

Type 1 Diabetes Mellitus among Adolescent Girls in Riyadh City, Saudi Arabia

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ABSTRACT

Background: Diabetes mellitus (DM) is rapidly becoming one of the main health issues among humans in the 21st century. The increase in the incidence of type 1 diabetes has been observed as a global public health problem in children and adolescents. This work was conducted aimed to estimate the prevalence of type I diabetes and to describe some related characteristics of cases in a sample of adolescent primary and secondary school girls of Riyadh city, KSA. **Methods:** A cross-sectional study was conducted during the academic year 2016-2017. Data were collected via a predesigned and pretested questionnaire to gather the relevant data. The total number of participants was 154 adolescent girls. **Results:** The overall prevalence of type I diabetes among the studied adolescent girls was 5.2% with Mean(\pm SD) age was 14.08 (\pm 3.4). All diabetic girls were Saudi. Only 25% of the cases were using a hormonal contraception. No smoking history or other chronic diseases was detected among them. **Conclusion:** The present study establishes the prevalence of type 1 DM among Saudi adolescent girls to be 5.2%. We suggest repeating this study periodically, with concentration on the various possible etiological and risk factors. Also we recommend conducting similar studies in other areas of Saudi Arabia to get more information about Diabetes. Awareness campaigns and continuous medical education is of utmost importance to detect the disease to guard against development of complications.

Keywords: Type 1 diabetes mellitus; Adolescent Girls; Riyadh City; Saudi Arabia.

INTRODUCTION

Type 1 diabetes mellitus (T1DM) is caused by insulin shortage because of autoimmune disease destroying the β beta cells of the pancreas. The emergence of diabetes mellitus as a global public health problem in children and adolescents is due to the widespread obesity and pronounced lifestyle changes ^[1]. It can occur at any age, but tends to develop in childhood ^[2], so it has long been called "juvenile diabetes". In the past, type 1 diabetes used to be the predominant type among children and It was called juvenile diabetes. For the last 20 years, type 2 diabetes ^[3, 4] which is known for its different etiology, is taking the lead. The trend toward more children developing T1DM has continued and as of 2015, more than half a million children are estimated to suffer from type 1 diabetes. Whilst T1DM is much less

common compared to type 2, it is still increasing by around 3% every year, particularly among children and adolescents ^[5]. Saudi Arabia, a

country of almost 30 million population of which 26% are under 14 years old, ranked the 7th globally in number of children with T1DM ^[6]. A nationwide Saudi Arabian project was conducted in the years 2001-2007 with the objective of establishing national growth charts, and defining the prevalence of some chronic childhood diseases such as diabetes mellitus. 45,682 children and adolescents were surveyed. Fifty children and adolescents were identified to have type 1 diabetes mellitus with a prevalence rate of 109.5 per 100,000. The male to female ratio was almost equal (26 males and 24 females) ^[7]. T1DM sequel in children and adolescents involve acute complications such as

hypoglycemia attacks, and diabetes ketoacidosis (DKA) [8]. The chronic hyperglycemia of diabetes is associated with long-term damage, dysfunction, and failure of various organs, especially the eyes, kidneys, nerves, heart, and blood vessels [9]. Diabetic complications continue to be a major cause of morbidity and mortality in persons with T1D [10]. In Saudi Arabia there are limited epidemiological studies describing the prevalence of DM. the aim of this study was to estimate the prevalence of type 1 DM in the adolescent girls in Riyadh, Saudi Arabia.

Objective

This work was conducted to estimate the prevalence of type I diabetes and to describe some related characteristics of cases in a sample of adolescent primary and secondary school girls of Riyadh city, KSA.

SUBJECTS AND METHODS

A cross-sectional study was conducted among a sample of adolescent primary and secondary school girls of Riyadh city, KSA during the academic year 2016-2017. The sample size was calculated using the sample size equation $n = z^2 * p (1-p) / e^2$ considering the prevalence of type I diabetes in Riyadh is 50%, target population less than 1000 and study power 95%. The minimum size required is 150 adolescent females. A predesigned questionnaire was disseminated to the targeted girls to complete it. The parameters included in the questionnaire included age, gender, other important socio-demographic data such as educational status and mean family income/month (in SR).

Data collection: participated students were given a predesigned and pretested questionnaire to collect the relevant data on Socio-demographic characteristics including grade, mother and father education and work and mean family income/month (in SR).

The use of hormonal contraception, smoking status and other chronic diseases among the adolescent participated girls suggested to affect diabetics such as hypertension, renal diseases and thyroid gland diseases.

Questions regarding the previously diagnosed type I diabetes millets and its determinants.

Ethical considerations

Permission to conduct the study was obtained from the Research and Ethics Committee at the College of Medicine, King Saud University, Riyadh , Saudi Arabia. Data collector gave a brief written introduction to the participants by explaining the aims and benefits of the study. Anonymity and confidentiality of data were maintained throughout the study. There was no conflict of interest.

Statistical Analysis

We utilized the Statistical Package for Social Sciences (SPSS Inc., Chicago, IL, USA) version 16 to analyze the collected data. Results were displayed as counts and percentages. The chi square and independent sample t tests was used as a tests of significance, and differences were considered significant at P value less than 0.05.

RESULTS

Table (1) shows that; the total number of participants was 154 adolescent girls. The overall prevalence of type I diabetes among the studied adolescent girls was 5.2%. 24.7% of the girls were under 15 years old and 75.3 were between 15 and 19 years old. The mean age was 12.08 (\pm 6.8). Almost 95% of the total participants were Saudi. More than 95% of participants were using hormonal contraception. 97.5% were nonsmokers, 0.6% was ex-smoker and 1.9% were smokers. Regarding the presence of any other chronic diseases, 1.2% of the total participants had renal diseases, 3.9% had hypertension, 0.6% had hypothyroidism, 2.4% had bronchial asthma and 0.6% had depression.

Table (2) and Figure (1) reveal that; total number of diabetic girls was 8, 2 of them were 16 years old, 4 were 18 and 2 were 19 years old. The mean age was 14.08 (\pm 3.4). All diabetic girls were Saudi. The father's educational level was primary in 12.5%, secondary in 25%, university or more in 37.5%. Fathers working in a privet sector represent 12.5%, Governmental

sector (25%) and in army forces (62.5%). About third (37.5%) of the diabetic girls have working mother. Only 25% of the cases were using

hormonal contraception. No smoking history or other chronic diseases were detected.

Table (1): Prevalence of Type I diabetes, age group, nationality, average family income, using of hormonal contraception, smoking history and other chronic diseases in the studied school girls, Riyadh, KSA, 2017

	Frequency (n=154)	Percent
Presence of diabetes		
• Yes	8	5.2
• No	146	94.8
Age group (in years)		
• ≤ 15	38	24.7
• 15 – 19	116	75.3
Mean age (\pm SD)	12.08 (\pm 6.8)	
Nationality		
• Saudi	146	94.8
• Non Saudi	8	5.2
Average family income/month (SR)		
• < 5000	26	16.9
• 5000 – 10000	50	32.5
• 10000-15000	36	23.4
• 15000-20000	22	14.3
• > 20000	20	13.0
Using of hormonal contraception		
• No	149	96.8
• Yes	5	3.2
Smoking history		
• No	150	97.5
• Ex-smoker	1	0.6
• Smoker	3	1.9
Other chronic diseases		
• Renal disease	2	1.2
• Hypertension	6	3.9
• Hypothyroidism	1	0.6
• Bronchial asthma	4	2.4
• Depression	1	0.6

Figure (1): Prevalence of Type I diabetes among the studied adolescent school girls, Riyadh, 2017

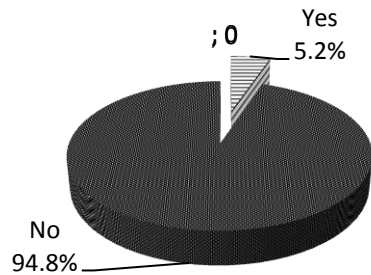


Table (2): Sociodemographic characteristics, average family income, using of hormonal contraception, smoking history and other chronic diseases in the studied type I diabetes cases, Riyadh, KSA, 2017

	Frequency (n=154)	Percent
Age (in years)		
• 16	2	25.0
• 18	4	50.0
• 19	2	25.0
Mean age (\pm SD)	14.08 (\pm 3.4)	
Nationality		
• Saudi	8	100.0
• Non Saudi	0	0.0
Educational level of the father		
• Primary	1	12.5
• Secondary	2	25.0
• University or more	3	37.5
• Preparatory	2	25.0
Father's work		
• Private	1	12.5
• Governmental	2	25.0
• Army forces	5	62.5
Working status of the mothers		
• Working	3	37.5
• House wife	5	62.5
Average family income/month (SR)		
• 5000 – 10000	4	50.0
• 10000-15000	2	25.0
• > 20000	2	25.0
Using of hormonal contraception		
• No	6	75.0
• Yes	2	25.0

Smoking history		
• No	8	100.0
Other chronic diseases		
• No	8	100.0

DISCUSSION

The increase in the incidence of type 1 diabetes have been observed around the world ^[11]. Therefore, this study aimed at deterring the prevalence of the T1DM among adolescent girls in Riyadh, Saudi Arabia, in order to provide data for possible early public health intervention. The prevalence of diabetes among the research group in the present study was 5.2%.

This was higher than that found in Tunisian study carried by **Ghannem et al.** ^[12] who reported a prevalence of 0.4 % amongst a research group of male and female adolescents aged 13–19 years, and also higher than that observed by **Nagah et al.** in district of Turaif, Northern Saudi Arabia ^[13].

They reported a prevalence of diabetes in adolescents, (1.7%) . Similarly, the prevalence in the present study was also higher than a prevalence of 109.5 per 100,000 (1.095 per 1000) documented in a Saudi-Arabian questionnaire based study on type 1 DM by **Al-Herbish et al.** ^[7]. Conversely, in **Al-Rubeaan** survey, the prevalence of diabetes was 10.83% among children and adolescents aged ≤18 years ^[14], which is higher prevalence than ours. There are many factors affecting metabolic control among adolescents including age of patients, duration of the disease, compliance to SMBG physical exercise and educational activities. Poor diabetic control, prevalence of acute and long term diabetes complications, associated autoimmune diseases, associated conditions as well as insulin treatment impact the quality of life of the patients, also their families and caregivers.

Renal disease, Hypertension, hypothyroidism, Bronchial asthma and depression were also found in our participants with prevalence of 1.2%- 3.9%- 0.6%- 2.4%- 0.6% respectively. However, none of these chronic diseases was recorded in the diabetic girls. Unlike other studies in which Microalbuminuria was found in 11% of the adolescents with type 1 diabetes (duration 8.1 years) ^[15].

Abnormalities in peripheral nerve function were also found in 27% of type 1 diabetic adolescents ^[16]. Many other multiple conditions, including developmental and psychosocial problems could be found in T1DM patients

specially when not enough care given to the patients.

Study has limitations

The present study has limitations due to the lack of the chances of having all the information of the various possible etiological and risk factors as a result of limited time allowed for the research workers to contact and deal intensively with the students.

CONCLUSION AND RECOMMENDATIONS

The present study established that the prevalence of type 1 DM among Saudi adolescent girls was 5.2%. We suggest to intensify this type of study periodically, with concentration on the various possible etiological and risk factors. Also we recommend conducting similar studies in other areas of Saudi Arabia to receive and collect more information about Diabetes. Awareness campaigns and continuous medical education is of utmost importance to detect the disease to guard against development of complications.

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