



Living with Type 1 Diabetes: The Influence of the Child's Gender on Family Functioning

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Abstract: Having a child with type 1 diabetes (T1D) has an impact on the family's dynamics, but less is known about the specific influence the child's gender exerts. The parents attending a routine diabetic review clinic were asked to complete the Family Adaptation and Cohesion Evaluation Scale (*FACES-IV*), and associated measures of family communication and satisfaction with family life. 53 mothers and 10 fathers completed the questionnaires, and the results revealed that mothers found communication within the family poorer if the index child was a girl, and felt less satisfied with family life. The fathers reports tended to echo this view. Possible reasons for this discrepancy are discussed, and it is suggested that routine review of children with T1D should maintain awareness that family functioning may be experiencing strain, particularly if the index child is a girl.

Keywords: Diabetes, Gender, Family Functioning, *FACES IV*

1. Introduction

The parenting of children is a challenging task at times, but when the child has a long term condition the level of that challenge increases significantly and structural adjustments to family functioning have to evolve. Type 1 diabetes (T1D) is a condition where the prevalence has been increasing steadily over recent years, and it is now the second most common disease in children [1]. By its nature, and the probability of long-term sequelae, it can have a profound effect upon the individual and their family, with long-term health requiring good metabolic control [2], and poorly controlled diabetes carrying an increased risk of serious complications later in life, such as heart disease, blindness, neuropathy, and stroke [3]. The goal of achieving good metabolic control has prompted considerable work trying to identify what elements ensure the best compliance with treatment regimes [4-6], and a significant element of this is trying to identify what aspects of family life might indicate poorer compliance, with studies suggesting that family functioning is one of the most critical [7].

Long term conditions in children can have significant impact upon the family, which in turn can affect the course and prognosis of the condition itself [8]. For instance parental concern that results in overprotective parenting styles have been shown to erode the child's healthy development [9]. Indeed some work has also suggested that family dynamics may be of more significance than insulin regimens in explaining differences in diabetic control [4]. For instance, high levels of reported family conflict have been found to be associated with more problematic trajectories of glycaemic control [10]. However considering how the gender of a child where there are no concerns about glycaemic control might influence this picture has received less attention. As part of a wider study, the opportunity arose to explore the views of parents of both boys and girls who had developed T1D.

2. Method

Having obtained relevant ethical approval and governance

permissions, the parents of young people between the age of 9 to 16 years who had a diagnosis of type 1 diabetes mellitus and were attending a specialist paediatric diabetes clinic for routine follow-up were given information about the study. None of the clinic attenders were presenting any concerns about the day-to-day management of the diabetes, there were no issues around poor behaviour, and the index child had no significant co-morbid medical condition. Families where a member had a serious physical illness, severe psychopathology (e.g. psychosis), or significant learning disability were not considered for inclusion.

63 families agreed to take part; 36 boys with a mean age 12.9 years (range 10 – 16.5 years), and 27 girls with mean age 13.3 years (range 9.8 – 16.6 years). The break-down of ages by gender is shown in table 1. The mean duration of type 1 diabetes for the sample was 5.5 years. The parents of the children were asked to complete three assessment scales.

Table 1. The sample by age and gender.

Age range in years	Girls	Boys
10 - 11	7	14
12 - 13	11	12
14 – 16.5	9	10

The Family Adaptation and Cohesion Evaluation Scale (FACES IV) is a self-report instrument designed to assess family functioning in terms of the Circumplex Model of Marital and Family System [11]. There are two balanced scales – cohesion, which is defined as the emotional bonding that family members have toward one another, and flexibility is the quality and expression of organization, rules and roles, and how negotiation of these elements are undertaken within the family. In addition, the scale gives four separate dimensions that represent the two contrasting aspects of cohesion (disengagement and enmeshment) and flexibility (rigidity and chaos). The U. S. instrument norms were drawn from 467 subjects made up of 64% college students and 36% from the community [12].

The scale has been shown to be suitable for assessing family functioning in various systematic reviews (e.g. [13, 14]). It has been translated into various languages including Italian [15] Hungarian [16] and Korean [17].

Two additional scales have been developed to compliment and extend the results provided by the *FACES IV*.

The Family Communication Scale this 10 item scale is based on the hypothesis that family communication will have a positive relationship to balanced family systems and, conversely, a negative relationship with unbalanced ones. The internal consistency of the scale is 0.90, and it has a test re-test of 0.86. In a large U. S. sample of 2,465 individuals the total mean score was found to be 36.2 (std. dev. 9.0) [18].

The Family Satisfaction Scale [19] this 10 item scale was one of the first satisfaction scales to be developed, and is based on the theoretical assumption that families with high scores on balanced cohesion and balanced flexibility would have higher levels of family satisfaction. The scale has a reported internal consistency reliability of 0.92 and a test re-test of 0.85 [19]. In a large U. S. sample of 2,465 individuals the total mean score was found to be 37.9 (std. dev. 8.5) [20].

The statistical analysis was undertaken using IBM-SPSS version 22. The mean scores and standard deviations (std dev) were compared using student's t-test (*t*), the statistical significance being drawn from the relevant degrees of freedom (*df*). Chi squared calculations (χ^2) were used for non-parametric data, and Mann Whitney U scores (*U*) compares means when the data is not normally distributed; the results are reported with the z-score which compares the result to the standard normal quantiles to obtain the reported *p*-value.

3. Results

The basic hypothesis of the Circumplex Model is that “balanced” families have a better pattern of functioning than “unbalanced” families. Considering the results of the *FACES-IV* by gender of the index child reveals that, for both boys and girls, the average cohesion and flexibility scores fall well within the “balanced” range (table 2). To place these results in context, the scores for these families were compared to those of the U. S. instrument norms [12]. This comparison (table 2) shows that the mothers in the current sample report much higher levels of cohesion and flexibility, all of which reached statistical significance. The number of fathers in the sample was small, but nevertheless they also showed a statistically significant higher average score than the instrument norms.

Table 2. The scores considered by gender and compared to instrument norms.

		Cohesion		Flexibility		Disengaged	
		mean (std dev)	score compared to instrument norms	mean (std dev)	score compared to instrument norms	mean (std dev)	score compared to instrument norms
Boys	Mothers (n=30)	61.73 (14.25)	13.3***	55.73 (11.73)	16.3***	20.37 (6.05)	6.3***
	Fathers (n=6)	71.67 (6.89)	15.8***	59.67 (7.91)	12.1***	18.17 (3.71)	3.2**
Girls	Mothers (n=23)	66.71 (12.3)	14.7***	55.1 (13.37)	11.8***	22.9 (11.14)	3.97***
	Fathers (n=4)	66.75 (20.83)	3.8***	51.5 (14.36)	4.3***	24.0 (10.71)	2.1*
Instrument norms	N = 467	27.0 (6)		20.5 (5.39)		13.2 (5.67)	

Table 2. Continue.

		Enmeshed		Rigid		Chaotic	
		mean (std dev)	score compared to instrument norms	mean (std dev)	score compared to instrument norms	mean (std dev)	score compared to instrument norms
Boys	Mothers (n=30)	17.70 (5.25)	7.1***	38.13 (17.76)	6.7***	26.03 (11.01)	6.4***
	Fathers (n=6)	21.17 (7.81)	3.3**	41.83 (16.33)	3.8***	20.33 (9.99)	1.77
Girls	Mothers (n=23)	17.57 (4.07)	7.5***	33.67 (11.36)	6.9***	31.24 (17.08)	4.9***
	Fathers (n=4)	18.0 (4.7)	13.5***	31.0 (4.76)	6.1***	20.36 (10.18)	1.42
Instrument norms N = 467		10.8 (4.0)		16.4 (5.52)		13.1 (5.37)	

* = $p < 0.05$; ** = $p < 0.01$; *** = $p < 0.001$

The ratio scores were developed by the Minnesota team to measure the level of balance versus unbalance in the family system, with a score over 1 indicating a balanced or healthy system. These ratio scores permit actual numbers who are showing difficulty to be identified. Using this ratio calculation, none of the families of boys with diabetes were reported by their mothers to be showing unbalanced cohesion or flexibility. Using these ratios, the mothers of the girls reported no unbalanced cohesion, whereas in terms of unbalanced flexibility, this was reported by 21% of these mothers.

When the subscores of the scale were generated (table 2) the mothers of girls reported their family somewhat more disengaged and chaotic than the mothers of boys, but these differences did not reach statistical significance. By contrast, the mothers of the boys indicated a pattern of family life that was somewhat more rigid, but again this did not reach a level

of statistical significance. When these scores were compared to the instrument norms the mothers' reports were again higher on average to a highly statistically significant degree.

Only a small number of fathers took part in the project, and yet, for them only the average chaotic score did not show a statistically significant difference to the norms.

The other two scales used to assess the family functioning within these families were the Satisfaction Scale and the *Communication Scale* (table 3). The mothers of boys were largely satisfied with family life, with only 7% reported low satisfaction, and none of these mothers reports were at the very low level. When the families of the girls were considered, 65% of them were less satisfied with family life, and 9 of these mothers (39% of the mothers) reported their satisfaction to be very low. This is a very different pattern to that seen in the families of the boys ($\chi^2 = 11.3, p < 0.001$).

Table 3. The Satisfaction and Communication scales considered by gender and compared to the instruments norms.

		Satisfaction			
		No. below cut-off (low/very low)	study population mean (std dev)	published norms (N= 2465) mean (std. dev.)	t-test against norms
Boys	Mothers (n=30)	2 (7%)/0	57.2 (21.16)	37.9 (8.5)	4.99***
	Fathers (n=6)	0/0	66.17 (21.51)	37.9 (8.5)	3.22***
Girls	Mothers (n=23)	15 (65%)/ 9 (39%)	55.57 (25.19)	37.9 (8.5)	3.21***
	Fathers (n=4)	3/3	25.25 (11.44)	37.9 (8.5)	2.21*

Table 3. Continue.

		Communication			
		No. below cut-off (low/very low)	mean (std dev)	published norms (N= 2465) mean (std. dev.)	t-test against norms
Boys	Mothers (n=30)	2 (7%)/0	65.6 (14.61)	36.2 (9.0)	11.00***
	Fathers (n=6)	0/0	77.5 (12.52)	36.2 (9.0)	8.08***
Girls	Mothers (n=23)	13 (57%)/ 1(4%)	64.57 (24.83)	36.2 (9.0)	5.23***
	Fathers (n=4)	3/0	59.25 (30.30)	36.2 (9.0)	NS

* = $p < 0.05$, ** = $p < 0.01$, *** = $p < 0.001$

published norms from Olson & Wilson (1989) for Satisfaction

Olson & Barnes (2009) for Communication

(for Satisfaction & Communication ratios < 35% & < 32% is "low" respectively and < 18% is "very low")

Norms for the Satisfaction Scale are available [20], and comparison with these shows that the level of satisfaction reported by the mothers of boys is much higher than the norm (t test ($df = 2493$) = 4.99 $p < 0.0001$). The mothers of girls reported again an average that was significantly higher than the published norm (t test ($df = 2486$) = 3.21; $p < 0.001$).

The low number of fathers in the sample means the results of analysis must be viewed with great caution. However it is

interesting that three of the four fathers of girls were very dis-satisfied with family life, and despite the very small numbers this achieved statistical significance when compared to the instrument norm (t test ($df = 2468$) = 2.21; $p < 0.05$). The fathers of boys were, however, satisfied with family life, their average score being significantly higher than the instrument norm (t test ($df = 2470$) = 3.22; $p < 0.001$).

In terms of communication, among the mothers of boys a

few (6%) had a concern about communication, and none reported it as very low. The mothers of the girls however reported far more concern about communication within the family with 57% of the mothers being dis-satisfied with family communication, with one mother reporting communication to be very low. This difference in perceived family communication between the mothers of boys and girls reached statistical significance ($\chi^2 = 8.0, p < 0.005$). Comparison to the norms for this scale [17] indicates that the mothers reported significantly higher levels of contentment with communication in their family than the norm in both, boys (t test ($df = 2493$) = 11.00, $p < 0.0001$), and girls (t test ($df = 2486$) = 5.23, $p < 0.0001$).

The fathers of the boys all reported positive views about family communication, with the average score being considerably higher than the instrument norm (t test ($df = 2469$) = 8.08; $p < 0.0001$). By contrast, the four fathers of girls were less content with communication within the family, though their average score was again higher than the instrument norm, but did not reach statistical significance.

Mann Whitney U scores were calculated with the satisfaction/dis-satisfaction dichotomy being the independent variable. For the mothers of girls the results showed a trend with age ($U=34, Z=-1.72, p < 0.09$), with a significant association with cohesion ($U=17.5, Z=-2.84, p < 0.005$), and especially communication ($U=9.5, Z=-3.34, p < 0.0001$). For the mothers of boys the only notable associations were with rigidity ($U=31, Z=-3.28, p < 0.001$) and being disengaged ($U=38, Z=-2.99, p < 0.005$).

To try to understand the differences better, the scores obtained from the mothers of the boys and girls were compared on a question by question basis. This highlighted that the mothers of boys recognised they have a lowered degree of emotional contact in their family than those of girls (Q.3) (t test ($df = 51$) = 2.04, $p < 0.05$), and were less likely to do things together (Q27) (t test ($df = 51$) = 2.94, $p < 0.01$).

Compared to the mothers of girls, the mothers of boys reported less clarity about roles (Q.24; Q36) ((t test ($df = 51$) = 2.15, $p < 0.05$) and (t test ($df = 51$) = 2.01, $p < 0.05$) respectively), but felt they had a good balance between closeness and individual space (Q.37) (t test ($df = 51$) = 2.33, $p < 0.05$). Mothers of girls were less satisfied with some aspects of family life including communication (Q43) (t test ($df = 51$) = 2.02, $p < 0.05$), expressing affection (Q.53; Q56) ((t test ($df = 51$) = 2.18, $p < 0.05$) and (t test ($df = 51$) = 2.95, $p < 0.01$) respectively), but felt they were less flexible about coping with stress (Q.54; Q55) ((t test ($df = 51$) = 3.11, $p < 0.01$) and (t test ($df = 51$) = 4.06, $p < 0.001$) respectively).

4. Discussion

The results of the FACES show that mothers parenting a child with diabetes reported their family functioning to be balanced, with the mean scores from the mothers of boys and girls being in the connected and flexible range. However, despite the fact that it is typically unbalanced family functioning that is associated with lower satisfaction and

poorer communication within the family [21], mothers of girls in this study reported feeling they were less satisfied with family life and felt their family communication was poorer than the mothers of boys. These parents are managing a life-altering condition in one of their children, and although the Circumplex Model predicts that families may move toward enmeshment and rigidity after a diagnosis of a chronic illness, [22] did not find evidence to support this in their study in the families of children being treated for cancer, and that was not the picture here either. Indeed the pattern described here, with parents expressing a level of dissatisfaction while placing themselves within the balanced range of functioning has been found previously, and prompted those authors to suggest that older concepts of how families respond to managing their child's illness needs to be reconsidered [23].

The most striking difference evident within this study is that mothers report different levels of satisfaction and quality of family communication according to the gender of the index child. The individual item differences may suggest themes underlying these gender differences. The mothers of boys recognised that in their families there was less emotional contact and that their families tended to do fewer things together. However overall they felt they had a good balance to family life. The mothers of daughters, by contrast, tended to report the family lacked closeness, with the linkage between separateness and closeness being out of balance, with less opportunity to share positive experiences and doing fewer things together as a family, suggesting that that generally family members got on better with people outside the family. These results prompt the question whether this gender discrepancy is a general feature of family life or is linked to the mothers' task of managing diabetes in their child.

Early theories on family development suggested girls tend to identify with their mothers, and that this aids healthy psychological functioning [24], in part by providing role models for their daughters [5]. However, along the developmental pathway, there tends to be a reducing reliance upon parents in favour of wider linkages as the young person prepares for the challenges of adult autonomy [25]. Gender is an important element in determining the variability in children's behaviour as evidenced by how girls and boys differ in the types and rates of adjustment problems [26, 27]. For girls, the general trend is for behavioural and temperamental problems to emerge in childhood, decline during the latency period, and then increase again in adolescence [28, 29]. The trajectory of maturation sees parental influence wain as relationships with peers gain a central role, and loosening the mother-daughter bond has been suggested as a factor in the rising prevalence of emotional disturbance with age that is observed in girls [30]. This pattern is important as it becomes increasingly clear that adjustment problems in women may be an especially important risk factor for psychopathology in the next generation [31], and even beyond [32].

More recently, theories have placed less emphasis on the

make-up of the family, rather focussing on the quality of the family relationships, and the family's emotional climate as well as wider social and cultural influences [33]. Intrinsic family functioning is therefore as important a factor as the trajectory of maturation. It has been reported for some time that conflict between mother and daughter increases as the relationship becomes less hierarchical [34]. This, in part, stems from the changes necessary to support the child's growing independence, a process that mothers tend to find more difficult with daughters [35], and although as society evolves fathers are gradually taking on a greater role in child care, mothers continue to have the greater involvement in parenting activities [36, 37], especially with girls [38], and arguably have a higher interdependence and emotional connection with them than other family relationships [39]. Thus, the developmental struggle with slackening the mother-daughter bond may be especially difficult for mothers of daughters with T1D because there has been a greater sense of needing to protect than mothers generally experience. Such a strain may, in part, explain the relative dis-satisfaction with family communication and the lower sense of satisfaction with family life found in this study.

The responses from the fathers in this study need to be interpreted with great caution because the number of fathers in the study was small. Also, research suggests that fathers' perceptions of diabetes regimen adherence, division of responsibility and family functioning often differ from mothers' perceptions [40]. The small number of responses obtained certainly indicated the fathers of boys were more satisfied with family life, and this is perhaps not surprising given the traditional view that fathers tend to spend more time with sons than with daughters [41, 42].

Considering the specific issues associated with T1D, girls have been found to have a lower level of self-esteem when compared to boys [43], perhaps because they seem to feel it has a greater impact upon their lives, and worry more about associated issues [44]. They have also been found to have levels of glycaemic control that place them at greater risk of difficulties than boys [10, 45].

When it comes to the mothers of children with T1D, they have been found to be more vulnerable to stress and feelings of being burdened by the caring role [6]. There are several aspects of managing T1D that underpin this burden, but managing mealtimes so there is adherence to the diabetes dietary recommendations is reported as one of the most difficult components [46]. Certainly there is evidence that families displaying lots of conflict and hostility are associated with poorer diabetes management and control [47, 48], even if not related to the diabetes management [49-51], while cohesive, supportive family environments predicting more positive outcomes [52].

There are a variety of caveats that need to be highlighted when considering the results of this study. The sample was drawn from a small geographical area, so there could be a heterogeneity to the parental functioning that would not be found elsewhere. In addition, it has been emphasized that differences in family patterns do occur depending upon

which member of the family is completing the instrument [53], and of course aggregating results from different age groups can distort findings, though focussing on the pre-adolescent and adolescent hopefully minimised this potential error. Finally, caution is needed when comparing this UK data to norms drawn from a US sample because although there may be a general concordance, it has been highlighted that differing cultures show specific adaptation to their functioning which can vary results [54].

5. Conclusion

The results from this study suggest that the pattern of family functioning reported by the mothers of girls with T1D is characterised by less satisfaction with family functioning and a poorer sense of family communication than reported by the mothers of boys. All though small in number, the fathers' reports suggest a similar pattern. The evidence from research suggests this trend is to be found in typically developing families, but this study suggests the presence of a life-influencing condition in the child prompts an exaggeration of this pattern. Given that the study was undertaken in a clinic where no significant problems were being reported, the findings suggest that even in such reviews specific attention should be given to exploring satisfaction with family functioning to minimise any potential for negative impact upon glycaemic control.

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