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# The Effect of Diabetes Type 1 on Some Blood and Biochemical Variables in Children

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## ABSTRACT

This study included the effect of type 1 diabetes on some blood and chemical variables, which included interleukin 2, folic acid, HBA1c, blood urea and serum creatinine in children. The study showed that there is a significant effect of diabetes on the higher rate of interleukin 2 than normal in 870 compared to With control 550, there are significant differences in the effect of diabetes on the increase in interleukin, and there was also a decrease in the percentage of folic acid for children with diabetes compared to control, where the concentration in patients with 10 compared with control 17, that is, there are also significant differences. The results showed that there is a significant effect of diabetes on kidney function, as the percentage of blood urea and derum creatinine reached 82, 1.7 respectively, compared with control 33 and 5. That is, there are significant differences.

**Keywords:** biochemical changes; blood; health; diabetes

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## INTRODUCTION

Diabetes Type 1 previously acknowledged as youthful diabetes or insulin-dependent diabetes, is a persistent circumstance in which the pancreas produces a small quantity of insulin, or it is now not secreted at all. <sup>(1,2,3)</sup> Insulin is a hormone required to permit sugar (glucose) to enter cells to produce energy. <sup>(4,5,6)</sup> Various factors, which includes genetics and some viruses, make a contribution to type 1 diabetes. Although type 1 diabetes commonly seems in childhood or adolescence, it can show up in adults. <sup>(7,8)</sup> Despite a good deal research, no definitive remedy for type 1 diabetes has been reached. Treatment focuses on controlling blood sugar ranges with insulin, diet, and lifestyle; To stop complications. <sup>(9,10)</sup> The specific purpose of type 1 diabetes is unknown. The body's immune device - which generally combats unsafe viruses and microorganism - commonly destroys insulin-producing cells (islets of Langerhans islands) by way of mistake. <sup>(11,12)</sup> Other viable reasons encompass genetics Exposure to viruses and different environmental factors<sup>(13)</sup> In type 1 diabetes, there is no insulin that approves glucose to enter the cells, and then sugar builds up in the bloodstream. This may also reason life-threatening complications<sup>(14)</sup> Over time, complications of type 1 diabetes can have an effect on the principal organs

in the body, such as the heart, blood vessels, nerves, eyes, and kidneys.<sup>(15)</sup> Maintaining an ordinary blood sugar level can noticeably decrease the danger of a couple of complications, Cardiovascular disease. Diabetes appreciably will increase the threat of a number of cardiovascular problems.

## METHODOLOGY

Blood samples were collected from 30 children with diabetes type 1 at the Children's Hospital in Ramadi, and after all confirmatory tests were carried out, it was established that 20 of them had type 1 diabetes, after which biochemical and immunological tests were performed on them and compared with control.

### Estimation of the interleukin-2 concentration

The concentration of interleukin-2 was measured by using the ELISA device according to a method.<sup>(16)</sup>

### Estimation of the folic acid concentration

The concentration of folic acid was measured by using the ELISA device according to a method.<sup>(17)</sup>

### Estimation of the HBA1c concentration

The concentration of HBA1c was measured by using the i chroma device according to a method.<sup>(15)</sup>

## RESULT AND DISCUSSION

**Table 1.** The effect of diabetes type 1 on the levels of interleukin-2 and folic acid and HBA1c concentration in children

Descriptive Statistics				
Dependent Variable: conceteration of parameter				
treatment	parameter	Mean	Std. Deviation	N
Diabetic type 1	HBA1c	11.20	0.837	5
	Interlukin 2	870.00	44.721	5
	folic acid	10.00	1.225	5
	Total	297.07	420.026	15
Non-Diabetic	HBA1c	3.20	0.447	5
	Interlukin 2	230.00	44.721	5
	folic acid	25.20	3.564	5
	Total	86.13	108.395	15

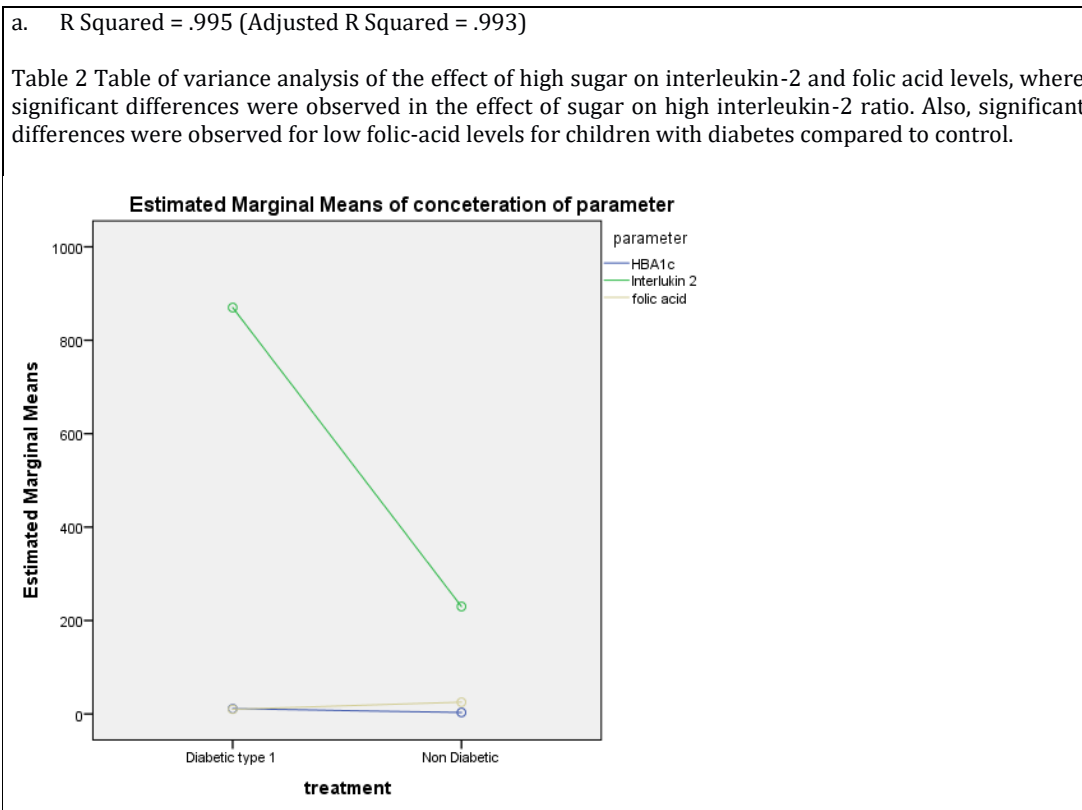
Total	HBA1c	7.20	4.264	10
	Interlukin 2	550.00	339.935	10
	folic acid	17.60	8.396	10
	Total	191.60	319.919	30

One of the first types of cytokines that have been described, cytokines are defined as a group of substances (proteins, glycoproteins and peptides) that are secreted from the cells of the immune system to carry signals between cells and have the effect on other types of cells. The initial definition of the first type of interleukin was that it is one of the factors that stimulate a rise in temperature, controls lymphocytes, increases the numbers of immune cells produced by the bone marrow and causes the destruction of bone joints. The first interleukin takes two separate alpha and beta forms, both of which are secreted prior to the occurrence of inflammation as a form of effective immune system defense, and are secreted from macrophages, monocytes and fibroblasts. Where these types raise the concentration of adhesion factors on the endothelial cells, which helps migrate the white blood cells that attack the pathogenic bodies to the place of injury and stimulate the thermostat centers in the hypothalamus, which leads to raising the body temperature "fever". High body

temperature helps the immune system fight the infection. Table 1 shows the effect of high blood sugar levels on higher levels of interleukin-2 compared to control, where the mean of the level of interleukin was 870 compared to the control value of 550, so we note that there is a large increase in levels of interleukin in patients This effect is evident in Figure 1. Folic acid or so-called vitamin B9 plays an essential role in the production of new cells in the body. It also plays a role in homocysteine metabolism. Folic acid is one of the B vitamins, and it is classified as a water-soluble vitamin, which means that we need it daily in our diet, because it cannot be stored in the body, and it is also found in small quantities in many foods, Table 1 shows a significant decrease in the levels of folic acid for children with type 1 diabetes compared to children without diabetes, where the mean for children with diabetes was 10 compared to control 17, and this indicates the effect of sugar on folic acid levels as evident in Figure 1.

**Table 2.** NOVA table effect of diabetes type 1 on the levels of interleukin-2 and folic acid and HBA1c concentration in children

Tests of Between-Subjects Effects					
Dependent Variable: conceteration of parameter					
Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	2952036.800 <sup>a</sup>	5	590407.360	882.280	.000
Intercept	1101316.800	1	1101316.800	1645.762	.000
treatment	333696.533	1	333696.533	498.662	.000
parameter	1927299.200	2	963649.600	1440.038	.000
treatment * parameter	691041.067	2	345520.533	516.332	.000
Error	16060.400	24	669.183		
Total	4069414.000	30			
Corrected Total	2968097.200	29			



**Figure 1.** effect of diabetes type 1 on the levels of interleukin-2 and folic acid and HbA1c concentration in children

**Table 3.** the effect of diabetes type 1 on the levels of blood urea and serum creatinine and HbA1c concentration to Children

Descriptive Statistics				
Dependent Variable: concentration of parameter				
treatment	parameter	Mean	Std. Deviation	N
Diabetic type 1	HbA1c	11.200	0.8367	5
	blood urea	82.200	5.4037	5
	serum creatinin	1.780	0.1483	5
	Total	31.727	37.2714	15
Non-Diabetic	HbA1c	3.200	.4472	5
	blood urea	26.600	5.8992	5
	serum creatinin	.560	0.1140	5
	Total	10.120	12.5197	15
Total	HbA1c	7.200	4.2635	10
	blood urea	54.400	29.7852	10
	serum creatinin	1.170	0.6550	10
	Total	20.923	29.4454	30

Kidney disease or kidney damage often occurs over time in people with diabetes. This type of kidney disease is called Diabetic Nephropathy. The mechanism for this is as follows: Each college is made up of hundreds of thousands of small units called Nephron. These are the units of its mission: to do blood filtering, remove harmful chemicals from the body, and control fluid balance in the body. In people with diabetes, the structure of the nephron unit changes slowly, specifically the thickness of its components increases and small scars of fibrous tissue appear over time, Then, the nephrons begin to leak the

blood albumin protein Albumin into urine components. It should be noted that this damage to the structures of the kidneys may begin to occur years before the start of complaining of any symptoms, In many cases, there are no symptoms that a diabetic patient complains about when kidney damage begins and his slow progression increases. Specifically, the damage may begin in the work of the kidneys between 5 and 10 years before the diabetic patient's complaint begins with symptoms of kidney failure. People who have had severe kidney function may experience one or a combination of the following

symptoms fatigue most of the time. Table 3 illustrates the major effect of high blood sugar levels on blood urea and serum creatinin levels in the blood. The mean urea and creatinin mean were 82 and 1.7 compared to control 26

and 0.5 respectively. This confirms the effect of increased blood sugar levels on kidney function as evident in Figure 2.

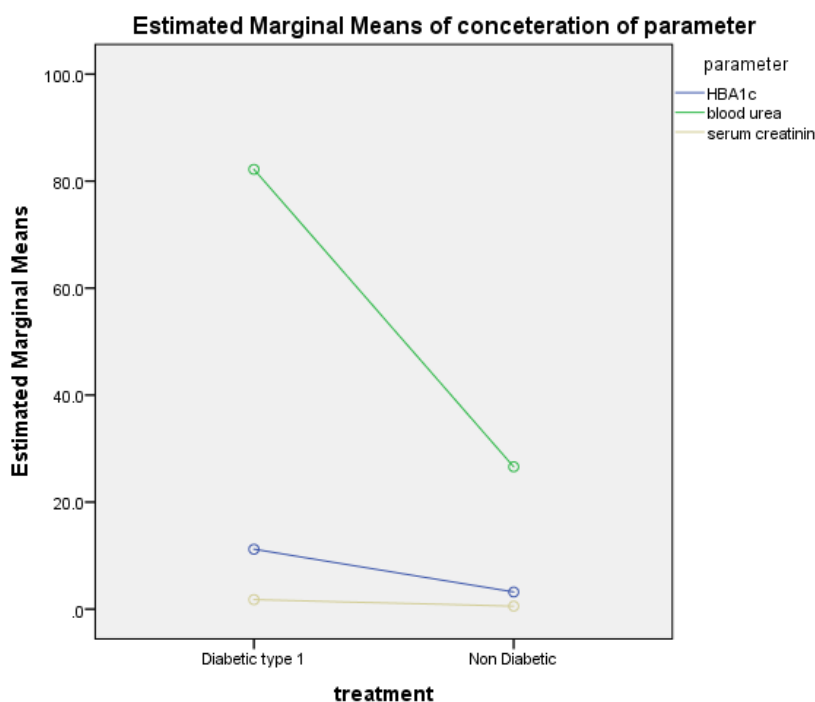
**Table 4.** NOVA table the effect of diabetes type 1 on the levels of blood urea and serum Creatinine and HBA1c concentration to children

Tests of Between-Subjects Effects					
Dependent Variable: concenteration of parameter					
Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	24884.234 <sup>a</sup>	5	4976.847	459.861	.000
Intercept	13133.576	1	13133.576	1213.544	.000
treatment	3501.360	1	3501.360	323.526	.000
parameter	16992.113	2	8496.056	785.036	.000
treatment * parameter	4390.761	2	2195.380	202.853	.000
Error	259.740	24	10.823		
Total	38277.550	30			
Corrected Total	25143.974	29			

a. R Squared = .990 (Adjusted R Squared = .988)

Table 4 shows an analysis of the variance of the effect of increasing the percentage of sugar on the kidney function of children with type 1 diabetes. There were significant

differences in the increase in the percentage of blood urea and serum creatinine in children with a comparison with control who had blood urea and serum creatinine levels normal.



**Figure 2.** the effect of diabetes type 1 on the levels of blood urea and serum Creatinine and HBA1c concentration to children

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