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A CROSS-SECTIONAL STUDY OF 120 CHILDREN TO KNOW THE MORTALITY OF CHILDREN DUE TO DIABETES.

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Abstract:
This study aimed to assess the outcomes of children with diabetes according to morbidity and mortality in Iraq.
Where data and demographic information were collected from several hospitals, and patients whose information was entered in the hospital were recruited for a full year from 2020 and 2021.
The design of this research was based on the establishment of a cross-sectional study of 80 people, and they were divided into two groups (45 children with diabetes and 35 children without diabetes).
The quality of life and quality of life for patients was measured through the HRQoL dependence, in addition to analyzing the data statistics and calculating the statistical differences between the two groups to find out the type of relationship generated
Results. The total number of diabetic patients reached 80 children aged between 8-16 years in the Republic of Iraq; patients were distributed according to gender in the patient group (30 children's boys, 15 children's girls) as for the control group (18 children's boys, 17 children's girls)
The study revealed a significant prevalence of children with type 1 diabetes for 20 patients and 19 in the group of patients, as for the control group, 20 children with type 1 and 10 children with type 2.
The study revealed a high mortality rate for the patient group for ten patients with 22.2%, and for the control group, the death rate for two children with 5.7%, and a negative relationship between HbA1c and the children's quality of life as both sexes

Keywords: HRQoL, Patients, Mortality, Quality, Children, Diabetes.

INTRODUCTION

Diabetes mellitus ranks first among endocrine diseases in terms of prevalence (more than 50% of all endocrine diseases) [1,2,3]. The World Health Organization describes diabetes as an epidemic of no communicable diseases [4,5]. Every 10-15 years in all countries of the world, the number of patients doubles; of particular concern is the high and increasing prevalence of diabetes among children [6,7,8]. In the general morbidity structure of children in Iraq, diabetes mellitus is 3-5%. Besides, there is a decrease in the age of manifestations of diabetes [9,10].

Diabetes mellitus (DM) is a chronic disease of multifactorial etiology, characterized by hyperglycemia, caused by defects in the secretion and action of insulin [11,12]. The incidence of globally modified diabetes mellitus (DM1) ranges from 0.1/per 100,000 population per year, and the incidence of 1DM in children under 15 years of age has increased by 2-5% per year. T2DM is also rapidly increasing globally and

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occurs at younger ages, including adolescence and childhood [13].

Most children with DM2 are older than ten years, and the prevalence triples up to 15-18 years and is more common in girls: 6.2% (95% CI: 4.2-8.2) and 3.7% (95% CI: 1.6-5.8), respectively [14].

It is estimated that the prevalence among children under 20 years of age will quadruple in the next 40 years, mainly due to lifestyles. [15]

Studies in Europe are rare and show a lower incidence, up to 2.4% in obese adolescents. In Spain, the prevalence represents 1-2% of diabetic patients. [16]

Data from a cross-sectional study of 133 children and adolescents diagnosed with obesity show an incidence of diabetes of 0.75%.[17]

Type 1 diabetes develops mainly in childhood due to the destruction of the cells of the pancreas that produce insulin. Insulin, which ensures the entry of glucose into the cell and thus reduces its level in the blood. [18] As the death of cells that produce insulin leads to a severe deficiency of insulin and a sharp increase in the level of glucose in the blood. [19]

The cause of type 1 diabetes lies in the complex interaction of heredity, viral infection, and immune disorders, so it is impossible to prevent the onset of type 1 diabetes at this stage of the development of medicine. [20]

Type 2 diabetes develops in the elderly, but in recent years it has been increasingly detected in young people and even children. Because of this type of diabetes, there is a catastrophic increase in diabetes in the world. [21]

Type 2 diabetes occurs due to the reduced sensitivity of the body's cells to insulin. To overcome this barrier, the pancreas must produce more insulin. [22]

MATERIAL AND METHOD

Collection sample

In this paper were analysed the general data and results of diabetes in children in the Republic of Iraq between 2020 and 2021

In this study, were recorded 80 children from the different hospitals and were divided into two groups (45 children with diabetes and 35 children without diabetes).

Metabolic control of diabetes mellitus was performed by measuring HbA1c and capillary blood glucose before testing and previous severe hypoglycaemic episodes

Study design

Data were collected from medical records related to the onset and development of diabetes, such as family and personal history and various relevant social aspects. In addition, families were interviewed to assess HRQoL

All participants and their parents were asked to cooperate on a voluntary basis in the experimental group; none of the parents or children who were asked refused to participate. The control group was obtained by asking for their cooperation through a leaflet sent to parents, and 5% of parents who received the information refused to have their children participate in the study

Inclusion criteria: children and adolescents aged 8 to 16 years; the presence of a diagnosis of diabetes mellitus with a duration of the disease of at least one year; Use of insulin therapy with multiple insulin injections

The exclusion criteria were children aged less than eight years who had been diagnosed with diabetes for less than one year

Statistical analysis

Statistical processing of the obtained data on the basis of a complex of modern methods of automated storage and information processing on personal computers was carried out using MS Excel and the standard SPSS application package

Statistical processing was performed using IBM SPPS Statistics 22 software for Windows. Descriptive results were expressed by measures of central tendency (the mean) and (standard deviation, minimum and maximum).

Qualitative variables were compared using the Chi-square test. For quantitative variables, Student's t-test for two variables and ANOVA for more than two variables were used.

The correlation between two variables was evaluated using Pearson's correlation coefficient and considered statistical significance if the p-value ≤ 0.05.

Ethical approval

The conduct of this research was approved by an ethics committee where the consent form is structured and drafted so as to seek parental and/or guardian consent for the child or young person to participate in the research project.

RESULTS

In this study, 80 children were collected and distributed into two groups (patients, 45 children) (and 35 children as the control group). In this study, the average ages ranged between 8-16 years for both groups.

In this study, patients were distributed according to gender in the patient group (30 children's boys, 15 children's girls) as for the control group (18 children's boys, 17 children's girls), as shown in the table below.

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Table 1- Demographic characteristics results of patient study

Variable	Patient, N=45	Control, N=35	P-value
Age (Mean ±SD)	10.3±2.2	9.6±2.7	0.56
Sex			
Male	30	18	0.07
Female	15	17	0.33
BMI	23.2±3.7	21.5±2.2	0.04
HbA1c* mmol/mol			
BOYS	80 (60-124)	64 (53-99)	0.01
Girls	79 (55-120)	58 (49-95)	0.03
Diabetes Control and Complications Trial			
BOYS	9.1 (7-13.7)	8.1 (6.5-10)	0.4667
Girls	9.0 (6.8-14.3)	8.3 (7.2-11.0)	0.323
Type of diabetes			
GDM	6	5	0.99
Type 1	20	20	0.00
Type 2	19	10	0.99
Diabetes duration (Year)	3.3±1.4	3.2±1.1	N.S

In Table 2, which shows the assessment of pediatric demographic outcomes according to Temperature f, Heart rate, Respiratory, and Steroid used %, and no statistical differences were found between the two groups.

Table 2- Assessment of pediatric demographic outcomes

Variable	Patient	Control	P-value
Temperature f	99.5±2.1	99.1±1.2	0.22

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Heart rate	123±34	116.4±27.3	0.004
Respiratory	40.4±18.9	41.1±20.1	0.56
Steroid used %	3%	7%	0.57

In Table 3- Assessment of the final outcomes related to morbidity and mortality for groups of this study Differences were found in most items of the study, where the stay length in the hospital for the group patients ranged from 3 to 13 days, but for the control group, it was less from 2 to 5 days with a p-value of 0.001

The study revealed a high mortality rate for the patient group for ten patients with 22.2%, and for the control group, the death rate for two children with 5.7%.

Table 3- Assessment of the final outcomes related to morbidity and mortality for groups of this study

Variable	Patient	Control	P-value
Stay length in hospital	6 (3-13)	3 (2-5)	0.001
Ventilation required	20 (44.4)	5 (14.2)	0.023
Inotrop infusion	15 (33.3)	5 (14.2)	0.05
Percentage of death	10 (22.2)	2 (5.7)	<0.001

Table 4- A comparison in assessing the quality of life for children

Variable	Patient	Control	P-value
Functional aspects	49±11.1	33.4±12	0.03
Physiological	55.3±8.9	37.7±6.6	0.009
emotional	44.5±5.5	31.6±6.9	0.004
neurological aspects	48±6.0	30.4±4.4	0.001

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Table 5- person correlation between General evaluation of functional aspects of groups study

V	General evaluation of functional aspects	Patient	Control
R correlation	1.00	-0.06*	0.045
S-sig	--	0.044	0.67
N	80		

DISCUSSION

In studies on the mortality of children due to diabetes, different definitions of hyperglycaemia were considered, greater than 120 MG/DL in the Faustino study and greater than 110 MG/DL in Wintergerst. We consider hyperglycaemia values equal to or Over 126 MG/DL. [22]

Children with diabetes were collected in our study for 45 patients, as for the control group, for 35 patients

The analysed bibliography shows an association between diabetes and increased mortality. Faustino found in a 2002 study a greater risk of death in patients with blood glucose greater than 150 mg/dL 24 hours after admission and with blood glucose greater than 120 mg/dl in 10 days (5). Srinivasan concludes that hyperglycaemia greater than 150 mg/dL 24 hours after admission is associated with an increased risk of death. [23]

Dynamic echocardiogram evaluation of parameters of central hemodynamic and left ventricular diastolic function allows diagnosis of cardiomyopathy in children with diabetes, and the development of late complications of diabetes in children depends on metabolic disturbances since the association between HbA1c level, and disease duration has been found. [24]

Clinical examination and electrocardiogram results for children with diabetes differed in comparison with the control group and depending on the duration of the disease where statistical differences were found with p-value < 0.05

Complaints were made by children with a disease duration of more than three years, in contrast to children with diabetes mellitus of shorter duration ($p < 0.01$), which, in our opinion, is due to their insufficient exposure to metabolic disorders. [25]

It was found that the heart rate of the children with diabetes was significantly higher than that of the children of the control group ($p < 0.004$). A tendency to a more frequent heart rate appeared in children with diabetes as early as three years after disease onset with a progressive increase in heart rate, which was confirmed by a direct association between heart rate and duration of DM ($p < 0.01$).

With regard to the quality of life for children questionnaire, it is clear that the good perception of the health-related quality of life reflected by the children of the control group compared to the group of patients where the worst scores were found according to the Physiological aspects with 55.3±8.9 and p-value 0.009.

CONCLUSION

There is a negative relationship between HbA1c and the children's quality of life, as both sexes scored similarly on the questionnaires regardless of age. The reported quality of life varied according to Functional aspects, Physiological, emotional, and neurological aspects.

REFERENCES

1. Krmpotic K, Lobos AT. Clinical profile of children requiring early unplanned admission to the PICU. Hosp Pediatr. 2013; 3:212–8. [PubMed] [Google Scholar]
2. Wu Y, Lai W, Pei J, Zhao Y, Wang Q, Xiang B. Hyperglycemia and its association with clinical outcomes in postsurgical neonates and small infants in the intensive care unit. J Pediatr Surg. 2016; 51:1142–5. [PubMed] [Google Scholar]
3. Kyle UG, Bu JA, Kennedy CE, Jefferson LS. Organ dysfunction is associated with hyperglycemia in critically ill children. Intensive Care Med. 2010; 36:312–20. [PubMed] [Google Scholar]
4. Umpierrez GE, Isaacs SD, Bazargan N, You X, Thaler LM, Kitabchi AE. Hyperglycemia: An independent marker of in-hospital mortality in patients with undiagnosed diabetes. J Clin Endocrinol Metab. 2002; 87:978–82. [PubMed] [Google Scholar]
5. Negi G, Kumar A, Joshi RP, Sharma SS. Oxidative stress and Nrf2 in the pathophysiology of diabetic neuropathy: Old perspective with a new angle.

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Available Online at: https://www.scholarexpress.net
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Biochem Biophys Res Commun. 2011; 408:1–5. [PubMed] [Google Scholar]
6. Jeschke MG, Gauglitz GG, Kulp GA, Finnerty CC, Williams FN, Kraft R, et al. Long-term persistance of the pathophysiologic response to severe burn injury. PLoS One. 2011;6: e21245. [PMC free article] [PubMed] [Google Scholar]
7. Andreelli F, Jacquier D, Troy S. Molecular aspects of insulin therapy in critically ill patients. Curr Opin Clin Nutr Metab Care. 2006; 9:124–30. [PubMed] [Google Scholar]
8. Patki VK, Chougule SB. Hyperglycemia in critically ill children. Indian J Crit Care Med. 2014; 18:8–13. [PMC free article] [PubMed] [Google Scholar]
9. Ballestero Y, López-Herce J, González R, Solana MJ, Del Castillo J, Urbano J, et al. Relationship between hyperglycemia, hormone disturbances, and clinical evolution in severely hyperglycemic post-surgery critically ill children: An observational study. BMC Endocr Disord. 2014; 14:25. [PMC free article] [PubMed] [Google Scholar]
10. Kerby JD, Griffin RL, MacLennan P, Rue LW., 3rd Stress-induced hyperglycemia, not diabetic hyperglycemia, is associated with higher mortality in trauma. Ann Surg. 2012; 256:446–52. [PubMed] [Google Scholar]
11. Karunakar MA, Staples KS. Does stress-induced hyperglycemia increase the risk of perioperative infectious complications in orthopaedic trauma patients? J Orthop Trauma. 2010; 24:752–6. [PubMed] [Google Scholar]
12. Yan LJ. Pathogenesis of chronic hyperglycemia: From reductive stress to oxidative stress. J Diabetes Res. 2014; 2014:137919. [PMC free article] [PubMed] [Google Scholar]
13. Wintergerst KA, Buckingham B, Gandrud L, Wong BJ, Kache S, Wilson DM. Association of hypoglycemia, hyperglycemia, and glucose variability with morbidity and death in the pediatric intensive care unit. Pediatrics. 2006; 118:173–9. [PubMed] [Google Scholar]
14. Kovacs M, Obrosky DS, Goldston D, Drash A. Major depressive disorder in youths with IDDM. A controlled prospective study of course and outcome. Diabetes Care 1997; 20:45.
15. Stewart SM, Rao U, Emslie GJ, et al. Depressive symptoms predict hospitalization for adolescents with type 1 diabetes mellitus. Pediatrics 2005; 115:1315.
16. Lawrence JM, Standiford DA, Loots B, et al. Prevalence and correlates of depressed mood among youth with diabetes: the SEARCH for Diabetes in Youth study. Pediatrics 2006; 117:1348.
17. Silverstein J, Cheng P, Ruedy KJ, et al. Depressive Symptoms in Youth With Type 1 or Type 2 Diabetes: Results of the Pediatric Diabetes Consortium Screening Assessment of Depression in Diabetes Study. Diabetes Care 2015; 38:2341.
18. Dybdal D, Tolstrup JS, Sildorf SM, et al. Increasing risk of psychiatric morbidity after childhood-onset type 1 diabetes: a population-based cohort study. Diabetologia 2018; 61:831.
19. Christiansen E, Stenager E. Risk for attempted suicide in children and youths after contact with somatic hospitals: a Danish register-based nested case-control study. J Epidemiol Community Health 2012; 66:247.
20. Calkins-Smith AK, Marker AM, Clements MA, Patton SR. Hope and mealtime insulin boluses are associated with depressive symptoms and glycemic control in youth with type 1 diabetes mellitus. Pediatr Diabetes 2018; 19:1309.
21. Svoren BM, Butler D, Levine BS, et al. Reducing acute adverse outcomes in youths with type 1 diabetes: a randomized, controlled trial. Pediatrics 2003; 112:914.
22. Ellis DA, Frey MA, Naar-King S, et al. Use of multisystemic therapy to improve regimen adherence among adolescents with type 1 diabetes in chronic poor metabolic control: a randomized controlled trial. Diabetes Care 2005; 28:1604.
23. Winkley K, Ismail K, Landau S, Eisler I. Psychological interventions to improve glycaemic control in patients with type 1 diabetes: systematic review and meta-analysis of randomised controlled trials. BMJ 2006; 333:65.
24. Delamater AM, de Wit M, McDarby V, et al. ISPAD Clinical Practice Consensus Guidelines 2018: Psychological care of children and adolescents with type 1 diabetes. Pediatr Diabetes 2018; 19 Suppl 27:237.
25. Meltzer LJ, Johnson SB, Prine JM, et al. Disordered eating, body mass, and glycemic control in adolescents with type 1 diabetes. Diabetes Care 2001; 24:678.