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might be associated with some psychological disorders and play an important role in the treatment of psychological disorders (Fernandes et.al., (2009).

Colton et.al., (2013) agreed to our results and reported that the mean level of glycosylated hemoglobin in the adolescents with T1D was high and the presence of a mental disorder was not associated with poorer glycemic control (p= non- significant).

Llewellyn et.al. (2015) reported that participants who reported angriness, anxiety, poor quality sleep, sadness/ depression, or worry, had lower levels of serum 25(OH)D than those who did not report such disorders (P< 0.05). These differences in serum 25(OH) D levels were highly significant in reporting worry (10.1ng/mL in individuals who reported worry, compared with 15.0ng/mL in those without worry) (P< 0.001).

In contrary to our results Razzaghy et.al. (2010) reported that Children with high mean HbA1c levels (8.5% [0.70 mmol/mol]) during the first 2 years showed the highest estimated risk of developing a psychiatric disorder, although these differences also appear to level out after (15- 20) years with type 1 diabetes.

According to a 2012 review by Johnson and colleagues, they found data contrary to our study: patients with high levels of glycated hemoglobin have more symptoms of depression (Johnson et.al., 2013).

Conclusion:

Vitamin D deficiency can predispose to psychiatric disorders in children and adolescents with type 1 DM.

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✎ Ethical approval: The study was approved by the Institutional Ethics Committee.

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In the previous table, history of acute diabetic complications data showed that the first parameter was number of hospital admission in the last 6 months. Data showed no admission for most of studied population in the two groups with 90% and 85% for psychiatric disorder and non-psychiatric disorder groups respectively. The second parameter was microvascular diabetic complications that showed 12% and 5% respectively complications with Retinopathy, 30% and 12.5% respectively showed complications with Peripheral neuropathy, 5% and 2.5% respectively showed complications with Nephropathy Table (6).

Discussion:

Delamater et.al (2018) agreed with us and stated that young people with diabetes appear to have a greater incidence of depression, anxiety, psychological distress and eating disorders compared to their healthy peers. Also, findings indicate children with T1D are at risk for adjustment problems during the initial period of adaptation after diagnosis. When adjustment problems exist, children are at higher risk for continued adjustment difficulties.

Also, Almeida et.al., (2016) reported that the prevalence of psychiatric disorders in the total sample of adolescents was considerably high, with almost double the rate in the diabetic group, although this difference was not statistically significant. The main diagnoses identified among all participants were depression, anxiety and neurodevelopmental disorders. In addition, being in the overweight range increased the chance of a psychiatric disorder.

Stahl- Pehe et.al., (2014) in a German population study involving 629 adolescents (11- 17) years old with early onset and long- duration T1D, and a control group of 6.813 adolescents without the condition, found a higher proportion of young people with mental health problems in the T1D group (4.4% vs. 2.9%).

In agreement with our results, Delamater et.al, (2018) reported that in a 10- year prospective study from diagnosis of T1D, adolescents were at high risk for various psychiatric diagnoses; females were more likely than males to receive a diagnosis.

Merikangas et.al. (2010) when assessed variables according to diagnosis, they pointed out that mood and anxiety disorders were more associated with female sex, and substance use with male sex. Additionally, rates of mood and substance use disorders increased with age.

In contrary to our results, Silverstein et.al., (2005) reported that females are more likely to participate in diabetes mismanagement, whereas boys are more likely to engage in risky behaviors.

In our study, mean age at onset of diabetes mellitus is 7.53 years with disease duration about 5.66 years for psychiatric disorder group this data didn't show significant difference in compared to the other group. This came in accordance with what reported by Almeida et.al. (2016) considering the diabetic group specifically, there was no association between disease duration (T1D) and the presence of psychiatric comorbidity (<2 years, 18.18%; (2- 4) years, 27.27%; (4- 8) years, 36.36%; >8 years, 18.18%; $p=0.563$).

In contrary to our results, a longitudinal study conducted by Butwicka et.al. (2015) in Sweden compared population cohorts consisting of 17.122 adolescents with T1D and 18.847 healthy siblings (from birth to 18 years old) followed up from 1973 to 2009. The risk of psychiatric morbidity in the T1D group compared to the general population tripled in the first 6 months of disease and doubled in the overall study time. There was also an increased risk of suicide attempts and most categories of psychiatric disorders among participants with T1D.

In our study the physical examination showed that the mean value of Body Mass Index (BMI) was 19.56 for psychiatric disorder group without any significant relation measured between the two groups. In contrary to our results Almeida et.al., (2016), reported that we attempted to investigate factors associated with the presence of a psychiatric disorder in the total sample of adolescents, such as BMI and family history of psychiatric disorders, but only found that BMI in the overweight range (BMI X percentile 85) increased this risk.

Pedersen et.al., (2014), reported that shortly after type 1 diabetes diagnosis, a higher estimated risk of psychiatric disorders was evident among patients who were (10- 15) years old at onset of type 1 diabetes. However, after (15- 20) years with diabetes, the differences among the groups came to the same level of risk at 30%.

Hossain et.al. (2018), found an inverse association between Vitamin D level& BMI. Association of low vitamin D level& obesity has been seen in many other studies worldwide.

In our study insulin protocol therapy showed that (actrapid+ lantus) were the more common and dominant drugs used for treatment of patients with type 1 DM having psychiatric disorder with 62.5%. Dosage of Insulin are 1.14 I.U/Kg/Day and, Number of insulin injections/day are around 4 to 5 times with percentage 45% this data didn't show any significant difference between the two groups.

Al- Agha et.al. found a direct association among dysfunctioning of beta cells, hypovitaminosis D, and resistance towards insulin Aljabri et.al. 2010. It has been mentioned that vitamin D is effective for making positive improvements in the production of insulin Ahmed et.al. 2019. Furthermore, the connection between HbA1c and vitamin D can also occur because of influencing vit D outcomes on insulin from beta cells, systemic inflammation, and actions of insulin. (Al- Agha et.al., 2015).

Our study showed that the mean random serum glucose level was 220.9 mg/dl with statistically significant result, the mean Serum level of HbA1c% was 6.76%, these data didn't show any statistically significant results as the diabetic patients of the two groups chosen to be controlled diabetes with HbA1c%<7% and the mean 25 hydroxy- vitamin D level were 20.1 ng/ml in psychiatric disorder group these data showed statistically significant results.

Recently reported that Low serum levels of vitamin D have been linked with mental health issues and is involved in numerous brain processes including neuroimmunomodulation, regulation of neurotrophic factors, neuroprotection, and neuroplasticity and brain development and

	H+L	7(17.5%)	10(25%)		
	H+M	0(0%)	1(2.5%)		
	H+T	1(2.5%)	0(0%)		
	N+L	3(7.5%)	9(22.5%)		
Dosage of Insulin I. U /Kg/Day		1.14±0.43	1.23±0.35	0.1053	N. S
Number of insulin injections/day	3	3(7.5%)	3(7.5%)	0.3816	N. S
	4	18(45%)	25(62.5%)		
	5	16(40%)	11(27.5%)		
	6	3(7.5%)	1(2.5%)		

Statistical test used: Chi- square Test& Tow sample T- test, p- value≤ 0.05 considered statistically significant (95% confidence interval).

In the previous table, protocol of insulin therapy showed that (actrapid+ lantus) were the more common and dominant drugs used for treatment of patients with type 1 DM with 62.5% and 50% respectively for psychiatric disorder and non- psychiatric disorder groups. Dosage of insulin was 1.14IU/Kg/Day for psychiatric disorder group and

1.23IU/Kg/Day for non- psychiatric disorder group. Number of insulin injections/day was around 4 to 5 times with percentage of 45% and 40% respectively for psychiatric disorder group and 62.5% and 27.5% for non- psychiatric disorder group Table (4).

Table (5) Hypoglycemia and Diabetic ketoacidosis Data Analysis for two groups according to the presence of psychiatric disorders

Hypoglycemia		Children and adolescents with psychiatric disorders (N= 40)	Children and adolescents without psychiatric disorders (N= 40)	P value	Statistically Significant
Frequency	negative	35(87.5%)	36(90%)	0.5035	N. S
	Once	2(5%)	2(5%)		
	Twice	1(2.5%)	2(5%)		
	3 Times	2(5%)	0(0%)		
Severity	Negative	35(87.5%)	36(90%)	0.0607	N. S
	Convulsion	0(0%)	1(2.5%)		
	Hospital Admission	5(12.5%)	0(0%)		
	Coma	0(0%)	2(5%)		
Diabetic Ketoacidosis	Convulsion/ Coma	0(0%)	1(2.5%)	0.6523	N. S
	Frequency	2.63±5.45	2.03±2.54		
	Negative	7(17.5%)	7(17.5%)		
	Diet	19(47.5%)	16(40%)		
Precipitants	Diet + Infection	10(25%)	6(15%)	0.585	N. S
	Diet+ Infection+ Stress	0(0%)	1(2.5%)		
	Diet+ Psychiatric	0(0%)	1(2.5%)		
	Diet+ Surgery	0(0%)	1(2.5%)		
	diet+ infection +stop insulin	0(0%)	1(2.5%)		
	Fever	0(0%)	1(2.5%)		
	Infection	4(10%)	3(7.5%)		
	Infection+ Stress	0(0%)	1(2.5%)		
	Stop Medication	0(0%)	1(2.5%)		
	Stress	0(0%)	1(2.5%)		

Statistical test used: Chi- square Test& Tow sample T- test, p- value≤ 0.05 considered statistically significant (95% confidence interval).

In the previous table, Frequency of Hypoglycemia was mainly negative in the two groups and with no severity to mention, in case of frequency of Diabetic ketoacidosis was 2.6 and 2.03 for psychiatric

disorder and non- psychiatric disorder groups respectively, in case of precipitants of Diabetic ketoacidosis diet was more dominant than other parameter with 47.5% and 40% respectively Table (5).

Table 6: History of acute diabetic complications Data Analysis for two groups according to the presence of psychiatric disorders

History of acute diabetic complications Data		Children and adolescents with psychiatric disorders (N= 40)	Children and adolescents without psychiatric disorders (N= 40)	P value	Statistically Significant
Number of hospital admission in the last 6 months	0	36(90%)	34(85%)	0.4651	N. S
	1	3(7.5%)	5(12.5%)		
	2	1(2.5%)	0(0%)		
	5	0(0%)	1(2.5%)		
Microvascular Diabetic Complications					
Retinopathy	Negative	35(87.5%)	38(95%)	0.2352	N. S
	Positive	5(12.5%)	2(5%)		
Peripheral Neuropathy	Negative	28(70%)	35(87.5%)	0.0557	N. S
	Positive	12(30%)	5(12.5%)		
Nephropathy	Negative	38(95%)	39(97.5%)	0.5562	N. S
	Positive	2(5%)	1(2.5%)		

Statistical test used: Chi- square Test, p- value≤ 0.05 considered statistically significant (95% confidence interval).

Table (1) Demographic Data Analysis for two groups according to the presence of psychiatric disorders

		Children and adolescents with psychiatric disorders group 1 (N= 40)	Children and adolescents without psychiatric disorders group 2 (N= 40)	P value	Statistically Significant
Age	Mean± S.D	13.01±3.47	12.49±3.42	0.5181	N. S
	Minimum	7.00	6.00		
	Maximum	18.00	18.00		
Sex	Male	16(40%)	12(30%)	0.4819	N. S
	Female	24(60%)	28(70%)		

Statistical test used: Fisher's test& Tow sample T- test, p- value≤ 0.05 considered statistically significant (95% confidence interval).

The total number of patients selected for the study were 80 children with type 1 diabetes mellitus were divided into 2 groups matched in age and sex, according to the presence of psychiatric disorders using child behavior checklist (CBCL) questionnaire into, Group 1: 40 controlled diabetic children and adolescents with psychiatric disorders, Group 2: 40 controlled diabetic children and adolescents without psychiatric disorders. The mean age was 13.01 years and the minimum age was 7 years and the

maximum age was 18 years for psychiatric disorder group and for non-psychiatric disorder group, The mean age was 12.49 years and the minimum age was 6 years and the maximum age was 18 years. The distribution of sex, the females were dominant with about 60% and 70% respectively and the males were 40% and 30% respectively, and all data showed no statistically significant difference shown in table Table (1).

Table (2) Sociodemographic Data Analysis for two groups according to the presence of psychiatric disorders

Sociodemographic Data		Children and adolescents with psychiatric disorders (N= 40)	Children and adolescents without psychiatric disorders (N= 40)	P value	Statistically Significant
Birth Order	1	13(32.5%)	10(25%)	0.4764	N. S
	2	11(27.5%)	18(45%)		
	3	12(30%)	9(22.5%)		
	4	3(7.5%)	3(7.5%)		
	5	1(2.5%)	0(0%)		
Number Of Family Members		5.75±1.63	5.33±1.14	0.2695	N. S
Crowding Index		2.09±1.09	1.65±0.46	0.0774	N. S

Statistical test used: Chi- square Test& Tow sample T- test, p- value≤ 0.05 considered statistically significant (95% confidence interval).

In the previous table, Sociodemographic data include the birth order showed dominance for 1st, 2nd and 3rd child order with percentage 32.5%, 27.5% and 30% respectively and mean number of family members was 5.75 and the mean Crowding index was 2.09 for psychiatric disorder group, in case of non- psychiatric disorder group it also showed dominant

for 1st, 2nd and 3rd child order with percentage 25%, 45% and 22.5% respectively and mean number of family members was 5.33 and the mean crowding index was 1.65. These data showed no statistically significant difference Table (2).

Table (3) Medical history Data Analysis for two groups according to the presence of psychiatric disorders

Medical History Data		Children and adolescents with psychiatric disorders (N= 40)	Children and adolescents without psychiatric disorders (N= 40)	P value	Statistically Significant
Sun exposure (20- 30) minute/d	Irregular Exposure	23(57.5%)	19(47.5%)	0.3705	N. S
	Regular Exposure	17(42.5%)	21(52.5%)		
Food Rich In Vit D	Adequate Intake	16(40%)	27(67.5%)	0.0136	Sig.
	Inadequate Intake	24(60%)	13(32.5%)		
History Of Any Supplementations	No	27(67.5%)	22(55%)	0.251	N. S
	Yes	13(32.5%)	18(45%)		
Age at onset of diabetes mellitus		7.53±3.11	6.18±3.6	0.049	Sig.
Disease Duration		5.66±3.01	6.44±3.58	0.393	N. S

Statistical test used: Chi- square Test& Tow sample T- test, p- value≤ 0.05 considered statistically significant (95% confidence interval).

In the previous table showing medical history data, more than 57% of patients were irregularly exposed to sun and 60% were inadequately intake of food rich in vit D, and 67.5% did not use any supplementations. Mean age at onset of diabetes mellitus was 7.53 years with disease duration about 5.66 years for psychiatric disorder group. In case of non- psychiatric

disorder group, more than 52.5% were regularly exposed to sun and 67.5% were adequately intake of food rich in vit D, and 55% did not use any supplementations. While mean age at onset of diabetes mellitus was 6.18 years with disease duration about 6.44 years for psychiatric disorder group Table (3).

Table (4) Insulin therapy Data Analysis for two groups according to the presence of psychiatric disorders

Insulin Therapy Data		Children and adolescents with psychiatric disorders (N= 40)	Children and adolescents without psychiatric disorders (N= 40)	P value	Statistically Significant
Insulin Drug Type	A+L	25(62.5%)	20(50%)	0.2591	N. S
	A+M	1(2.5%)	0(0%)		
	A+M+L	1(2.5%)	0(0%)		
	A+T	1(2.5%)	0(0%)		
	H+H	1(2.5%)	0(0%)		

respiratory rate and effort; sweating; chest contour; venous distention; edema), palpation (of the pulses and of the heart through the chest wall), and auscultation.

- f. Examination of the abdomen included inspection (contour, symmetry, pulsations, peristalsis, peripheral vascular irregularities, skin markings), auscultation (bowel sounds, bruits), and percussion and palpation (to detect mass lesions and assess organ size and localized pain).
- g. Fundoscopy: In children with strabismus, inspection of the eye fundus is unavoidable part of the examination. Organic disease as the cause of the eye deviation must be excluded. Posterior pole scars, coloboma, but also malignancies such as retinoblastoma can lead to instability or loss of fixation and strabismus. Unfortunately, peripherally situated tumors did not have to give signs of the disease in the beginning. Therefore, ophthalmoscopy in mydriasis is recommended even within usual, routine ophthalmological examination in children. Indirect binocular ophthalmoscope is the instrument of choice, due to its simplicity, speed, and the possibility to examine peripheral parts of the retina. It is recommended to use the least light intensity that still gives reliable picture to encourage child's cooperation. The attention and gaze direction change could be achieved by sound toys, like in motility exam, in order to get a glimpse on peripheral retina. Loupe of 20 diopters is usually used, as it gives optimal relation between field of vision and image magnification. If some pathological change is found, other loupes with less dioptric power (e. g., 16 d), giving bigger image, can be used, but the field of vision is less here. They are also suitable for posterior pole examination.
- h. Neurological examination for assessment of diabetic neuropathy by performing a physical exam and carefully reviewing symptoms, medical history, overall muscle strength and tone, tendon reflexes and sensitivity to touch and vibration.
- i. Random serum glucose level and serum level of HbA1c% were checked. Also, 2 ml of venous blood sample was collected and centrifuged to estimate serum 25 hydroxy- vitamin D level concentration.

4. Neuropsychological Test:

- a. Child Behavior Checklist (CBCL): The Child Behavior Checklist (CBCL) is a component of the Achenbach System of Empirically Based Assessment (ASEBA). The ASEBA is used to detect behavioral and emotional problems in children and adolescents. The CBCL is completed by parents. There are 3 Competence Scale Scores which rate general functioning in these areas; activities, social and school.

The 2001 revision of the CBCL, the CBCL/(6- 18) (used with

children 6 to 18), is made up of eight syndrome scales; anxious/depressed, depressed, somatic complaints, social problems, thought problems, attention problems, rule- breaking behavior and aggressive behavior.

The 2001 revision also added six DSM- oriented scales consistent with DSM diagnostic categories; affective problems, anxiety problems, somatic problems, ADHD, oppositional defiant problems and conduct problems.

The CBCL consists of 113 questions, scored on a three- point Likert scale (0= absent, 1= occurs sometimes, 2= occurs often). Each scale score is interpreted based on the T Score and Percentile score; percentile scores below the 95th percentile (approximate t score of 65 and below) are considered to be in the normal range. Percentile scores between the 95th and the 98th percentile (approximate t scores of 65 to 70) are considered to be in the borderline range. Percentile scores above the 98th percentile (approximate t score of 70 and) are considered to be in the clinical range. These guidelines are flexible based on the severity of the problem. Since CBCL responses are based on frequency (not true, somewhat/sometimes true, and very often/often true) rather than severity, problem scores approaching clinical significance should be further investigated for severity to determine service needs.

Ethical Statement:

The present study runs in concordance with international ethical standards and applicable local regulatory guidelines. The study did not have any physical, psychological, social, legal, economic, or any other anticipated risks to study's participants. The study conserved participants' privacy. Investigators were responsible for keeping the security of the data. We also confirmed that the participants' data were not used for any other purpose outside this study. Personal data (e.g., Name, contact information) were not entered in our data entry software to conserve the participants' privacy, however, each subject got a unique identifier code.

Statistical Analysis:

Data were fed to the computer and analyzed using IBM SPSS software package version 20.0. (Armonk, NY: IBM Corp) Qualitative data were described using number and percent. The Kolmogorov- Smirnov test was used to verify the normality of distribution Quantitative data were described using range (minimum and maximum), mean, standard deviation, median. Significance of the obtained results was judged at the 5% level.

Results:

There was no statistically significant difference between study groups as regard age with P value 0.507, BMI with P value 0.104, GA with P value 0.523, gravidity with P value 0.226 and Parity with P value 0.788 Table (1).

Introduction:

Diabetes is found in every population in the world and in all regions, including rural parts of low and middle-income countries. Also concerning is that depression, which affects over 25% of women with type 2 diabetes (T2DM), exacerbates patient's management of their diabetes and hastens their morbidity and mortality. (Elstgeest et.al., 2018)

Diabetes is one of the most common chronic diseases in childhood, with more than 18000 new cases in youth below 20 yr. of age during 2008/ 2009. Diabetes is problematic in youth because associated microvascular changes may occur within 5 yr. of diagnosis and decline in intelligence quotient may occur within 12 yr. of diagnosis, possibly related to wide variations in glucose levels. (Ideraabdullah et.al., 2019)

Type 1 diabetes in adolescence has previously been linked to a range of psychosocial problems. In a review from 2009, Kakleas and colleagues concluded that Type 1 diabetes in adolescents was associated with increased risk of developing psychiatric disorders (10- 20%), specifically eating disturbances (8- 30%). (Korczak et.al., 2011)

Vitamin D insufficiency in the general population was estimated to range from 1% to 78% among different studies. The optimal level of vitamin D is controversial. The cutoff serum levels range from 20 to 50 ng/ml. (Rak and Bronkowska, 2018)

The potential effects of extended vitamin D deficiency on the human body are vast and varied, and spread across most of the lifespan. In utero and during childhood, vitamin D deficiency can cause growth retardation and skeletal deformities, and may increase the risk of hip fracture in later adulthood. (Lee et.al., 2021)

The biology of vitamin D in the developing and adult brain and the links between low levels of vitamin D and neuropsychiatric diseases the active form of vitamin D, calcitriol, plays a role in activating the gene expression of an enzyme (tyrosine hydroxylase) which is considered to be the rate limiting step in the synthesis of the catecholamines. (Atkinson, 2021)

Given the association between vitamin D and T1DM and the possible role that vitamin D deficiency might play in its pathogenesis, many observational studies have assessed the 25- hydroxyvitamin D (25-OH D) level in T1DM patients and found a significant higher prevalence of 25-OH D deficiencies in T1DM patients compared to controls. (Midtbø et.al., 2020)

The available literature suggests both possibilities; vitamin D status is a strong environmental risk factor for T1DM as well as a consequence of physiological and behavioral changes that result from disease. (Yoo et.al., 2018)

Methods:

This is cross- sectional case control study was conducted at Diabetes Clinic, Children's Hospital, Ain Shams University during a period of two years starting from May 2019 till June 2021(two days per week).

1. Inclusion Criteria: Children or adolescents' cases of both sexes diagnosed with controlled Type 1 diabetes mellitus.

2. Exclusion Criteria: Any child with other chronic illness than diabetes mellitus, with HbA1c> 7% in the past 3 months and any child whose parents refused to participate in the study.
3. Ethical Issue: No names were recorded in the questionnaire forms; instead, each participant was given a unique identification number. Also, an oral consent was taken from the participant and a written consent from parents to keep the collected data anonymous. Participants had the right to withdraw from the study at any time without giving any reason. Participation in the research did not affect on the cure given to the participant. Participation was only for the sake of the scientific research purposes and will not have a direct benefit to the participant.

Procedure:

Children who were enrolled in this study were divided into 2 groups matched in age and sex, according to the presence of psychiatric disorders using child behavior checklist (CBCL) questionnaire into; group 1 included 40 controlled diabetic children and adolescents with psychiatric disorders and group 2 included 40 controlled diabetic children and adolescents without psychiatric disorders.

1. Personal and Sociodemographic Characteristics: Sociodemographic data included birth order, number of family members, crowding index, father's education, father's employment, mother's education and mother's employment.
2. Medical History Of Diabetes: Age at onset of diabetes mellitus, daily nutritional intake, disease duration, history of any supplementations e. g. calcium and any vitamins, insulin therapy (type, dosage and number of insulin injections/ day), history suggestive of acute diabetic complications as hypoglycemia (frequency, timing and severity), diabetic ketoacidosis (frequency and precipitants), number of hospital admission due to hypoglycemia or diabetic ketoacidosis in the last 6 months prior to the study, history suggestive of microvascular diabetic complications (retinopathy, peripheral neuropathy& nephropathy).
3. Physical Examination:
 - a. Body mass index (BMI) and pubertal assessment using tanner staging from 11 to 18 years.
 - b. Examination of the chest wall included observation of the shape, symmetry, alignment and distance between the nipples, and movement with inspiration and exhalation. Chest wall abnormalities may provide clues to underlying pulmonary, genetic, cardiac, or neuromuscular disease.
 - c. Examination of the breasts included assessment of pubertal stage (picture 1) in girls and assessment for gynecomastia in boys.
 - d. Examination of the lungs included observation of breathing pattern and auscultation of the lung fields. Abnormalities detected during the lung examination may provide clues to anatomic defects, upper airway obstruction, pulmonary disease, and metabolic disorders.
 - e. Examination of the heart included observation (general appearance; central and peripheral color; nutritional status;

Vitamin D in Children and Adolescents with Type 1 Diabetes

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Summary

Background: Diabetes affects 1 in 10 persons and is projected to increase to 1 in 3 adults by 2050. Diabetes is found in every population in the world and in all regions, Also concerning is that depression, which affects over 25% of women with T2DM, exacerbates patient's management of their diabetes and hastens their morbidity and mortality. The strongest evidence suggesting a link between vitamin D deficiency and the increased risk of developing T1DM comes from both animal and human studies. In young NOD mice with no evidence of insulinitis (a histological lesion in pancreatic islets of Langerhans caused by infiltrating immune cells which precedes the clinical presentation of diabetes) treatment with high doses of 1, 25(OH) 2D decreases chemokine and cytokine expression by the pancreatic islets and therefore reduces the incidence of insulinitis.

Objective: Evaluation of association between vitamin D level and psychiatric disorders in controlled diabetic children and adolescents.

Methods: This cross- sectional case control study was conducted at Diabetes Clinic, Children's Hospital, Ain Shams University from May 2019 till June 2021. Children who were enrolled in this study were divided into 2 groups matched in age and sex, according to the presence of psychiatric disorders using child behavior checklist questionnaire into; group 1 included 40 controlled diabetic children and adolescents with psychiatric disorders and group 2 included 40 controlled diabetic children and adolescents without psychiatric disorders.

Results: Laboratory investigations showed that random serum glucose level was 220.9 in psychiatric disorder and 175.5 in Group 2 (P value= 0.0197). The 25 hydroxy- vitamin D levels was 20.1 ng/ml in psychiatric disorder and 38.6 ng/ml in group 2 (P value< 0.0001) and these data showed statistically significant difference.

Conclusion: Vitamin D deficiency can predispose to psychiatric disorders in children and adolescents with type 1 DM.

Keywords: Vitamin D; Children; Diabetes; Psychiatric disorders.

فيتامين (د) لدى الأطفال والمراهقين المصابين بداء السكري من النوع الأول

الخلفية: يوجد مرض السكري في كل سكان العالم وفي جميع المناطق،، ومما يؤثر القلق أيضا أن الاكتئاب، الذي يصيب أكثر من ٢٥٪ من النساء المصابات بداء السكري من النوع ٢، يؤدي إلى تفاقم حالة المريض لمرض السكري ويسرع من معدلات الوفاة لديهن. أقوى دليل يشير إلى وجود صلة بين نقص فيتامين (د) وزيادة خطر الإصابة بداء السكري من النوع الأول يأتي من الدراسات التي أجريت على الحيوانات والبشر. في الفئران الصغيرة مع عدم وجود دليل على التهاب الأنسولين (أفة نسيجية في جزر البنكرياس من لانجرهانز ناتجة عن تسلسل الخلايا المناعية التي تسبق العرض السريري لمرض السكري) العلاج بجرعات عالية من ١، ٢٥ ٢ يقلل من التعبير الكيميائي والخلوي من قبل جزر البنكرياس وبالتالي يقلل من حدوث التهاب الأنسولين.

الهدف: تقييم العلاقة بين مستوى فيتامين (د) والاضطرابات النفسية لدى الأطفال والمراهقين المصابين بمرض السكري.

طرق الدراسة: أجريت الدراسة في عيادة السكري، مستشفى الأطفال بجامعة عين شمس من مايو ٢٠١٩ حتى يونيو ٢٠٢١. تم تقسيم الأطفال الذين تم تسجيلهم في هذه الدراسة إلى مجموعتين متطابقتين في العمر والجنس، وفقا لوجود اضطرابات نفسية باستخدام استبيان قائمة مراجعة سلوك الطفل في؛ تضمنت المجموعة الأولى ٤٠ من الأطفال المصابين بالسكري الذين يخضعون للرقابة والمراهقين الذين يعانون من اضطرابات نفسية، بينما تضمنت المجموعة (٢) ٤٠ من الأطفال المصابين بالسكري الذين يخضعون للرقابة والمراهقين الذين لا يعانون من اضطرابات نفسية.

النتائج: أظهرت الفحوصات المختبرية أن مستوى الجلوكوز العشوائي في الدم كان ٢٢٠,٩ في الاضطرابات النفسية و ١٧٥,٥ في المجموعة الثانية P value= 0.0197. كانت مستويات ٢٥ هيدروكسي فيتامين د ٢٠,١ نانوغرام /مل في الاضطرابات النفسية و ٣٨,٦ نانوغرام /مل في المجموعة الثانية P value< 0.0001 وأظهرت هذه البيانات اختلافا في الدلالة إحصائية..

الخلاصة: يمكن أن يؤدي نقص فيتامين د للاضطرابات النفسية لدى الأطفال والمراهقين المصابين بداء السكري من النوع الأول.

الكلمات المفتاحية: فيتامين د؛ أطفال؛ اضطرابات نفسية.