Doctors' views on diabetes

T M MARTEAU AND J D BAUM

University Department of Paediatrics, John Radcliffe Hospital, Oxford

SUMMARY Children with diabetes may be managed by either paediatricians or adult physicians with a particular interest in diabetes. This study compares the views of these two groups of doctors on juvenile onset diabetes. A questionnaire was given to all doctors attending two conferences, one primarily for paediatricians and one primarily for adult physicians with a particular interest in diabetes. Adult physicians estimated morbidity and mortality from juvenile onset diabetes to be significantly higher after 30 years than did paediatricians. The two groups of doctors also differed in the target blood glucose concentrations they considered optimal for diabetic children—more paediatricians opted for higher values than did adult physicians. The findings of this study support the view that paediatricians and adult physicians view juvenile onset diabetes differently. The origin of these differences is uncertain but may relate to the contrasting clinical experiences of the two groups of specialists.

Children with diabetes are managed by a variety of people in a variety of settings. Some are cared for by paediatricians in general paediatric clinics or in specially designated clinics, others by adult physicians usually in diabetic clinics. It has been postulated that paediatricians and adult physicians have different perspectives on juvenile onset diabetes as a result of their different experiences with diabetes. While both groups of physicians are aware of the long term complications it is adult physicians who have direct clinical experience of diabetic tissue damage; diabetic complications for paediatricians are remote, theoretical risks.

As a result of these differences it was hypothesised that adult physicians consider the long term morbidity and mortality associated with juvenile onset diabetes to be greater than do paediatricians. It was further postulated that there would be differences in clinical management between the two groups of doctors, particularly in relation to attempts to achieve near normal glycaemia. The present study was designed to test these postulates.

Method

A questionnaire was designed to assess doctors' views on juvenile onset diabetes.

Sample of doctors. The sample of paediatricians was obtained from doctors attending the 1983 annual scientific meeting of the British Paediatric Associa-

tion. The sample of adult physicians with a particular interest in diabetes was collected at the 1983 spring scientific meeting of the British Diabetic Association. A copy of the questionnaire was placed in the registration folder of all those attending the two conferences. Questionnaires were returned either at the conference or by post.

Questionnaire. Information was collected on the current posts held by the respondents, how many years they had been qualified as physicians, and their type and amount of experience with diabetes. The questionnaire concentrated on: (1) how serious a disease they considered juvenile onset diabetes to be; (2) the morbidity and mortality associated with the disease; and (3) the glycaemic concentrations desirable in a child with juvenile onset diabetes. The views of adult physicians and paediatricians were compared.

The perceived severity of juvenile onset diabetes was assessed using visual analogue scales. Respondents put a mark on a 10 cm line (the end points labelled 0=not at all serious, and 10=extremely serious) to show how serious they would consider diabetes in a 10 year old child and how serious they would consider the diabetes to be in 20 years time. They were then asked to rate (again using visual analogue scales) the seriousness of juvenile onset diabetes together with 10 other childhood illnesses (influenza, brain stem tumour, status asthmaticus, appendicitis, food poisoning, broken arm, glue ear,

mumps, recurrent fits, and ingrowing toe nail). Opinions on morbidity rates were assessed by posing the following question: 'In a sample of 100 males aged 40 who have had diabetes since the age of 10 and who have been averagely well controlled, what percentage would you estimate to have developed the following problems?' Eight types of tissue damage associated with diabetes were then listed alongside 10 cm lines upon which respondents were again asked to place a mark to represent their answer.

Views on mortality risk were assessed by asking them to estimate the percentage of a similar sample of adults with diabetes who would be dead at age 40 years as a result of ketoacidosis, hypoglycaemic coma, or from other causes directly related to their diabetes.

An index of how doctors approach the management of juvenile onset diabetes in a child was derived from ratings made on some hypothetical blood and urine test results. Respondents were asked to select from 7 sets of test results the set they would be happiest to see in a child with diabetes.

Finally the doctors were asked to indicate (using a visual analogue scale marked at one end by 0% and at the other by 100%) how close they considered the relation to be between chronic hyperglycaemia and diabetic complications.

Statistical analysis. The responses of the two groups were examined for differences using either the Student's *t* test or the χ^2 test.

Results

A total of 104 questionnaires out of 800 distributed were returned from the British Paediatric Association conference (a return rate of 13%) and 119 questionnaires out of 500 distributed were returned from the British Diabetic Association (a return rate of 24%). There were no differences between the two groups of doctors in the length of time that they had been qualified, the grades of posts occupied, and the number of years' experience with managing children with diabetes. As expected, however, adult physicians had had significantly more experience in managing adults with diabetes.

Perceptions of juvenile onset diabetes.

(a) Seriousness

There was no difference between the two groups in how serious they considered diabetes in a 10 year old child to be (Table 1). There was also close agreement in their ratings of how serious they perceived diabetes to be in relation to 10 other childhood complaints (Table 2).

Table 1 Ratings (mean (SD)) of seriousness of juvenile onset diabetes using 10 cm visual analogue scales*

	Adult physicians (n=119)	Paediatricians (n=104)
Seriousness of juvenile onset diabetes in a 10 year old child	4.4 (2.8)	3.7 (2.2)
Projected seriousness in 20 years time	6.1 (2.3)	5.4 (1.9) [†]
Seriousness of a hypoglycaemic coma in a child	4.5 (3.0)	5.6 (3.3) [‡]
Seriousness of a hyperglycaemic coma in a child	6.3 (3.0)	7.0 (2.6)
Seriousness of proteinuria in a child	8.2 (2.6)	7.5 (2.5) [†]

*0=not at all serious, 10=extremely serious.

[†]P<0.05, [‡]P<0.01.

Table 2 Ratings (mean (SD)) of seriousness of 11 childhood illnesses using 10 cm visual analogue scales*

Illness	Adult physicians (n=119)	Paediatricians (n=104)
Tumour	9.9 (0.4)	9.8 (0.4)
Diabetes	6.9 (2.1)	6.5 (2.1)
Asthma	6.7 (2.5)	6.3 (2.3)
Epilepsy	6.4 (2.5)	5.9 (2.1)
Appendicitis	3.0 (2.1)	3.1 (2.0)
Glue ear	2.1 (1.5)	2.3 (1.6)
Food poisoning	1.7 (1.7)	1.7 (1.4)
Broken arm	1.4 (1.1)	1.4 (1.3)
Mumps	1.3 (1.0)	1.2 (1.1)
Influenza	0.9 (1.2)	0.8 (0.8)
Ingrowing toe nail	0.9 (3.7)	0.5 (0.7)

*0=not at all serious; 10=extremely serious.

It is interesting to note, however, that the absolute rating of seriousness of diabetes differed, depending upon whether the rating was made relative to other childhood conditions (Table 2) or relative to short or long term complications of diabetes (Table 1). Paediatricians often rated the short term complications—ketoacidotic and hypoglycaemic comas—as more serious than adult physicians. This difference reached statistical significance for hypoglycaemic coma. In contrast, paediatricians considered the diabetes of a 10 year old child to be less serious in 20 years time than did adult physicians. Paediatricians also considered proteinuria in a 10 year old to be significantly less serious than did adult physicians.

(b) Likelihood of complications and death

Significant differences were found between the two groups (Table 3) in relation to the estimated development of diabetic complications among 100 men aged 40 who had had diabetes for 30 years. The differences between the ratings of adult physicians and paediatricians were significant in all but persistent proteinuria. For the other 7 complications adult

Table 3 Estimated percentage (mean (SD)) of prevalence of complications and death in juvenile onset diabetes by study responders and from the published reports

	Adult physicians (n=119)	Paediatricians (n=104)	Estimates derived from published reports (40-50 years after onset)
Complications			
Retinopathy	61.4 (20.8)	48.0 (24.5) [‡]	85.0 ²
Blindness	11.5 (10.3)	8.7 (8.9)*	16.3 ¹
Proteinuria	33.8 (21.5)	30.0 (19.8)	38.3 ¹
Renal failure	15.5 (15.5)	8.3 (8.1) [‡]	21.6 ¹
Stroke	8.7 (8.2)	6.7 (6.1)*	9.5 ¹
Myocardial infarction	16.9 (12.6)	12.1 (10.6) [‡]	20.9 ¹
Impotence	39.6 (21.6)	18.9 (15.8) [‡]	46.5 ³
Gangrene	12.3 (14.4)	6.7 (8.2) [‡]	12.1 ¹
Death from			
Ketoacidosis	5.5 (4.7)	7.1 (6.2)*	1.2 ¹
Hypoglycaemia	3.1 (3.4)	3.6 (3.8)	3.0 ¹
Other causes related to diabetes	21.7 (19.4)	10.4 (10.8) [‡]	55.8 ¹

*P<0.05; [‡]P<0.01; [‡]P<0.001.¹Deckert (1978); ²Lestrade (1981); ³Fairburn (1981).

physicians estimated the frequency of complications to be higher than did paediatricians. The number of patients in a similar group estimated as likely to be dead by the age of 40 years was significantly greater for adult physicians than for paediatricians. Paediatricians, however, attributed significantly more deaths to ketoacidosis than to other causes of death related to diabetes.

(c) Preferred pattern of glycaemic control

Most doctors in both groups selected the same pattern of glycaemic control (Table 4). Ninety per cent of adult physicians and 76% of paediatricians chose the only profile that had all test results within normoglycaemic ranges. Of those choosing profiles

outside of the normal ranges, paediatricians were more likely than adult physicians to favour those tending towards hyperglycaemia.

Although both groups of doctors considered the relation between chronic hyperglycaemia and tissue damage to be close (mean for adult physicians, 75.3%; mean for paediatricians, 66.8% on the visual analogue scale), adult physicians considered the relation to be significantly closer than did paediatricians (P<0.001).

(d) Clinical experience and perceptions of juvenile onset diabetes

In an attempt to explain some of the differences between the views of the two groups of doctors,

Table 4 Percentage preference of adult physicians and paediatricians for one of 7 hypothetical glucose profiles

Profile No		Hypothetical 7 day blood and urine glucose profiles														Preference for each profile	
		Mon		Tues		Wed		Thurs		Fri		Sat		Sun		Adult physicians	Paediatricians
		am	pm	am	pm	am	pm	am	pm	am	pm	am	pm	am	pm		
1	Urine* Blood [†]	5	0	5	3	2	5	3	T	5	5	5	1	1	1	0	0
			22		44		22		13		22		22		13		
2	Urine Blood	0	0	0	0	0	0	0	0	0	0	0	0	0	T	4	2
			4		7		7		4		2		1		4		
3	Urine Blood	0	0	½	0	0	0	0	0	0	½	0	0	0	0	6	14
			7		7		2		10		10		4		10		
4	Urine Blood	5	0	5	1	0	0	T	0	2	3	3	1	0	0	0	0
			13		22		2		7		13		13		2		
5	Urine Blood	0	T	T	½	0	0	0	½	1	0	T	0	T	0	0	8
			13		7		10		13		10		10		10		
6	Urine Blood	0	0	0	0	0	0	0	0	0	0	0	0	0	0	90	76
			7		4		7		4		4		7		7		
7	Urine Blood	0	0	½	0	5	5	0	0	0	½	0	5	0	0	0	0
			7		7		22		10		10		13		10		

*Urinary glucose, g%; [†]blood glucose, mmol/l. T=trace.

correlations between the types of clinical experiences of the two groups and their estimates of the likelihood of complications were examined. While the correlations between clinical experience and estimates of the likelihood of complications did not reach significance, there was a significant difference in the direction of these correlations between the two groups. For paediatricians there was a negative correlation between how long they had spent managing diabetes and their estimates of the likelihood of complications in 7 of 8 complications. For adult physicians these correlations were positive for 7 out of 8. This difference in the pattern of the relation between experience and estimated likelihood of complications is significant (χ^2 test, $P < 0.01$), adult physicians estimating complications as more likely with increasing experience, paediatricians estimating complications as less likely with increasing experience.

Discussion

These results support the main postulate of the study—that paediatricians and adult physicians have different perspectives of juvenile onset diabetes. The hypothesis that adult physicians estimate the likelihood of complications and early death in juvenile onset diabetes to be higher than paediatricians was supported by the data. The two groups held similar views on the seriousness of diabetes compared with other childhood illnesses. Adult physicians, however, estimated the morbidity and mortality after 30 years of juvenile onset diabetes to be higher than did paediatricians. Paediatricians felt that the relation between hyperglycaemia and tissue damage was less strong than did adult physicians.

These views on prognosis and its relation to hyperglycaemia seemed to be reflected in the management goals of the two groups of doctors. There was a significant difference between the two groups in the target blood glucose concentrations they considered optimal for diabetic children, more paediatricians opting for higher concentrations than adult physicians.

The responders represent highly selected samples of paediatricians and adult physicians. It could be argued that different biases have operated in the self selection of the two groups and that this alone accounts for the differences observed between them. The doctors in each group, however, had been qualified for similar lengths of time and were of similar seniority. Moreover, the two groups were remarkably similar in their responses to a large part of the questionnaire. In the absence of any specific and plausible theory of how selection bias might act differently in the two groups it seems reasonable to

seek other explanations for the differences in their answers.

The estimates of morbidity and mortality given by the two groups of doctors were compared with those given in the published reports to see whether, in the light of available evidence, paediatricians were underestimating the risk of complications and death, or adult physicians were overestimating these, or there was some combination of the two. The recent data provided by the Steno group¹ was chosen for this comparison since it includes figures on the prevalence of complications, the mortality rate, and causes of death in patients diagnosed before they were aged 31 who had had diabetes for at least 40 years. Figures on the prevalence of retinopathy and impotence are not given in the Steno study. For these complications therefore a comparison was made with rates quoted by Lestrade² and Fairburn³ respectively.

Taking into account that the estimates derived from the published reports are based upon patients diagnosed some 50 years ago with a longer duration of diabetes than the hypothetical sample in the questionnaire, the comparison suggests that the observed differences are mainly a result of paediatricians underestimating the risk of complications and death, with adult physicians making more realistic estimates (see Table 3).

There are perhaps three reasons why paediatricians underestimate the morbidity and mortality from juvenile onset diabetes: (1) experience, (2) information, and (3) optimism.

Experience. The differing views of paediatricians and adult physicians may result from differences in their clinical experiences of diabetes. Adult physicians have had more exposure to the long term complications of diabetes and would be expected, therefore, to give a higher estimate of the risk of complications and death than paediatricians. There was some evidence that experience of managing diabetes influenced estimates of the likelihood of complications. This explanation is further supported by the mortality estimates obtained. While the overall estimate of chance of death by age 40 years from causes related to diabetes was higher for adult physicians than for paediatricians (31.3% and 21.2% respectively), paediatricians estimated that significantly more deaths would have occurred by this age from ketoacidosis than did adult physicians. It is suggested that paediatricians attribute more deaths to ketoacidosis in adult diabetics because ketoacidosis is the major cause of death in diabetics under the age of 20 years.⁴ Although paediatricians attributed significantly more deaths to ketoacidosis than did adult physicians, the latter group also

overestimated the likelihood of a diabetic dying from ketoacidosis in comparison with the published reports (Table 3). This overestimate may reflect the fact that patients dying from ketoacidosis are more likely to be managed by an adult physician specialising in diabetes than patients dying from other causes related to their diabetes. These results are therefore compatible with the explanation that clinical experience rather than objective information influences a doctor's estimate of the risks attached to this disease.

Information. A second explanation for these results is that adult physicians specialising in diabetes are more knowledgeable about diabetes in general than are paediatricians. If better informed they would be more likely to make accurate estimates of the morbidity and mortality of juvenile onset diabetes. The data collected in this study do not shed any light on this possible explanation for the differences observed between the two groups of doctors. It must therefore remain a possible hypothesis.

Optimism. The phenomenon of individuals viewing their own chances of becoming ill as less than average is well documented in psychological reports.⁵ It may be that the tendency of paediatricians to underestimate morbidity and mortality from juvenile onset diabetes is a further example of 'unrealistic optimism about health'—in this instance applied not to the responders' health but to the health of their young, ostensibly disease free patients. The climate of the paediatric clinic is one of optimism in which overt acknowledgement of the long term complications is often considered inappropriate. This optimistic approach may eventually become incorporated into the doctor's beliefs about the disease.

The present study does not allow decisive distinction to be made between these explanations for the differing perspectives on juvenile onset diabetes between paediatricians and adult physicians: these explanations are not, in any case, mutually exclusive.

Conclusions

Adult physicians and paediatricians view juvenile onset diabetes differently. Adult physicians often consider that juvenile onset diabetes has a poorer long term prognosis and they see the relation between chronic hyperglycaemia and complications as closer than do paediatricians. The origin of these differences is uncertain but it is suggested that in part they are a function of differences in the clinical experiences of the two groups of specialists.

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Correspondence to Ms T M Marteau, Department of Paediatrics, John Radcliffe Hospital, Headington, Oxford OX3 9DU.

Copies of the questionnaire are available from the authors on request.