IJHS

Original Article

Evaluation of diabetes care management in primary clinics based on the guidelines of American Diabetes Association

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WEBSITE: ijhs.org.sa
ISSN: 1658-3639
PUBLISHER: Qassim University

ABSTRACT

Objective: There is a rapid increase in the incidence of diabetes mellitus in Saudi Arabia. Diabetes management is an essential constituent to prevent prognosis of diabetes complications. The main objective of this study was to assess diabetes care in primary clinics based on the guidelines of American Diabetes Association (ADA).

Methods: A retrospective study at King Khaled University Hospitals, Riyadh, Saudi Arabia. A total of 200 patients were randomly selected from the databases of primary care clinics. An evaluation checklist was created based on the ADA treatment guidelines such as medical history, physical examination, laboratory evaluation, and referrals.

Results: The result showed that elements achieving the ADA targets for overall care were medical history (44.9%), physical examination (59.6%), laboratory evaluation (36.3%), and referrals (19.3%). The other subelement indicators such as referral to diabetes self-management education clinics (10%), dental examination (2%), HbA1c regular monitoring (33.5%), and blood pressure determination (100%) were documented with adherence to ADA standards.

Conclusions: Diabetes management standards are an essential element in the success of the management plan. Most of the elements examined are not in full compliance with the ADA standard. Continues monitoring and self-review are recommended.

Keywords: American Diabetes Association standards, diabetic patients, laboratory evaluation, medical history, physical examination, referrals

Introduction

Diabetes mellitus (DM) is a chronic metabolic disorder characterized by hyperglycemia mainly due to deficiency of insulin hormone and resulted in Type 1 diabetes or relative Type 2 diabetes.[1] Previous study reported that the prevalence of diabetes among people aged ≥ 65 was more than 6 times that of people aged 20–24 years in the United States.[2] In the past two decades, Saudi Arabia is developing rapidly, which influence toward urbanization, thereby influencing the lifestyle of Saudis. Therefore, a major impact of rise in diabetes prevalence has escorted these changes in lifestyle. In the late 1970s in Saudi Arabia, diabetes was not considered as a major health problem. However, this fact has changed dramatically in the past two decades, as the prevalence of diabetes in Saudi Arabia is now one of the highest in the world.[3] The recommendation for the classification, diagnosis, and screening of diabetes announced by the American Diabetes Association (ADA) in 1997, has changed the epidemiology of DM.[4]

Patients with diabetes are at a higher risk of prolonged complications. Compliance with various aspects of the ADA management recommendations has been shown to reduce many of these long-term complications. It is reported that integration of diabetes care management into long-term care facilities is necessary and requires a multidisciplinary team.[5] Due to the rapid increase in the incidence of DM in KSA, it is important to evaluate the screening patterns of diabetes associated health care problems in Primary Care Clinics (PCCs). The present study was to evaluate the ADA guidelines achieving targets in patients with diabetes attending PCC.

Methods

A retrospective study of medical records and laboratory system was conducted between November 2011 and May 2012. The study received ethical approval from the Ethical Committee, College of Medicine, King Saud University (KSU). In total, 200 diabetic patients from the database of PCCs in King

Khaled University Hospitals (KKUH) were randomly selected. The inclusion criteria were patients visiting PCC both male and female over 18 years of age with diabetes for more than 3 years and having at least 2 years of follow-up in KKUH. The exclusion criteria were patients with gestational diabetes and secondary diabetes related to genetic defects of beta-cell function and insulin resistance. Damage to exocrine pancreas and drug or chemical-induced diabetes patients also excluded from the study. The participants were selected randomly from the recent database of the PCCs. Based on the ADA standards of care for diabetes 2010,[6] a checklist was constructed to evaluate the standard care given to patients in PCC at KKUH, concentrating on the medical history, physical examination, current treatment plans, laboratory checkups, and referrals to other clinics. Data were analyzed using SPSS and summarized to compute frequencies, means, and percentages.

Results

The medical records of 200 patients that met the inclusion criteria were included in the analysis. Table 1 shows the PCC achieving adherence to the ADA standards. The ADA standards showed wide extent of variation in different elements of ADA. The result showed that only 6.0% of characteristics of onset of diabetes element was not documented appropriately in the medical records. Similarly, other elements such as patient education about using data (16.5%), diabetic ketoacidosis frequency, severity and cause (1.5%), psychosocial problems (3.5%), dental disease (1.0%), thyroid palpation (2.0%), and skin examination (4.5%) were not appropriately documented in the medical records. However, other indicators such as medication treatment (100%), weight history (92.0%), result of glucose monitor (90.0%), and blood pressure determination (100%) showed documented adherence to ADA standards. The overall of elements compliance with the ADA treatment guidelines are medical history (44.9%), physical examination (59.6%), laboratory evaluation (36.3%), and referrals (19.3%) [Figure 1]. This indicates that the diabetes care management in the clinic do not fully comply with the ADA standard.

Discussions

During the past two decades, the prevalence of diabetes was getting higher in Saudi Arabia, and this tendency is inclined throughout the world. The present study was to determine the rate of compliance in primary clinics with the ADA standards of care for diabetes concerning medical history, physical examination, laboratory evaluation, and referrals. The four elements were evaluated by assessing medical records of 200 patients in PCCs. An ADA standards checklists were developed to provide information about the components of diabetes care and for general evaluation of care given to diabetic patients.[6]

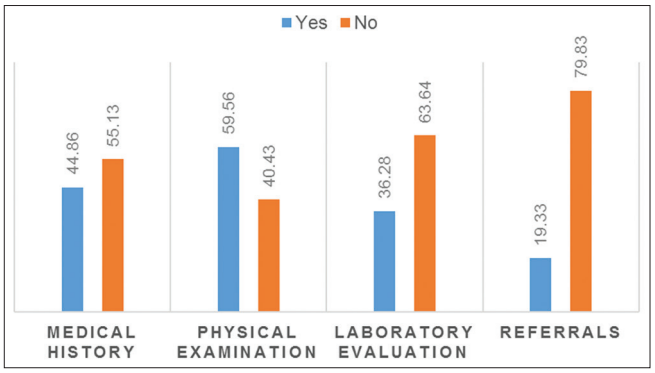

Figure 1: Overall mean percentage of American Diabetes Association standards

The current study showed that nearly half of the patients were not managed according to ADA standards of medical care. Similar results in local studies were reported indicating most of the ADA guidelines were not achieved in diabetic patients.[7,8] In the elements of medical history, such as age of onset, eating patterns, weight history, medication treatment, meal planning, physical activity plan, and glucose monitor were reported to be documented more than 50% which are higher rate of compliance with ADA standards care. This indicates that the subelements are more important for evaluating the condition of diabetes and its severity. Similarly, medication treatment was 100% documented in all the patients in the current study. In the medication, almost all the patients were on medication either oral hypoglycemic agents or insulin or both, which shows that complex treatment regimen was essential, in spite of the high level of microvascular and macrovascular complications. In a similar study, use of medications by diabetic patients according to ADA standards adherence was 51.4% for aspirin and 54.7% for both statin and ACE inhibitor.[7] In another study, approximately 70.0% were documented for ACEI or ARB or both compliances to ADA.[9] The current study showed that in 71.0% of the cases of previous treatment regimens and response to therapy was documented in the records. It is essential to record past medical treatment and diagnosis to identify appropriate diseases causing illness according to patients presenting complaints. In the present study, only 14.5% of patients had an awareness of hypoglycemia. This outcome could be due to poor care or poor patient compliance. Hypoglycemic unawareness is considered as a major risk factor. In a previous study shown that with scrupulous avoidance of hypoglycemia, subjects with hypoglycemic unawareness can regain awareness within 3 weeks.[10] Therefore, ADA recommends raising glycemic targets for several weeks to restore awareness.[11]

In the ADA standards assessment of physical examination, the elements such as height, weight, BMI, and blood pressure demonstrated above 95.0% compliance to the ADA standards of diabetics care. In a similar study, 92.9% for blood pressure and BMI means standard as 31.4 ± 4.4 were documented adherence to ADA.[8] In the current study, only 40% of the

Table 1: ADA 2010 Standards of Medical Care guidelines

ADA standards assessment	Number and percentage of primary clinic compliance to ADA standards assessments	
	Yes[α] *n* (%)	No[β] *n* (%)
Medical history		
Age of onset	128 (64.0)	72 (36.0)
Characteristics of onset of diabetes	12 (6.0)	188 (94.0)
Eating patterns, physical activity habits, and nutritional status	117 (58.5)	83 (41.5)
Weight history	184 (92.0)	16 (0.8)
Growth development in children and adolescents	1 (0.5)	199 (99.5)
Diabetes education history		
Medication treatment	200 (100.0)	0 (0)
Meal planning	156 (78.0)	44 (22.0)
Physical activity plan	143 (71.5)	57 (28.5)
Glucose monitor	182 (91.0)	18 (0.9)
Result of glucose monitor	180 (90.0)	20 (10.0)
Patient education about using data	33 (16.5)	167 (83.5)
Review of previous treatment regimens and response to therapy (A1C records) current treatment of diabetes, including medications, meal plan, physical activity patterns and results of glucose monitoring and patients use of data	142 (71.0)	58 (29.0)
DKA frequency, severity, and cause	3 (1.5)	197 (98.5)
Hypoglycemic episodes		
Hypoglycemia awareness	29 (14.5)	171 (85.5)
Any severe hypoglycemia: Frequency and cause	17 (8.5)	183 (91.5)
History of diabetes-related complications		
Microvascular: Retinopathy, nephropathy, neuropathy (sensory, including history of foot lesions; autonomic, including sexual dysfunction and gastroparesis)	79 (39.5)	121 (60.5)
Macro vascular: CHD, cerebrovascular disease, PAD	90 (45.0)	110 (55.0)
Others		
Psychosocial problems	7 (3.5)	193 (96.5)
Dental disease	2 (1.0)	198 (99.0)
Physical examination		
Height	176 (88.0)	24 (12.0)
Weight	200 (100)	0 (0)
BMI	188 (94.0)	12 (0)
Blood pressure determination, including orthostatic measurements when indicated	200 (100)	0 (0)
Fundoscopic examination	80 (40)	120 (60.0)
Thyroid palpation	4 (2.0)	196 (98.0)
Skin examination (for acanthosis nigricans and insulin injection sites)	9 (4.5)	191 (95.5)
Comprehensive foot examination: Inspection, palpation of dorsalis pedis and posterior tibial pulses, Presence/absence of patellar and Achilles reflexes, determination of proprioception, vibration, and monofilament sensation	96 (48.0)	104 (52.0)
Laboratory evaluation		
A1C, if results not available within past 2-3 months	67 (33.5)	133 (66.5)
If not performed/available within past year	25 (12.5)	175 (87.5)
Fasting lipid profile, including total, LDL and HDL cholesterol, and triglycerides	135 (67.5)	65 (32.5)
Liver function tests	99 (49.5)	101 (50.5)
Test for urine albumin excretion with spot urine albumin/creatinine ration	35 (17.5)	164 (82.0)

(Contd...)

Table 1: (*Continued*)

ADA standards assessment	Number and percentage of primary clinic compliance to ADA standards assessments	
	Yes[α]	No[β]
	n (%)	*n* (%)
Serum creatinine and calculated GFR	120 (60.0)	80 (40.0)
TSH in Type 1 diabetes, dyslipidemia, or women over age 50 years	27 (13.5)	173 (86.5)
Referrals		
Annual dilated eye examination	126 (63.0)	74 (37.0)
Family planning for women of reproductive age	26 (13.0)	174 (87.0)
Registered dietitian for MNT	53 (26.5)	147 (73.5)
DSME	20 (10.0)	180 (90.0)
Dental examination	4 (2.0)	196 (98.0)
Mental health professional, if needed	13 (6.5)	187 (93.5)

α: Yes indicates the number of information available in the medical records, β: No indicates the number of information not available in the medical records, MNT: Medical nutrition therapy, DSME: Diabetes self-management education

fundoscopic examination was examined this examination is essential for routine screening of diabetes patients. It should help in early detection of retinopathy and help in timely process of treatment, thereby preventing vision loss. However, most of the diabetic clinics have not been efficiently implementing screening methods recommended by ADA diabetes care of clinical guidelines. It should be noted that only 2% of thyroid palpation were observed. These results could be due to poor documentation or because thyroid examination is related more to Type 1 DM. In diabetes patients, infection, nerve damage, and circulation problems are common occurring foot problems. In the present study, only 48.0% of foot examination were observed among diabetes patients. This percentage is low when compared to similar study, which reported 72% adherence to this standard.[8]

In the laboratory investigations of diabetes patients, the overall percentage of compliance to the ADA standards of care was as low as 36.3%. The lower percentage 33.2% was seen in the 3 months Hb1AC checkup and 99.0% were noted at every 6-month follow up. In comparison to similar laboratory investigation, reported 85.0% of the cases in rural areas are compliance to ADA standards of care.[12] In one local study, shown 94.4% of HbA1c were tested at least twice in a year.[7] Few studies reported lowest percentage of patients with a documented A1c within the last 3 months which were 21.8% and 57.0%, respectively,[9,13] HbA1c periodic checkup is very important in the management of diabetes and can improve in the treatment process. Evidence suggests that intensive blood glucose control reduces microvascular complications.[14] Notably, 67.5% of fasting lipid profiles such HDL and LDL cholesterol and triglycerides were documented in the current study. In comparison with other studies, fasting lipid profiles were higher (72.0%) and lower (42.0%) percentage of adherence to ADA reported, respectively.[7,13] However, the higher rate of compliance with lipid profile measurement 80.2% was reported in another literature.[8] In the present study, 50.0% of diabetic patients liver function test were documented. We believe this test was performed based on patients other commodities conditions as they often required multiple test. Urine albumin excretion tests were performed in 17.5% of the cases of admitted patients only. In similar studies, reported 25.1% and 34.9% of microalbuminuria indicator were adherence to ADA targets.[7,9] This study showed lowest percentage and this could be due to poor care in the PCCs. Serum creatinine showed 60.0% of patients achieved ADA standards of care, which is lower when compared to a similar study.[7] TSH tests were performed in only 13.5% of the patients, which are extremely low. This could be due to the test primarily performed mainly for Type 1 diabetic patient. The achievement of highest standards of diabetic care management in primary clinics is difficult unless providing healthcare professionals and patients with appropriate ADA standard of care education.

A referral is important and necessary in diabetic patients due to other comorbidities conditions to see any specialist other than primary care physician. In contrast, 19.3% of referrals were documented accordingly to ADA specifications. In the present study, 63.0% of patients were referred for eye examination. In audit of referral of diabetic patients showed 68.5% were referred to ophthalmology for retinopathy and conclude that referral rate and feedback from eye clinic was lower.[15] According to referral ADA standards, nearly 13.0% of family planning women's were referred and 26.5% referred to a dietitian for medical nutrition therapy. Diabetes self-management education (DSME) is a critical component of the clinical management of DM. Many studies reported that DSME is necessary to prevent or delay the complications of diabetes.[16,17] The current study showed that 90.0% of the patients had never received education about how to deal with their diabetes. Only 2.0% of patients were referred

to dental examination and 6.5% referred to mental health professionals. The lower percentage in referral assessment could be patient noncompliance to diabetes care management system. Forgetfulness is other possible factor that causes patient noncompliance to care management.

The study had few limitations. The sample size collected within the University Hospitals limits the generalization of the results and findings of the study. The other limitation is data not available of referral hospitals such as foot examination and ophthalmology cases in the medical records. Further investigation should be designed to evaluate the diabetic care management standards adherence in many healthcare providers, especially in rural areas primary care settings.

Conclusions

This study revealed inadequacy of diabetes care, and proper guidelines are not followed in the care for diabetic patients in the PCCs in comparison to the ADA standards of care. Healthcare providers should consider the implementation of clinical programs and clinical education designed to improve compliance with the ADA standard of care. Finally, the study emphasizes that the health professionals in the diabetic centers of PCCs should be trained to document appropriately clinical practice procedures according to ADA standard of care. Diabetes management standards are an essential element in the success of the management plan. Continues monitoring and self-review are recommended.

Acknowledgment

This project was supported by The National Science, Technology, and Innovation Plan (NSTIP) strategic technologies programs, number (11-MED 2121) in the Kingdom of Saudi Arabia. The authors also thank the staff of PCCs and medical records department for their great cooperation during the research study.

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