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Awareness and Knowledge about Diabetes Mellitus among Students at Al-Balqa' Applied University

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Abstract: This study was conducted to evaluate the level of awareness about diabetes mellitus amongst students at Al-Balqa' Applied University in Al-Zarqa University College in Jordan. A structured questionnaire about the definition, causes and symptoms of DM was administered to college students of Bachelor degree of 4 specialties. The questionnaire comprised two sections about sociodemographics characteristics and general knowledge of diabetes. The response options were "yes, no or I do not know. The interpretation of scores was defined as poor if the correct answers were ($\leq 50\%$), fair if the correct answers were (51-80%) and good if the correct answers were (81-100%). A total of 240 students were enrolled for the study. Their ages were between 18-25 years. About 33.75% of students know the definition of DM, 31.2% of them considered insulin deficiency in type 1 DM and 41.6% insulin dysfunction in type 2 DM. About 27.5% of all students could correctly identify the cut-off point of 126 mg/dl fasting plasma glucose as being diagnostic for DM. Insulin and diet therapy were identified as the most common method of management of type 1 DM in 27 % of the students. 79.2% of the students identified that Polyuria is the most common symptom of diabetes. There is poor awareness of diabetes amongst college students especially students of the first year. More health education is needed to address these deficiencies in order to equip them with the knowledge to positively help their community to reduce the burden of DM on society.

Key words: Students, awareness, diabetes mellitus, diet therapy

INTRODUCTION

Diabetes mellitus is a global public health disease with an extreme effect on the quality of life of affected patients (Hjelm *et al.*, 2003; Moodley and Rambiritch, 2007; Abegunde *et al.*, 2007) and its prevalence is increasing at an alarming rate (Wild *et al.*, 2004). The prevalence of type 2 diabetes is high in Jordan, it is about 2.2% and this condition continues to be increased (Ajlouni *et al.*, 2008). It is important to know about the awareness level of a condition in a population, as knowledge is a critical component of behaviour change. Once awareness is created, people are more likely to participate in prevention and control activity (Wee *et al.*, 2002). Research has shown that education about diabetes resulted in a significant increase in knowledge of a population, which plays a vital role in future development and early prevention and detection of the disease (Osman *et al.*, 2009). This study therefore set out to find the awareness and knowledge about DM amongst students in Al-Zarqa college of Al_Balqa Applied University in Jordan.

MATERIALS AND METHODS

This study was a cross sectional, descriptive study. It was carried out at Al-Balqa' Applied University (BAU) in Al-Zarqa College in Jordan. The college is offering

scientific knowledge with different skills, which copes with the market, demands. It consists of many scientific and administrative departments and specialties and awarded Bachelor and Diploma degrees.

The students who took part in the study were from the first and fourth years of Bachelor degrees of Biological Sciences, Medical Analysis, Applied Microbiology, Nutrition and Food technology specialties, 60 students from each one. The questionnaire comprised two sections: the first one is about sociodemographics characteristics (name, age, gender, is the respondent diabetic, is there a positive family history of diabetes, source of diabetic education (TV, Newspapers, lectures, radio and workshops about diabetes), specialty of education and year of the student education. The other section of the questionnaire is about general knowledge of diabetes (definition, types, causes, risk factors, symptoms, control, management, treatment, complications and diabetes in pregnant women. The response options were yes, no or I do not know. The respondents were awarded one point for each correct response and zero for each wrong and I do not know answers because they were considered wrong answers. As the first section was not scored, the maximum possible score was 40. The interpretation of scores was defined as poor if the correct answers were

($\leq 50\%$), fair if the correct answers were from (51-80%) and good if the correct answers were from (81-100%). The questionnaire was administered to the students after their lecture in class and collected immediately to stop them consulting each other. After the questionnaires were filled out by the students, they were collected and then analyzed.

Exclusion criteria: students with diabetes: Data Analysis was done using Statistical Package for Social Science (SPSS) version 17.

RESULTS

A total of 240 students were enrolled for the study 120 first year and 120 fourth year, (100 males and 140 females). All of them answered the questionnaire. Their ages were between 18-25 years, 10% have positive family history of DM. The source of DM education were 15% from TV, 20% lectures, 10% workshops, 20% newspapers and magazines, 10% radio and 25% from friends. There is a lack of general knowledge of all students 33.75% of them know the definition of DM and 45% know that DM is a chronic disease, Generally 75% of the fourth year and 15% of the first years students know that DM is a chronic disease and 31.2% of all students considered insulin deficiency in type 1 DM and 41.6% of them insulin dysfunction in type 2 DM and 40% of them agree that DM may present in pregnant women (20% of first and 60% of fourth year agree that DM may present in pregnant women). About 27.5% of all students could correctly identify the cut-off point of 126 mg/dl fasting plasma glucose as being diagnostic for DM (6.7% of the students of the first and 20.8% of fourth year could correctly identify this cut-off point). 66.6% of the students of the first and 80% of the fourth year identified obesity as a risk factor for diabetes while only 50% of the first year and 75% of the fourth year know that weight reduction could help in the management of DM type 2. Diet therapy and insulin were identified as the most common method of management of diabetes type 1 in 16.6% of the first year and in 37.5% in fourth year in type 1 DM. Polyuria is the most common symptom of diabetes identified by the students in 75% of the first year and 83.3% of the fourth year. 50% of the fourth year and 8.3% of the first year know that the kidney and the eyes were the most common organ identified as being affected by DM and 4.2% of the first year and 20.8% of the fourth year agreed that nervous system and the lower limbs may be affected and the end result is amputation. 4.7% of students of first year and 45.8% of fourth year do know that urine sugar cannot be used to diagnose diabetes. Only 5% of the first year and 33.3% of fourth year know that Type 2 DM can be seen in the adolescent.

DISCUSSION

In the present study, we have sought to determine the awareness level of students at Al-Zarqa University

College/Al-Balqa' Applied University (BAU) about the disease. The strategy of this study was to prepare a questionnaire that would test the basic knowledge of diabetes mellitus, its definition, types, causes, symptoms, complications, management and treatment, also to find out the sources of diabetic education to stress on them and encourage diabetic educators to work on these sources.

Our study demonstrated that there is a poor of knowledge and lack of awareness of certain aspects of diabetes amongst college students of Al_Balqa Applied University in Jordan and it showed that the students of fourth years are much more educated about diabetes when compared with the first year students. Our results were similar with other various recent studies which conducted in many parts of the world and suggest that there is a lack of public awareness and knowledge of various factors related to diabetes (Gunay *et al.*, 2006; Angeles-Llerenas *et al.*, 2005; Murugesan *et al.*, 2007), even physicians have poor diabetic knowledge as shown in a study conducted in the US which showed that physicians' knowledge in the treatment of diabetes was not enough and knowledge level of different medical groups such as general practitioners, specialists, internal medicine residents and medical students had significant differences with each other (Gosmanova and Gosmanova, 2009). And another study in UK was also seen that physicians' knowledge about starting insulin therapy in type 2 diabetes, patients' treatment with diet and insulin treatment during an acute illness was not enough (Cheekati *et al.*, 2009). In a study in Bahrain showed that school teachers have inadequate Knowledge of the basic facts of DM which could have dangerous consequences for school students because they are considered to be the first line of school children protection and they should have knowledge of common health problem in order to offer help and support to the students when they needed (Faisal, 2003). Another study showed that even diabetic patients (53.5%) were unable to provide even a rudimentary definition of diabetes (Mohammed *et al.*, 2008).

First year students in our study considered as general population and about 29% of them know the definition of DM and about 15% of them know that DM is a chronic, disease while the fourth year were more aware about DM about 38.3% know the definition of DM and about 75% of them know that DM is a chronic disease and this result was a similar to another study conducted in a metropolitan city in India, Mohan *et al.* (2005) reported that about one third of the general public was unaware of the term 'diabetes' (Mohan *et al.*, 2005).

Regarding classical symptoms 80.5% of the fourth year and 72.3% of the first year were aware about the symptoms. 79.2% of the students agreed that polyuria is a symptom of diabetes. While in Omani study (57.0%) knew at least one of the classical symptoms of diabetes,

Table 1: The knowledge and awareness of college students of Al-Balqa Applied University/Al-Zarqa College of the first and fourth year students

	First year (120)			Fourth year (120)			Total of correct answers %
	Yes	No	I do not know	Yes	No	I do not know	
1. Definition: DM is a increased blood sugar above acceptable level	*35	37	48	*46	32	42	81 (33.75%)
2. DM is a chronic disease	*18	31	71	*90	21	9	108 (45.00%)
3. Risk factors for DM is obesity	*80	15	25	*96	14	10	176 (73.30%)
4. Risk factors for DM is family history	*60	20	40	*80	10	30	140 (58.30%)
5. Risk factors for DM is excessive sugar intake	86	*6	28	44	*36	40	42 (17.50%)
6. Commonest type of DM is type 2	*45	20	55	*80	10	30	125 (52.00%)
7. DM may be present in pregnant women	*24	36	60	*72	23	25	96 (40.00%)
8. Insulin deficiency is found in type 1 DM	*10	40	70	*65	35	20	75 (31.25)
9. Insulin dysfunction is found in type 2 DM	*20	10	90	*80	10	30	100 (41.60%)
10. Insulin deficiency is found in type 2 DM	30	*50	40	54	*56	10	106 (44.50%)
11. One symptoms of DM is excessive thirst	*90	5	25	*100	5	15	190 (79.20%)
12. One symptoms of DM is weight loss	*80	15	25	*90	5	25	170 (70.80%)
13. One symptoms of DM is excessive urination	*90	5	25	*100	5	15	190 (79.20%)
14. Cut-off point for DM diagnosis is fasting blood sugar of 200 mg/dl	15	*5	100	60	*10	50	15 (6.25%)
15. Cut-off point for DM diagnosis is fasting blood sugar of 126 mg/ dl	*16	56	48	*50	35	35	66 (27.50%)
16. Cut-off point for DM diagnosis is 90 mg/dl	5	*15	100	40	*38	42	53 (22.00%)
17. Urine sugar cannot be used to diagnose DM	*5	76	39	*55	34	31	60 (25.00%)
18. Mode of treatment in type 1 DM is diet therapy and insulin	*20	30	70	*45	35	40	65 (27.00%)
19. Mode of treatment in type 1 DM is diet therapy and hypoglycemic drugs	30	*10	80	15	*74	31	84 (35.00%)
20. Mode of treatment in type 1 DM is oral hypoglycemic drugs	10	*56	54	20	*55	45	111 (46.30%)
21. Mode of treatment in type 1 DM is insulin alone	20	*70	30	20	*70	30	140 (58.30%)
22. Mode of treatment in type 2 DM is diet therapy, weight reduction	*60	25	35	*90	10	20	150 (62.50%)
23. Mode of treatment in type 2 DM is oral hypoglycemic drugs alone	60	*25	35	99	*11	10	35 (14.60%)
24. Mode of treatment in type 2 DM is insulin	50	*30	40	20	*70	30	100 (41.60%)
25. DM in pregnant can be treated by insulin and hypoglycaemic drugs	15	*45	60	40	*37	43	82 (34.20%)
26. DM in pregnant can be treated by insulin	*12	36	72	*60	33	27	72 (30.00%)
27. DM in pregnant can be treated by oral hypoglycemic drugs alone	5	*47	68	30	*48	42	95 (39.60%)
28. Complication of DM may be seen in kidneys	*10	67	43	*60	43	17	70 (29.10%)
29. Complication of DM may be seen in eyes	*10	67	43	*60	43	17	70 (29.10%)
30. Complication of DM may be seen in nerves	*5	49	66	*25	23	72	30 (12.50%)
31. Complication of DM may be seen in lower limbs (as amputation)	*5	49	66	*25	23	72	30 (12.50%)
32. Type 2 DM can be found in adolescent	*6	64	50	*40	33	47	46 (19.50%)
33. Control of diabetes by measuring urine sugar	50	*10	60	40	*33	47	43 (17.90%)
34. Control of diabetes by measuring HbA1c	*20	35	65	*75	24	21	95 (39.60%)
35. Control of diabetes by measuring Daily blood sugar	50	*10	60	50	*25	45	35 (14.60%)
36. Diet therapy means -- 3 meals and 3 snacks	*25	30	65	*75	28	17	100 (41.60%)
37. Diet therapy means 2 meals and 2 snacks	10	*33	77	60	*37	23	70 (29.10%)
38. Diet therapy means not to eat carbohydrate	6	*67	47	30	*55	35	122 (50.80%)
39. Exercise in type 2 DM is recommended	*64	33	23	*90	10	20	154 (64.10%)
40. Exercise in type 1 DM is recommended	*12	48	60	*50	20	50	62 (25.80%)

*Showed the number of students with correct answers

like polyuria, polydipsia or unexplained weight loss. Polyuria was the most commonly identified symptom reported by (44.8%) of Mohammed *et al.* study (2008). Obesity is associated with type II diabetes mellitus, recent reports from India, Pakistan and other developing countries indicate that increasing prevalence of obesity and associated risk factors in Urban population (Isra and Vikram, 2004). Nearly 73.3% of our subjects agreed that obesity can cause diabetes, this is encouraging as the increasing incidence of Type 2 DM is clearly related to the increasing incidence of obesity as a result of sedentary lifestyle, reduced physical activity and unhealthy diets. Studies have shown that overweight and obesity significantly increase the risk of developing Type 2 Diabetes (Harrison *et al.*, 2003) and also obesity considered as one of the major risk factors behind hypertension (Jafar and Chaturvedi, 2006).

Our results are better than that have been reported by Mohammed *et al.* study (2008) which showed that two thirds of the subjects were unable to recognize obesity as a risk factor (Mohammed *et al.*, 2008).

The increasing incidence and prevalence of diabetes is attributed to the epidemic of Type 2 DM which is the commonest form of diabetes and is responsible for 80-90% of the cases of DM (World Health Organization, 1999). However, about 52% of our college students agreed that type 2 is the most common type of diabetes while in Unadike (2010) study which showed that one quarter agreed that type 2 is the most common (Unadike, 2010).

It is widely acknowledged that excessive sugar intake is a risk factor for developing diabetes mellitus (Johnson *et al.*, 2007). In our study 54.1% of the students consider excessive sugar intake is a risk factor for developing

diabetes mellitus, while approximately 60% of the population of Mohammed *et al.* study (2008) considered high consumption of dietary sugar as an important risk factor for developing diabetes (Mohammed *et al.*, 2008). Family history of diabetes appears to influence one's level of knowledge and perceptions of diabetes. So those with family history of DM have better diabetic knowledge in our study, individuals with a positive family history of a disease may develop a personal sense of vulnerability which, in turn, may increase their awareness (Walter *et al.*, 2004). In support of this view, Harwell *et al.* (2001) found that family history is the factor most significantly associated with the perceived risk of developing diabetes (Harwell *et al.*, 2001). However, Pierce *et al.* (2000) in their randomized controlled trial, found that the family members of individuals with type 2 diabetes underestimate their own risk of developing the disease (Pierce *et al.*, 2000). Those who reported a positive family history of diabetes were not much more aware of family history as a risk factor for DM than those with no positive family history for the disease (Mohammed *et al.*, 2008) but in our study 65 % of those who reported positive family history have good diabetic knowledge.

23.3% of our students identify that fasting plasma glucose of 126 mg/dl is the recommended cut-off point for the diagnosis of diabetes. However, less than half of the respondents identified this cut-off point in Unadike study (2010).

Weight reduction is an important aspect of management especially in Type 2 DM. Weight reduction reduces obesity and hence insulin resistance in these patients, who constitute about 80-90% of the cases of diabetes worldwide (World Health Organization, 1999). About 62.5% of our students agreed that weight reduction is important in diabetes mellitus, however, in Unadike study (2010) less than half of the nurses agreed that weight reduction is important in DM (Unadike, 2010) while in other studies, 87% of the nurses agreed that weight reduction is important in the management of diabetes (El-Shrief, 2006; Findlow and McDowell, 2002).

Diabetes can lead to microvascular and macrovascular complications. Macrovascular disease is responsible for most of the deaths in persons with diabetes. Knowing complications of diabetes is helpful in reduction of morbidity and health cost (Haan *et al.*, 2003; Krook *et al.*, 2003). In our study lack of knowledge was found about complications of diabetes. Microvascular complications can affect the kidney, eye and nerves. In our study about 20% of the first year and 40% of the fourth year agreed that Diabetes may affect the kidneys and may lead to end stage renal disease and may affect the, eyes with the end result of blindness and also may affect the nerves and lower limbs may cause non traumatic

amputation and these result were similar to other studies (Dirks and Robinson, 2006; Klein *et al.*, 1984; Unachukwu *et al.*, 2005). The results of our study were similar to other studies which showed that only 19.0% of whole population knew that diabetes could cause complications. Even among the self reported diabetic subjects, only 40.6% were aware that diabetes could produce some complications (Mohan *et al.*, 2005) to prevent or to delay these complications warnings about the hazards of diabetic complications should also be emphasized (Jawad, 2003).

50% of our students agreed that diabetes can be diagnosed by urine sugar, while the majority (92.3%) of the respondents agreed that urine sugar can be used to diagnose diabetes (Unadike, 2010). About 20 % of our students know that type 2 DM may be seen in children while in another study 39.5% of the subjects agreed that Type 2 DM may be seen in adolescents (Unadike, 2010). The majority of adolescents have Type 1 DM, but these days, we are seeing an epidemic of Type 2 DM amongst adolescents (Fisher, 2006), this is as a result of unhealthy lifestyle of the public with many people living a sedentary lifestyle, not exercising adequately and have an intake of excessive calories which leads to obesity, a risk factor for Type 2 DM.

Despite this increasing rate and the various complications associated with the condition, knowledge of the disease by the public, patients and health care providers is still very poor. One major challenge for health care providers is how to increase public, patients' and health care workers' awareness about the disease. This will help in early diagnosis, appropriate treatment and adequate follow-up strategies.

Conclusion: This study demonstrated that there is lack of awareness of certain aspects of diabetes amongst college students of Al_Balqa Applied University in Jordan. Level of education is the most significant predictor of knowledge regarding risk factors, complications and the prevention of diabetes. More health education by all available sources such as TV, lectures, workshops is needed to address this poor knowledge in order to equip them with the right information to positively affect their society in order to reduce the burden imposed by the disease.

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