

Original Research Article

Prevalence of complications of diabetes among patients with diabetes mellitus attending a tertiary care centre in Tamil Nadu

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Received: 19 February 2019

Revised: 10 March 2019

Accepted: 11 March 2019

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ABSTRACT

Background: Diabetes will be the 7th leading cause of death by the year 2030 as per the World Health Organization. In adults the prevalence of diabetes globally has risen from 4.7% in 1980 to 8.5% in 2014. Level of awareness depends on socioeconomic class, literacy of the patients, training received by them, source of information on diabetes. Knowledge, attitude, and practices about diabetes mellitus and its complications are important to reduce the prevalence and morbidity associated with diabetes mellitus and its complications.

Methods: The cross sectional study was conducted among 201 patients with diabetes visiting. Outpatient department of Sree Mookambika Institute of Medical Sciences, Kulasekharam, Tamil Nadu during a period from January 2017 to June 2018 using a pre-tested, semi structured questionnaire.

Results: Among 201 patients with diabetes included in the study, 69.0% had one or more of the complications of diabetes. Factors significantly associated with high rate of complications were the female gender ($p < 0.001$), obesity, rural residential area, high blood pressure ($p < 0.001$), familial history of diabetes ($p < 0.001$), duration of the disease above 5 years ($p < 0.001$) and high HbA1c level ($p < 0.001$).

Conclusions: This study revealed that type 2 diabetic patients followed up in the OPD of SMIMS showed a high rate of chronic complications which often occurred in age more than 50 years. Socio-demographic and biological factors were significantly associated with the high rate of complications of diabetes.

Keywords: Diabetes mellitus, Complications, Tertiary care center

INTRODUCTION

Diabetes will be the 7th leading cause of death by the year 2030 as per the World Health Organisation.¹ In adults the prevalence of diabetes globally has risen from 4.7% in 1980 to 8.5% in 2014.² Level of awareness can be major social determinant in the progression of disease leading to increased morbidity and mortality. Studies have reported that level of awareness depends on socioeconomic class, literacy of the patients, training received by them, source of information on diabetes.

Knowledge, attitude, and practices about diabetes mellitus and its complications are important to reduce the prevalence and morbidity associated with diabetes and its complications.³

A systematic review concluded that diabetes patients might perceive better self-efficacy in disease management with self-monitoring of blood glucose, and would have a better understanding about the possible factors that affect diabetes management thereby reducing the complications of diabetes.³

Objectives

Primary objective was to find out the prevalence of complications of diabetes mellitus among patients with type 2 diabetes mellitus.

Secondary objective was to assess the factors associated with complications of diabetes mellitus among the study participants.

METHODS

Study design: Cross sectional study.

Study area: Outpatient Department of Sree Mookambika Institute of Medical Sciences, Kulasekharam, Tamil Nadu.

Study period: January 2017 to June 2018.

Sampling method: Convenient sampling method.

Sample size calculation: Using prevalence 32.8% as per the study by Maniarasu et al.¹⁴

Sample size: $n = Z_{\alpha}^2 pq / L^2$

$Z_{\alpha} = 1.94$, so $Z_{\alpha}^2 = 3.84$ So $p = 32.8\%$, $q = 100 - p = 100 - 32.8 = 67.2$

With relative precision 20% of p, $L = 20\%$ of $P = 20\%$ of $32.8 = 6.56$

$n = [(1.96)^2 * 67.2 * 32.8] / (6.56)^2 = 197$

Assuming a 10% non-response rate, sample size = 217.

Study participants

All patients diagnosed to be having type 2 diabetes mellitus and getting treatment for more than 6 months and attending the Outpatient Department of Sree Mookambika Institute of Medical Sciences, Kulasekharam during the study period.

Inclusion criteria

All patients diagnosed to be having type 2 diabetes mellitus and getting treatment for more than 6 months and attending the outpatient department of Sree Mookambika Institute of Medical Sciences, Kulasekharam.

Exclusion criteria: People who are not willing to participate in the study.

Study approval

The study was approved by the institutional human ethical committee of Sree Mookambika Institute Of

Medical Sciences, Kulasekharam and written consent were obtained from patients.

Data collection tool

Pre tested, semi structured questionnaire. Data were collected on the socio demographic details, health profile. Health profile included and laboratory reports (FBS, PPBS, HbA1c) and medical history records in past 3 months.

Data collection

After getting informed consent from the participants, they were interviewed to obtain information on socio-demographic details and health profile and biochemical profile. Health profiles were obtained from past medical history records. Biochemical profile included fasting blood sugar (FBS), 2-hour post-prandial level and HbA1c value. Complications investigated were erectile dysfunction, nephropathy, macroangiopathy, retinopathy, peripheral neuropathy and ulcer foot.

Operational definitions

Diabetes: As per American diabetes association the criteria for diagnosing diabetes were (1) symptoms of diabetes plus casual plasma glucose concentration 200 mg/dL (11.1 mmol/L). Casual is defined as any time of day without regard to time since last meal. The classic symptoms of diabetes include polyuria, polydipsia, and unexplained weight loss or (2) FPG 126 mg/dl (7.0 mmol/L). Fasting is defined as no caloric intake for at least 8 hours or 3.2 hours postprandial glucose 200 mg/dl (11.1 mmol/L) during an OGTT. The test should be performed as described by WHO, using a glucose load containing the equivalent of 75 g anhydrous glucose dissolved in water.²

Statistical analysis

The results were presented as mean and standard deviation. Chi square was used to examine the relationship between socio-demographic factors and factors associated with diabetic complications. Data were entered in Microsoft Excel 2013 spreadsheet and analyzed using SPSS trial version 20.0.

RESULTS

A cross sectional study was done to find the prevalence of complications of diabetes mellitus and factors associated with it among patients with type 2 diabetes attending outpatient department of Sree Mookambika Institute of Medical Sciences, Kulasekharam from January 2017 to June 2018 using pretested semi structured questionnaire. Required sample size was calculated to be 217, 210 patients with type 2 diabetes responded making the response rate of 92.62% for the present study.

Among 201 patients included in this study comprised of 124 women (61.69%) and 87 men (43.28%). The mean age of patients was 56.22 ± 5.80 years. Out of these 201 Patients, 140 (69.65%) presented with at least one of the complications of diabetes.

Peripheral neuropathy was present in 69.2% of participants. 20.39% had nephropathy, 57.33% had retinopathy, 56.09% had macroangiopathy and 30.84% had foot ulcer. 83.90% of male participants with diabetes had erectile dysfunction. As it appears in Table 1, the more prevalent complication observed was neuropathy and three out of four type 2 diabetic men complained of erectile dysfunction.

Table 1: Prevalence of complications of diabetes mellitus among participants.

Type of main complications	Number (%)
Neuropathy	139 (69.2)
Nephropathy	41 (20.39)
Retinopathy	43 (57.33)
Macroangiopathy	23 (56.09)
Diabetic foot	62 (30.84)
Erectile dysfunction (males)	73(83.90)

Study of factors associated with chronic complications in diabetic patients is shown in Table 2 and Table 3.

Table 2: Association of diabetic complications with socio-demographic factors.

Socio-demographic factors	Category	Participants with diabetic complications		P value
		Number	Percentage	
Age (in years)	30-50 (n=159)	107	76.19	0.267
	≥ 51 (n=42)	32	67.29	
Sex	Male (n=77)	15	19.48	<0.001
	Female (n=124)	30	24.19	
Residential area	Rural (n=51)	88	57.95	<0.001
	Urban (n=150)	51	34	

Table 3: Association diabetic complications with clinical and biological factors.

Factors		Participants with diabetic complications		P value
		Number	Percentage	
Obesity	Obese (n=100)	78	78	<0.001
	Normal weight (n=101)	62	61.3	
Hypertension	Yes (n=73)	62	84.93	<0.001
	No (n=128)	78	60.93	
Family history of diabetes	No (n=103)	62	60.19	<0.001
	Yes (n=98)	78	79.59	
Diabetes duration (in years)	Less than 5 (n=98)	62	63.26	<0.001
	More than 5 (n=103)	78	75.72	
Glycated hemoglobin	Less than 7% (n=111)	62	55.85	<0.001
	More than 7% (n=90)	78	86.66	

As shown in Table 2, complication rate in patients with type 2 diabetes was significantly higher in women and those in Rural residential area.

As shown in Table 3, the high rate of complication was also significantly associated with hypertension, familial history of diabetes, duration of diabetes more than five years and the high plasma level of glycated haemoglobin and obesity.

DISCUSSION

In the present study among 201 diabetic patients, the prevalence rate of Diabetic complications was 69.0% and for Peripheral neuropathy was 69.23%, 83.90% for erectile dysfunction, 20.39% for nephropathy, 57.33% for retinopathy, 56.09% for macroangiopathy and 30.84% for foot ulcer.

The prevalence of diabetic complications rate of 69% revealed by this study is very high since other international studies conducted in other countries of the sub-Saharan Africa region have shown lower complication rates of 58% and 65%.^{4,5} But in a study conducted by Djrolo et al in Contonou showed a higher diabetic complication rate of 78%.⁶

As in this study the study population has not been randomly selected, this higher complication rate can be due to the fact that the center where the study has been conducted is a specialized tertiary care center for diabetes care and can concentrate diabetic patients with particular health problems.

Mean age of patients of 56.22 ± 5.80 years observed in our study is higher to what had been reported by Belkhadir et

al and 52 years reported by Touré in Mali but lower than 62 years reported in France.⁷⁻⁹

When specific complications are considered, we can notice that the rate of neuropathy observed in our study is higher than the rate of 45% reported by Ouerdane et al but less high than the rate of 80% observed by Fendi et al.^{10,11} Investigation of retinopathy revealed a rate of 57.33% which is higher than the rate of 47.5% reported by Khadraoui et al.¹²

In the 201 patients included in our study, only 43 (21.39%) were investigated for retinopathy. This confirms the observation of Rosenberg et al who reported in their study that only 35% of studied patients were referred for eye exam showing that screening guidelines for diabetic retinopathy are not often respected by physician.¹³

In this study, high diabetic complication rate was associated with several factors in which duration of diabetes and the female gender can be underlined. Factors classically associated with high rate of complications in type 2 diabetes such as the female gender, obesity, rural residential area, high blood pressure, familial history of diabetes, duration of the disease above five years and high HbA1c level have been evidenced in our study. No association was found between diabetic complication rate and age.

It can be noticed that patients without familial history of diabetes presented significantly higher rate of complications suggesting that those with familial history of diabetes are more prone to better care of their condition than the others.

CONCLUSION

This study has shown a high prevalence of long term complications in type 2 diabetic patients attending the OPD of Sree Mookambika Institute of Medical Sciences Kulasekharam. It was found that good control of the blood sugar level was associated with decreased prevalence of complications of diabetic mellitus. The duration of diabetic mellitus was also associated with presence of complications. These challenges may be overcome by early diagnosis and good control of diabetes mellitus.

Limitations of this study

- This study may not be generalized to the general diabetic population as this study was conducted only among the outpatients.
- The biochemical profile of the patients such as HbA1c, 2 hours post- prandial and fasting blood sugar values was incomplete for some patients.

Recommendation of the study

- Education programs for improvement in modification of life styles may be done by providing leaflets on prevention of complications of diabetes which include activities like aerobic exercise, gardening, mopping etc.
- Improvement in physical activity may be done by introducing unplanned exercise at work place or office reducing sedentary life.
- Promote cycling, walking and other forms of active transportation that are accessible and safe for all.
- Labour and workplace policies should encourage physical activity.
- Schools should have facilities and safe places for students to spend their free time actively.
- Quality physical education supports children to develop behavior patterns that will keep them physically active throughout their lives.
- Recreation facilities and sports provide opportunities for everyone to keep physically active.

The complications due to diabetic mellitus can be reduced or controlled to a considerably large extent enabling them to improve the quality of life.

Funding: No funding sources

Conflict of interest: None declared

Ethical approval: The study was approved by the Institutional Ethics Committee

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Cite this article as: Bruce MSP, Mallika MCV. Prevalence of complications of diabetes among patients with diabetes mellitus attending a tertiary care centre in Tamil Nadu. *Int J Community Med Public Health* 2019;6:1452-6.