Depressive Symptoms in Children of Women With Newly Diagnosed Type 2 Diabetes

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Objective: Type 2 diabetes is a chronic disease with increasing prevalence. Individuals with diabetes are at risk for long-term complications such as nephropathy, retinopathy, and cardiovascular complications. Additionally, several studies have indicated that diabetes doubles the risk for depression. Individuals with depression are also said to be at greater risk for developing diabetes. Studies have shown depressive symptoms to be higher in children with diabetes than in those without the disease. This study measured depressive symptoms in children without diabetes of women with recently diagnosed type 2 diabetes.

Method: Fifty children whose mothers were newly diagnosed with type 2 diabetes were assessed with the Children's Depression Rating Scale, Revised (CDRS-R) to measure the psychological impact of the mothers' newly diagnosed diabetes on their children. This cross-sectional study was conducted in public and private clinics from April 2001 to June 2003.

Results: Sixty percent of children (N = 30) whose mothers were recently diagnosed with type 2 diabetes had CDRS-R scores consistent with likely or very likely having major depressive disorders. Mean ± SD CDRS-R scores were highest in children of women with diabetes affecting greater than or equal to 3 generations of their families (68.2 ± 8.9, p = .02).

Conclusion: The findings suggest that depressive symptoms are common in children of women with newly diagnosed type 2 diabetes. Severity of depressive symptoms positively correlated with the number of generations of diabetes in the family.

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Type 2 diabetes is an epidemic that is affecting an increasing proportion of many populations.[1–3] Some ethnic groups are more affected by type 2 diabetes than others. Persons of African and Hispanic descents are at higher risk than whites for developing type 2 diabetes.[2] Children from families with diabetes are also at increased risk for type 2 diabetes; frequency of a history of type 2 diabetes in a first- or second-degree relative ranged from 74% to 100% in 1 study.[4] Brown et al.[5] have shown that depression appears to increase the risk of developing diabetes by approximately 23% in young adults. Depressive symptoms are also high in persons with chronic illnesses including diabetes.[6,7]

Children of mothers with diabetes are at increased risk for the disease.[8] Past studies have indicated that children of mothers with chronic illness are at risk of psychological maladjustment.[9,10] In a study by Stein and Newcomb,[11] it was shown that depressed mood in ill mothers correlated with children's behavioral problems. Parental depression, particularly maternal depression, disrupts attachment and places children at increased risk for psychosocial difficulties and a range of adjustment problems.[12,13]

We hypothesized that children whose mothers are newly diagnosed with type 2 diabetes may show depressive symptoms since the illness increases the likelihood that the mother will experience psychological distress, economic difficulties, and troubles in family relationships, which are risk factors for psychopathology in children.[14] In a study of 76 Hispanic patients with diabetes, Chesla et al.[15] reported that 23% of the patients had troubling changes in family relationships after diagnosis. The current study was therefore designed to examine whether children and adolescents of mothers with newly diagnosed type 2 diabetes are at increased risk for psychopathology. It is important to identify these children since psychopathology appears to increase risk of diabetes[5] in children who are already at risk on the basis of hereditary factors.[4,8]

METHOD

Study Design and Setting

This was a cross-sectional study conducted within the Kingston metropolitan area of Jamaica from April 2001 to

June 2003. The target population was mothers with newly diagnosed type 2 diabetes attending public and private clinics. Information was obtained by interviews, and the children were assessed regarding depression via the administration of a standardized depression rating instrument. The study received approval from the University of the West Indies Faculty of Medical Sciences/University Hospital of the West Indies Ethics Committee. Informed consent was obtained.

Sample and Inclusion/Exclusion Criteria

Our population of interest was mothers recently diagnosed with diabetes mellitus who had their offspring living with them. At initial interview, 55 women with a total of 63 children within the desired age range were identified for further screening. Subsequently, 45 women with a total of 50 children satisfying the inclusion criteria were recruited into the study. Screening consisted of an interview of the mother and a fasting blood glucose test on the offspring.

In the interview, information obtained included demographic data, family history, and current health status of the children to determine if they were cognitively impaired, had any chronic diseases, had recent traumatic experiences, or showed signs of depressive symptoms (based on the Children's Depression Rating Scale, Revised[16] [CDRS-R] items) previous to the diagnosis of maternal diabetes. A fasting blood glucose test was also performed on each child to rule out the presence of diabetes.[17]

Inclusion criteria were a recent diagnosis, within 1 to 3 months prior to recruitment, of diabetes mellitus in the mother; mothers living with their offspring in the same home; offspring within the age range of 6 to 17 years; normal fasting blood glucose level for offspring; and absence of paternal history of diabetes mellitus for offspring. Exclusion criteria were diagnosis of diabetes mellitus in the mother greater than 3 months prior to recruitment; mother not living with offspring; offspring younger than 6 and older than 17 years; and offspring with a prior history of depression, recent traumatic experience, history of chronic illness, paternal history of diabetes, and presence of cognitive impairment.

Data and Instruments

The 50 children, in the presence of their mothers, were then assessed for depressive symptoms using the CDRS-R.[16] All assessments were done within 3 months of diagnosis of diabetes in the mothers. The CDRS-R is a validated 17-item instrument for the assessment of depressive symptoms in children aged 6 to 17 years. The scale has been used in other studies.[7,16,18] With the CDRS-R, ratings based on different sources (e.g., parent and child interviews) can be compared for each of the symptom areas assessed.[16] The scale can be administered in 15 to 20 minutes and easily scored in a few minutes. In a nonclinical setting such as school and the physician's office, the scale can be used as a quick and economical screener, identifying children who need professional help.[16] The interviewer rated 17 symptom areas, including those that serve as DSM-IV criteria for diagnosis of depression.[19]

Symptom areas rated included difficulty having fun, impaired schoolwork, fatigue, physical complaints, excessive weeping, depressed facial affect, listless speech, hypoactivity, suicidal ideation, morbid ideation, low self-esteem, depressed feelings, excessive guilt, irritability, sleep disturbance, social withdrawal, and appetite disturbance. Based on normative t scores, patients were characterized as extremely unlikely (≤ 39), unlikely (40–54), possible (55–64), likely (65–74), very likely (75–84), or almost certain (≥ 85) to meet the diagnostic criteria for a depressive disorder. Scores on the CDRS-R are used primarily to rate severity of depressive symptoms, and not to diagnose depressive disorders.[7,18,20]

Analysis

Data were analyzed with SPSS 11.5 (SPSS Inc., Chicago, Ill.). A 1-way analysis of variance was used because of multiple variables in the study. Demographic variables were analyzed against CDRS-R scores using Spearman's correlation coefficient. Levine statistics were used to check homogeneity of variance. Correlation regression was used to assess multiple relationships.

RESULTS

Fifty children of 45 women were assessed for depressive symptoms. Thirty (60%) of those had depressive scores indicating that they likely or very likely had a major depressive disorder (N = 15 [30%] likely and N = 15 [30%] very likely).

Table 1 gives demographic data and CDRS-R scores of the participating children. Only 10% (N = 5) of the participating children had mothers with greater than or equal to 10 years of formal schooling. Eighty percent (N = 40) of the children came from a single-mother household. The mean ± SD age of the mothers was 35.4 ± 3.8 years. Sixty percent (N = 30) of the children who participated had mothers with diabetes affecting greater than or equal to 2 generations of their families.

Table 2 gives CDRS-R scores in relation to generations of diabetes in the family. CDRS-R scores were highest (mean ± SD = 68.2 ± 8.9) in children of mothers with diabetes affecting greater than or equal to 3 generations of their families and lowest (mean ± SD = 57.4 ± 10.3) in children of mothers who were the first in the family to be diagnosed with type 2 diabetes. A statistically significant difference in CDRS-R score (p = .02) was noted between the cohorts with the highest and lowest scores.

Table 1. Demographic Characteristics of Study Participants (N = 50)[a]

Characteristic	Value
Single-mother household	40 (80)
Nuclear family	10 (20)
Age of mother, mean ± SD, y	35.4 ± 3.8
Ethnicity	
Afro-Jamaican	50 (100)
History of diabetes in mother's family	
No family history	20 (40)
2 generations	20 (40)
≥ 3 generations	10 (20)
Annual household income, $US	
< 5000	25 (50)
5–10,000	20 (40)
> 10,000	5 (10)
Education level of mother	
< 5 years' formal schooling	25 (50)
5–9 years' formal schooling	20 (40)
≥ 10 years' formal schooling	5 (10)
CDRS-R score, mean ± SD (range)	62.4 ± 12.3 (27–84)
Categorization of depression scores	
Depression extremely unlikely (< 39)	5 (10)
Depression unlikely (40–54)	10 (20)
Depression possible (55–64)	5 (10)
Depression likely (65–74)	15 (30)
Depression very likely (75–84)	15 (30)
Depression almost certain (> 85)	0 (0)

[a]All values are shown as N (%) unless otherwise stated.
Abbreviation: CDRS-R = Children's Depression Rating Scale, Revised.

Table 2. Relationship Between CDRS-R Scores and Family History of Diabetes (N = 50)[a]

Family History of Diabetes (maternal)	N (%)	CDRS-R Score, Mean ± SD
No family history	20 (40)	57.4 ± 10.3[b]
2 generations	20 (40)	64.2 ± 12.1
≥ 3 generations	10 (20)	68.2 ± 8.9[b]

[a]1-way analysis of variance was used for comparisons.
[b]p = .02.
Abbreviation: CDRS-R = Children's Depression Rating Scale, Revised.

Table 3 gives age and gender characteristics of the children who were assessed for depressive symptoms. Fifty-two percent (N = 26) of the children were females. Eighty percent (N = 40) of the children who participated in the study were between 6 and 12 years old. Twenty percent (N = 10) were adolescents between 13 and 17 years of age.

The comparisons of the demographic variables of family structure, years of education of the mother, age of the mother, and family income against CDRS-R scores using Spearman's correlation coefficient showed no statistical significance. Severity of depressive symptoms positively correlated with the number of generations of diabetes in the family (r = 0.51). This significance (p = .042) remained after age of mother, family structure, mother's years of education, and family income were controlled for. Linear regression analysis showed that, for each change in family history of diabetes, there was a 3-unit change in CDRS-R score.

Table 3. Characteristics of Children in the Study (N = 50)

Age, y	Male	Female
6–9	10	13
10–12	8	9
13–15	4	2
16–17	2	2

DISCUSSION

The results suggested that depressive symptoms are prevalent in children of mothers with newly diagnosed type 2 diabetes. The 30% likely depression rate among the children in our study is much more than the 1% to 6% reported in epidemiologic studies of children.[20,21] Another 30% of the participants in the study had CDRS-R scores that suggested that depression was very likely. In the study, 52% of the children who participated were females and 48% were males. Eighty percent (N = 40) of the participants were children aged 6 to 12 years. Males and females are equally affected by depressive disorder in childhood.[22] Depression is prevalent in women with diabetes. Prior to the diagnosis of diabetes, there was no recorded evidence of depression in the mothers and children. Stein and Newcomb[11] showed that depression in ill mothers was highly correlated with children's internalizing problem behaviors and moderately correlated with externalizing problem behaviors. The high scores seen in the children in our study may be the internalization of maternal depression reflected in depressive symptoms. Mothers of these children had reported no previous signs of depression in children prior to diagnosis of type 2 diabetes in the mothers.

Eighty percent of the children in this study came from single-mother households. Ninety percent of the children had mothers with less than 10 years of formal education. Fifty percent of the households from which these children emerged had annual incomes of less than $5000 per year. A variety of demographic factors such as single-unit household and low income are associated with depression.[23,24] Regression analysis in this study showed that demographic variables such as income, family structure, and years of education of the mothers had no significant impact on CDRS-R scores. Again, mothers involved in the study reported that their children showed no symptoms associated with depressive disorders prior to diagnosis of diabetes (inclusion criterion). Therefore, it may be reasoned that depressive symptoms were most likely manifested soon after the mothers were diagnosed with type 2 diabetes.

Higher CDRS-R scores in this study correlated with family history of diabetes. The scores were highest in

children who had a family history of diabetes in 3 or more generations. This high score might indicate fear associated with cultural understanding of hereditary illness in families, such as perceptions of the inevitability of the disease in each member of the family.[15] The children might have become depressed when their mothers were diagnosed with type 2 diabetes by reasoning that, since the disease is now evident in their mother, it is inevitable that they too will develop the disease.

Depression screening measures used in this study did not diagnose depression but provided an indication of the severity of symptoms associated with depression.[16,18] Without diagnostic interviews, one could not determine if the participants with likely or very likely depression would fulfill the diagnostic criteria for any major depressive disorders. Children with likely or very likely depressive symptoms in this study should therefore be assessed by a mental health professional using the DSM-IV depressive disorders criteria.[19] Major depression is recognized and treated in only about one third of cases in children.[21] Depression in children is associated with an increased risk of illness and psychosocial difficulties that can last long after the depressive episode is resolved. Physicians should therefore be made aware of the risk for depressive illnesses in children of mothers with newly diagnosed type 2 diabetes and make referrals to mental health professionals for further evaluation.

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