

Audit of diabetes mellitus among patients attending an employee health clinic at a tertiary care centre in Riyadh, Saudi Arabia

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ABSTRACT

Purpose: To assess the clinical practices in the management of patients with type 2 diabetes mellitus (T2DM) as a basis for establishing a guideline that focuses on risk factors and complications. **Methods:** We conducted a retrospective audit of the medical records of 450 patients (aged 20–65 years) diagnosed with T2DM attending an employee health clinic at King Fahad Medical City, Riyadh (Saudi Arabia) during the period from 1 January to 1 July 2016. All patients requiring emergency treatment were excluded. A checklist of demographic variables, co-morbidities, clinical examinations, and laboratory investigations was used for collecting data. **Results:** In total, 303 (67.3%) were women and 312 (69.3%) were Saudis. Forty-five (10%) patients were not receiving current treatment for diabetes and body mass index was not calculated for 117 (26%). Retinal and neurological examinations were not performed in 363 (80.7%) and 109 (24.2%) patients, respectively. Cardiovascular and peripheral vascular system examinations were not conducted for 112 (24.9%) and 114 (25.3%) patients, respectively. For laboratory investigations, 2-h glucose tolerance tests and vitamin B12 tests were not performed for 473 (97.1%) and 436 (96.9%) patients, respectively. Moreover, TSH/T4 and eGFR tests were not performed for 220 (48.9%) and 135 patients (30%), respectively. **Conclusions:** We concluded that current clinical practice for management of T2DM patients is not comprehensive and that the quality of healthcare should be improved with continuous checking of patient records.

Keywords: Audit, body mass index, diabetes, retinal examination, tertiary care

Introduction

Diabetes mellitus (DM) is a chronic and lifelong condition that is characterized by hyperglycemia. There are three major types of diabetes: Type 1, type 2, and gestational diabetes, with approximately 90% of all cases diagnosed with type 2 diabetes mellitus (T2DM).^[1] More than 347 million patients are affected globally, and this number is expected to increase to 439 million by 2030.^[2] In 2013, the cost of diabetes care represented approximately 10.8% of the total amount spent

on health worldwide.^[3] In the Middle East and North Africa, one in 10 individuals are affected by diabetes mellitus 2, and the incidence is predicted to increase to 67.9 million by 2035.^[4]

The injurious effects of hyperglycemia are separated into microvascular and macrovascular complications. Microvascular complications include diabetic nephropathy, neuropathy, and retinopathy, while macrovascular complications include coronary artery disease, peripheral arterial disease, and stroke.^[5]

It is crucial to implement multifactorial risk reduction strategies such as weight reduction and blood pressure control early in the course

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of the disease to prevent both microvascular and macrovascular complications.^[6] Furthermore, diabetic nephropathy is a common cause of kidney failure, with a significantly higher incidence among males, smokers and alcoholics which can be reduced by early follow-up and use of specific tests.^[7,8] According to Pruthu *et al.*, clinical practices in the management of T2DM (measurement of HbA1c and cholesterol/lipid levels, annual screening for nephropathy and blood pressure control) were improved in 2012 compared with those adopted in 2010. For example, approximately 63% (2,679) of patients were tested for HbA1c levels in 2012, while 30% were tested from the sample in 2010.^[9] Regular clinical and biochemical monitoring of patients helps prevent complications.^[9] Good clinical practice regarding follow-up, such as foot, neurological, ocular and fundus examinations, is vital in preventing the complications of diabetes.^[10] Absence of visual acuity tests, fundoscopy and foot examination records limit the early detection of complications.^[11] “Clinical guidelines for the management of diabetes in adult patients have been designed to aid physicians in providing individualized care and setting treatment goals to improve the quality of patient care.^[12-14] Moreover, attitudes influence the behavior of healthcare professionals.^[15] The medical records for patients with diabetes mellitus include significant amounts of useful information such as family history, relevant past medical history, clinic visit details, and medication list. The standard interventions achieve a positive effect on both the delivery of diabetes care and clinical outcome in terms of a considerable reduction in FBG and HbA1c levels.^[16] However, some of the most critical laboratory tests are not conducted due to lack of access to laboratory facilities to test factors such as HbA1C.^[16]

From this perspective, we assessed the clinical practices of physicians in the management of diabetes mellitus to establish a guideline that focuses on risk factors and complications of the disorder.

Subjects and Methods

In August 2016, we conducted a retrospective study of medical records of patients diagnosed with T2DM attending an employee health clinic at King Fahad Medical City, Riyadh during the 6-month period from 1 January to 1 July 2016. All Patients with T2DM aged between 20 and 65 years were included; all patients requiring urgent care were excluded.^[16-18] Details of demographic variables, co-morbidities, clinical examinations, and laboratory investigations were collected. In total, the records for 720 patients were identified, of which 270 failed to fit the inclusion criteria; thus, 450 patients were included in our analysis.

SPSS, version 22 was used for both data entry and analysis. All variables were summarized and described using descriptive statistics; numbers and percentages were calculated for all qualitative variables.

Results

In total, 450 patients with T2DM were included in our analysis. Of these, 303 (67.3%) women and 312 (69.3%) were

Saudis. Almost two-thirds of the patients (62.9%) were in the 50–65 year age group. Regarding BMI, data were available in only 333 (74.0%) patients, of which 188 (56.5%) were obese. Regarding co-morbidities, 198 (44%) patients had hypertension, 153 (34%) were obese, and 146 (32.4%) had dyslipidemia [Table 1].

As shown in Table 2, 45 (10%) patients were not receiving diabetic treatment and BMI was not calculated for 117 (26%) patients. Additionally, most patients (363, 80.7%) did not undergo retinal examination and neurological examination was not conducted in 109 (24.2%) patients. Almost one-quarter of the patients (67, 24.9%) did not undergo cardiovascular system examination and 114 (25.3%) patients did not undergo peripheral vascular system examination.

Table 3 shows that 2-h GTT and vitamin B12 tests were not performed for the majority of patients (473, 97.1% and 436, 96.9%, respectively). Moreover, TSH and T4 tests were not conducted for 220 patients (48.9%) and eGFR tests were not performed for 135 patients (30%).

Discussion

The importance of auditing the quality of care delivered to diabetic patients in any health care system has been well-documented.^[19,20] More specifically, the assessment of performance indicators for evaluation of the quality of care has been associated with a favorable influence on patient outcomes.^[21]

Therefore, the purpose of this study was to assess adherence to clinical guidelines for the care of patients with T2DM by conducting an audit of the medical records of patients. Our findings suggest that comprehensive clinical examinations and

Table 1: Characteristics of diabetes mellitus patients attending an employee clinic at the KFMC from 1 January to 1 July 2016

Characteristic	Number	Percentage
Sex		
Male	147	32.7
Female	303	67.3
Age		
20-34	28	6.2
35-49	139	30.9
50-65	283	62.9
Nationality		
Saudi	312	69.3
Non-Saudi	138	30.7
Body mass index (n=333)		
Normal weight	37	11.1
Overweight	108	32.4
Obesity	188	56.5
Co-morbidities*		
Hypertension	198	44.0
Dyslipidemia	146	32.4
Obesity	153	34.5

*More than one answer is accepted

Table 2: Incompleteness of clinical data and physical examinations of diabetes mellitus patients attending an employee clinic at the KFMC from 1 January to 1 July 2016

Characteristic	Number	Percentage
Current diabetes treatment	45	10
Body mass index	117	26
Nephropathy examination	138	30.7
Retinopathy examination	363	80.7
Neuropathy examination	109	24.2
Foot condition	110	24.4
Cardiovascular system	67	24.9
Peripheral vascular system	114	25.3

Table 3: Incompleteness of laboratory investigations of diabetes mellitus patients attending an employee clinic at the KFMC from 1 January to 1 July 2016

Characteristic	Number	Percentage
HbA1c	58	12.9
Fasting blood glucose	63	14
2-h Glucose tolerance test	437	97.1
Glomerular filtration rate (eGFR)	135	30
Lipid profile	74	16.4
Vitamin B12	436	96.9
TSH and T4	220	48.9
Creatinine, urea	85	18.9

laboratory investigations were not completed in a high proportion of patients.

A study conducted in the Department of Family Medicine, Aga Khan University, Karachi, Pakistan revealed that the management of type 2 diabetes provided by family physicians was inadequate. Moreover, the majority of patients had poor glycemic control. It was concluded that improvements in the quality of diabetes care were necessary and further large-scale audits and research were recommended.^[17]

Moreover, a study conducted at the King Faisal University, Kingdom of Saudi Arabia (KSA) showed that the care provided to diabetic patients was relatively inappropriate. The report recommended implementation of specific measures to promote diabetic care in family health clinics. These measures included formulating and using protocols for diabetes management and better training of health care providers.^[18]

The results of a study conducted in Muğla, Turkey, showed that Primary Care Physicians (PCP) were reasonably confident about initiating oral antidiabetic drugs (OAD) in T2DM patients, but were not confident about either initiating or intensifying insulin therapy. Most PCPs indicated that they refer patients who need insulin treatment when OADs are inadequate to specialists.^[3]

In a study conducted in Kuwait,^[2] most of the patients with diabetes had received at least one HbA1c test during the study

period in 2012. In the present study, only 12.9% of patients received this test, which is much lower than the international benchmarks for annual HbA1c management from the US (90%), UK (83%), and Italy (88%).^[22,23]

In the present audit, the annual retinal examination was not performed in 80.7% of cases. Similar high rates were reported in Pakistan,^[18] and in another Saudi study.^[18]

This audit was conducted to assess adherence to specific guidelines for the management of patients with T2DM by auditing medical records. Our analysis showed that some of the recommended clinical examinations and laboratory investigations were not completed for a proportion of the patients. Furthermore, some specific medical information, such as smoking habits and BMI, was either omitted or recorded inaccurately. In the light of the result of the present audit, we recommend that the quality of healthcare provided to the patients should be improved and that the records of patients should be checked continuously.

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Conflicts of interest

There are no conflicts of interest.

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