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Original Research Article

Assessment of phsychological well-being and prevalence of depressive symptoms amoung young adults with type-1 diabetes mellitus

Anu Anna Jacob[1], Divya Deodhar[2]*

[1]Department of Pathology, Malankara Orthodox Syrian Church Medical College, Kolenchery, Kerala, India
[2]Depattment of Infectious Diseases, Christian Medical College, Vellore, Tamil Nadu, India

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***Correspondence:**
Dr. Divya Deodhar,
E-mail: divyadeodhar@gmail.com

ABSTRACT

Background: Depression in adolescents and young adults with type-1 diabetes mellitus has been associated with poor glycemic control and recurrent hospitalizations. The World Health Organization-Five Well- being index (WHO-5) is a simple, short and positively worded screening method to assess the level of emotional well-being and has been validated for use in adolescents with type-1 diabetes mellitus. Aims and objectives to assess the psychological well-being in adolescents and young adults with type-1 diabetes mellitus using the WHO-5 well-being index. To estimate the prevalence of symptoms of depression in type-1 diabetes mellitus using the major (ICD-10) depression inventory (MDI-ICD-10) of the psychiatric research unit.
Methods: Study was a prospective study. Cases were patients with type-1 diabetes mellitus who attended the "Juvenile Diabetic Club" in CMC Ludhiana consisting of children and adolescents. Controls were healthy age matched adolescents within the family of the patients. Informed consent was taken, and they were asked to fill up the structured WHO-5 Well-being index (version 1998) questionnaire and the WHO-Major (ICD-10) Depression Inventory (MDI-ICD-10) questionnaire.
Results: 36 patients were chosen for the study. There were 20 boys and 16 girls. 12 (33.3%) patients (diabetic group) had scores indicating poor well- being. P value is 0.0455, statistically significant. Among the healthy control (non-diabetic group), all of them had a scores suggesting good well- being.
Conclusions: 33% of the diabetic children are depressed compared to the non-diabetic candidates in whom none are depressed.

Keywords: Asterion, Approach to posterior cranial fossa, Mastoid process, Transverse sinus

INTRODUCTION

Depression appears to be two to three times more prevalent in individuals with type-1 diabetes mellitus compared to the general population. Diabetes is a chronic disease which leaves a psychological sequel. Depression in adolescents and young adults with type-1 diabetes mellitus has been associated with poor glycemic control and recurrent hospitalisations. It is therefore recommended that screening for depressive symptoms be performed routinely in patients with type-1 diabetes.

The World Health Organisation-Five Well-being index (WHO-5) is a simple, short and positively worded screening method to assess the level of emotional well-being over a 14day period and has been validated for use in adolescents with type-1 diabetes mellitus.

While mechanisms that link depression and suboptimal health outcomes are poorly understood in type-1 diabetes mellitus, it is apparent that the chronicity of type-1 diabetes and the demands of management provide a fertile environment for adjustment problems.

Definition

Diabetes mellitus is a group of common metabolic disorders that share the phenotype of hyperglycaemia. Several distinct types of diabetes mellitus exist and are caused by a complex interaction of genetics, environmental factors and life style choices.[1]

Classification of diabetes mellitus

In 1997, ADA issued new diagnostic and classification criteria; in 2003, modifications were made regarding the diagnosis of impaired fasting glucose (IFG). The classification of diabetes includes four clinical classes.[2,3]

- Type 1 diabetes (Results from β-cell destruction, usually leading to absolute insulin deficiency),
- Type 2 diabetes (results from a progressive secretary defect on the background of insulin resistance),
- Other specific types of diabetes due to other causes, e.g. genetic defects in β-cell function, genetic defects in insulin action, diseases of the exocrine pancreas (such as cystic fibrosis), and drug or chemical induced (such as in the treatment of AIDS or after organ transplantation),
- Gestational diabetes mellitus (GDM- Diagnosed during pregnancy). Occasionally, patients who otherwise have type 2 diabetes may present with ketoacidosis.

Epidemiology of type 1 diabetes in India

Type 1 Diabetes mellitus is immune mediated in over 90% of cases and idiopathic is less than 10% cases. The highest incidence of immune mediated type 1 diabetes mellitus is in Scandinavia and northern Europe, where the yearly incidence per 100,000 youngsters 14years of age or less is as high as 37 in Finland, 27 in Sweden, 22 in Norway and 19 in the United Kingdom; as per the early studies. The U.S averages 15/100,000, the lowest incidence was found to be less than1/100.000/year in China and parts of South America.[4]

Pathogenesis

Type 1 diabetes mellitus is an auto-immune disease in which islet destruction is caused primarily by T lymphocytes reacting against as yet poorly defined β- cell antigens.[5]

Mechanism of β-cell destruction

- T- Lymphocytes react against β-cell antigens and cause cell damage. They include CD4+ T cells and CD8+ T lymphocytes,
- Locally produced cytokines damage β-cells (INF-γ, TNF, IL-1),
- Auto- antibodies against islet cells.[7]

Genetic susceptibility

The principal susceptibility locus for type 1 diabetes resides in the region of the MHC on chromosome 6p21 (HLA-D).[8]

Environmental factors

Epidemiological studies suggest a role of viruses.[9]

Criteria for the diagnosis of diabetes

- Symptoms of diabetes and a casual plasma glucose ≥200mg/dl(11.1mmol/l). Casual is defined as any time of the day without regard to time since last meal. The classic symptoms of diabetes include polyuria, polydipsia, and unexplained weight loss,
- FPG≥126mg/dl(7.0mmol/l). Fasting is defined as no caloric intake for at least 8hrs,
- 2-h plasma glucose≥200mg/dl (11.1mmol/l) during an OGTT. The test should be performed as described by the World Health Organization, using a glucose load containing the equivalent of 75g anhydrous glucose dissolved in water.

Lab diagnosis

Table 1: Plasma blood glucose and A1C goals for type 1 diabetes by age-group.

	Plasma blood glucose (mg/dl)			
Values by age (years)	**Before meals**	**Before bed time/over night**	**A1C**	**Rationale**
Toddlers and pre-schoolers (0-6)	100-180	110-200	<8.5% (but>7.5%)	High risk and vulnerability to hypoglycaemia
	90-180	100-180	<8%	Risk of hypoglycaemia and relatively low risk of complications prior to puberty.
	90-130	90-150	<7.5%	Risk of severe hypoglycaemia Devepmental and psychological issues A lower goal (<7.0%) is reasonable if it can be achieved without excessive hypoglycaemia

Key concepts in setting glycaemia goals

- Goals should be individualized, and lower goals may be reasonable based on benefit risk assessment,
- Blood glucose goals should be higher than those listed above in children with frequent,
- Postprandial blood glucose values should be measured when there is a disparity between pre-prandial blood glucose values and A1C levels.

Diagnostic sensitivity and specificity of autoimmune markers in newly diagnosed patients with type 1 diabetes mellitus

- Glutamic acid decarboxylase (GAD65),
- Insulin (IAA),
- Tyrosine phosphate.

Lab findings

Urine analysis

- Glycosuria: constituent method to detect glycosuria-clinistin, Dinstix,
- Ketonuria: Quality detection by nitroprusside test.

Blood testing procedures

- Glucose tolerance test (GTT)- WHO criteria:
- Glycated HbA1 measurements.
- Serum Fructosamine.
- Self-monitoring of blood glucose.
- Continuous glucose monitoring systems.

Treatment of type 1 diabetes mellitus

Goal

Maintain euglycaemia, improve physical performance, wellbeing, reduce frequent infections, coma, other micro vascular and macro vascular complications of diabetes.[11]

Attention to such issues as family dynamics, developmental stages, and physiologic differences related to sexual maturity all are essential in developing and implementing an optimal diabetes regimen. Ideally, the care of a child with type 1 diabetes should be provided by a multidisciplinary team of specialists trained in the care of children with paediatric diabetes, although this may not always be possible. At the time of initial diagnosis, it is essential that diabetes education be provided in a timely fashion, with expectation that the balance between adult supervision and self-care should be defined by, and will evolve according to, physical, psychological, and emotional maturity.

- Glycaemic control,
- Screening and management of chronic complications in adolescents and young adults with type 1 diabetes.

Diabetes and its effect on the youngsters

Stress exists when the adaptive capacity of the individual is overwhelmed by events. Diabetes mellitus like any other chronic disease has psychological sequalae. Past research has shown that a relationship exists between depression and diabetes.[12] Depression has been associated with hyperglycaemia, diabetes-related complications, and perceived functional limitations of diabetes.[13-16] The contributions of socioeconomic status, marital status, obesity, smoking habits, and physical limitations and inactivity have been extensively tested.[17-22]

Depression appears to be two to three times more prevalent in adolescents with diabetes compared with adolescents in the general population and adversely affects the quality of life and diabetic outcomes.[23-27] In type 1 diabetes, low levels of education and physical impairment were found to be correlated with depression.[28] Adolescents magnify the internal conflicts that all human being cope or intermittently fail to cope with during life. Diabetic holiday camps help prevent a feeling of isolation and help them to meet more people of their age with same problem. With the onset of adolescents, youth tend to spend increasing time with their friends. In patients with psychological problems, deficit in verbal fluency, visual search, psychomotor speed, alteration and working memory have been reported. Automatic processing abilities remain largely intact.[29-36] The adolescents may be aware of the potential health complications from poor adherence but have difficulty maintaining their regimen because they are apprehensive about being singled out by others.[37,38] Other research has found negative attributions (e.g. Focusing on negative features of the situation, frequently expecting the worst to happen) to be associated with both diabetes related stress and general feelings of stress.[39] Inaccurate interpretations of events could result in poor behavioural choices and emotional distress.[40] Diabetic stress also has direct association with metabolic control.[39,41]

The WHO-5 well-being index is a short, positively worded instrument designed to assess the level of emotional well-being over a fourteen-day period. It is therefore recommended that screening for depression be performed routinely in this age-group, but there is no consensus on which measure to use for this purpose. The WHO-5 measures (the absence of) positive affect rather than the presence of negative emotions. Previous studies suggest good reliability and validity for the WHO-5, particularly given its brevity, and that it is suitable instrument to be used in adolescents.[42] It also has the advantage of being a generic measure of emotional well-being, allowing for comparison of well- being with that of healthy peers.[42]

Aims and objectives of the study was to assess the psychological well-being in adolescents and young adults with type-1 diabetes mellitus using the WHO-5 well-being index. To estimate the prevalence of symptoms of

depression in type-1 diabetes mellitus using the major (ICD-10) depression inventory (MDI-ICD-10) of the psychiatric research unit (WHO collaborating centre in mental health).

METHODS

Table 2: depressive symptoms matched with blood glucose.

Age in (yrs.)	Sex	Fasting blood sugar(mg/dl)	Category of depression
15	M	100	1
9	F	95	2
17	M	130	2
18	M	150	1
7	M	150	2
18	M	100	1
20	M	250	3
23	F	90	3
29	M	130	3
15	M	95	1
13	F	300	1
14	F	122	1
12	M	120	1
10	M	105	1
13	F	95	1
20	F	159	1
21	M	80	1
18	M	140	1
7	F	41	1
27	M	376	1
20	F	77	2
3	F	73	2
19	F	91	2
27	M	71	1
22	F	150	4
18	M	100	1
21	M	79	2
16	M	72	1
22	F	130	1
17	F	100	2
17	F	100	1
20	M	95	1
18	M	120	1
22	F	151	1
17	M	85	1
23	M	92	1

Where, M- Male, F- Females.

- 1- Not depressed.
- 2- Mild depression.
- 3- Moderate depression.
- 4- Major depression.

The Chi value is 4.000. The P value is 0.0455.

This study was a prospective study. Patients with type-1 diabetes mellitus who attended the "Juvenile Diabetic Club" of Christian Medical College and Hospital, Ludhiana were taken as cases.

The club includes children, adolescents and young adults. Controls taken were healthy age matched adolescents (10 years and above) and young adults among the family of the patients with type-1 diabetes. Informed consent was taken from the patients and controls (if 18 years or above) or from the legal guardian. The patients and controls were then asked to fill up the structured WHO-5 Well-being index (version 1998) questionnaire and the WHO-Major (ICD-10) Depression Inventory (MDI-ICD-10) questionnaire. They were made to fill the questionnaires in a minimum of twenty minutes, in the presence of the researcher and no personal details were taken. As a well valid translation of the questionnaire was not available in the local language, translation was made and provided to patients as and when required by the researcher.

RESULTS

From the diabetics, 36 patients were chosen for the study after an informed consent was taken either from them or from the legal guardian. An equal number of age and sex matched controls were recruited among the healthy children. Out of the 36 diabetic children, there were 20 boys and 16 girls, male:female being 1.25:1.

Age distribution in the study was as follows. Youngest person in the study was 7 years old and oldest was 29 years old. Mean age being 18.

Table 3: Age distribution of the children.

Age	Number of children	(%)
5-10	3	8.3
10-15	7	19.4
15-20	12	33.3
20-25	11	30.5
25-30	3	8.3

Majority of the patients were in the age group of 15 – 20 years, i.e. 12 (33.3%).

The Chi value is 4.000. The P value is 0.0455, statistically significant.

All the diabetic, as well as non-diabetic patients were assessed for their psychological well-being using the WHO-5 well-being index, and screened for depressive symptoms using the MDI-ICD-10 of the Psychiatric Research Unit of WHO Collaborating centre in Mental Health. Among the 36 diabetic patients from the Juvenile Diabetic club who were assessed for the psychological well-being index, 12 (33.3%) had scores indicating poor well-being. Among the healthy control non-diabetic group, all of them had a scores suggesting good well-being.

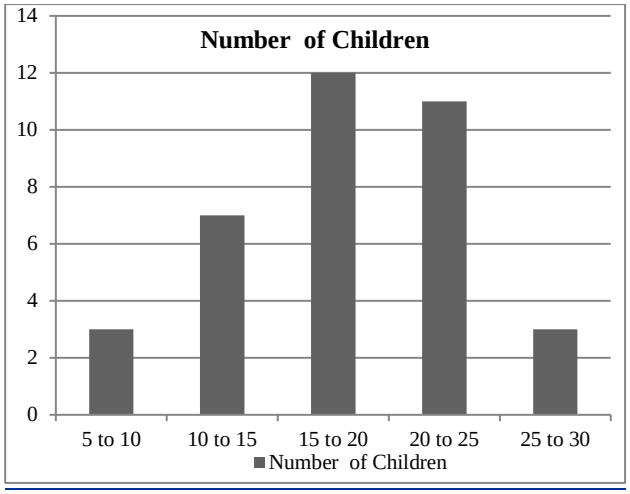

Figure 1: Age distribution of the children.

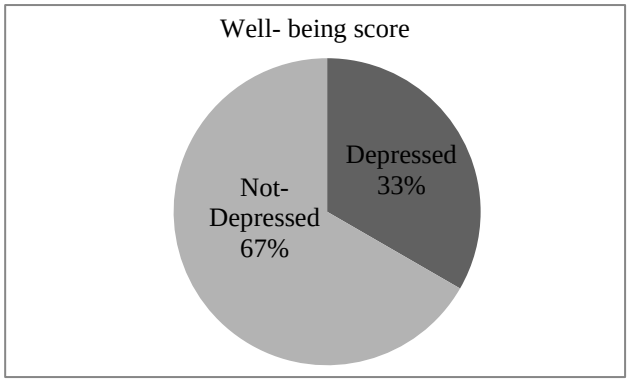

Figure 2: The prevalence of poor well-being in diabetic children.

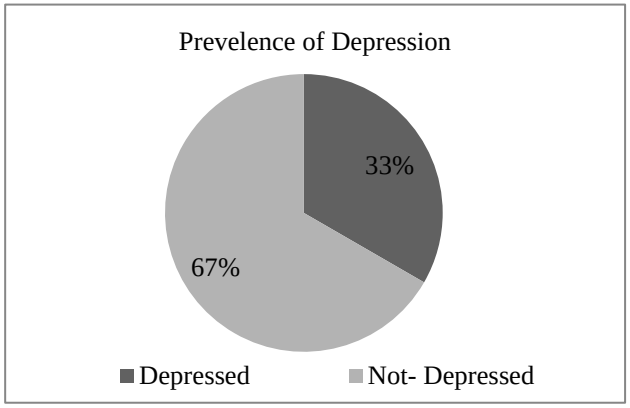

Figure 3: Prevelence of depressive symptoms among type 1 diabetics.

DISCUSSION

The purpose of this study was to examine the prevalence of poor well- being among the type 1 diabetics and also to see the prevalence of depression in the same. The study shows that 33% among the candidate with type 1 diabetes mellitus were found to have poor well-being. Also, another 33% had depressive symptoms. A study conducted by Anne Engum and Arnstein Mykletun shows that individuals with type 1 diabetes mellitus (15.2%) are more likely to be depressed than the non-diabetic population (10.7%).

The prevalence of depression is more among the age group 15 to 20years, which falls in the teenage category. These children were diagnosed early of their disease. As illustrated in a population-based study conducted by Palinkas et al, individuals in whom diabetes has already been diagnosed had significantly higher rates of depressive symptoms than these with newly diagnosed diabetes.

Kruse et al did not find positive association between depression and Hb A1c in a community. This study also does not show any significant association between depressive symptomatology and the variation in the glucose levels in blood.

This study is in par with the study conducted by Marrtie de Wit et al, who did the first study to examine the psychometric properties of the WHO-5 in adolescents with type 1 diabetes.

CONCLUSION

Depression is two to three times more prevalent in adolescents with diabetes compared with the adolescents in the general population and adversely affects the quality of life and diabetic out comes. 33% of the diabetic children are depressed compared to the non-diabetic candidates in whom none are depressed.

The prevalence of depression among diabetic youth may be due to low socio- economic standard or fear of non-acceptance in the society or due to other co-morbid diseases associated with diabetes. Majority of the type 1 diabetics are depressed as they are diagnosed from a very young age and have fear of low acceptance in the family and society and also have to attend frequent clinical check- ups, making the a chronic diabetic patient.

The percentage of incidence of depression in diabetics is only 33% (<50%) and majority (67%) are not depressed. This may be attributed to the Juvenile Diabetic Camp in Christian Medical College, Ludhiana, which holds a meeting for all type 1 diabetic patients every forth night. Here the patients get to see and interact with each other, sharing their thoughts and interests. It has helped them, as the camp give them a sense of belonging and is an exposure for them to the outside world. The patients are also made aware of the various problems and dangers that they may face and are morally strengthened to face the same in future.

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