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THE RELATED CHANGES BETWEEN DIABETIC POSITIVE FAMILY HISTORY CHILDREN'S AND SALIVARY SIALIC ACID, FLOW RATE, AGE, GENDER IN IRAQI PRIMARY SCHOOL

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ABSTRACT
In this study we made an effort toward estimation Levels of salivary sialic acid biochemical parameters as signs of prophesy diabetes in children's family history diabetes mellitus type 2. Sialic acids appear in numerous human being body fluids containing tears, saliva, human milk, urine, serum, and gastric juice. Sialic acid was an important portion in all salivary mucins, name of sialic acid was taken from the Greek 'sialos' meaning saliva. Disturbance in a metabolic rate of sialic acid owing to inherited fault might impair physiological functional and make happen disorder. Many of infrequent disorders that include sialic acid increase and lack in human beings have been explained. People with a positive family history of diabetes, containing children, might show early signs of faulty insulin actions. Our Study was conducted on 106 individuals between the age group of 6-13 years. Primary school children took part in this study, focusing on family history of diabetes mellitus, with diabetes family history was defined by 1st and second relatives, Quantitative determination of free and total Sialic acid was used to estimate the concentration of salivary Sialic Quanti ChromTM Sialic Acid Assay Kit (Cat# DSLA-100) from BioAssay Systems (USA). A significant correlation was observed between age (6-9), (10-13) years and sialic acid in study group($r=0.03$; $P<0.05$) and in control group ($r=0.01$; $P<0.0$) .A significant correlation was observed between age (6-9),(10-13) years and salivary flow rate in 1, 5 min in study group. ($r=0.32$; $P < 0.05$), high-level salivary secretion produced through increased age group. In our research with bigger samples was requisited and long time to support these findings.

KEY WORDS: Salivary sialic acid, Diabetes mellitus type 2, flow rate, age.

INTRODUCTION

Sialic acid or neuraminic acid consist of nine-carbon amino sugars that occur predominant in mucus rich environments[1]. Sialic acids are found in all vertebrates, organism they were existing in essentially wholly tissues[2], except the plants, prokaryotes, or else invertebrates[3]. Mammalian central nervous system (CNS) has maximum concentrations of sialic acid. Composites sialic acid in the body fluids could play a part in the structure and function defense of the mucosal surface. Sialic acid concentrations in body fluids may possibly reflect metabolic status and body tissue levels. Sialic acids appears in numerous human being body fluids containing tears, saliva, human milk, urine, serum and gastric juice[4]. Disturbance in the metabolism of sialic acid owing to inherited fault might impair physiological function and cause disorder. Many of infrequent disorders that involve sialic acid increase and lack in human being have been explained. Deficiency of sialic acid in brain glycoprotein and ganglioside stay associated with mental retardation[4]. Changes in Sialic acid have been found to be involved in progressive disorders for example artherosclerosis and diabetes in addition to neurological sicknesses for instance alcoholism also Alzheimer's disease. Several human genetic Sialic acid disorders are recognized: such as, hereditary inclusion body myopathy affected as a result of missense mutations of the UDP-GlcNAc-2- epimerase/ ManNAc kinase [GNE] gene, sialuria (a defect of GNE feedback inhibition through CMP-Neu5Ac), Salla disease (deficiency in lysosomal Sialic acid transporter Sialin) [5]. Diabetes Mellitus was a condition of many etiology was described with prolonged hyperglycemia with fat and protein metabolism resulting from deficiency in insulin secretion disturbances of carbohydrate, insulin action or together. The chronic hyperglycemia of diabetes was associated with important long-term sequelae, mainly harm dysfunction and failure of several structures, specially blood vessels; the kidneys, nerves, heart and eyes[6]. People with a positive family history of diabetes, containing children, could appearance initial signals of faulty insulin action[7], glucose bigotry lipid defects, higher Blood Pressure, big weight increases[8] damaged endothelial malfunction,[9] changed mitochondrial metabolic rate[10]. Sialic acid was an important portion in all salivary mucins, name sialic acid was taken from the Greek 'sialos' meaning saliva[5]. Saliva was a biological liquid that was helpful for novel methods to diagnosis, laboratory, and managing of patient with together systemic disease and oral. It was simply accumulated; put in storage and ideal for initial finding of disease as it comprises special soluble biological indicators [11].
Saliva parameters for instance, CA-15-3, CA-125, p53 , and epidermal growth factor were estimate as tumor markers in the cancers of breast, colon, ovary[12]. Saliva works an essential role in oral health have many functions and compounds the main functions of saliva was

lubrication of the oral mucosa. Sialic acid was principal element of mucin and could be found free and bound to protein, but patients with type 1 and type 2 diabetes have been associated with elevated fasting blood glucose concentrations (hyper glycaemia) and neuropathy. xerostomia related or not with hyposalivation[13].

MATERIALS & METHODS

Our study was conducted on 106 pupils between the age group of 6-13 years. Primary school children participated in the study .An organized questionnaire was distributed in Arabic language and sent to the family of each student**.** These questionnaires consisted of two parts**:**

1-Demography of children

2-Child medical history and family medical history **,** focusing on family history of diabetes mellitus, with diabetes family history was defined by 1st and second relative's unstimulated whole saliva was collected from all participants under the same conditions over 5- minutes period into graduated sterile test tubes. Sampling sessions were limited to the hours between 9:00 and 11:00 AM to minimize the effect of diurnal variations. After the disappearance of salivary froth, the salivary flow rate was estimated in milliliters per minutes.

Saliva analysis

Quantitative determination of free and total Sialic acid was used to estimate the concentration of salivary Sialic QuantiChrom™ Sialic Acid Assay Kit (Cat# DSLA-100) from BioAssay Systems (USA).

Statistical analysis

The data were analyzed using Statistical analysis SPSS version 19.0. Descriptive statistical analysis,

Student T-test, analysis of variance (ANOVA)

A p-value of less than 0.05 was measured to indicate statistical significance.

The multivariate regression analysis was performed to correlate Salivary Sialic acid, Flow rate, Age, Gender in Children's Iraqi primary school with diabetic family history.

RESULTS

The sample used in this study consist of 106 student divided into two groups according to diabetes mellitus type 2 family history, the students were have positive family history of diabetes represent the study group (54), the students were have negative family history of diabetes representing the control (52). Pupils were distributed into two age groups: 6-9and 10-13 years in table 1. A significant correlation was detected between age (6-9),(10-13) years and sialic acid in study group($r=0.03$; $P<0.05$) and in control group ($r=0.01$; $P<0.05$). A significant correlation was observed between age (6-9), (10-13) years and salivary flow rate in 1, 5 min in study group. ($r=0.32$; $P<0.05$), higher salivary secretion produced with increased age; table 1.

TABLE 1: Age of study and control group in relation to salivary sialic acid and flow rate (1min. - 5min.)

Group Statistics

Group		Age1	N	Mean	Std. Deviation	Std. Error Mean	T-test	Sig. P<0.05
Control	Sialic acid	6-9	28	63.507	5.288	.999	2.652	.011
		10-13	24	60.070	4.041	.824		[S]
	FLowRate 1min.	6-9	28	.291	.1876	.035	-.943	.351
		10-13	24	.350	.251	.051		[NS]
	FLowRate 5min.	6-9	28	1.455	.938	.177	-.943	.351
		10-13	24	1.750	1.259	.257		[NS]
Study	Sialic acid	6-9	30	60.556	3.702	.676	-2.123	.039
		10-13	24	62.950	4.418	.901		[S]
	FLowRate 1min.	6-9	30	.261	.215	.039	-2.222	.032
		10-13	24	.411	.269	.054		[S]
	FLowRate 5min.	6-9	30	1.305	1.077	.196	-2.222	.032
		10-13	24	2.056	1.346	.274		[S]

Considering age, figure 1 shows that age (6-9) years students in study group showed lower mean salivary sialic acid level compared to control group students at same age, but age (10-13) years showed higher mean sialic acid level in study group compared to control group (10-13)years. Difference was not significant. ($r=0.59$; $P < 0.05$) Table 4.

For stimulated saliva the mean flow rate in 1min.at age (6-9) in control group showed higher (0.291) when compared with study group (0.261) figure 2, but at age (10-13) the mean flow rate in 1min.

In study group higher than control group (0.411), (0.350).

Observed in figure (2) higher salivary secretion produced with enlarged age.

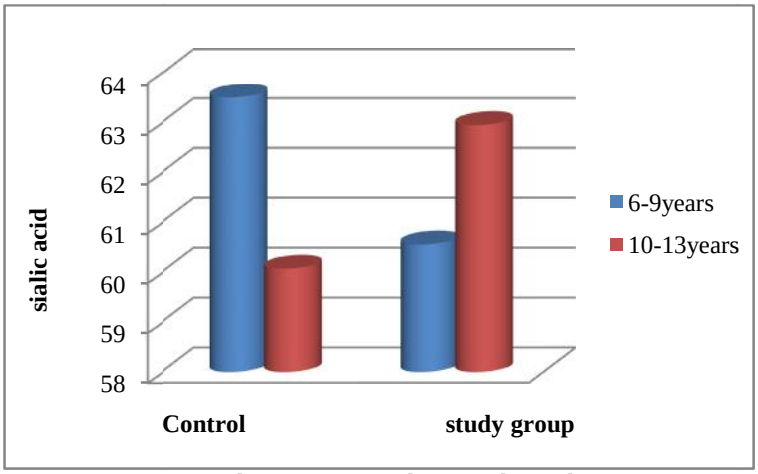

FIGURE 1: Age group in relation to mean salivary sialic acid concentration.

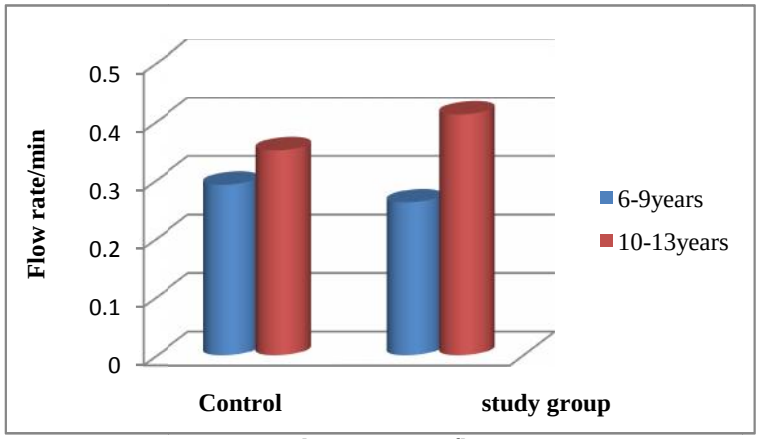

FIGURE 2: Age group in relation to mean flow rate in 1 minute.

In table (2) exhibited the result of gender, yet failed to reach the level of statistical significance. Table 2 shows that male study group showed lower mean sialic acid level (60.916) match up to female study group (62.227), however the difference was not significant; but revealed a highest level mean salivary sialic acid in male control group (62.838) compared with female control group (61.300) no significant correlation have been detected with all variables in study group compared with control group.

TABLE 2: Gender of study and control group in relation to salivary sialic acid and flow rate (1min. - 5min.)

Group Statistics

Group		Gender	N	Mean	Std. Deviation	Std. Error Mean	t-test	Sig. P<0.05
	Sialicacid	Males	21	62.838	5.568	1.215	1.047	.302
control		Females	31	61.300	4.595	.825		[NS]
	Flow Rate 1min.	Males	21	.3190	.248	.054	.020	.984
		Females	31	.3177	.201	.036		[NS]
	Flow Rate 5min.	Males	21	1.595	1.241	.270	.020	.984
		Females	31	1.588	1.009	.181		[NS]
	Sialic acid	Males	25	60.916	4.124	.82	-1.157	.253
		Females	29	62.227	4.190	.778		[NS]
Study	Flow Rate 1min.	Males	25	.350	.237	.047	.607	.546
		Females	29	.308	.263	.048		[NS]
	Flow Rate 5min.	Males	25	1.750	1.185	.237	.607	.546
		Females	29	1.543	1.317	.244		[NS]

Table (3) it showed no statistically significant differences between both study and control group In relation to different categories salivary sialic acid and salivary flow rate in (1, 5 min.) and showed almost the same mean in control and study group.

TABLE 3: study and control group in relation to salivary sialic acid and flow rate (1min. - 5min.)

Group Statistics						t-test	Sig. P<0.05
	Group	N	Mean	Std. Deviation	Std. Error Mean		
Sialic acid	control	52	61.921	5.016	.695	.335	.738[NS}
	study	54	61.620	4.173	.567		
Flow Rate	control	52	.318	.219	.030	-.208	.835[NS]
1min.	study	54	.327	.250	.034		
Flow Rate	control	52	1.591	1.097	.152	-.208	.835[NS]
5min.	study	54	1.638	1.250	.170		

Significant correlation has been observed between the age group (6-9), (10-13) years and salivary flow rate (1-5min.) showed in table (4) (r=0.024) P<0.05 but no significant correlations have been detected with salivary sialic and the two aged group (r=0.599) P<0.05.

TABLE 4: Different categories aged in relation to salivary sialic acid and flow rate (1min. - 5min.)

Group Statistics						t-test	Sig. P<0.05
	Age1	N	Mean	Std. Deviation	Std. Error Mean		
Sialicacid	6-9	58	61.981	4.736	.621	.527	.599[NS]
	10-13	48	61.510	4.434	.640		
FLRmin	6-9	58	.275	.201	.026	-2.290	.024[S]
	10-13	48	.380	.259	.037		
FLRFIVE	6-9	58	1.377	1.006	.132	-2.290	.024[S]
	10-13	48	1.903	1.299	.187		

Flow rate in 5 min. mean values of both study and control group at age (10-13) years higher (2.056); (1.750) when compared with age (6-9) years of both study and control group (1.305) ;(1.455) shown in Figure (3) Observed in figure 3 higher salivary secretion produced with increased age.

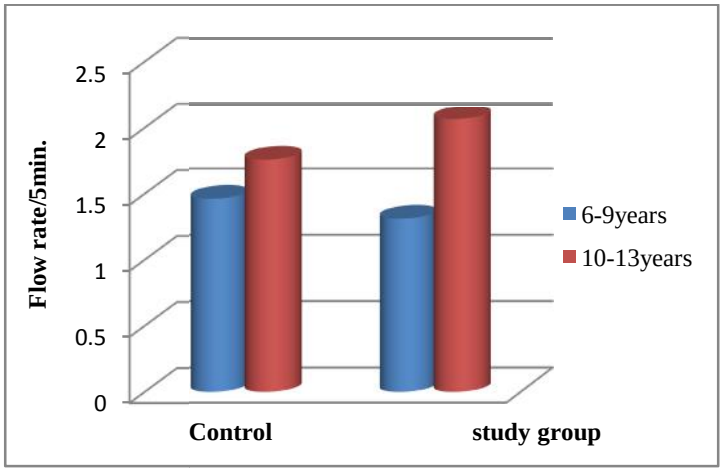

Figure 3: Age group in relation to mean flow rate in 5 minute.

DISCUSSION

There were no studies concerning the level of sialic acid in the saliva of children's family history diabetes mellitus type 2 in Iraq. In this study we have made an effort toward estimation Levels of salivary sialic acid biochemical parameters as signs of prophesy diabetes in children's family history diabetes mellitus type 2. We observed elevated levels of sialic acid in the saliva of study group at age (10-13) years matched to individuals of controls. We have discovered significant correlation of sialic acid and two groups age (6-9)(10-13)years of study group.

That was similar to the finding of Sanjay *et al.* [12],who found salivary sialic acid levels be there significantly higher in well-differentiated squamous cell carcinoma than in moderately differentiated carcinoma (P<0.001), and agreement with salvolini *et al.* the pregnant women salvia's increase in sialic acid concentration through the course of gestation[14] .

Also the biological and nutritional parts of sialic acid in human milk in additional dietary sources were stilled not completely known. The higher levels of sialic acid in human milk, composed with the higher contents in saliva

of breast-fed matched with formula-fed infants, proposes that dietary sources are absorbed[4].

That maybe the reason of higher sialic acid in saliva and significant correlation observed between age and sialic acid in study group and control group in age (6-9),(10-13) years because the habits' of eating dietary sources on their food of Iraqi pupils' especially in the morning. Dezan *et al*.[15] reported that levels of salivary sialic acid in control subjects were higher in his study than in other studies, that agreement with study results presented the salivary sialic acid mean higher in control group at age (6-9) years compared than in study group at same age however this might reflect to different and Procedure variants. No significant changes have been observed in the level of sialic acid in study group was seen as compared with control group, this result were agreement Ozturk *et al* [16]. The decrease of salivary sialic acid level in type 1 diabetes might be caused by changes in the activities of enzymes taking part of in the synthesis and catabolism of sialic acid [17]. Taking into consideration the flow rate, there was a significant correlation among together salivary flow rate (1, 5 min.); age and salivary sialic acid level. This was dependable with the observance from earlier studies that salivary flow- rate, enzyme contents and protein in saliva increase by age. Salivary flow rate increases with age in children and adolescent populations (18) while others have described controversial findings [19, 20].

In this study for stimulated saliva the mean flow rate in 1min.at age (6-9) in control group showed higher (0.291) when compared with study group (0.261), that agreement with Romero et al.[13] Studies including patients with diabetes report decreased salivary flow rate, because diabetes causes changes in the salivary glands and in the components of saliva.

Family histories of diabetes have a metabolic studies described early signs of abnormalities between else healthy people who have a family history of diabetes. Persons with a positive family history of diabetes, containing children, may show early signs of defective insulin actions, 14–18 glucose intolerance[21,22]. Many epidemiologic reports have indicated that People with 1 or more first-degree relatives who have an effect with diabetes are 2 to 6 times as possibly to have the disease compared with people who have no affected relatives [23].

CONCLUSION

Sialic acid is an important component of saliva, estimation of sialic acid levels may help in early prediction and prevention of diabetes mellitus type 2. In our research with larger samples is required and long time to support these findings.

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