

Psychosocial morbidity among children with type-1 diabetes mellitus

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ABSTRACT

Background: Although the psychosocial impact of type-1 diabetes mellitus (T1DM) patients is well recognized, data about its prevalence in India is scant. Hence, this study was undertaken to determine the prevalence and spectrum of psychosocial morbidities among pediatric T1DM patients and factors associated with psychosocial distress. **Methods:** Among 39 pediatric T1DM patients, a cross-sectional questionnaire-based study was carried out. Psychological distress was measured by applying a childhood psychopathological measurement schedule (CPMS) questionnaire. Psychosocial distress was analyzed across various sociodemographic factors and disease-specific variables by applying the Chi-square test using the statistical package for social sciences (SPSS) version 16. **Results:** The mean age of the study sample was 11.59 + 2.65 years (range: 6–16 years). Out of a total 39 patients, 21 (53.85%) were found to be psychologically distressed. The mean CPMS score was 12.74 + 9.54. Mean scores among psychologically distressed and nondistressed patient groups were 19.19 + 8.5 and 5.22 + 2.74, respectively. Anxiety, conduct disorder, and depression were the most common problems identified. Psychosocial distress was more prevalent among those who were postpubertal, males, Muslims, residing in rural areas, living in a nuclear family, having no sibling, and from the upper-lower socioeconomic background. Psychosocial distress was significantly associated with an increased number of insulin injections per day ($P = 0.041$) and dietary and drug regimen noncompliance ($P = 0.001$). **Conclusion:** The present study revealed a very high prevalence (53.85%) of psychosocial morbidity among T1DM patients. Psychosocial distress was significantly more among patients taking an increased number of insulin injections per day and patients who were noncompliant with the dietary and drug regimen.

Keywords: Child psychology, psychosocial, type-1 diabetes mellitus

Introduction

Type-1 diabetes mellitus (T1DM) is an autoimmune disorder where insulin-producing beta cells are destroyed and intense lifelong insulin therapy is needed for survival. To up bring a child with T1DM is stressful because lifelong intensive medical

therapy, proper dieting, regular health check-up, nursing, proper coordination with school authority are needed for patients' survival.^[1] Literature shows that the psychosocial impacts of T1DM get modified with the advancement of the disease and the time course of the illness.^[2] In fact, evidence shows that psychological maladjustment increases with an increase in HbA1c level.^[3] Episodes of hypoglycemia and diabetic ketoacidosis (DKA) in infancy cause learning disabilities.^[4,5] In the case of school-going children, fear of rejection and exclusion from peers are the main problems. Anxiety, depression, adherence difficulties, and eating disorders are particularly common with adolescents.^[6] On the other

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hand, psychological and behavioral disorders in adolescence have been associated with negative diabetes-related health outcomes such as poorer glycemic control and DKA episodes.^[7]

Current treatment guidelines for diabetes include stringent metabolic goals along with the facilitation of normal social and emotional development.^[8] However, the psychosocial aspect of the disease, especially among younger patients with T1DM, is still a neglected arena.^[9-11] In India, which accounts for the largest number of cases of T1DM,^[12] there are multiple social and economic factors that hinder the proper psychosocial patient-centered care of diabetic patients.^[13] There is a dearth of awareness of the psychological impact of a lifelong disease like T1DM among clinicians, patients, and caregivers.^[14] A number of a diabetes educator, nurse, dietician, and child counselor is virtually nil in most of the diabetic centers in our country. The misery is compounded by the economic constraints and illiteracy of the general people.^[15] In the last 3 years, there have been few Indian studies^[16-18] published addressing the psychological impact of T1DM. We conducted this study from eastern India with the following aims and objectives: 1. To determine the prevalence and spectrum of psychological comorbidities among T1DM patients, 2. To determine if there is a significant difference between psychologically distressed and nondistressed groups across various sociodemographic and disease-related variables.

Materials and Methods

An observational, cross-sectional study was carried out in the T1DM clinic of the Department of Endocrinology, Institute of Postgraduate Medical Education and Research, Kolkata, India over a period of 2 months.

Patient's profile was assessed by a preformed and pretested questionnaire containing relevant information in the form of sociodemographic variables (age, sex, religion, residence, family type, siblings, and socioeconomic status assessed by modified Kuppaswamy's socioeconomic status scale, 2012^[19,20]) and disease-specific variables (duration of disease, insulin regime, number of times patient suffered from acute complications like hypoglycemia or DKA, number of times patient was hospitalized with acute complication, and compliance with drug and dietary regimes).

Childhood psychopathology measurement schedule (CPMS) was applied to assess the psychosocial distress among the study subjects. CPMS is the Indian adaptation of the child behavior checklist (CBCL). CPMS has been used as a screening instrument in population surveys to identify psychosocially disturbed children and is standardized on the Indian population.^[21] It measures overall psychopathology in the form of total scores and also the type of psychopathology in the form of eight factorially derived syndromes (namely, low intelligence with behavior problems, conduct disorder, anxiety, depression, psychotic symptoms, special symptoms, physical illness with emotional problem, and somatization). It contains 75 items, to

be designated as "yes-no" responses. The informant should be a parent, preferably a mother. Scores of the items on each of the eight factors are summed to give factor scores. CPMS has been used as a screening instrument with a cutoff score of 10 and above indicating significant psychopathology, with 87% specificity and 82% sensitivity. It can also be used as a tool to measure the severity of a disorder (indicated by the overall score) and also the individual factor scores showing the specific type of psychopathology.

After obtaining the approval of the institutional ethics committee data collection was started. Informed written consent was obtained from the participating parents. Data was collected by a one-to-one interview basis and complete anonymity was ensured.

Considering the rarity of T1DM, we gathered as many patients as we could in the prespecified duration of the study (2 months). Patients having other unrelated chronic illnesses and patients already having neuropsychiatric illnesses before being diagnosed as T1DM were excluded. Primary caregivers, preferable mothers of a total of 40 patients were interviewed. Out of them, one was excluded from analysis for being identified as Down's syndrome. Hence, data from 39 patients were included in the final analysis.

Collected data were entered in MS Excel-2010. The analysis was done using the statistical package for social sciences (SPSS) version 16. Preliminary analysis was expressed as means (SD), medians (range), and frequencies. To determine the normalcy of distribution across categorical variables Sapiro-Wilk's test was done, which showed the nonparametric distribution of the data. Chi-square test was applied to determine if there is a significant difference between psychologically distressed and nondistressed groups across various sociodemographic and disease-related variables. The *P* value of <0.05 was taken as statistically significant.

Results

A total of 39 patients with a mean age of 11.59 ± 2.65 years (range: 6–16 years) were enrolled in the study. Taking 11 years as the mean age of attainment of puberty, there were 26 postpubertal subjects (66.67%). There were 17 (43.59%) males and 22 (56.41%) females. There were 23 (58.97%) patients from urban areas and 16 (41.03%) from rural areas; 31 (79.49%) patients were from Hindu community while 8 (20.51%) were Muslims; 26 (66.67%) patients were living in a nuclear family, and 13 (33.33%) patients belonged to joint family; 30 (76.92%) patients had siblings while 9 (23.08%) had not; 25 (64.10%) patients belonged to upper-lower socioeconomic status while rest were in lower socioeconomic scale as per the modified Kuppaswamy scale [vide Table 1].

The mean duration of illness was 38.82 ± 30.92 months (range: 4 to 132 months). The majority of patients (66.67%) used to take twice daily mixtard insulin while rest took thrice daily regular insulin regimen. Around 29 (74.36%) patients suffered

from at least one episode of acute complications (hypoglycemia or diabetic ketoacidosis) while 10 (25.64%) did not. Around 15 (38.46%) patients had a history of hospitalization at least one due to those acute complications [vide Table 2].

Out of a total 39 patients, 21 (53.85%) had CPMS scores ± 10 . The mean CPMS score was 12.74 ± 9.54 . The mean score among the psychologically distressed patient group (CPMS ± 10) was 19.19 ± 8.51 . On the other hand, the mean score among the psychologically nondistressed patient group (CPMS <10) was 5.22 ± 2.74 . Among the psychologically distressed patients, anxiety (32.40%), conduct disorder (30.82%), and depression (27.46%) were carrying more score than the mean score (25.59%). This pattern was also true for psychologically nondistressed individuals (anxiety- 16.6%, conduct disorder- 8.47%, and depression- 7.23%).

Although psychosocial distress (CPMS score ≥ 10) was more prevalent among those who were postpubertal (61.54%), males (64.71%), Muslims (62.50%), residing in rural areas (56.25%), living in nuclear family (57.69%), having no sibling (55.56%) and from upper-lower socioeconomic background (56%) compared

to prepubertal (38.46%), females (45.45%), Hindus (48.39%), residing in urban areas (52.17%), living in joint family (46.15%), having siblings (53.33%) and from lower socioeconomic background (50%), respectively, it was not statistically significantly associated with any of the sociodemographic variables [vide Table 1]. Among the disease-specific variables psychosocial distress was statistically significantly associated with an increased number of insulin injections per day ($P = 0.041$), and dietary and drug regimen noncompliance ($P = 0.001$) [vide Table 2].

Discussion

In the present study, 53.85% of T1DM patients have been found to be psychologically distressed, compared to the survey done in the northern part of the country^[16] which applied the same scale and found 20% patients had CPMS score ≥ 10 . While that survey showed patients with T1DM had a mean CPMS score of 4.48 ± 4.925 , ours revealed a much higher mean score (12.74 ± 9.54). On the other hand, a case-control study from western India using “DSM-5 parent/guardian-Rated Level 1 and 2 Cross-Cutting Symptom Measure-Child age 6–17” showed

Table 1: Sociodemographic characteristics and CPMS scores of study samples

Variables		Total number of subjects (%)	CPMS score		Chi-square value	P
			Number of subjects having score <10 (%)	Number of subjects having a score ≥ 10 (%)		
Age	Prepubertal	13 (33.33)	8 (61.54)	5 (38.46)	1.857	0.173
	Postpubertal	26 (66.67)	10 (38.46)	16 (61.54)		
Sex	Male	17 (43.59)	6 (35.29)	11 (64.71)	1.430	0.232
	Female	22 (56.41)	12 (54.55)	10 (45.45)		
Residence	Urban	23 (58.97)	11 (47.83)	12 (52.17)	0.063	0.802
	Rural	16 (41.03)	7 (43.75)	9 (56.25)		
Religion	Hindu	31 (79.49)	16 (51.61)	15 (48.39)	0.303	0.582
	Muslim	8 (20.51)	3 (37.50)	5 (62.50)		
Family type	Nuclear	26 (66.67)	11 (42.31)	15 (57.69)	0.464	0.496
	Joint	13 (33.33)	7 (53.85)	6 (46.15)		
Having siblings	Yes	30 (76.92)	14 (46.67)	16 (53.33)	0.014	0.907
	No	9 (23.08)	4 (44.44)	5 (55.56)		
Socioeconomic status	Upper-Lower	25 (64.10)	11 (44)	14 (56)	0.130	0.718
	Lower	14 (35.90)	7 (50.00)	7 (50.00)		

Degree of freedom (df)=1 $P < 0.05$ has been considered a significant

Table 2: Disease-related data and CPMS score of study samples

Variables		Total number of subjects (%)	CPMS score		Chi-square value	P
			Number of subjects having score <10 (%)	Number of subjects having a score ≥ 10 (%)		
Number of insulin injection/day (type of insulin)	2 (mixtard)	13 (33.33)	9 (69.23)	4 (30.77)	4.179	0.041*
	3 (regular)	26 (66.67)	9 (34.62)	17 (65.38)		
Suffered at least one episode of acute complication	Yes	29 (74.36)	13 (44.83)	16 (55.17)	0.080	0.777
	No	10 (25.64)	5 (50)	5 (50)		
Hospitalized with at least once with acute complications	Yes	15 (38.46)	8 (53.33)	7 (46.67)	0.506	0.477
	No	24 (61.54)	10 (41.67)	14 (58.33)		
Drug and dietary compliance	Yes	29 (74.36)	18 (62.07)	11 (37.93)	11.527	0.001*
	No	10 (25.64)	0 (0)	10 (100)		

Degree of freedom (df)=1. * $P < 0.05$ has been considered as significant

that 55.95% T1DM patients had a psychosocial illness, compared to 20% among the control group.^[17] This underpins the need for a comprehensive psychological support system for T1DM patients in our setup. Among both psychologically distressed and nondistressed patients domains of anxiety, conduct disorder and depression carried more score than the mean score in our study. The north Indian study also showed the most common problems were conduct disorder among their cohort.^[16] On the other hand, the west Indian study showed irritation, depression, and anxiety were the principal psychosocial morbidities.^[17] Another Indian study focusing only on depression showed a high prevalence (60%) among T1DM subjects.^[18] Analysis of the western literature^[11,22-24] revealed high psychiatric morbidity, anxiety, depression, and disruptive behavior supporting our findings. Asian studies^[25-27] also showed a similar spectrum of psychosocial morbidities among T1DM patients.

In the present study, the psychosocial stress was associated with none of the sociodemographic variables. The other three prior Indian studies also did not find any association of psychological illness with any sociodemographic variables.^[16-18] Puberty has been implicated in the worsening of metabolic control and psychosocial adaptation among T1DM patients.^[28] Although the prevalence of psychosocial morbidity was much higher among postpubertal individuals than prepubertal ones in this study, it did not demonstrate a statistically significant association between psychosocial morbidity and puberty. In contrast to the present study and other Indian studies, in western literature females were found to be more psychosocially distressed and have greater psychiatric morbidities than males.^[29,30] From the present study, it could not be ascertained whether socioeconomic status had any impact on psychosocial morbidity or not as all of the study participants belonged to either upper-lower or lower class. In this study, patients on 3 times per day regular insulin were more psychosocially distressed than those on 2 times per day mixtard insulin regimen. Fear and anxiety related to insulin injection are known causes of diabetes distress and psychological comorbidity.^[31] Therefore, reducing the frequency of insulin injections, the use of insulin pumps, and technologies to measure continuous glucose monitoring might be possible ways to curtail the injection-related distress, although comes with increased cost.^[32,33] Dietary and drug-related noncompliance was also found to have a statistically significant association with psychosocial distress in this study. This finding was congruent with the previous Indian study.^[17] Although the previous survey in northern India^[16] showed a statistically significant relationship between the total number of hospitalization in the last 6 months and psychosocial morbidity, the present study could not demonstrate any.

Limitations

Although the present study was the first in eastern India to assess the psychosocial impact of the disease among T1DM patients, there were number of limitations. Firstly, the sample size was relatively small and the study was done in only one center.

Moreover, it was a cross-sectional study with no follow-up, there was no control group to compare the psychological burden specific to the disease. It was a questionnaire-based study having its inherent subjective and recall bias. CPMS is just a psychological screening tool. Consequently, no specific psychiatric diagnosis can be ascertained by using this. No standardized validated questionnaire in the local vernacular was available.

Conclusion

To conclude, the study highlights the fact that the prevalence of psychosocial distress among pediatric T1DM patients is 53.85%, which is quite alarming. Anxiety, conduct disorders, and depression were the most common problems observed. Psychosocial distress was significantly associated with an increased number of insulin injections per day and dietary and drug regimen noncompliance. Considering the high prevalence of psychosocial morbidity among T1DM patients, identification of psychosocially distressed individuals in the T1DM clinic and its early management might be recommended. Greater awareness among parents, primary caregivers, pediatricians, and endocrinologists are needed for early diagnosis and subsequent intervention.

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Nil.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form, the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Conflicts of interest

There are no conflicts of interest.

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