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ORIGINAL ARTICLE

Glycemic control in diabetic patients in King Khalid University Hospital (KKUH) – Riyadh – Saudi Arabia

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KEYWORDS

Diabetic patients;
Saudi Arabia;
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Abstract *Objectives:* To evaluate glycemic control of diabetic patients at the King Khalid University Hospital (KKUH) in Riyadh, Saudi Arabia.

Methods: A cross sectional study was conducted among diabetic patients attending KKUH, Riyadh. Patients were identified through the hospital pharmacy records, over a one year period (January–December, 2009). A total of 20,000 patients were identified, and 1520 patients were selected by a simple random method. Medical charts were reviewed, the data were collected in a specially designed data sheet: and entered in a computer, and finally analyzed using a SPSS program.

Results: About 90% of patients were older than 40 years old and 90% were overweight or obese. Fasting blood sugar was above 7.2 mmol/L in 60% of the patients and random blood sugar was more than 10 mmol/L in about 70% of patients. The overall glycemic control as evaluated by HBA1C was acceptable in about 40% of the patients. Cholesterol level was normal in more than 70% of patients while triglyceride was normal in 56% of patients. In about half of the patients systolic blood pressure was not controlled, while in 27% the diastolic blood pressure was above the target level.

Conclusion: The control of diabetes and its associated cardiovascular risk factors in this hospital – based survey, in Riyadh is far from optimal. Further studies are needed to find out the possible causes for this defective care of diabetic patients.

1. Introduction

Diabetes is a chronic illness with considerable morbidity and mortality (ADA, 2009; Beaton et al., 2004; Charpentier et al., 2003). It requires continuous medical care and patient self-education to prevent its acute and chronic complications (ADA, 2009). Cardiovascular disease, for example, is the major cause of morbidity and mortality among diabetic patients,

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accounting for about 70% of hospitalizations and 70–80% of deaths (Goldberg and Capuzzi, 2001; Wingard et al., 1995). Also, microalbuminuria is an established predictor of the later development of nephropathy in both IDDM and NIDDM (Gall et al., 1995; Mogensen, 1984; Mogensen and Christensen, 1984; Parving et al., 1982; Viberti et al., 1982). Other potentially modifiable risk factors that increase morbidity and mortality among diabetics include hypertension, smoking, poor glycemic control (Rossing et al., 1996) and dyslipidemia (ADA, 2009). Over the years, intensive therapy has proved its efficacy in preventing the development of retinopathy, nephropathy and neuropathy in patients with IDDM as well as delaying their progression (Diabetes control and complication trial Research group, 1993; Diabetes control and complication trial/epidemiology of diabetes interventions and complications research group, 2003; Melsinger et al., 2008; Rossing et al., 1996). However, the adequacy of glycemic control is suboptimal in most clinical settings. A report (Saydah and Fradkin, 2004) indicated that only 37% of adults with diabetes mellitus achieved a level of HBA1C of $<7\%$, only 36% had a blood pressure $<130/80$ mmHg and just 48% had a cholesterol level <200 mg/dL. Another study (Beaton et al., 2004) showed that only a small percentage of diabetics (37%) reached their respective goal for HBA1C, low density lipoprotein (LDL) (23%), and systolic blood pressure (41%) despite being tested for it.

The relationship between medical care and health status and outcomes in patients with type 2 diabetes has also been investigated. In the USA (Harris, 2000), it was found that the rates of health care access and utilization, screening for diabetes complication and treatment of hyperglycemia, hypertension and dyslipidemia are high; nonetheless, health status and outcomes are unsatisfactory. Almost half of U.S. adults with diabetes did not meet the recommended goals for diabetes care (Ali et al., 2013).

A recent study was conducted in Saudi Arabia in which only 27% of the study patients reached the target HBA1C of $<7\%$, 16% attained the target blood pressure of $<130/80$ and 65% had a lipid profile above the optimal level (Al-Elq, 2009). Another study in primary care clinics showed similar results as only 24% of the patients achieved a HBA1C level of $<7\%$ (AlFadda and Bin Abdulrahman, 2006). Therefore, the current study was conducted to evaluate glycemic control of diabetic patients at the King Khalid University Hospital (KKUH) in Riyadh, Saudi Arabia. KKUH is a general hospital with an open access for all Saudis as well as non-Saudis King Saud University employers.

2. Methods

A cross sectional study was conducted among diabetic patients attending the King Khalid University Hospital, Riyadh. Patients were identified through the hospital pharmacy records of prescription of insulin and oral hypoglycemic agents (OHA) over a one year period (January–December, 2009) whether they are followed up in primary health care clinics (PHCC) or specialty clinics. Criteria for inclusion were adult patients >18 years of age of both sexes, both Saudi and non-Saudi, on diabetic treatment. A total of 20,000 patients were identified, and 1520 patients were selected by simple random method.

Medical charts were reviewed and the following data were collected in a specially designed data sheet: age, sex, nationality, body mass index (BMI), blood sugar level (fasting and postprandial), HBA1C, blood pressure level, lipid profile, type of drug treatment and presence of complication.

The goals for adequate glycemic control in this study were specified by 2009 American Diabetes Association (ADA) guidelines as follows: HbA1C $<7\%$, low density lipoprotein (LDL) <2.6 mmol/L, high density lipoprotein (HDL) >1 mmol/L, triglyceride <1.7 mmol/L, systolic blood pressure <130 mmHg, diastolic blood pressure <80 mmHg, fasting blood sugar (FBS) 3.9–7.2 mmol/L and postprandial blood sugar <10 mmol/L.

Data were entered in a computer, and analyzed using the SPSS program and were presented as percentages. The chi square test was used for evaluating the relationship between variables; a p value less than 0.05 was considered significant.

3. Results

Characteristics of the diabetic patients are shown in Table 1. About 90% of patients were older than 40 years old and 90% were overweight or obese. Most patients were followed in primary care clinics (93%). Although 1520 medical charts were reviewed, some data were missing; for example BMI was available for only 1377 patients.

Fasting blood sugar was more than 7.2 mmol/L in 60% of patients and about 70% had random blood sugar more than 10 mmol/L. The overall glycemic control was evaluated

Table 1 Characteristics of the diabetic patients ($n = 1520$).

	No.	%
Sex ($n = 1518$)		
Male	694	45.7
Female	824	54.3
Age (*years*) ($n = 1516$)		
<40	124	8.2
40 to <60	773	51
60+	619	40.8
Nationality ($n = 1513$)		
Saudi	1398	92.4
Non-Saudi	115	7.6
BMI ($n = 1377$)		
<18.5	4	0.3
18.5–24.9	148	10.7
25–29.9	443	32.2
30–39.9	648	47.1
40+	134	9.4
PHCC follow-up	1413	92.9
Specialty clinic	107	7.1
FBS (*mmol/L*) ($n = 1493$)		
<7.2	595	39.9
$\geqslant 7.2$	898	60.1
RBS (*mmol/L*) ($n = 1445$)		
<10	438	30.3
$\geqslant 10$	1007	69.7

PHCC: primary health care clinic; BMI: body mass index; FBS: fasting blood sugar; RBS: random blood sugar.