

# Awareness of Complications in Diabetic Patients - Study in a Tertiary Care Centre in Kerala

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## ABSTRACT

### BACKGROUND

Type 2 diabetes mellitus is common in the Indian population and awareness regarding the disease and its complications is low among the patients with diabetes. There is lack of studies regarding awareness of complications of diabetes among type 2 diabetic patients. The purpose of this study was to assess the awareness of diabetic complications among type 2 diabetic patients.

### METHODS

This is an institutional based observational study. The sample comprised of 150 adult patients with type 2 diabetes mellitus who underwent treatment in the Department of Medicine, Medical College Kottayam and the patient's age ranged from 18 - 77 years.

### RESULTS

Majority of patients were in the age group 38 to 57 and the sample comprised of 56 % males and 44 % female patients. Out of 150 patients involved in the study, 120 patients (80 %) were aware of the complications of diabetes mellitus. Among the male patients, 70 (83.33 %) and among females, 50 (75.75 %) were aware of the complications in diabetes. In the study sample, 92 (61.33 %) were aware of the foot problems, 120 patients (80 %) were aware of renal complications, 91 patients were aware regarding eye problems of diabetes, 38 (25.33 %) regarding development of hypertension, 62 (41.33 %) regarding heart attack, 42 (28 %) patients were aware regarding development of stroke and 78 patients (52 %) had awareness regarding occurrence of recurrent infections.

### CONCLUSIONS

Awareness regarding diabetes and its complications is fairly good among the diabetic patients in Kerala. Awareness regarding all complications of diabetes was higher among males than females. Providing awareness to type 2 diabetic patients by various educational programs may be of further help to prevent complications and to decrease the mortality and morbidity in type 2 diabetes patients.

### KEYWORDS

Awareness, Diabetes

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**BACKGROUND**

Type 2 diabetes is a very common problem in the general population. Urbanization, industrialization and change in the lifestyle had all lead to change in the disease pattern and now the more common communicable diseases have been replaced by lifestyle diseases like diabetes. Diabetes and cardiovascular diseases are the primary challenges faced by the health systems.<sup>1</sup> The diabetic population in India is a major share of the world diabetic population. Rapid rate of urbanization, rapid socio-economic changes and changes in lifestyle may account for the same. As per the World Health Organization (WHO) data, India leads the world in diabetic patients with 32 million patients and the projected number of diabetic patients by 2030 is 79.4 million.<sup>2</sup> The consequences i.e. morbidity and mortality in diabetes result mainly from its consequences i.e. diabetic foot, renal complications, retinopathy, neuropathy, infections, musculoskeletal and cardiac complications.<sup>3</sup> It has been found that there are only limited number of studies which deal with awareness of complications in diabetic patients and further the number of research works are far less common in developing countries like India. It was found in a study done in Africa that 59.7 % of diabetic patients were affected by complications.<sup>4</sup> It was observed in a study by Michele Muggeo et al. that when type 2 diabetes was diagnosed, 10 % of the patients would have developed cardiovascular disease and 15 % of the patients would have developed renal involvement and retinopathy.<sup>5</sup> Further it has been observed that diabetic patients tend to neglect investigations and regular follow up which is very much necessary to detect the development of complications and this is due to the lack of knowledge of diabetes mellitus and its complications. The cost of investigations and the lack of proper health education given by the health personnel could also contribute to decreased level of awareness about diabetes mellitus and its complications among type 2 diabetic patients. Timely detection of the complications of diabetes in diabetic patients is essential for preventing the progression of complications and decreasing the mortality and morbidity associated with diabetic complications. The study was done with the aim of studying the awareness of complications developing in diabetic patients who underwent treatment in the General Medicine out-patient department (OPD) and Diabetic Clinic of Government Medical College, Kottayam. As Kottayam Medical College is a tertiary care centre catering to the referred cases from Kottayam, Idukki, Pathanamthitta, Alappuzha and Ernakulam districts, a study on the awareness of complications in diabetic patients would throw light on the level of awareness of complications in diabetic patients. It has been well documented that early detection of complications can help retard the progression of diabetic complications. And as such for early detection and better management of complication, an increased level of awareness regarding diabetic complications is very important in diabetic patients. This knowledge gained by the study would help the health workers to further educate the patients regarding the complications of diabetes and help to take steps to prevent or retard the complications of diabetes. The knowledge gained from the study would help the health

planners and administrators in allocating funds and planning strategies for management of complications in diabetes and for educating the masses.

**Significance of the Study**

Awareness regarding the complications of diabetes has been found to be low in diabetic patients in several studies conducted in various parts of the world especially in developing countries. In India, the data regarding awareness of diabetic complications in type 2 diabetic patients is very meagre and only a few studies have been carried out in this specific and very important aspect of diabetes. By knowing about the level and extent of awareness regarding complications in diabetic patients, efforts can be made to create awareness by education methods, distribution of educational materials among diabetic patients and by the use of social media. By these efforts, the development and progression of complications in diabetic patients can be prevented which will in the long run decrease the morbidity, mortality and the cost of management in type 2 diabetic patients. Several studies have shown that by increasing awareness in diabetic patients regarding complications most of them are preventable.<sup>6,7</sup>

**Objectives**

To assess the awareness of complications in patients with type II diabetes mellitus.

**METHODS**

A cross sectional study was conducted among 150 patients with type 2 diabetes mellitus aged more than 18 years. Patients who had registered and underwent treatment in the Department of Medicine, Government Medical College, Kottayam from December 2020 to May 2021 were included. Socio-demographic characteristics of the patients like age, sex, level of education, occupation, place of residence, the family history of diabetes, duration of diabetes, treatment undertaken by the patient was documented and a detailed questionnaire was used to obtain data regarding the awareness of diabetes. The awareness regarding the development of complications, knowledge of different diabetic complications and awareness regarding measures for management or preventing or delaying the complications. The study was approved by Institutional Ethics Committee before the start of the study (IRB NO: 91/2020).

**Inclusion Criteria**

Type 2 diabetes mellitus patients aged more than 18 years, with duration of diabetes less than 1 year, attending outpatient department and those who were admitted as inpatients in the Department of General Medicine, Government Medical College, Kottayam were included for the study. A written informed consent was taken from each

participant before they were enrolled for the study. Patients detected to have diabetes of a duration of less than 1 year were only included in the study as were done in studies conducted previously on the subject and further if patients with longer duration are included it could affect the level of awareness regarding complications as some of the patients could have developed complications by then.

**Exclusion Criteria**

Type 1 diabetes patients  
Diabetic patients with diabetes for more than 1 year.

**Statistical Analysis**

The data was entered in Microsoft Office Excel 2007 and analysed using IBM Statistical Package for Social Sciences (SPSS Version 16). The data was expressed as frequencies and percentages. Chi square test was used to find if there was a statistically significant difference between categorical variables. P value less than 0.05 was considered to be statistically significant.

**RESULTS**

A total of 150 patients were studied, of which 84 (56 %) were males and 66 (44 %) were females. 86.66 % were married and most (44 %) of the study population belonged to 38 - 57 years age group. 69.33 % had been educated till high school or above and 30 % were working in government sector. 62 % of the study population were from rural area. 86 % of them had a positive family history with regards to diabetes. The maximum population (57.33 %) were on oral hypoglycaemic agents (Table 1).

Knowledge about associated complications like development of hypertension and neurological complication (stroke) were deficient among the study population with awareness level of 25.33 % and 28 % respectively. 80 % of them knew that kidney diseases can occur secondary to diabetes as a complication (Table 3).

There was no difference in the overall awareness level between males and females (Table 2). But there was significant difference in awareness levels between males and females with regards to knowledge about complications with respect to foot problems, eye diseases and stroke. Males had a better knowledge when compared to females in these three aspects (Table 3).

With regards to most of the measures undertaken for management or prevention or delaying the complications, the awareness levels were higher in males when compared to females. Both males and females were aware that exercises had a role in the management of the disease and its complications. More males were aware of this role when compared to females, however this difference was not statistically significant (Table 4).

It was also noted that patients with family history of diabetes were four times more aware about complications of diabetes when compared to those who did not have a positive family history. Patients with family history of

diabetes were six times more common in the study compared to those who did not have a positive family history.

Sl. No.	Characteristics	No. of Patients No. (%)
1	Age group	18 – 37 years 39 (26 %)
		38 – 57 years 66 (44 %)
		58 – 77 years 45 (30 %)
2	Gender	Male 84 (56 %)
		Female 66 (44 %)
3	Level of education	Cannot read and write 2 (1.33 %)
		Read and write 14 (9.33 %)
		Primary school 30 (20 %)
		High school and above 104 (69.33 %)
4	Marital status	Married 130 (86.6 %)
		Divorced 3 (2 %)
		Widowed 5 (3.33 %)
		Single 12 (8 %)
5	Occupation	Manual labourers 40 (26.66 %)
		Government worker 45 (30 %)
		House wife 40 (26.66 %)
		NGO worker 25 (16.66 %)
6	Residence	Rural 93 (62 %)
		Urban 57 (38%)
7	Type of medication used	Oral 86 (57.33%)
		Injection 34 (22.66 %)
		Both 30 (20 %)
8	Family history of diabetes mellitus	Yes 129 (86 %)
		No 21 (14 %)

**Table 1. Baseline Characteristics of the Study Population**

Sl. No.	Awareness	Male	Female	Total	Chi Square Value	P Value
1	Aware	70 (58.33 %)	50 (41.66 %)	120 (100 %)	1.3258	0.2495
2	Not aware	14 (46.66 %)	16 (53.33 %)	30 (100 %)		

**Table 2. Awareness Regarding Diabetes and Development of Complications**

Sl. No.	Complications of Diabetes	Males (n=84)	Females (n= 66)	Total (n=150)	Chi Square Value	P Value
1	Foot problems	60 (71.42 %)	32 (48.48 %)	92 (61.33 %)	8.2040	0.0041*
2	Kidney disease	70 (83.33 %)	50 (75.75 %)	120 (80 %)	1.3258	0.2495
3	Eye disease	58 (69.04 %)	33 (50 %)	91 (60.66 %)	5.6196	0.0177*
4	Hypertension	26 (30.95 %)	12 (18.18 %)	38 (25.33 %)	3.1866	0.0742
5	Heart attack	40 (47.61 %)	22 (33.33 %)	62 (41.33 %)	3.1106	0.0777
6	Stroke	34 (40.47 %)	8 (12.12 %)	42 (28 %)	14.7401	0.0001*
7	Recurrent infections	48 (57.14 %)	30 (45.45 %)	78 (52 %)	2.0230	0.1549

**Table 3. Knowledge about Different Diabetic Complications in Patients with Type 2 Diabetes Mellitus**

Sl. No.	Measures for Management/ Preventing/ Delaying the Complications	Males (n=84)	Females (n= 66)	Total (n=150)	Chi Square Value	P Value
1	Role of dietary modifications	72 (85.71 %)	45 (68.18 %)	117 (78 %)	6.6207	0.0100*
2	Role of exercises	61 (72.61 %)	38 (57.57 %)	99 (66 %)	3.7273	0.0535
3	Role of smoking	72 (85.71 %)	48 (72.72 %)	120 (80 %)	3.8961	0.0483*
4	Role of alcoholism	73 (86.90 %)	47 (71.21 %)	120 (80 %)	5.6886	0.0170*

**Table 4. Awareness Regarding Measures for Management or Preventing or Delaying the Complications**

## DISCUSSION

The mean age of patients in the study was 48 compared to a study by Agarwal et al. where it was 53 and the awareness regarding renal damage was 80 % in the present study compared to 58 % in the study conducted in Nepal.<sup>8</sup> The awareness regarding diabetic complications was more in the present study as was observed by Ullah F et al. in Pakistan.<sup>9</sup> The awareness regarding complications of diabetes was 80 % in the present study compared to the studies conducted in Bangladesh, where it was 42 %<sup>10</sup> and in Ghana<sup>11</sup> where it was 40 % and it was similar to the study conducted in Saudi Arabia 80 %.<sup>12</sup> The reasons for the high levels of awareness in the present study may be due to the high level of literacy, well organized and widely available health facilities and also due to the high standard of living in Kerala. It has been observed in a study by Hawthorn et al. that socio-economic conditions, habits and cultural beliefs have an impact on pattern of awareness of diabetic complications.<sup>13</sup>

In the present study, 93 (61.3 %) were aware of the foot problems, 120 patients (80 %) were aware of renal complications, 91 (60.66 %) patients were aware regarding eye problems of diabetes, 38 (25.33 %) regarding development of hypertension, 62 (41.33 %) regarding heart attack and (42 %) regarding development of stroke whereas in a similar study conducted by Mohan et al.<sup>14</sup> the awareness regarding complications was less among self-reported type 2 diabetes mellitus patients. The higher levels of awareness regarding all the complications of diabetes in the present study may be due to the higher level of literacy, better socio-economic situation, wider availability of health services in the population studied. Throughout the world, socio-economic cultural factors, level of literacy, health care strategies, health care policies and availability of proper diabetic care have been found to influence the awareness of complications of diabetes among diabetic patients. It was observed in the present study that the awareness regarding all complications of diabetes was higher in males compared to females and this finding is in line with finding of another study done in Africa where the awareness in males was 4.6 times compared to females.<sup>15</sup> The difference in the extent of awareness may be due to cultural, socio-economic reasons and difference in literary status of women in different countries. It has been well recognized of the role and awareness of self-help behaviour and lifestyle modification in the development and management of diabetes among diabetic patients and this was high in the present study. In a study conducted by Lerman et al. it was found that (26 %) of type 2 diabetes patients in Mexico followed three important treatment recommendations: medication compliance, meal planning, and exercise<sup>16</sup> and in the present study majority of the patients were aware of the role of exercise in preventing or delaying the complications and did regular exercise.

In the present study, 85.21 % males and 72.72 % of females were aware regarding the importance of smoking in management and delaying complications in diabetes whereas in a study by Khamesh ME et al. half of the respondents were unaware of smoking and its relationship

with diabetic foot complications.<sup>17</sup> In a study by Emanuele et al. it was observed that regular consumption of moderate amounts of alcohol clearly interferes with diabetic blood sugar control and increases the risk of impotence, peripheral neuropathy, retinopathy<sup>18</sup> and a high awareness was found in the present study regarding the role of alcoholism in the management and development of complications in type 2 diabetes. The increased level of awareness could be due to high level of literacy, better socio-economic status, better access to medical information and increased access of medical facilities in the state. Although the awareness regarding the role of exercise, smoking and alcoholism in the development, management of diabetes was high in the present study there is still a scope of spreading the message to the masses and implementing diabetic education activities to the rural masses and in areas where prevalence of diabetes is increasing<sup>19</sup> in other parts of country. Patients with family history of diabetes in the study conducted were more aware of the complications compared to those without a family history as was seen in the study by Murugesan et al.<sup>20</sup> The reason may be that patients with a family history of diabetes mellitus would have more chances to get involved in the management and treatment of family members. In due course of regular visits to hospitals with family members having diabetes, interactions with health personnel, getting involved in the management and care, diabetic patients would gain more knowledge and awareness of diabetes and its complications.

## CONCLUSIONS

Awareness regarding diabetes and its complications is fairly good among the diabetic patients in Kerala. Awareness of the complications of diabetes was higher in males than female. Providing awareness to type 2 diabetic patients by various educational programs may further help to prevent complications and to decrease the mortality and morbidity in type 2 diabetes patients.

### Limitations of the Study

1. Limitations in the use of questionnaire, as the open-ended questions in the questionnaire depended on verbal ability and recall memory whereas the closed questions could be guessed by the participants.
2. Only diabetic patients treated in the department of medicine were included in the study and this may not be the true representation of the diabetic population as a large number of diabetic patients were being treated in other specialities for their co-morbid illness.
3. Even if the data regarding awareness of complications of diabetes is to be carried out carefully, patients may tend to give response which would be more socially acceptable which would lead to overestimation of observed results.
4. Large multi-centric studies involving large number of patients are to be done to get a clear picture of the exact awareness of complications in diabetic patients.

Data sharing statement provided by the authors is available with the full text of this article at jebmh.com.

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