Facts about type 2 diabetes mellitus and its control in Misan governorate: single-center experience

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ABSTRACT

Background: **Diabetes mellitus is a metabolic disease that can affect every system of the body particularly if it is not controlled for long period of time. Complications of diabetes can be halted or prevented by good metabolic control. Measures that are considered in the treatment of diabetes mellitus include; healthy diet, physical activity, blood sugar monitoring, compliance with drugs, and hygienic habits.**

Aim of the study: **The aim of present study is to shed light on the outcome of treatment and control of type2 diabetes mellitus (T2DM) among patients in Misan governorate.**

Patients and methods: In this study, records of 336 patients with T2DM, followed up for one year, were reviewed. HbA1c levels at the first visit and every three months later on for one year were used to reflect glycemic control. Other parameters taken into consideration were; age, gender ~~sex~~, duration of diabetes, and the type of treatment.

Results: **It was found that only (24.1%) of patients, had reasonably good glycemic control, as reflected by HbA1c levels less than 7% with significantly more men than women. Better glycemic control was recognized among patients with disease duration from 6-10 years as compared to those with disease duration below 5 years or above 10 years.**

Conclusion: **Control of T2DM in our study is not so different from that in some other studies in other regions; also gender seems to have an impact on glycemic control, it was found that glycemic control was significantly better among men than women (P-value < 0.05).**

Key words: **Diabetes mellitus, antidiabetic, glycated hemoglobin, glycemic control, Misan Governorate**

حقائق عن مرض داء السكري النوع الثاني والسيطرة عليه في محافظة ميسان

الخلفية: يؤثر مرض السكري على جميع أجهزة الجسم خاصة اذا لم يكن تحت السيطرة لفترة طويلة. إن السيطرة الدقيقة على هذا المرض تؤخر او تمنع المضاعفات التي ترافقه. إن الاجراءات التي تخص علاج مرض السكري تشمل: الغذاء الصحي، النشاط البدني، متابعة نسبة السكر في الدم، المطاوعة والالتزام باستخدام الادوية، وكذلك العادات الصحية الصحيحة.

هدف الدراسة: القاء الضوء على نتائج العلاج الدوائي لمرضى السكري النوع الثاني ومدى السيطرة عليه في محافظة ميسان.

الطرائق: تم دراسة سجلات ٣٣٦ مريض سكري من النوع الثاني الذين تمت متابعة حالاتهم لمدة سنة من خلال فحص نسبة الهيموغلوبين التراكمي كل ثلاثة اشهر كمؤشر على السيطرة على المرض.المؤشرات الاخرى التي اخذت بنظر الاعتبار كانت: العمر، الجنس، مدة الاصابة بالمرض، ونوع العلاج المستخدم. جميع المرضى المشمولين في الدراسة كانوا اصلا يستخدمون الادوية المضادة للسكري.

النتائج: اظهرت النتائج في هذه الدراسة، ان ٢٤,١% من المرضى كانوا يتمتعون بسيطرة جيدة على المرض كما يظهرذلك من خلال نسبة للهيموغلوبين التراكمي اقل من ٧%. كما ان السيطرة على المرض كانت افضل بين الرجال مقارنة بالنساء كما ان نتائج العلاج كانت افضل بين المرضى الذين تمتد فترة المرض عندهم من ٦–١٠ سنوات.

الاستنتاج: هناك تقارب في نتائج العلاج او السيطرة على مرض السكري النوع ٢ في دراستنا مع دراسات في مناطق اخرى.كانت السيطرة الجيدة على المرض اكثر بين الرجال مقارنة بالنساء .(٣٣.٣% مقابل ١٧.٣%)

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INTRODUCTION

Diabetes mellitus is a metabolic disease that results from relative or absolute deficiency of insulin, with hyperglycemia as the main laboratory abnormality. Postprandial clearance of glucose by the liver is impaired in T2DM in addition to increased production of glucose.[1] Healthy diet, physical activity, home monitoring of blood glucose, and easy accessibility to measure glycated hemoglobin (HbA1c) have contributed to better control of disease.[2] There is an increasing prevalence of T2DM worldwide; it is a major, non-communicable disease.[3] The causes of poor control of diabetes in developing countries may include; high cost of medicines, poor access to medications, irregular attendance of patients for follow up, lack of health education, and inequality in distribution of health facilities between rural and urban areas.[4] HbA1c target less than 6.5% is depended currently for good glycemic control. [5] HbA1c assessment does not require fasting, with increased stability and less difference in its levels over different days due to other factors like stress or illness.[6] The increasing number of antidiabetic drugs for T2DM, with different mechanisms of action and safety profiles, can form a challenge for physicians, and increase the complexity of diabetes management.[7] T2DM may be diagnosed at the time of appearance of complications in nearly one third of patients; therefore, it is important to detect people with undiagnosed diabetes by good screening programs.[8]

Aim of the study, is basically, to shed light on the control of T2DM in Misan Governorate and also, to establish a baseline data about this common disease for future, probably more informative studies that may search for the factors with negative impacts on its control in this governorate.

PATIENTS AND METHODS

In this retrospective study, the records of 336 patients with T2DM, were analyzed to shed light on their glycemic status. These patients attended the Diabetes and Endocrinology Center in Misan Governorate from January 2016 to the end of December 2016, for follow up of their disease. All patients had their antihyperglycemic drugs being prescribed by their physicians in other health centers or hospitals with no additional or change in their treatment during follow up. Their verbal consents were obtained for follow up through laboratory checking of their HbA1c at the time of first visit and every three months later on for one year. For the sake of this study, patients who had achieved HbA1c levels less than 7%, at the end of one year, were considered as having a reasonably good control, and those with HbA1c higher than 7% were considered to have poor glycemic control. Other parameters taken into consideration were; age, gender, duration of diabetes, and type of treatment. The results of this study were presented in tables as numbers and percentage. Statistical analysis of results was done by SPSS version 18, Chi squared test was used to assess the significance of relation, and P value less than 0.05 is considered significant.

RESULTS

Out of the 336 diabetic patients, the most frequent age group was (41-65) years, (66.4%) for both genders.(Table -1)

Table 1. Distribution of patients according to gender & age groups.

Age group in years	Male		Female		Total		P value
	No.	%	No.	%	No.	%	
≤ 40	18	11	36	20.8	54	16.1	0.03
41-65	118	72.4	105	60.7	223	66.4	
More than 65	27	16.6	32	18.5	59	17.5	
Total	163	100.0	173	100.0	336	100.0	

Glycemic control was also found to be significantly better among men as compared to women. (Table-2).

Table 2. Glycemic control of patients among both genders

Total	Male		Female		P-value
	No.	*%*	*No.*	*%*	
HbA1c < 7%	51	31.3	30	17.3%	0.004
HbA1c > 7%	112	68.7	143	82.7	
Total	163	100.0	173	100.0	

With respect to the relation of duration of diabetes and the glycemic control, patients with disease duration more than 10 years had significantly worse control with 91.5% had HbA1c > 7%. (Table-3)

Table 3. Glycemic control according to different disease durations

Control	1-5 years		6-10 years		> 10 years		Total		P value
	No.	%	No.	%	No.	%	No.	%	
HbA1c < 7%	40	24.4	36	31.9	5	8.5	81	24.1	0.01
HbA1c > 7%	124	75.6	77	68.1	54	91.5	255	75.9	
Total	164	100.0	113	100.0	59	100.0	336	100.0	

With respect to the type of treatment the patients on, most of patients 61.9%, were on combination of anti-diabetic drugs. (metformin plus insulin and metformin plus glibenclamide.) (Table-4).

Table 4. Pharmacological treatment of diabetes among both genders.

Treatment	Male		Female		Total		P value
	No.	*%*	*No.*	*%*	*No.*	*%*	
Metformin	40	24.5	34	19.6	74	22.0	< 0.05
Insulin	10	6.1	26	15.1	36	10.7	
Glibenclamide	10	6.1	8	4.6	18	5.4	
Drug combination*	103	63.3	105	60.7	208	61.9	
Total	163	100.0	173	00.0	336	100.0	

***Combinations include metformin + insulin in 126, and metformin + glibeclamide 82 patients.**

Patients on metformin immunotherapy were found to have significantly better glycemic control, as reflected by HbA1c levels less than 7%, in comparison to those on combination therapy of different types. (Table-5)

Table 5. Glycemic control with metformin as compared to drug combination.

Control	Metformin		Combination*		P-value
	No.	%	No.	%	
HbA1c < 7%	28	37.8	40	19.2	0.001
HbA1c > 7%	46	62.2	168	80.8	
Total	74	100.0	208	100.0	

***Combinations include metformin + insulin in 126, and metformin + glibeclamide 82 patients.**

Out of the total 336 diabetic patients studied, only 24.1% were found to have HbA1c levels less than 7%. (Table-6)

Table 6. Glycemic control among diabetic patients

Control	Patients	
	No.	%
HbA1c < 7%	81	24.1
HbA1c > 7%	255	75.9
Total	336	100.0

DISCUSSION

In this study, particular concern of the glycemic control among patients with type2 diabetes mellitus, was considered. Patients in the age group between 41-65 years constitute the majority (66.4%) among both genders. This finding may be comparable to facts revealed by other study which showed increasing incidence of T2DM as the age increases until 65 years of age, after that incidence seems to level off.[9] This study reveals that, better glycemic control was detected among men than women. Overweight and psychosocial stress are more common among women than men[10], it is said that differences in diabetes risk & response to treatment depend on biological and psychosocial factors.[11] Regarding the effect of the duration of T2DM on glycemic control, we found that, better glycemic control was recognized with disease duration between 6-10 years, this may indicate less awareness or education about the nature and management of diabetes of those with disease duration below 5 years, or on the other hand, patients with disease duration more than 10 years, may get less glycemic control due to, noncompliance, increased severity of their disease, or other comorbidities. Data from other studies showed that drug therapy of T2DM becomes more complex in longer duration of disease.[12] A study revealed that, each 1-year decrease in diabetes mellitus duration resulted in a 5.2% increase in the possibility of having good glycemic control.[8] Regarding the mode of drug treatment among patients, we found that the majority of diabetic patients, (61.9%) were on combination of antidiabetic drugs and only 22% of patients were on metformin monotherapy. In a study, metformin had captured one third of prescriptions.[13] A study done in Basrah, south of Iraq showed that the majority of the patients with (T2DM) on oral antihyperglycemic therapy didn't receive the first line drug, metformin.[14] It was found that only failure of response to metformin monotherapy may warrant the addition of other antidiabetic drugs such as; sulfonylureas, thiazolidinediones, acarbose, or insulin.[15] According to current guidelines from American College of Endocrinology, metformin plus a second antidiabetic agent is recommended as initial treatment in diabetic patients when the HbA1c levels are less than 7.5%.[16] The American Diabetes Association says that metformin may be considered by physicians in prevention of (T2DM) in individuals at the highest risk to have this disease.[17] In our study, it was found that better glycemic control was significantly more frequent among patients on metformin monotherapy as compared to other treatment modalities. Other researchers found that, diabetic patients on monotherapy had 4.8-fold chances of having good glycemic control, as compared to 2.3-fold for those on a combination of antidiabetic drugs.[8] Out of the total number of diabetic patients in the present study study, only 24.1% were found to have reasonable glycemic control as reflected by HbA1c levels less than 7%. In a study held in Basrah, Iraq, (23.7%) patients were found to have A1C less than 7%. [18] Also another study held in Basrah, showed that, the target of HbA1c levels < 7% were achieved only in 25.6%.[19] Another researcher found that only 20% of patients with T2DM had HbA1c levels below 7.0%. [8]

CONCLUSION

1. Metformin immunotherapy is associated with reasonably better glycemic control, in comparison to other treatment modalities
2. Gender may have an impact on the glycemic control as found in our study; with better glycemic control among men than women.
3. Metabolic control of patients with T2DM, in Misan governorate is, to some extent comparable to that in some other studies or countries.
4. This study may stimulate further works or studies to find out the probable causes that

may affect T2DM control negatively, and so, to plan for its correction to improve the control of this disease and decrease its negative impacts on the public health.

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