ORIGINAL ARTICLE

The relationship between parental perceptions of diabetes and glycaemic control

H M Pattison, S Moledina, T G Barrett

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See end of article for authors' affiliations

Correspondence to:
Dr H M Pattison,
Psychology, School of Life
and Health Sciences, Aston
University, Aston Triangle,
Birmingham B4 7ET, UK;
h.m.pattison@aston.ac.uk

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Aim: To measure the relationship between perceived child competence, parental self-efficacy, and children's glycaemic control.

Methods: Cross-sectional outpatient based questionnaire survey of 78 parents of children aged 6–12 years with insulin dependent diabetes mellitus, diagnosed for at least one year. Parental perceptions of their child's competence were assessed, together with parental perceptions of their own self-efficacy in managing their child's diabetes. Glycaemic control was assessed by the average annual HbA_{1c} level.

Results: The response rate was 64.5% (51 parents); 82% were mothers and the socioeconomic class and ethnicity spread was representative of the general population. The mean age of the children was 10 years and duration of diabetes 4.4 years. Poorer glycaemic control was associated with higher perceived child competence, together with lower perceived age of responsibility, lower perceived seriousness, and less frequent blood tests. Higher parental self-efficacy and higher perceived child competence predicted a higher level of normalisation, as did lower perceived seriousness, a lower perceived parental responsibility for management, and a less protective style of parenting.

Conclusion: Parents' perceptions of their children's diabetes are significantly related to glycaemic control; however, those who appear more competent at managing diabetes may overestimate their child's capabilities, leading to poorer glycaemic control.

The overall incidence of diabetes in children in the UK under 16 is 18.6 per 100 000 per year, an annual increase of 4% from 1985 to 1996.^{1 2} The Diabetes Control and Complications Trial (DCCT) showed that an intensive treatment regimen in adolescence prevented the onset and progression of complications.³ This puts pressure on all involved in managing diabetes to improve glycaemic control. However, there is a danger that metabolic targets will be attained at the expense of the psychological wellbeing of the children and their families, involving as it does frequent blood glucose monitoring, insulin injections, and carefully controlled diet and exercise.⁴ Parenting is the single largest variable implicated in childhood illness.⁵ Parents' perceptions of their children's diabetes may influence many of their decisions about parenting, which may in turn have an effect on glycaemic control.⁶

The health beliefs of people with diabetes have been shown to be important predictors of successful diabetic self-management. A central health belief in predicting health behaviour is self-efficacy⁷—that is, a belief in one's capabilities to perform a specific action to achieve a desired outcome. Several studies have shown that high self-efficacy is associated with good metabolic control in adolescents and young adults.^{8 9} However, for younger children, parental health beliefs are likely to be equally if not more important than the beliefs of the child, given the role of parents in the management of their children's diabetes. The impact of “parental self-efficacy”—that is, the extent to which the parents believe themselves capable of managing their child's condition effectively—has rarely been explored. A study into the role of parental self-efficacy in mothers and its relationship to management of their child's diabetes found high maternal self-efficacy to be significantly related to perceptions of their child's self-management in a positive direction.¹⁰ However, glycaemic control was not measured in this study.

In addition to assessment of their own competence, parents will also have a view of their child's competence to manage their illness. As the child becomes older the expectation is that more responsibility will shift to the child and away from the parent. During this important transition period, parents are faced with the difficult task of remaining in a supportive role in managing diabetes, while encouraging their children to assume greater responsibility and become increasingly independent.¹¹

A review on diabetes compiled for the Department of Health and Medical Research Council in the UK concluded that child competence was often underestimated, and that children as young as 3 years could be expected to be competent in some aspects of self-care.¹² A survey of parents in the UK in 1994 found that the mean age for starting self-injection was 8 years.¹³ However, a US study of 100 youths with diabetes indicated caution about encouraging maximal self-care autonomy and suggested that families who can succeed in maintaining some parental involvement in diabetes care may have better outcomes.¹⁴ Similarly, a study of 89 youths with diabetes in Germany found continued parental monitoring to be beneficial for glycaemic control as long as a balance was found between medical adaptation to the illness and the child's developmental needs.¹⁵ So parenting style, in terms of the amount of discipline enforced and protectiveness shown,¹⁶ is likely to affect parental involvement in diabetes care and also the effectiveness of such involvement.

A final consideration is that while good glycaemic control may be a primary aim of parents, ensuring that the child and the family live normal lives may be equally important. The process of actively accommodating the physical and emotional needs of the chronically ill child, in such a way as to minimise feelings of the child and the family being different, has been termed “normalisation”.^{17 18} Control beliefs such as parental self-efficacy and child competence are important in this process of accommodation.

The main aim of this study was to understand the relationships between parental self-efficacy, perceived child competence, and glycaemic control with a view to optimising the transition of care from parent to child without compromising the health of the child.

METHODS

Seventy eight children aged 6–12 years, diagnosed with insulin dependent diabetes for over 12 months, were identified on the Birmingham Children's Hospital database. These criteria were chosen as most parents are still actively involved in managing their child's diabetes in this age group but had adapted to the diagnosis and treatment regimen. Parents of the children were contacted and consented to completing a questionnaire, and allowing the researchers access to their children's notes.

A cross-sectional survey was carried out over three months between February and May 2001. Those parents whose children had a routine appointment over that period were approached in the waiting room of the clinic; those who did not have an appointment were sent the questionnaire, together with a freepost envelope in which to return it.

No standardised questionnaire covered all the areas of parental perceptions to be investigated, so a first version of the questionnaire was constructed to cover parenting style and illness perceptions as well as for perceived child competence and self-efficacy, with eight domains in total, using four sources of items. These sources were: the work of Eiser on the psychology of chronic childhood illness;⁶ 19 scales developed by Bradley to test psychological aspects of diabetes;⁴ a generic parenting scale;¹⁶ and a specific parental self-efficacy scale for parents of children with diabetes.¹⁰ Perceived child competence was assessed by asking parents how competent they felt their children were at self-injecting insulin, monitoring their blood sugar level, and recognising the signs of hypoglycaemia. Perceived self-efficacy was measured by giving the parents different scenarios to see how confident they were at managing diabetes related problems. Positive and negative statements were quasi-randomly ordered for each domain in a gender specific, four point psychometric Likert scale format.

The original questionnaire was piloted on a sample of parents, not included in the main study because their children did not fit the inclusion criteria. Face and content validity were assessed by clinical staff not involved in the questionnaire design, and the parents in the pilot, as well as through reference to the original studies cited above. Statements to which all parents gave the same response were discarded and the remaining items were assessed for internal consistency by calculating inter-item correlation in each domain using Cronbach's α . The final set of items showed good internal consistency within domains but ensured content validity by representing all the domains of interest. The final version of the questionnaire included 49 Likert scale items. Examples of items in the eight domains are given in table 1.

In addition to completing the Likert scale items, parents were asked at what age children should self-inject. They were also asked how many times a week blood sugars were checked at home. Sociodemographic information was obtained including the child's age, duration of diabetes, family history of diabetes, parents' level of education, occupation, living status, and ethnicity. Average annual HbA_{1c} level was obtained from the child's records as a measure of glycaemic control. All the pre-coded answers and scores were entered onto SPSS version 11 for analysis. Data were analysed using analysis of variance and multiple linear regression with a significant *p* value set at less than 0.05. For regression analyses standardised residuals were examined to ensure that the model was a good fit to the data and that there were no outliers; the tolerance statistic was examined to ensure that there was no evidence of collinearity.

Ethical approval for the study was granted by the South Birmingham and Birmingham Children's Hospital Research Ethics Committees.

RESULTS

Fifty one parents took part in the study. Of the 37 parents approached at the clinic, 100% agreed to take part; however, only 14 of the 41 of the parents who were sent the questionnaires returned them (34.1%), giving an overall response rate of 64.5%. Of these, 82% were mothers as they most frequently attended clinic. Twenty five per cent of parents had a higher educational qualification; the distribution in social class was equivalent to that of the general population, with most parents falling into social class 2 or 3 according to the Registrar General's Classification. Ninety per cent of parents lived with a partner and 80% had other children in addition to the child with diabetes. Eighty eight per cent were Caucasian, with the rest of the sample consisting of four Indian parents, one Afro-Caribbean, and one parent who described their ethnicity as mixed. Forty seven per cent of parents reported some family history of diabetes, type 1 or type 2; 14.3% of children had a first degree relative with diabetes, which is typical of the population as a whole.²⁰

The mean age of the children at diagnosis was 5.3 years and the mean current age of the children was 10 years. The mean HbA_{1c} level among the children was 9.37%. None of the sociodemographic variables was a significant predictor of glycaemic control, though the small number of parents in some groups (for example, ethnic groups), mean that these results should be treated with caution. Neither the chronological age of the child or the time from diagnosis, predicted glycaemic control. However, having a family history of diabetes was significantly associated with increased perceived seriousness of diabetes ($F_{1,47} = 6.751$, $p = 0.012$).

There was a wide variation in the age that parents thought children would be able to manage their own diabetes. Answers ranged from 6 to 14 years with a mean of 9.6 years. Twenty nine per cent of parents did not state a specific age. One parent commented: "I don't think there is any age where

Table 1 Examples of items from the parental questionnaire

Domain	Example item
Self-efficacy	I can adjust my child's management to avoid hypos
Child competence	I am happy to let my child stay overnight with a friend as he can look after his diabetes
Perceived parental responsibility	Giving my child more responsibility will worsen the control of his diabetes
Normalisation	I see my family the same as any other family
Discipline	I am no more soft on my child than other parents are
Protectiveness	I need to watch my child at all times to avoid hypos
Perceived seriousness	Diabetes has serious consequences if not controlled
Expectancy of regimen outcome	Controlling my child's diet is essential to controlling his diabetes

What is already known on this topic

- High self-efficacy is associated with good metabolic control in adolescents and young adults
- However in younger children, the role of parental beliefs about their own and their child's capability to manage diabetes effectively have been little studied

a child should inject themselves. It should be done as and when the child is ready, regardless of age or time since diagnosis". Boys were perceived to be responsible at a younger age than girls ($F_{1,34} = 6.489$, $p = 0.016$).

The internal reliability was measured for each domain of the final parent's questionnaire using Cronbach's α . Given the need to ensure content validity by representing all the domains of interest, and the small number of items in each scale,²¹ a relatively low level of α was taken to be acceptable ($\alpha > 0.6$). All had acceptable levels of consistency except for "discipline" ($\alpha = 0.27$), which was dropped from the analysis. Glycaemic control (measured by HbA_{1C} level) was predicted by perceived child competence, perceived responsible age, perceived seriousness, and frequency of blood tests ($F_{4,24} = 6.744$, $p = 0.001$, $R^2 = 0.451$). Thus higher perceived risk and more frequent blood tests, but lower child competence and higher perceived age at which a child could be responsible for self-management, were associated with better glycaemic control. Parental self-efficacy did not independently predict glycaemic control. However, both higher parental self-efficacy and higher perceived child competence predicted a higher level of normalisation, as did lower perceived seriousness, a lower perception of parental responsibility for management, and a less protective style of parenting ($F_{5,24} = 8.977$, $p < 0.001$, $R^2 = 0.579$).

DISCUSSION

The results of the study show that children who are perceived by their parents to be more competent in managing their diabetes actually have poorer control. Although it is not possible to show the direction of this effect, it is likely that this implies that some parents may perceive their children to be competent enough to manage their diabetes, and give them more responsibility for monitoring and treatment, when they are not yet fully prepared. Glycaemic control was not significantly related to any sociodemographic factors in this sample, which reduces the chance of confounding by social differences. It was also not predicted by characteristics of the child such as chronological age and time since diagnosis. This contrasts with studies of wider age groups, including pubescent and post-pubescent adolescents, where higher age is an important predictor, or proxy-predictor, of HbA_{1C} levels.²²

The beliefs that people with diabetes hold about diabetes and its treatment have been shown to influence self-management in adults and adolescents with diabetes. For example, Skinner and Hampson showed in a study of adolescents, that belief that their treatment regimen would control their diabetes led to better dietary self-care, which in turn led to better glycaemic control.²³ The results of this study offer some support for a similar effect of parental beliefs on the management of their child's diabetes, with lower perceived seriousness and fewer blood tests being associated with poorer control. However, taking into account also the results on parental self-efficacy, it may be that these beliefs are adopted by some parents in order to accommodate the child's illness and treatment.

What this study adds

- Higher parental self-efficacy was not associated with good metabolic control, but was associated with higher levels of normalisation (the process of accommodating the needs of the diabetic child to minimise the feelings of the child and family as being different)
- Children who are perceived by their parents to be more competent in managing their diabetes may actually have poorer glycaemic control

Self-efficacy is a positive health belief in many ways, but in this case parental self-efficacy may have counterproductive effects on glycaemic control. Some previous studies have concluded that children who are in receipt of help from their parents tend to have lower HbA_{1C} levels,¹⁴ with poorer control associated with a greater onus on the child for responsibility for his or her own care.¹⁵ It is important to ensure that while giving their children more independence as they grow up, parents are still involved in diabetes management to a certain degree. Higher parental self-efficacy was not associated with better glycaemic control as anticipated, but was associated with higher levels of normalisation. Diabetes has a major impact on family life. Low levels of parental self-efficacy have been linked to emotional distress in mothers of chronically ill children.²⁴ The association here between higher perceptions of child competence, higher parental self-efficacy, and a more relaxed parenting style with parents' beliefs that their family is "normal" may indicate that these perceptions are ways of coping with that impact and minimising the effect of diabetes on the family even at the expense of good glycaemic control.

Parents who appear competent to health professionals, and report their children as being competent, may be left to their own devices. This study shows that they too need appropriate guidance. Diabetes clinic appointments are quite short and in view of social desirability, parents may feel under pressure to convey the impression that everything is going well and their child can cope by themselves. Instead of accepting this at face value, there needs to be an ongoing assessment of child competence, so that the child is not given the responsibility of looking after their diabetes before they are ready to do so. This assessment could be made objectively by diabetes health professionals, possibly through brief standardised questioning of the child in clinic. If this was done in the presence of parents, competence could be demonstrated, allowing parents, children, and professionals to set realistic goals in collaboration. By aiming for the same realistic goals, we can improve the transition in diabetes care and ensure that glycaemic control is not compromised over this period.

The results of the analyses in this study should be interpreted with some caution. Although the sample was representative, it was relatively small. It was not possible to undertake subgroup analysis—for example, of mothers and fathers. Further research is needed to explore these issues over time.

Conclusion

Parents' perceptions of their child's diabetes are significantly related to their child's glycaemic control. This study has shown that the children of parents who perceive them as more competent at self-management, and perceive diabetes as less serious, are those with poorer glycaemic control. These perceptions, together with parents' perceptions of their own self-efficacy, may be part of strategies for coping with the impact of diabetes on families. This has important implications for clinical practice. An ongoing assessment by the

diabetes care team is required to determine child competence and optimise the transition in responsibility for care. A longitudinal study is recommended to assess changes in these parental perceptions and their impact on glycaemic control over time.

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Authors' affiliations

H M Pattison, Psychology, School of Life and Health Sciences, Aston University, Birmingham, UK

S Moledina, Guy's and St Thomas' Hospital NHS Trust, London, UK

T G Barrett, Department of Paediatrics and Child Health, University of Birmingham, Edgbaston, Birmingham, UK

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REFERENCES

- Gardner S, Bingley P, Sawtell P, *et al*. Rising incidence of insulin dependent diabetes in children aged under 5 years in the Oxford region: time trend analysis. *BMJ* 1997;**315**:713-17.
- Metcalfe MA, Baum JD. Incidence of insulin dependent diabetes in children aged under 15 years in the British Isles during 1988. *BMJ* 1991;**302**:443-7.
- Diabetes Control and Complications Trial Research Group. Effect of intensive diabetes treatment on the development and progression of long-term complications in adolescents with insulin-dependent diabetes mellitus. *J Pediatr* 1994;**125**:177-88.
- Bradley C. *Handbook of psychology and diabetes*. Switzerland: Harwood Academic Publishers, 1994.
- Hoghughli M. The importance of parenting in child health. *BMJ* 1998;**316**:1545.
- Eiser C. *Chronic child disease. An introduction to psychological theory and research*. Cambridge: Cambridge University Press, 1990.
- Bandura A. *Self efficacy. The exercise of control*. New York: Freeman, 1994.
- Grossman HY, Brink S, Hauser ST. Self-efficacy in adolescent girls and boys with insulin-dependent diabetes mellitus. *Diabetes Care* 1987;**10**:324-9.
- Griva K, Myers LB, Newman S. Illness perceptions and self efficacy beliefs in adolescents and young adults with insulin dependent diabetes mellitus. *Psychology and Health* 2000;**15**:733-50.
- Leonard BJ, Skay CL, Rheinberger MM. Self-management development in children and adolescents with diabetes: the role of maternal self-efficacy and conflict. *J Pediatr Nurs* 1998;**13**:224-33.
- Anderson BJ, Auslander WF, Jung KC, *et al*. Assessing family sharing of diabetes responsibilities. *J Pediatr Psychol* 1990;**15**:477-92.
- DoH/MRC Research Advisory Committee on Diabetes. *Current and future research on diabetes*, 2002 (<http://www.doh.gov.uk/nsf/diabetes/pdfs/DoHMRC-DiabetesresearchreviewOct2002.pdf>).
- Parker H, Swift PGF, Botha JL, *et al*. Early onset diabetes: parents' views. *Diabet Med* 1994;**11**:593-6.
- Wysocki T, Taylor A, Hough B, *et al*. Deviation from developmentally appropriate self care autonomy. *Diabetes Care* 1996;**19**:119-25.
- Seiffge-Krenke I. The highly structured climate in families of adolescents with diabetes: functional or dysfunctional for metabolic control? *J Pediatr Psychol* 1998;**23**:313-22.
- Irvine AB, Biglan A, Smolkowski K, *et al*. The value of the parenting scale for measuring the discipline practices of parents of middle school children. *Behav Res Ther* 1999;**37**:127-42.
- Knaff KA, Deatrick JA. How families manage chronic conditions: an analysis of the concept of normalization. *Res Nurs Health* 1986;**9**:215-22.
- Bossert E, Holaday B, Harkins A, *et al*. Strategies of normalization used by parents of chronically ill school age children. *J Consult Clin Psychol* 1994;**62**:603-10.
- Eiser C. *Growing up with a chronic illness: the impact on children and their families*. London: Jessica Kingsley, 1993.
- Ehtisham S, Hattersley AT, Dunger DB, *et al*. First UK survey of paediatric type 2 diabetes and MODY. *Arch Dis Child* 2004;**89**:526-9.
- Cortina JM. What is coefficient alpha? An examination of theory and applications. *J Appl Psychol* 1993;**78**:98-104.
- Smith AHK. *National Paediatric Diabetes Audit: results from the audit year 2002*, Research Department, Diabetes UK, London, 2004 (<http://www.diabetes.org.uk/audit/downloads/PaediatricAuditReport.pdf>).
- Skinner TC, Hampson SE. Personal models of diabetes in relation to self-care, well-being and glycaemic control. *Diabetes Care* 2001;**24**:828-33.
- Silver EJ, Bauman LJ, Ireys HT. Relationships of self-esteem and efficacy to psychological distress in mothers of children with chronic physical illnesses. *Health Psychol* 1995;**14**:333-40.