



Original Article

A prospective study assessing the etiology of Diabetes mellitus among Jordanian patients



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ABSTRACT

Background: Diabetes mellitus has considerable public health implications for communities, individuals, and health services. Increasing prevalence of diabetes all over the world intensifies the demand for health care services, and particularly for inpatient care.

Aim: The present study aims to assess the current prevalence of diabetes and its etiology among hospitalized Jordanian adults.

Methods: This was a cross sectional study conducted at Specialist Hospital (SH) in the Jordanian capital of Amman, with data collection taking place between June and August 2015, and data was extracted manually from medical records. Patients were divided into three groups: (a) those with a medical history of diabetes, (b) those with unrecognized diabetes or new hyperglycemia, and (c) those with no diabetes. Data management and analysis were conducted using the SPSS program. Means \pm SD were used to present all continuous variables, as well as the numbers and percentages for categorical variables, and we used analysis of variance (ANOVA) to compare between means. For differences between categorical variables, we used (χ^2). A *P*-value of less than 0.05 was considered significant.

Results: A total of 392 patients (266 female, 126 male) were admitted during the 10-week study period. Of these, 204 fell into category (a), 45 into category (b), and 143 into category (c). Diabetes was the principal diagnosis in 52% of the hospitalizations. Patients who had diabetes or new hyperglycemia were considerably older than non-diabetic patients. The five most common reasons for hospitalization were congestive heart failure (25.0%), pneumonia (22.5%), DKA (22.0%), coronary atherosclerosis (16.20%), and septicemia (14.20%).

Conclusion: The common etiologies for hospitalization were congestive heart failure, pneumonia, DKA, coronary atherosclerosis, and septicemia. Keeping in view the results of this study it is recommend that regular screening should be performed for diabetic patients, as this will increase the chances that many diabetes complications will be prevented, particularly for elderly subjects.

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1. Introduction

Diabetes is a chronic disease caused by insulin insufficiency or its lack of action, leading to an increased glucose concentration in the blood [1]. Globally the disease burden of type 1 and type 2 diabetes mellitus is increasing at an alarming rate, even reaching epidemic status in developed and developing countries [2,3]. In the United States, half of all direct medical diabetes expenditure is caused by diabetes-related hospitalization [4]. According to the World Health Organization's recent update, diabetes, hypertension, and obesity are one of the top five contributing risk factors for cardiovascular deaths in the world [1]. It is estimated that, in 2010, 6.4% of adults

would have diabetes mellitus affecting 285 million in the world and it will increase to 7.7% by 2030, affecting 439 million adults. Of special note is that there will be a 67% increase in the prevalence of diabetes in developing countries from 2010 to 2030 [2,3].

Addressing the situation in Jordan's prevalence of diabetes is the highest in the region and one of the highest in the world [5]. In 2014, the Jordanian Society for the Care of Diabetes JSCD's scientific and education committee reported that one in three Jordanians aged 25 and over suffers from diabetes with an estimated direct and indirect costs of diabetes are more than US\$1 billion annually [6]. It has been estimated that by 2050, 3.4 million Jordanians will suffer from diabetes mellitus [6]. A cross-sectional study by Ajlouni et al. [5], which included a random sample of 1121 Jordanians aged 25 and over, found that the prevalence of diabetes is high and is increasing. More than half of the diabetes patients in that study had unsatisfactory glucose control.

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Diabetes mellitus has implications for individuals and communities, as well as for health and human services [7]. Health planners are concerned by the increased prevalence of diabetes and the significant impact that it has on the use of health care services, especially hospitals. Policy and practice interventions to improve diabetes care have recognized and supported the importance of early detection and management of diabetes in order to prevent the progression of the disease, increased use of health services, and poor health outcomes. Many of the hospitalizations caused by diabetes are preventable [8]. The quality of primary care for diabetes has improved, as shown by a decrease in preventable diabetes-related hospitalizations [9].

Studies of hospital populations or practice-based populations have found that the hospital admission rates of people with diabetes are 2–6 times higher than for those without diabetes, and also that the hospital stays of diabetes patients are much longer than those of people without diabetes [10,11]. Diabetes was either the principal or secondary diagnosis in 40.6% of hospitalizations in Kuwait [8]. However, the associated risks and hospitalization rates could be over-estimated, given that studies of hospital-based populations could include people with severe diabetes, including diabetes complications and associated morbidity. The Jordanian government has recognized that diabetes has caused a heavy financial and social burden on the country, so it has made a number of efforts to combat the problem. It is necessary to identify the risk of hospitalization and the impact that diabetes has on a general population. Diabetes is also a major risk factor for stroke, chronic renal failure, and acute myocardial infarction [7,9]. Despite this, there is scant data available on hospitalizations related to diabetes [6]. We conducted the present study in order to identify the prevalence of hospitalization among diabetic patients in Jordan and the associated factors. Therefore, it is important for public health that those people with higher hospitalization rates are characterized, in order to target prevention efforts more effectively. The present study aims to assess the current prevalence of diabetes and its etiology among hospitalized Jordanian adults.

2. Methods

This was a cross sectional study conducted at Specialist Hospital (SH) in the Jordanian capital of Amman. All the patients with meeting the inclusion criteria with clinical medical conditions were considered for their potential inclusion in the study. The study duration was from any patient whose glucose was not

measured on admission, patients who had no information about the duration of diabetes, patients admitted for surgical procedures, and patients for whom medical records were not accessible were excluded from the study. A standardized data collection form was utilized to collect the data for this study. Common information gathered were demographic information (including age, gender, history of smoking), as well as information about the hospital stay duration, the reason for admission, and fasting or random blood glucose. In addition, patients' history of coronary heart disease, dyslipidemia, cerebrovascular disease, and hypertension were also collected. Patients were divided into the following three groups: (a) those with a medical history of diabetes, (b) those with unrecognized diabetes or new hyperglycemia, and (c) those with no diabetes. The reason to divide the population in to three cohorts was to see the difference in terms of etiology and diabetic control. Prior to data collection, permission for collecting data and ethical approval (Ref: 11014) was obtained from the Clinical Research Center (CRC) at the S.H hospital to enable the medical records of patients to be accessed. In addition formal written consent was also taken from the patient for their potential inclusion in the study. Data collection was totally anonymous and it was ensured that any information that discloses patient identity was avoided.

Entire data was codes in to relevant variable types, and statistical analysis was conducted using SPSS (version 18, SPSS, Inc, Chicago, IL). Means \pm SD were used to present all continuous variables, as well as the numbers and percentages for categorical variables, and we used analysis of variance (ANOVA) to compare between means. For differences between categorical variables, we used (χ^2). A *P*-value of less than 0.05 was considered significant.

3. Results

Upon implementation of study protocol, (*n* = 392) patients met the eligibility criteria. Of whom 204 (52.0%) of the patients were diabetic with either the principal reason for hospitalization or a coexisting condition. New hyperglycemia accounted for 11.5% of the patients, while 143 (36.5%) were non diabetic. Nine patients were excluded from the study because they were newly diagnosed with type 1 diabetes and were admitted to hospital. Demographic information of the patients is listed in details in the Table 1.

Overall, it is seen that the majority of the hospitalized patients were female 266 (67.9%), and the proportion of hospitalizations increased with age—over half of the patients in the sample (56%) were aged 50 and over. Overall no significant differences were

Table 1
Characteristics of hospitalized patients.

Variable	Total <i>n</i> = 392 (%)	Diabetes history <i>n</i> = 204 (%)	New hyperglycemia <i>n</i> = 45 (%)	No diabetes <i>n</i> = 143 (%)	<i>P</i> value
Gender					
Female	266 (67.9)	132 (64.7)	30 (66.7)	58 (40.6)	0.01 ^a
Male	126 (32.1)	72 (35.3)	15 (33.3)	85 (59.4)	
Age groups					
≤29	31 (7.9)	2 (1.0)	1 (2.2)	24 (16.8)	0.001 ^b
30–39	56 (14.3)	18 (8.8)	7 (15.6)	26 (18.2)	
40–49	83 (21.2)	41 (20.1)	13 (28.9)	29 (20.3)	
50–59	103 (26.3)	64 (31.4)	8 (17.8)	33 (23.1)	
≥60	119 (30.3)	79 (38.7)	16 (35.6)	31 (21.7)	
Smoker	219 (55.8)	126 (61.8)	24 (53.3)	69 (48.3)	0.073 ^a
Non-smoker	173 (44.2)	78 (38.2)	21 (46.7)	74 (51.7)	
Pre-existing history:					
Bronchial asthma	41 (10.5)	21	8	14	0.013 ^a
Cerebrovascular disease	62 (15.8)	39	3	20	0.010 ^a
Hyperlipidemia	126 (32.1)	86	7	33	0.001 ^a
Coronary heart disease	163 (41.6)	119	5	39	0.001 ^a

(a) chi square; (b) One way Anova, *p*-values less than 0.05 was statistically significant.

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