Adjusting the effect of iron by two way analysis of variance for age, the number of visits, land holding or for the possession of a watch or a radio, or for the level of education of the household head did not reduce the strength of the association between the iron content of tubewell water and height for age.

The effect of iron water on height seemed to be more pronounced in younger children who, on average, were significantly less stunted (table 2). Yet a two way analysis of variance failed to show a significant interaction between age and iron content of water, which means that the effect of iron was not significantly greater in younger age groups.

Discussion

The association reported here between the iron content of drinking water and linear growth may be coincidental or due to some unknown confounding factors. Confounding, however, seems unlikely. Iron concentration in drinking water depends on soil characteristics and high concentrations occur in clusters of tubewells independently of other factors determining nutritional state. Age of the tubewell was considered as a potential confounder as tubewells with a high iron content were often old models installed by slightly better off families before the project started. However, adjusting for other socioeconomic indicators did not change the association between iron and height. In addition, each tubewell was usually used by several families of different socioeconomic status.

In this community diet is based on rice and contains virtually no animal protein. Presumably, most of these children were iron deficient, both as a result of a low intake and of a low absorption of iron. Iron coming from the tubewell was in ferrous form, which is likely to be well absorbed, especially if taken between meals. We suspect we observed on a quasi experimental basis at the community level, the growth promoting effect of iron, which has been recently reported from a clinical trial.[6]

Further studies are needed to confirm our findings. Other minerals present in the soil along with iron, and not iron itself, may have promoted linear growth. Our observations, however, support the hypothesis that the mineral content of the diet may be an important determinant of linear growth.

Dr A Briend was seconded to the International Centre for Diarrhoeal Disease Research, Bangladesh by ORSTOM, Institut Français de Recherche Scientifique pour le Développement en Coopération, France.

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The five year school medical—time for change

G C Smith, A Powell, K Reynolds, C A Campbell

Abstract

School medical records of 1000 children born in 1981 were studied retrospectively. They showed that once known medical problems and those screened for by the school nurse (hearing, vision, growth) were excluded, only 17 problems requiring treatment were discovered: speech (n=10), development (n=3), undescended testes (n=3), and phimosis (n=1). This indicates that routine screening by a nurse, backed up by selective medical examination by the school doctor, is efficient and effective.

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Accepted 4 September 1989

In recent years the effectiveness of routine screening tests has come under increasing scrutiny and particular reference has been made to school medicals.[1 2] School medicals have been in existence since the 1908 Education Act, although since 1959 there has been no obligation to perform these medicals at any particular age. This has left individual community health departments to initiate their own programmes of screening checks at various ages. At present, in the North Staffordshire district all children are screened at the age of 5 years, on primary school entry. Before the examination a questionnaire is sent to the parents inquiring about any known medical problems or any worries they have regarding their child. The school nurse performs an audiometric assessment using pure tone audiometry, tests visual acuity using the Sheridan Gardner single letter cards (STYCAR), and measures height and weight. The school doctor then sees the child, ideally in the presence of a parent and performs a physical examination and a basic neurodevelopmental assessment including speech. Until four years ago, children also routinely received a medical at the age of 16 years, before leaving school. This is now a selective medical for children known to have medical problems or those who are thought by the parent, teacher, or school nurse to warrant a medical. Again a parent questionnaire is sent before this selection process.

We wanted to discover whether the present

Problems found in the study

Problem found	*Total No of problems*	*New problems*	*New problems needing treatment*
		Detected by nurse	
	(n=205)	*(n=77)*	
Ears/hearing	99	43	
Eyes/vision	66	13	
Growth	40	21	
		Detected by doctor	
	(n=345)	*(n=78)*	*(n=17)*
Chest/nose/throat	78	8	0
Speech	72	19	10
Soiling/enuresis	43	4	0
Behaviour/development/central nervous system	32	10	3
Skin	27	1	0
Abdomen/genitourinary	26	19	4
Dental	24	7	0
Orthopaedic	24	3	0
Cardiovascular	19	7	0

non-selective system operating in North Staffordshire was an efficient screening programme, or whether this should become a selective examination. We looked retrospectively at information gleaned from school medicals performed on a selected number of an annual cohort and in particular we were interested as to whether any important medical or developmental problems would be missed by a programme of selective medicals, thereby possibly delaying treatment in these children.

Method

In 1981 there were approximately 6140 newborns in the North Staffordshire district. Records of 1000 children born in 1981 were looked at, the sample obtained by taking every fifth set of notes from the files. From these notes information was obtained from the main school medical record (10M), the parent's questionnaire, and the preschool health clinic record.

Follow up data was obtained from the school medical and hospital notes and the records of general practitioners.

Results

A total of 1000 school medical records were obtained for analysis of which 473 were for girls and 527 for boys.

In 979 medicals the parent questionnaire was returned and in 935 a parent attended the medical. No problems were reported in 333 (34%) questionnaires and in 279 (84%) of these no problems were found at the medical.

In total, 550 problems were discovered in 441 children and a breakdown of these is given in the table. Of the problems found, 395 (72%) were either known to a doctor (general practitioner, paediatrician), known to the appropriate therapist (speech therapist, orthoptist), or known to the parents and reported on the questionnaire.

The 155 new problems were found in 145 children as a result of the medical examination (see table). Of these problems, 77 (50%) consisted of hearing, visual, or growth problems, screened for by the school nurse.

The next most common new finding was speech difficulties and 10 of these were referred for speech therapy. Seven heart murmurs were reported, which were found to be innocent at follow up. Included in the abdominal or genitourinary problems were 10 boys reported as having undescended testes of whom three have had or are awaiting orchidopexy. One other had phimosis and required a circumcision. The remaining reported problems were of constipation, vague abdominal pain, a hydrocoele, an umbilical hernia, and a suspected inguinal hernia, none of which required treatment. One child's parents reported on the questionnaire that 'sometimes her water could smell strong at night'. A urine specimen was taken and found to have a significant culture of *Escherichia coli*. No action was taken by the general practitioner until eight months later, however, when a further urinary tract infection occurred and investigation showed bilateral grade III reflux with renal scarring.

Ten behavioural and developmental problems were discovered; two were referred to a child psychiatrist but each attended only one session. One child was referred to an occupational therapist because of clumsiness.

Discussion

The routine screening of children at school entry is largely historical. Preschool health services have improved and general living standards, which in the past contributed to such diseases as tuberculosis, have similarly changed for the better. A rethink of policy regarding school health management is now necessary but as any changes meet with opposition we have critically examined all the positive findings in a group of children undergoing school medical examination and identified the eventual outcome.

Of the 550 problems found in our study, only 155 (28%) were newly diagnosed and 77 of them were picked up by the routine screening checks carried out by the school nurse. The remaining 78 were either minor problems (innocent heart murmurs, dental, mild asthma) or problems that could be identified at the time of selection, by discussion with the teacher and school nurse (speech, clumsiness, behaviour, development). If we consider the remaining medical problems requiring treatment that might be missed, these would consist of three children who needed orchidopexies and a circumcision for phimosis. The outcome of orchidopexy is less favourable at this age,[3] and ideally undescended testes

should have been picked up at the examination performed at 6 weeks of age. Interestingly one of these boys had no previous records of examination, the second was reported as having both testes palpable in the scrotum at 6 weeks, while the third had in fact had a left herniotomy at 5 months of age but required a left orchidopexy aged 5 years. In addition we know of at least one child in our sample who has had an orchidopexy who was recorded as having normally descended testes at the school medical.

One suggested advantage of the present unselective system is that of parental reassurance. Also the presence of a captive audience of parent and child in school has potential opportunities for health education. It is arguable, however, that little real value comes from a 10 minute physical examination, in addition to the questionnaire and the nurses' screening checks.

It has been suggested that this medical may be used for neurodevelopmental assessment.[4] However there are several difficulties with this. Firstly, children with appreciable problems will probably already have been identified by the age of 5. Secondly, because there is a wide variation of normal and many signs are 'soft' there is a danger of labelling a normal child as one with a problem. An additional factor to consider is one of time. Bax and Whitmore estimated that 15–20 minutes was required per medical.[4] This would increase by between 50–100% the estimated 500–600 sessions per year presently required in North Staffordshire and in our opinion would require justification that real benefit would accrue.

The results of this study provide further evidence that a policy of selection of children for medicals at school entry is a reasonable one. This should be performed one term after school entry to allow time for teacher assessment. The selection process would be preceded by the screening of all children for hearing, vision, and growth problems by the school nurse. A class review would then be carried out by a named school doctor, school nurse, and the class teacher with the aid of a questionnaire completed by the parents and the preschool records. Criteria for selection for examination by the doctor should include: poor preschool records, previously identified problems requiring follow up, concern expressed by the nurse or teacher, and parental request. By adopting such a policy school doctors would be freed from performing unnecessary medicals on healthy children without fear of missing any important problems and this would allow more time to be concentrated on children in mainstream schools with special needs.

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Isolated fructose malabsorption

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Abstract

A patient with isolated fructose malabsorption presented with diarrhoea and colic during the first year of life and subsequently responded to a fructose free diet. Fructose malabsorption has been implicated in some cases of irritable bowel syndrome in adults and may also be an infrequently recognised cause of gastrointestinal symptoms in children.

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Accepted 1 August 1989

Fructose is a monosaccharide and a component of the disaccharide sucrose that is increasingly being used as a 'natural' sweetener in processed foods. It was previously supposed that fructose was absorbed passively, and thus specific malabsorption states should not occur as they do for sugars that require brush border enzyme systems for their digestion and absorption. A low capacity, oxygen dependent transport system for fructose alone has been shown in the small bowel,[1] which is independent of the high capacity system used when fructose is absorbed together with glucose.[2]

Fructose malabsorption is a cause of recurrent abdominal pain in adults[3] but in children only a single case (diagnosed in a 12 year old) has been described.[4] In addition, asymptomatic adult volunteers have been shown to be intolerant of loading doses of fructose.[5] Fruit juices containing fructose have been implicated as a cause of 'toddler diarrhoea', but symptoms were thought to be more related to the sorbitol component of the drinks than the fructose they contained.[6]

We describe a case of isolated fructose malabsorption diagnosed in the first year of life.

Case report

A baby girl was the product of a healthy term pregnancy and the second child born to unrelated parents. Her birth weight was 4000 g and there were no serious neonatal problems. She fed poorly from the breast, so was given cows' milk formula complements from 2 days of age, and fennel or blackcurrant drinks from 1 week of age. She was changed entirely to formula feeds at 4 weeks and rice weaners were added at the age of 6 weeks.