Scholars Journal of Applied Medical Sciences
Abbreviated Key Title: Sch J App Med Sci
ISSN 2347-954X (Print) | ISSN 2320-6691 (Online)
Journal homepage: https://saspublishers.com

OPEN ACCESS

Medicine

Association of Comorbidities in Diabetic Patient and Their Treatment Approach

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DOI: 10.36347/sjams.2021.v09i02.023 | **Received:** 08.01.2021 | **Accepted:** 12.02.2021 | **Published:** 27.02.2021

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Abstract **Original Research Article**

Diabetes is a metabolic disorder characterize by increase blood glucose level. Type 2 diabetes occurs most often in middle-aged and older people is the most common type of diabetes. Our present study was to assess the various comorbid conditions associated with diabetes and their treatment approach in Qatar diabetes patients visited to primary health care centers over the year May 2019- Apr 2020. Three hundred Seventy Four (374), patients with type 2 diabetes were enrolled in this study during routine visits to the Primary health care corporation in Qatar. Most number of patients was found females compared to males. In our study it was also found that most the patients have multiple comorbidities and main are Obesity, Hypertension, Hyperlipidemia, Neuropathy, Nephropathy, Coronary Artery Disease and Retinopathy. The main reason behind the problem is unhealthy diet. Atorvastatin, Losartan, Acetaminophen, Aspirin and their combinations are highly found in prescriptions. In conclusion, it can say that it need to concern about various comorbid complications with diabetes. Not only with medication, has it required to make patient need to educate for food habits, exercise and other way to prevent diabetes.

Keywords: Type 2 diabetes, Qatar, comorbid conditions.

INTRODUCTION

Diabetes is a metabolic disorder characterize by increase blood glucose level. Insulin, a hormone released by pancreas helps to uptake glucose from blood into cells and use for energy. If pancreas is unable to produce enough insulin or body unable to use insulin cause continuous rise in blood glucose level in blood. Type 1 diabetes, in which body does not make insulin and Type 2 diabetes body can't utilizes insulin. Type 2 diabetes occurs most often in middle-aged and older people is the most common type of diabetes.

The prevalence of diabetes globally was estimated to be 2.8% in 2000 and 4.4% in 2030. The total number of people with diabetes is projected to rise from 171 million in 2000 to 366 million in 2030 [1]. Another report estimates the global prevalence of diabetes to be 10.2% (578 million) by 2030 and 10.9% (700 million) by 2045 [2]. Moreover, the prevalence of diabetes in higher in urban (10.8%) than rural (7.2%) areas, higher in high-income (10.4%) than low-income countries (4.0%) [2].

Saudi Arabia is a high income country with high urban population (84.3% in 2020) with annual growth rate 1.05% [3] and having That's why there is an increase burden of diabetes in Saudi Arabia due to various factors, including a rising obesity rate and an aging population [4]. Whereas, Qatar is having 99.2 % urban population [5]. According to WHO, the prevalence of diabetes mellitus among population of Qatar is approximately 17% and is in 2020, it contributes 7% of the total disease burden, and 10% of the mortality in Qatar [6].

Diabetes is a chronic disorder and due to long term rise of blood glucose level make various metabolic problems and related comorbid conditions. The most common comorbid conditions are in general hypertension, obesity, hyperlipidemia, renal disease, liver disease, Obstructive Sleep Apnea, anxiety etc.

Our present study was to assess the various comorbid conditions associated with diabetes and their

treatment approach in Qatar diabetes patients visited to primary health care centers over the year May 2019-Apr 2020.

Aim and Objectives of the study

The main aim of this study is to know the co-morbid conditions in type-2 diabetes patients in Qatar with following objectives.

- To identify co-morbid conditions in type-2 diabetes patients.
- To identify commonly used or prescribed medications to manage complications.

METHODOLOGY

Study type

Prospective cross-sectional study of patients from Qatar with type 2 diabetes

Data Source

The data were collected from patients profiles visited in Primary health care Corporation in Qatar having diabetes. The information was taken from the reports on diagnosis, referrals, tests and therapy records. Generals information were collected from patients counseling, patients history and treatment protocols. The presence of comorbid complications was confirmed by a qualified physician.

Study sample

Three hundred Seventy Four (374), patients with type 2 diabetes were enrolled in this study during routine visits to the Primary health care corporation in Qatar from May 2019 to April 2020.

Inclusion criteria

- Patients who have been diagnosed with type 2 diabetes both Genders.
- Patients from born Qatar national or staying in Qatar diagnosed with type 2 diabetes mellitus
- Patients who able to give consent
- Patients above 18 years of age at time of enrollment

Exclusion criteria

- Patients who are pregnant
- Patients who are below 18 years
- Patients who are not willing to give consent

Complications study

Following comorbid conditions were studied based on their clinical data.

- Obesity was calculated based on BMI if BMI ≥ 25 as taken overweight.
- Hypertension was taken if systolic blood pressure >130 mm Hg, diastolic blood pressure >80 mm Hg, or taking antihypertensive medications.
- Dyslipidemia was diagnosed as a total cholesterol >6.2 mmol/L, low-density lipoprotein (LDL)-cholesterol >3.3 mmol/L, and or triglycerides >2.2 mmol/L.
- Cardiovascular disease (CVD) was confirmed by medical records and verified by the consulting physician.
- Peripheral neuropathy was determined according to presence of (1) foot ulcers, (2) loss of sensation/numbness/burning/tingling in the feet (3) loss of toe, foot or leg due to diabetes, (4) claudication, or (5) peripheral vascular disease as determined by ultrasound [7].
- Diagnosis of Kidney disease (Nephropathy) was set by a urine albumin level >30 µg/min for microalbuminuria, and >200 µg/min for macroalbuminuria, or estimated glomerular filtration rate (eGFR) >60 mL/min/1.73 m^2
- Diagnosis of retinopathy was defined as either white or red lesions (non-proliferative or proliferative retinopathy) or both present in the retina according to WHO criteria [8].

Treatment Approach

Drugs used for the treatment of diabetes and other complications like glucose lowering drugs, lipid lowering drugs, and blood pressure lowering drugs were and other drugs were assed.

Statistical analyses

Results were expressed in percentage and graphs were plotted using Microsoft Excel 2010.

Ethical considerations

Permission was taken from each patient and concern physicians who agreed to take part in this study and as it is a non-invasion study where simple observations were taken.

RESULT

Gender wise distribution of patients

During the study period in one year from May 2019 to April 2020 all the patients were reviewed among them total 374 patients were enrolled in the study. Most number of patients was found females compared to males. The results are given in Table-1.

Table-1: Gender wise distribution of patients

Gender distribution	Number of patients	Percentage (%)
Males	156	41.71
Females	218	58.29
Total (n)	374	100

Age wise distribution of patients

More number of patients was found in older groups. Highest numbers of patients are found in the age groups in between 50 to 70 years. The details results are given in Table-2.

Table-2: Age wise distribution of patients

Age group (years)	Total no of patients	Males	Females	Males (%)	Females (%)
18-29	2	2	0	0.53	0.00
30-39	12	7	5	1.87	1.33
40-49	77	30	47	8.02	12.56
50-59	123	56	77	14.97	20.59
60-69	137	51	76	13.63	20.32
>70	23	10	13	2.67	3.47

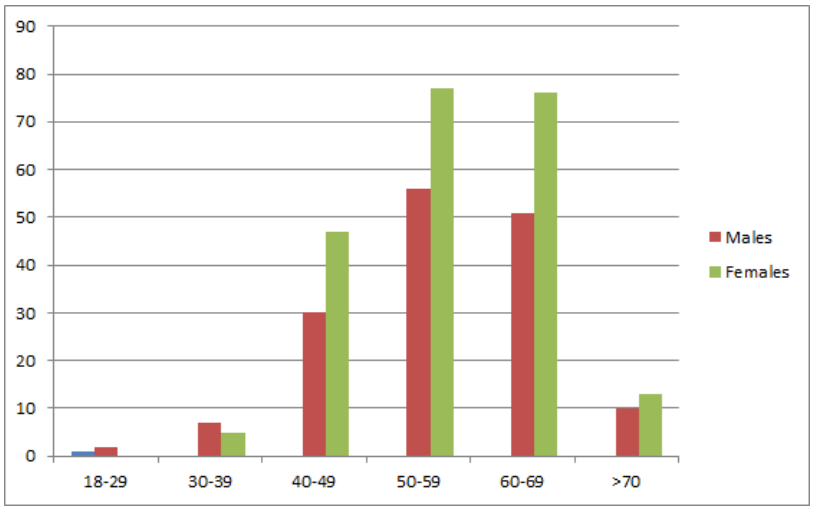

Fig-1: Age wise distribution of patients

Diabetic patients with comorbid conditions

Percentage of diabetic patients with co-morbid conditions were presented in Table-3. Most of the patients have multiple comorbid conditions.

Table-3: Diabetic patients with co-morbid conditions

Categories of comorbid conditions	No of patients	Percentage (%)
No complications	36	9.62
Single Complications	67	17.91
Double Complications	108	28.87
Three Complications	89	23.79
More Than Three Complications	74	19.78
Type of comorbid conditions		
Obesity	136	36.36
Hypertension	115	30.74
Hyperlipidemia	102	27.27
Neuropathy	67	17.91
Nephropathy	77	20.58
Coronary Artery Disease	45	12.03
Retinopathy	34	9.09
Others	13	3.47

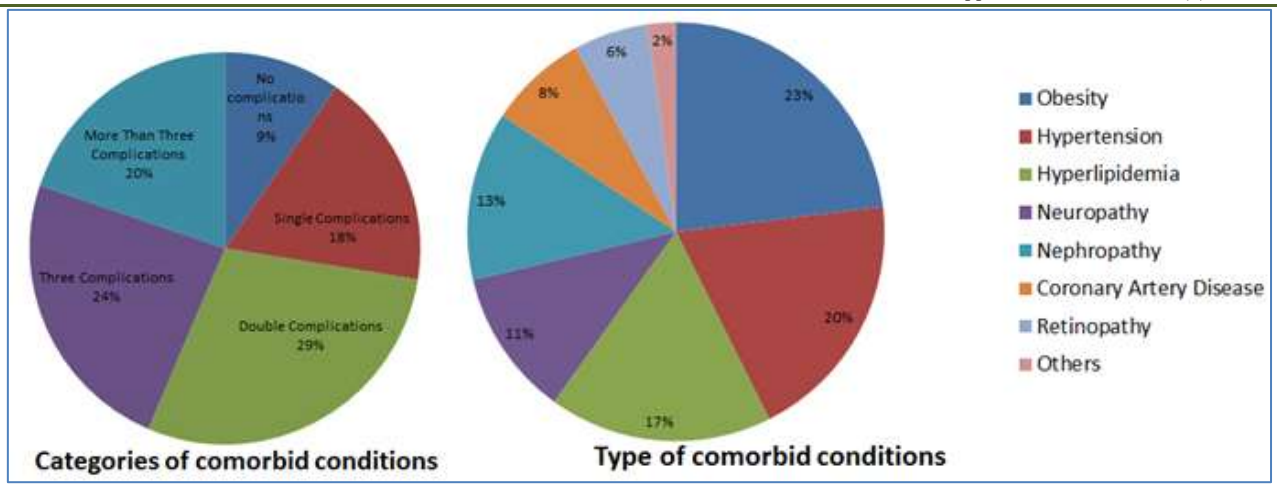

Fig-2: Diabetic patients with co-morbid conditions

Drug therapy of Diabetes patients for Co-morbid Conditions

The details drugs found to be used for diabetes patients for prophylaxis and treatment of various co-morbid conditions are given in table-4.

Table-4: Drug therapy of Diabetes patients for Co-morbid Conditions

Drugs	Co-Morbid Conditions	Percentage (%)
Atorvastatin	Hyperlipidemia	67.05
Aspirin+Atorvastatin	Coronary Artery Disease	20.23
Acetaminophen	*Neuropathy*	45.06
Acyclopram+Clonazepam	*Neuropathy*	2.93
Amitriptyline	*Neuropathy*	7.7
Amlodipine	hypertension	6.57
Aspirin	Coronary Artery Disease	15.83
Aspirin+Clopidogrel	Coronary Artery Disease	8.5
Atorvastatin+Fenofibrate	Hyperlipidemia	6.37
Clonazepam	*Neuropathy*	11.46
Clopidogrel	Coronary Artery Disease	9.67
Enalapril	hypertension	8.63
Losartan	Hypertension, Nephropathy	77.35
Metaprolol	hypertension	6.67
Olmesartan+hydrochlorthiazide	hypertension	30.32
Pregabalin	*Neuropathy*	12.44
Ramipril	Hypertension, Nephropathy	4.53
Ramipril	Nephropathy	18.75
Rosuvastatin	Hyperlipidemia	21.21
Rosuvastatin+Fenofibrate	Hyperlipidemia	5.68
Telmisartan	hypertension	17.66
Telmisartan+hydrochlorthiazide	hypertension	5.67
Torsemide	Nephropathy	6.04
β-histine	*Neuropathy*	1.44

DISCUSSION

Type 2 diabetes is the most common type of diabetes which is 90 to 95% of the diabetic population worldwide [9]. The deficiency of the insulin actions in type 2 diabetes is main reasons which cause macrovascular and microvascular complication and other comorbidities [10]. According to Alsulaiman *et al*. blood glucose control is an essential to prevent the chronic metabolic complications such as hyperlipidemia, cardiovascular and kidney disease [11]. In our study, we have found that females have more diabetics cases reported than males. Most the patients are of the age group of in between 50-70 years. This may be more sedentary life style in Qatari women than men as it was reported by various studies that sedentary lifestyle is a risk factor for obesity and type 2 diabetes [12].

In our study it was also found that most the patients have multiple comorbidities and main are Obesity, Hypertension, Hyperlipidemia, Neuropathy, Nephropathy, Coronary Artery Disease and Retinopathy. The main reason behind the problem is unhealthy diet. It was observed diabetic patients were unhealthy due to high-level consumption of fats, cholesterol, sodium, and free sugar and lack of physical activities. The patients used to take medicines but they are found to neglect the life style habits. Another reason may be lack of knowledge about dietary management system. In our study it was found that most the patients used to take medications for co-morbid conditions for management. Atorvastatin, Losartan, Acetaminophen, Aspirin and their combinations are highly found in prescriptions.

CONCLUSION

In conclusion, it can say that it need to concern about various comorbid complications with diabetes. Not only with medication, has it required to make patient need to educate for food habits, exercise and other way to prevent diabetes.

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