anti-IgA present in the patient's plasma. Far more rarely an anti-Gm may be implicated. The simplest case is where the patient has no IgA in his plasma and hence has been able to form an anti-IgA in response to receiving this antigen. In others anti-IgA reacting with a more limited group of IgA immunoglobulins are found. The reaction may be flushing, hypotension, and dyspnoea, but more usually by urticaria or only a few wheals. It can follow the first few ml of a transfusion but may be due to an IgG preparation contaminated with small amounts of IgA. All these reactions will not be recognised if the patient is under anaesthetic. Nevertheless, the patient should receive an antihistamine such as chlorpheniramine maleate, 10 mg intravenously (or by mouth if an anaesthetic is not being given) and hydrocortisone, 100 mg parenterally. A single dose should prove adequate but it should be remembered that this treatment does not prevent the antigen-antibody reaction but merely prevents its side effects becoming manifest. If, however, in a patient receiving plasma over a longer period there is a further evidence of a reaction taking place, the dose of chlorpheniramine could be repeated four-hourly and the action of hydrocortisone supplemented by, for example, prednisone, 20 mg 12-hourly.

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Does monosodium glutamate trigger migraine attacks?

No, dietary triggers of migraine are not as frequent as generally supposed, affecting probably no more than 10% of patients. But many migraine sufferers do avoid certain foods, particularly chocolate, cheese and other dairy products, citrus fruits, and alcohol. In fact, practically every food has been suspected as a trigger by one or two people but the evidence is not convincing.

Is there any danger in eating green potatoes?

Potatoes contain small quantities of an alkaloid—solanine. Its concentration increases considerably as potatoes become green and begin to sprout. I can find no record of any fatality caused by eating green potatoes. What usually happens ranges from some nausea to fairly severe vomiting, diarrhoea, and abdominal pain.