Original Article

Study on Patients with Poor Control of Type II Diabetes Mellitus at National Ribat University Hospital

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ABSTRACT

Background: Diabetes control is elusive so great effort is needed to keep blood glucose normal or near the required level. Various factors are suspected for poor glycemic control. These factors included: aging, sex, duration of diabetes, medication adherence, clinical inertia, physical inactivity, patient knowledge, comorbidity and quality of medications.

Objectives: To assess factors associated with poor glycemic control among patients with type2 diabetes.

Materials and method: This was a descriptive cross sectional hospital-based study conducted in the National Ribat University (NRU) Diabetes Clinic, Khartoum state, Sudan.

Results: Out of 398 diabetic patients attending NRU Diabetes Clinic 88.2% has type 2 DM,
Of whom 31.4% (125 patients) had poor glycemic control and were shifted to insulin therapy. Female constituted 76.8% of the poor glycemic control patients and 88.8% of patients were above 40years of age. About 64.8% were shifted to insulin within 10 years of diabetes diagnosis. The majority (79.2%) were not having an exercise program, 84% were not having diet program, 70.4% their knowledge about hypoglycemia symptoms was not satisfactory and 61.6% their knowledge about medication usage was not satisfactory. About 66.4% were on mono anti diabetic therapy and need medications intensification, and 54.4% were not adherent to anti diabetic medications.

Conclusion: Our findings showed that sedentary life, clinical inertia and longer diabetes duration were behind poor diabetes control.

Key words: Type 2DM, diabetes control, poor glycemic control.

Diabetes mellitus (DM) is a chronic metabolic disorder associated with hyperglycemia due to insulin deficiency, often conjugated with insulin resistance[1]. Type2 DM constitutes more than 90% [2] of total cases of DM, and can remain undetected for many years.

Type2DM control is complex and cost-effective process and requires an integrated multi-disciplinary medical team consists of at least physicians, pharmacists[3], nurses, dietitians and behavioral scientists who were skilled in diabetes management.

Recent researches that depend on evidence-based clinical trials show that the most successful guidelines for treatment of type2 DM are patient-centered approach[4]. In patients- centered the medical providers should make the person as a partner in the clinical decision and the treatment recommendation should be tailored to fit with person's needs, culture and educational level. Ongoing assessment for treatment goal, person's willingness and readiness to change his habits to fit with the flexible treatment goal should be considered. Although American Diabetes Association (ADA) recommends maintaining glycated hemoglobin (HbA1c) to <7.0% in most patients, individualization of HbA1c to less stringent targets (up to 8% or higher) for some patients is important such as patients have history of severe hypoglycemia[5]. Individualization of HbA1c to more stringent targets (6-6.5%) can be suitable for some

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selected patients such as patients with short diabetes duration. Patient-centered approach is now adopted with many recognized organizations such as American Diabetes Association (ADA) and United Kingdom Diabetes (UK Diabetes)[6].

MATERIALS AND METHODS:

This is a cross sectional hospital based prospective and retrospective study. It was conducted in the National Ribat University Diabetes Clinic, Khartoum state, Sudan.

Data collection:

Structured questionnaires were distributed to collect data from patients, and patients' cards were also used to extract some information or to understand some patients' answers.

Data analysis:

Data were analyzed using the social package for social sciences (SPSS), version16. Chi square was used and P-value of < 0.05 was considered significant.

RESULTS:

Total patients were 398 and 88.2% have type 2DM. 56.8% of patients were on oral therapy, while 31.4% (125 patients) had poor glycemic control and were shifted to insulin according to definition and target of poor glycemic control at Ribat University Diabetes Clinic (no patient should be shifted to insulin unless HbA1c > 8%), (Table 1). Females constituted 76.8% of the patients and 88.8% of patients were above 40 years of age. About 64.8% were shifted to insulin within 10 years of diabetes diagnosis (Table 2). In this population 79.2% were not having an exercise program, 84% were not having diet program (Table 3), 70.4% needed education about hypoglycemia symptoms and 61.6% needed education about their medication (Tables 4). Co-morbidity in our patients was 64.8% (Figure 1) and 50 patients (40%) were hypertensive (Figure 2). Regarding pharmacological treatment, 54.4% were not adherent to their medications (Table 6), 66.4% were on mono anti diabetic therapy (Figure 3) and 62.4% were on glibenclamide (Table 5).

Table (1): Distribution of types of diabetes among patients seen at Ribat diabetic clinic.

Type of diabetes	Frequency/ Percent	P-value
Type 2 on oral antidiabetic drugs	2269(56.8)	<0.001
Type 2 shifted to insulin	125 (31.4)	
Type 1	34 (8.5)	
Gestational	7 (1.8)	
Newly diagnosed patients	6 (1.5)	
Total	398	

Table (2): Personal factors before shifted to insulin among the studied patients.

Factors	Status	Frequency/ Percent	P-value
Sex	Male	29 (23.2)	<0.001
	Female	96 (76.8)	
Age	20-40	14 (11.2)	
	41-60	70 (56)	
	Above 60	41 (32.8)	
Diabetes duration	0-5	45 (36)	
	6-10	36(28.8)	
	11-15	24 (19.2)	
	16-20	20 (16)	
Total		125	

DISCUSSION:

Patients studied at Ribat University Diabetes Clinic showed the same reasons of diabetes

poor control known globally. However some differences in frequency and percentages of these reasons were detected upon comparing them with other studies from many countries.

This study showed that age affects diabetes control. Patients with older ages showed poor control and this is consistent with Al-Nuaim *et.al* [7], and disagrees with Maysaa *et al* findings[8]. Majority of our patients, were shifted to insulin when they were more than 40 years of age. American report from centre for disease control reported that poor control is common among adults aged 18–39 years[9]. Physical under activity may be one of the reasons that led to loss of control among older patients in Sudan. Females in our population had poorer control of sugar. This finding is consistent with Kautzky *et al*[10]. This is probably due to the low education level and physical under activity, which is higher among females in this study. About 64.8 % of our patients with poor control had type 2 DM. One fifth of these were shifted to insulin within 10 years of diagnosis, whereas Meena *et al*[11] reported that 50% of patients required insulin therapy within 10 years. This study showed diet as one of the reasons that hinder diabetes control and this agrees with many studies[12].

Table (3): Distribution according to life style modification among the studied patients.

Question	Answer	Frequency/ Percent	P-value
Have you diet program	Yes	20 (16)	< 0.001
	No	105 (84)	
Have you exercise program	Yes	26 (20.8)	
	No	99 (79.2)	
Total		125	

Table (4): Distribution according to patients' knowledge among the studied patients.

Patient's knowledge	Knowledge level	Frequency/Percent	P-value
Hypoglycemia Knowledge	Sufficient	37 (29.6)	< 0.001
	Insufficient	88 (70.4)	
Drugs use Knowledge	Sufficient	48 (38.4)	
	Insufficient	77 (61.6)	
Total		125	

Table (5): Pharmacological treatment used by the studied patients.

Therapy before shift to insulin	Frequency/ Percent	P-value
Glibenclamide	78 (62.4)	< 0.001
Glibenclamide+metformin	36 (28.8)	
Glimepride+metformin	5 (4.0)	
Glimepride	2 (1.6)	
Metformin	2 (1.6)	
Gliclazide+metformin	1 (0.8)	
Gliclazide	1 (0.8)	
Total	125	

Table (6): Patients' distribution according to adherence to anti-diabetic medications.

Patients adherance	Frequency/Percent	P-value
Non adherent to medication	68 (54.4)	0.325
Adherent to medicateon	57 (45.6)	
Total	125	

More than three quarters of patients in this study had no diet program, and this is higher when comparing with others[13]. Only one fifth of our patients were on an exercise program, and this finding is approximately identical with Ayman *et al* study[14]. Majority of patients considered the daily activities is enough as exercise program and this consistent with other reports[14]. This low percent is mainly due to the fact that the majority of our patients were females. Unlike what was reported in the literature[15-16], this study showed that patients' knowledge about their medications usage and hypoglycemia symptoms was not satisfactory this is probably due to low level of patients' education and, week relationship between patients and health education team in Ribat Hospital. Inability of health care providers to initiate or intensify therapy (clinical inertia) is one of the factors that prevent diabetes control. The majority (62.4%) of our patients were shifted to insulin after treatment with glibenclamide as mono therapy. Many studies reported that early treatment intensification by adding metformin to sulphonylureas significantly improve diabetes control[17].

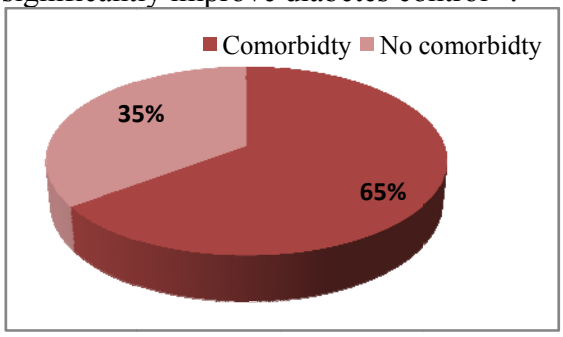

Figure (1): Patients distribution according to presence of co-morbidity.

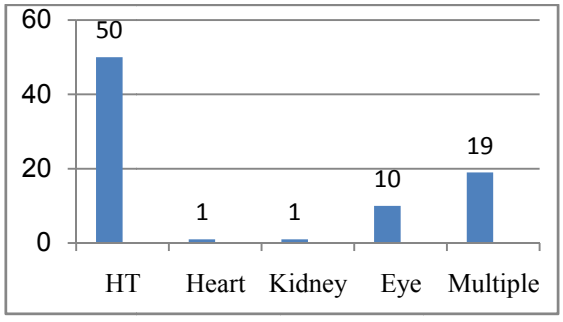

Figure (2): Patients' distribution according to type of co-morbidity among the studied patients.

However further studies are required to determine reasons that prevent treatment intensification. Adherence to diabetes treatment affects significantly diabetes control. This study showed that more than one half of patients were not adherent to their medications, and this finding is slightly higher than Wabe's study in Ethiopia (51.3%)[18], and better than Yusuff *et al* study in Nigeria (59%)[19]. Comorbidity affects control. This study showed that 40% of patients were hypertensive, and this finding goes with that of Arauz.et al[20]. During this study it was noticed that some patients were shifted to insulin due to cardiovascular, kidney and liver disease.

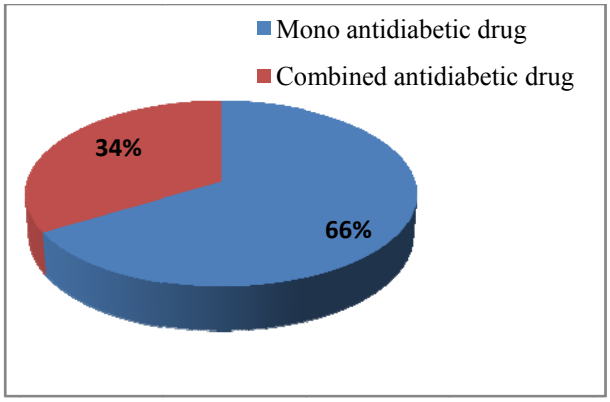

Figure (3): Patients distribution according to treatment intensification.

CONCLUSION:

It can be concluded that the major reasons for poor glycemic control were sedentary life style, longer duration of diabetes and clinical inertia. Carrying bioequivalence studies for various brands of anti-diabetic, will give an answer for the debate about efficacy of some anti-diabetics. Again carrying more studies for loner period is required.

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