

Type 2 Diabetes Mellitus: Risk Evaluation and Advice in Undergraduate Students in Ashrafieh, Lebanon

Firas Fneish¹, Dnyanesh Limaye¹, Gerhard Fortwengel¹, Maya Tannoury²

(1. Faculty III, Hochschule Hannover, University of Applied Sciences and Arts, Germany;

2. American University of Science & Technology, Lebanon)

Abstract: Background: Type 2 Diabetes Mellitus (T2DM) is a chronic lifestyle disease. It has become evident that T2DM finds its presence even among the younger age groups. In Lebanon, Type 2 diabetes (T2D) has a major public health impact through high disease prevalence, significant downstream pathophysiologic effects, and enormous financial liabilities. **Purpose:** The aim of this study was to find the risk of T2DM among undergraduate students from Ashrafieh city by using validated Diabetes Risk Score Questionnaire (DRSQ). This study also offered T2DM education and awareness to respondents. **Materials and Methods:** A cross sectional study was conducted by using the validated questionnaire. Out of total 100 students approached, 79 students accepted to participate in the study. Respondents were interviewed and scored using DRSQ on the basis of four parameters: Age, abdominal obesity, physical activity and family history of diabetes. **Results:** Out of 79 students screened by the Diabetes Risk Score Questionnaire, 39 (49%) were males and 40 (51%) were females. In description, 23 (29%) respondents were not doing any exercise, and only 40 (51%) respondents were without abdominal obesity. 8 (10%), 35 (44%) and 36 (46%) of the respondents were found to be in high, moderate and low diabetes risk groups respectively. **Implications:** According to the International Diabetes Federation, the projected prevalence of T2DM among adults in Lebanon for year 2020 is 20.4%. Our study revealed that only 46% respondents were in the low risk category. Thus, it is essential to enhance awareness among the youth regarding T2DM, and also obesity and physical activity as most of the respondents were found to lead a sedentary lifestyle. Therefore, as per study plan at the end of the questionnaire, a booklet on “Diabetes prevention advice” was provided to all the respondents.

Key words: type 2 diabetes mellitus, Lebanon, awareness, risk, sedentary lifestyle

1. Introduction

Diabetes Mellitus Type 2 (T2DM) is a chronic disease affecting mainly adult ages (Abdulfatai B. Olokoba, Olusegun A. Obateru & Lateefat B. Olokoba, 2012; Sarah Wild, Gojka Roglic, Anders Gree, Richard Sicree & Hilary King, 2004). However, recent studies have revealed over the years an increase in the ratio of T2DM in younger people of all income levels. It has gained the attention of health organizations as a major health issue affecting both developed and developing countries (Boyle J. P., Honeycutt A. A., Narayan K. M., Hoerger T. J.,

Firas Fneish, Master of Science in International Horticulture/Specialty in Biostatistics, Hochschule Hannover, University of Applied Sciences and Arts; research areas/interests: public health. E-mail: firmfneish@gmail.com.

Geiss L. S., Chen H., Thompson T. J., 2001; Show J. E., Sicree R. A., Zimmet P. Z., 2010). The presence of T2DM even among younger groups of age has become evident (Francine K., 2006; George Alberti, Paul Zimmet, Jonathan Shaw, Zachary Bloomgarden, Francine Kaufman & Martin Silink, 2004; Thomas Reinehr, 2013).

In Lebanon, Type 2 diabetes (T2D) has a major public health impact through high disease prevalence, significant downstream pathophysiologic effects, and enormous financial liabilities (Naja F., Hwalla N., Itani L., Salem M., Azar S., Zeidan M. & Nasreddine L., 2012; Hirbli K. I., Jambeine M. A., Slim H. B., Barakat W. M., Habis R. J. & Francis Z. M., 2005).

Diabetes is a chronic disease characterized by increased blood levels of Glucose, a source of energy for the human body. Low levels can reveal an underactive thyroid gland, high level of insulin or misuse of diabetes drugs while high levels of glucose can be indicative of diabetes, liver diseases, overactive thyroid gland, renal failure, pancreatic cancer or pancreatitis (American Diabetes Association, 2009). There are 2 types of diabetes. Type 1 diabetes Mellitus is the result of the inability of Beta cells to produce insulin, the main hormone produced to promote the absorption of glucose from the blood stream to the muscles (Jeffrey A. Bluestone, Mark A. Atkinson, & Peter Arvan, 2012; Atkinson M. A. & Eisenbarth G. S., 2001; Mark A. Atkinson, Matthias von Herrath, Alvin C. Powers & Michael Clare-Salzler, 2015). These cells are recognized as foreigners and auto antibodies are produced by white blood cells to destroy them. Thus the pancreas produces little or no insulin leading to a very high concentration of glucose in blood. Patients with T1DM are dependent on insulin injection to get glucose into their cells. T2DM occurs due to environmental and genetics factors. Insulin is produced normally by the pancreas but it cannot bind to receptors due to abnormal insulin receptor structure which can be explained as insulin resistance (Diabetes Care, 1997; Harold E. Lebovitz, 1999; Swapn Kumar Das & Steven C. Elbein, 2006; Michael Stumvoll, Barry J Goldstein & Timon W. van Haften, 2005; Jennifer Mayfield, 1998). Patients with T2DM are requested to maintain a healthy life style, take care of their nutrition and lose weight as part of their treatment (Diabetes Prevention Program Research Group, 2002; Tuomilehto J., Lindström J., Eriksson J. G., Valle T. T., Hämäläinen H., Ilanne-Parikka P., Keinänen-Kiukaanniemi S., Laakso M., Louheranta A., Rastas M., Salminen V. & Uusitupa M., 2001; Kastorini C. M. & Panagiotakos D. B., 2009). They are also advised to maintain a low glucose diet and practice regular physical activity (Sheri R. Colberg, Ronald J. Sigal, Bo Fernhall, Judith G. Regensteiner, Bryan J. Blissmer, Richard R. Rubin, Lisa Chasan-Taber, Ann L. Albright & Barry Braun, 2010; Mohammad Asif, 2014; American Diabetes Association, 2004).

Studies reveal that T2DM could be early detected by specific screening tests such as fasting blood sugar test, random blood sugar test and oral glucose tolerance test (Parita Patel & Allison Macerollo, 2010; Christopher D. Saudek, William H. Herman, David B. Sacks, Richard M. Bergenstal, David Edelman & Mayer B. Davidson, 2008; David B. Sacks, Mark Arnold, George L. Bakris, David E. Bruns, Andrea Rita Horvath, M. Sue Kirkman, Ake Lernmark, Boyd E. Metzger & David M. Nathan, 2011; McCance D. R., Hanson R. L., Charles M. A., Jacobsson L. T., Pettitt D. J., Bennett P. H. & Knowler W. C., 1994; David B. Sacks, 2011). Detecting premature diabetes is highly effective in preventing the disease among populations (Grazyna Sypniewska, 2014; Glenn Matfin & Richard E. Pratley, 2010). Other daily factors can also play a role in detecting the risk of premature diabetes known as the Diabetes Risk Score (Eugene Mochan & Mark Ebell, 2009; Jaana Lindström & Jaakko Tuomilehto, 2003). Four main parameters are considered in this score: family history of diabetes score, physical activity score, age score and abdominal obesity score. A simple questionnaire was distributed containing the main parameters to assess the risk of diabetes.

2. Material & Methods

A cross sectional study was conducted by using a validated questionnaire. Out of a total of 100 students approached, 79 students accepted to participate in the study. Respondents were interviewed and scored using DRSQ (diabetes risk score questionnaire) on the basis of four parameters: Age, abdominal obesity, physical activity and family history of diabetes. The Inclusion criteria included an age not less than 17 years and not more than 22 years. Also all respondents have to be university or college students. Ethics committee at American University of Sciences and Technology approved the study. A written informed consent was requested after explaining the purpose of the study. Exclusion criteria were as follows: less than 17 years and more than 22 years old are excluded from the study. In addition, respondents within the age range but not university or college students were also excluded. The time period was from 1st of June till end of August 2015. Scores were given for each parameter. 0 score was given to all respondents since they belong to inclusion criteria between 17 and 22 years old. For abdominal obesity section waist and hips a tape measure was used of 0.5 accuracy. The score distribution according to the DRS as a standard is mentioned in Table 1.

Table 1 Diabetic Risk Score

Parameters	Diabetes risk score
Age (years)	
< 35	0
35–49	20
≥ 50	30
Abdominal Obesity	
Waist < 80 cm [female], < 90 [male]	0
Waist ≥ 80–89 cm [female], 90–99 cm [male]	10
Waist ≥ 90 cm [female], ≥100 cm [male]	20
Physical activity	
Exercise [regular] and strenuous work	0
Exercise [regular] or strenuous work	20
No exercise and sedentary work	30
Family history	
No family history	0
Either parent	10
Both parents	20
Maximum Score	100

Table 2 The Score of Each Candidate Was Calculated and Presented as Follows

Group	Score	Male	Female	% Total
I	Low (< 30)	15	21	46
II	Medium (30–50)	19	16	44
III	High (> 50)	5	3	10
	Total	39	40	100%

3. Observation and Results

The score of each candidate was calculated and tabulated as mentioned in Table 2. Out of 79 respondents, 40 (51%) were females and 39 (49%) were males. After calculating the scores according to the diabetes risk score, 36 (46%) were considered in low risk category while 35 (44%) were in medium risk category and 8 (10%) were in high risk category.

Showing details of risk score component in 79 students is mentioned in Table 3. The physical activity scores were as such: 23 (29%) do not exercise or have sedentary work, 39 (49%) exercise or do strenuous work, 17 (22%) exercise and have sedentary work. As for waist circumference scores, 24 (60%) of the females interviewed had a waist circumference below 80 cm, 9 (22.5%) had waist circumferences between 80–89 cm, and the waist circumference of 7 (17.5%) was more than or equal to 90 cm. As for males, 16 (41%) had a waist circumference less than 90 cm, 13 (33%) had a waist circumference between 90–99 cm and 10 (26%) had a waist circumference above or equal 100 cm. When it comes to family history scores, 19 (24%) had one parent with diabetes, 1 (1%) had both parents diabetic and 59 (75%) had none of their parents diabetic.

Table 3 Showing Details of Risk Score Component in 79 Students

Parameters	Number	% Percentage
Physical Activity		
No exercise & sedentary work	23	29
Exercise or strenuous work	39	49
Exercise & strenuous work	17	22
Waist Circumference		
1. < 80 cm female	24	60
2. < 90 cm male	16	41
3. ≥ 80–89 cm female	9	22.5
4. ≥ 90–99 cm male	13	33
5. ≥ 90 cm female	7	17.5
6. ≥ 100 cm male	10	26
Family History		
1. One parent	19	24
2. Both parents	1	1
3. None	59	75

4. Discussion

If you have diabetes, you are at least twice as likely as someone who does not have diabetes to have heart disease or a stroke. People with diabetes also tend to develop heart disease or have strokes at an earlier age than other people. If you are middle-aged and have type 2 diabetes, some studies suggest that your chance of having a heart attack is as high as someone without diabetes who has already had one heart attack (Michael T. Johnstone, A. V., 2005; Scott M. Grundy, Ivor J. Benjamin, Gregory L. Burke, Alan Chait, Robert H. Eckel, Barbara V. Howard, William Mitch, Sidney C. Smith & James R. Sowers, 1999; National Diabetes Information Clearinghouse). A diabetic patient can have a normal life if takes care of his sugar level with a healthy diet and regular exercise.

Driven by a free-market financing structure, the health care system in Lebanon is irrational and highly inefficient because of an extraordinary reliance on high-technology curative care and a total neglect of public health programs, primary care and preventive services (Abla Mehio Sibai, Kasturi Sen, May Baydoun & Prem Saxena, 2004). Programs have to be made to shed light on the important factors to avoid developing diabetes and also decrease the probability of young and older people from having T2DM. Scientists think genetic susceptibility and environmental factors are the most likely triggers of type 2 diabetes (National Diabetes Information Clearinghouse). A notable result can be taken from family history of respondents were 19 (24%) had 1 parent affected with T2DM. Male with waist circumference ≥ 90 –99 cm were 13 (33%) thus they should monitor themselves and watch out for their obesity and daily life program. Respondents having 1 or both parents affected should have checkups every year for prediabetes and diabetes.

It is highly important to prevent the disease from spreading especially in younger ages, importance of evading this disease or preventing it are not difficult to achieve. Small steps can result in big rewards. Having a normal easy diet program for prediabetes patients with small program of physical activity can be live changing. Government with association can play a major role in spreading the awareness and knowledge of this disease. A developing country as Lebanon will definitely be slowed up by an insufficient healthcare system.

5. Conclusion

The enormous economic, social and personal cost of type 2 diabetes make a compelling case for prevention. In recent years, there has been much new evidence demonstrating the potentially preventable nature of type 2 diabetes, particularly by the implementation of lifestyle measures such as weight control and exercise. In view of this and the devastating health impact of the disease, it seems prudent to make primary prevention a major priority (Steyn N. P., Mann J., Bennett P. H., Temple N., Zimmet P., Tuomilehto J., Lindstrom J. & Louheranta A., 2004). We recommend all young age groups to test their risk of developing diabetes. Routine follow ups for individuals with high risk probability are also suggested. Also young age individuals have to maintain a normal health life style. The proper solution to avoid the disease is to identify the early development of it. When individuals understand the causes and prevent them, they will not face the result.

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