

Knowledge, attitude and practices regarding diabetes management and complications among Type 2 Diabetic patients

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Abstract

Introduction: Diabetes initially causes generalized or nonspecific symptoms that are often unimportant. Patients require healthcare attention to reduce the comorbidities that may develop in future. Since diabetes is prevalent in India, there is a National Programme for Diabetes that provides free diagnostics, drugs, and health promotion through behavior change, but patients still develop complications. **Objectives:** The aim of the study was to assess participants' awareness of the diabetic diet, foot care, regular eye checkup, and complications of diabetes, as well as adherence to a diabetic diet, physical exercises, drug therapy, and timely follow-ups. **Methods:** A descriptive cross-sectional study was conducted among 156 Diabetic individuals who had at least three previous visits to the Non-Communicable Disease clinic. Seriously ill patients were excluded. A pretested semi-structured questionnaire was used. The data collected was documented in MS Excel and analyzed using Epi Info v7.2.5. **Results:** Of the 156 participants, the mean age was 57.1 years, and 48.7% had diabetes for > 5 years. Almost 85.9% of participants had low awareness of self-care and complications. Half (49.4%) of the participants had lightheadedness as their initial reason that led to the investigation of diabetes, and 14.1% were diagnosed during regular check-ups. About 39.1% of participants did regular physical exercises, and 32.7% followed the diabetic diet. About 45.5% and 73.1% of the participants were overweight and had hypertension, respectively. About 36.5% missed one or two doses of medication, and 19.2% had changed medication dosage on their own. About 78.9% made their follow-up visits on the recommended dates. **Conclusion:** Most participants' adherence to drug therapy and timely follow-up was high. But the participants had low awareness of self-care and complications, as well as low adherence to diet and exercise. This highlights the need to improve healthcare attention among people with diabetes.

Keywords: Diabetes Mellitus, awareness of diabetes, follow-up in diabetics

Introduction

Diabetes Mellitus (DM) is the commonest endocrine disorder in India. Diabetes is a group of metabolic disorders that requires multiple aspects of management, including appropriate intake of drugs, lifestyle modification, and long-term follow-up. The overall prevalence of diabetes in India is 11.8%⁽¹⁾.

Health-seeking behavior (HSB) are activities undertaken to maintain good health, prevent ill health, and deal with any departure from a good state of health⁽²⁾. Diabetes initially causes generalized or nonspecific symptoms which are often not given importance. It is important to seek healthcare attention for diabetic treatment to prevent hyperglycemia as it may lead to complications such as stroke, myocardial infarction, peripheral neuropathy, retinal hemorrhages, etc.⁽³⁾. A monthly check of blood sugar level and biannual check for

any complications is needed to prevent complications or early detection of complications and prompt treatment. Prevention of dreadful complications of diabetes will prevent not only mortality but also a lot of morbidities, thereby improving the quality of life. Adding life to years will become a reality.

Diabetes is detected late in many cases, sometimes even after a complication. Diabetes screening has to start at 18 years of age. People of 18-30 years age can use diabetes risk scoring by themselves. This risk scoring is very easy, and it includes the family history of diabetes, history of gestational diabetes, and the weight status of the individual. This awareness has to reach all healthcare workers and even the general public. Increased awareness will improve the lifestyle and help in the prevention or better control of the disease.

Along with the other factors, HSB and the personal habits of

diabetic patients will also determine the control of blood sugar levels. Although there is a National Programme for diabetes with the supply of drugs free of cost, patients still develop complications. The reason may be a delay in visiting the hospital to collect the drugs as per the schedule. Studying the delay in making visits will give an insight into the HSB, thereby preventing dreaded complications. So the current study started with the objective of estimating participants' awareness of a diabetic diet, foot care, regular eye checkup, and complications of diabetes and assessing participants' adherence to a diabetic diet, physical exercises, drug therapy, and timely follow-ups.

Materials and Methods

A descriptive cross-sectional study was conducted in a Non-Communicable disease (NCD) clinic at Mahatma Gandhi Memorial Government Hospital, Trichy, Tamil Nadu, for three months (March 2022 – May 2022). The random sampling method was used for sample collection and 25-30 patients were selected every day out of the total number of patients coming to the diabetic clinic OPD each day. All follow-up patients with type II DM attending the NCD clinic were included, making at least their third follow-up visit. Seriously ill patients were excluded from the study.

According to a study by Agrawal et al., 71% of diabetic patients had follow-up visits once a month. With an allowable error of 10%, the estimated sample size was 156⁽⁴⁾.

A pretested semi-structured questionnaire was used to collect the information from participants. Height was measured by inch-tape. The weighing scale measured weight BMNI was calculated. Visual acuity was examined using Snellen's chart^(5,6). Diabetic diet and physical exercise history were assessed with an objective answer from participants.

Methodology of data collection

Institutional Ethics Committee approval was obtained from the Department of Community Medicine in KAPV Government Medical College with Ref No KAPV/IEC/2022/03/007. Patients were interviewed at the NCD clinic after getting their informed consent. The interviews were conducted strictly conforming to the relevant guidelines and regulations. The interview was conducted in the Tamil language. Strict patient confidentiality was maintained throughout the study. Clinical examination was done individually by the investigators. The laboratory investigation report of each patient was obtained from the patient's treatment card. Patients' awareness of diabetes was assessed using six questions. The study used the following variables: socio-demographic details, family history, personal history, details of the disease and drugs, regularity of the last three visits, and visual acuity.

Data analysis

Data was collected, cross-checked, and analyzed using Epi Info 7.2.5 software. Categorical data was presented with percentages and quantitative data as a mean±SD.

Operational definition

Information about the last three visits with regard to the due date of the visit to the outpatient department and the actual date visited were obtained from the patients and were cross-checked with the clinical records. Criteria for the delayed visit included even one day of delay in visiting the center. The modified Kuppusamy scale was used to assess the socio-economic status of the study participants. The socio-economic status was determined by using this scale with the parameter - the total monthly family income. By using this scale, the total monthly family income was used to determine socio-economic status⁽⁷⁾.

The awareness score was calculated based on awareness of diet, foot care, medication adherence, visual acuity screening intervals, and attending healthcare awareness programs. Study participants were grouped based on their awareness score (score or scores) of ≥ 3 (14.1%) and < 3 (85.9%).

Results

A total of 156 diabetic patients were included. The majority of our study participants were females (60.9%). The mean age of the study participants was found to be 57.1±9.5 years. The maximum number (48.1%) of study participants is 46-60 years old. Most (88.4%) of the participants were married. The majority (75%) were Hindus, followed by Muslims (19.2%), and Christians (5.8%). The majority (72.4%) of our study participants were literate. The average number of family members was found to be 3.9±1.2. A family history of diabetes was found in 18.7% of the study participants. The average distance between the center and the home was 7.9±4.9 km. The majority (78.9%) of the patients traveled more than 5 km to reach the center. Majority participants had awareness score < 3 (85.9%). The characteristics of the study participants are shown in Table 1.

Table 1: Characteristics of study participants

Characteristics	Number n (%)
Age (in years)	
30-45	22 (14.1)
46-60	75 (48.1)
61-75	56 (35.9)
>75	3 (1.9)
Education	
Literate	113 (72.4)
Illiterate	43 (27.6)

Table 1: Continued....

Characteristics	Number n (%)
Socio-economic status	
Lower middle	19 (27.6)
Upper lower	116 (74.3)
Lower	21 (13.5)
Number of drugs	
1	56 (35.9)
2	98 (62.8)
3	2 (1.3)
Awareness score	
≥3	22 (14.1)
<3	134 (85.9)
Visual acuity	
Normal	76 (48.7)
Near Normal	31 (19.9)
Moderate low vision	49 (31.4)
Distance to travel to reach to hospital	
<5 Kilometers	33 (21.1)
≥5 Kilometers	123 (78.9)
Duration of disease	
<5 years	80 (51.3)
≥5 years	76 (48.7)
Treatment pathy system	
Allopathic system	154 (98.7)
Allopathic and other systems	2 (1.3)

In our study, only 2.5% were smokers, and alcohol usage was found in 3.9%. The majority of our study participants preferred a mixed diet. Only about 39.1% did physical exercise, and 32.7% followed the advise of the treating physician, and 32.7% followed the diabetic diet prescribed by the physician.

In our study, the majority (78.9%) of the patients made their last three visits on the recommended dates, and the remaining made delayed visits. The most common reasons cited for the delayed visits were forgetfulness, workload, conveyance issues, and others. About 31.1% of the patients had a companion during the hospital visits.

The average age at the time of diagnosis was found to be 50.5±11.4 years. The average duration of the disease was 6.6±6.9 years. The most common reason for blood investigation leading to a diagnosis of the disease was lightheadedness (49.4%), followed by regular health checkups (14.1%), peripheral neuropathy (5.1%), and cataract surgery (3.2%). The reason for the blood investigation leading to a diagnosis of diabetes are shown in Table 2.

Table 2: The Reason for the Blood Investigation leading to a Diagnosis of Diabetes

Common reported reasons	Number n (%)
Lightheadedness	77 (49.3)
On regular health checkups	22 (14.1)
Peripheral neuropathy	8 (5.1)
Cataract / decreased vision	5 (3.2)
Non-healing wound	5 (3.2)
Incidental finding while on	
Treatment for other diseases	6 (3.9)
Other reason	33 (21.2)

More than half of our study participants (51.3%) were on treatment for fewer than five years (Table 1). Almost 78.3% of diabetic patients had at least one comorbidity. The most common co-morbid condition among diabetic patients was hypertension (73.1%), and 45.5% were found to be overweight. Comorbidity among diabetic patients are shown in Table 3.

Table 3: Comorbidity among Diabetic Patients

Comorbidity	Number n (%)
Hypertension	114 (73.1)
Overweight	71 (45.5)
Coronary Artery Disease	16 (10.3)
Hypothyroidism	5 (3.2)
Hypercholesterolemia	4 (2.6)
Others	7 (4.5)

The majority of the participants were treated with two drugs for diabetes. Only 2% of the participants reported having taken self-medication. Almost 98.1% of the patients reported that they did not have any side effects due to anti-diabetic medication. Only 4.5% of the patients had a history of hospitalization within the last six months.

The majority of the patients were diagnosed at a government hospital (89.7%), and the remaining were diagnosed at private hospitals. A greater number (96.8%) of the patients were taking free medication from a government hospital; the remaining took medication from both government and private. Only 5.8% of the study participants had also consulted private practitioners. About 7% of the study participants took medication from multiple centers, 1.3% of the patients took drugs from other systems along with allopathic drugs. About 36.5% of the participants reported forgetting to take the medication (one or two missed doses) while on travel and 19.2% of the study participants had a history of changing the dose of medication on their own. The majority of the patients (85.9%) had low awareness scores, 73.7% of the participants had poor awareness regarding diabetic foot care.

The majority (93%) of the participants were satisfied with the treatment given at the government hospital and 71.2% of the participants have felt improvement after starting the treatment. In our study, 9% of the patients had foot ulcers, 7.1% of patients had poor sensation in the foot, and 31.4% of the participants had a moderate low vision.

Discussion

Diabetes is a group of metabolic disorders that requires multiple aspects of management, including appropriate intake of drugs, lifestyle modification, and long-term follow-up. This study sought to assess participants' awareness of the diabetic diet, foot care, regular eye checkup, and complications of diabetes, as well as adherence to a diabetic diet, physical exercises, drug therapy, and timely follow-ups. We found out that the diabetic patients, even if they had a longer duration of diabetes and also made regular follow-up visits, had low awareness of HSB.

The mean age of the population of our study is 57.1 ± 9.5 years, which is similar to the mean age of other studies done in India on the diabetic population⁽⁸⁻¹⁰⁾. Females were a majority (60.9%) in our study, but other studies from India show us that the majority of the population is males^(11,12). Our study has 74.3% of the population from the upper lower socio-economic class. Rani et al. show that knowledge about diabetes is high for those from the upper socioeconomic strata⁽¹³⁾. This could explain the reason for the low awareness of diabetes in our study. Basu et al. also show that sociocultural resistance is an important factor that poses a barrier to outdoor exercise, particularly among women⁽¹⁴⁾. Kefale et al. show that individuals of 45 to 65 years of age, from every family income, have an increased risk of facing problems with drug therapy⁽¹⁵⁾. Babu et al. show that 53% of diabetics are from rural areas⁽¹²⁾. This is similar to our study, where 78.9% of the population traveled more than five kilometers to reach the hospital. The average duration of the disease in our study was found to be 6.8 ± 14.2 years, similar to other studies conducted in India^(16,17).

A study by Babu et al. shows us that awareness of a diabetic diet, as well as attending a formal diabetes education program, was 37.5%, 12.3%, and 9.2%, respectively⁽¹²⁾. This is similar to our study findings; 85.9% of participants had low awareness of self-care and complications. In contrast, some studies have shown that more diabetics are aware of the organs affected due to the complications of the disease^(18,19).

In our study, the majority (63.5%) of the patients have never missed any doses. This reflects that the patients are taking the drugs as prescribed. A study by Medi et al. finds that 47.85% of the patients never missed any dose⁽²⁰⁾. Noncompliance may occur due to a lack of money and difficulty remembering to take daily medication due to work or forgetfulness^(17,21). A study by Acharya et al. shows us that age, educational status,

and longer duration of disease are associated with noncompliance⁽²²⁾.

Our study shows that 39.1% had good adherence to exercises, similar to a study in Puducherry, where inadequate physical activity among patients attending non-communicable disease clinics was found to be 60%⁽²³⁾. A study by Srinath et al. also shows that only 27% of diabetic patients had adequate physical activity⁽²⁴⁾. A study by Karthik et al. shows us that 52.4% of the participants had poor adherence to self-care practices⁽²⁵⁾. Similarly, Gopichandran et al. found that good dietary behavior and good exercise were 29% and 19.5%, respectively⁽²⁶⁾. In our study, the advised dietary change and physical activity were practiced by 32.7% and 39.1%, respectively. According to Arulmozhi et al., less than 25% of diabetics adhered to self-care activities such as exercising/walking for 30 minutes at least four days a week, regularly inspecting their feet, and providing foot care⁽¹⁰⁾. Though our study shows a greater adherence to diet and exercise, we believe it is due to the objective nature of our study. So, the importance of these lifestyle modifications may be reinforced to improve blood sugar levels and the prevention of complications.

Health interventions are required to reduce morbidity in adults⁽²⁷⁾. Mohandas et al. show us that support from the family ($p=0.020$) and place of diagnosis ($p=0.033$) are significantly associated with diet adaptations amongst the diabetic population⁽¹¹⁾. Burman et al. depicts that family support and a community-level approach is needed to improve self-care practices⁽²⁸⁾.

Our study shows that 62.8% of diabetics were on dual drug therapy to manage diabetes. Padhi et al. shows that dual drug therapies are often given to those unable to attain therapeutic goals, and frequent dosage changes, as well as side effects from these medications, can lead to patient noncompliance⁽²⁹⁾. We showed that 98.7% of the diabetic in our study followed only the allopathic system for the management of this disease. Wangnoo et al. show us that alternative medicine and other therapy system could pose a barrier to managing diabetes⁽³⁰⁾.

Though our study demonstrated that 48% of the population had normal visual acuity, most participants were unaware of the complications of diabetes. A study by Dixit et al. shows that only 15.8% of the patients had undergone an ophthalmologic evaluation⁽³¹⁾. We report that 31.4% of the diabetic had moderately low vision, which is higher than the study by Lingam et al., where low vision is seen amongst 22.6% of the diabetics⁽³²⁾. In a study by Venugopal et al., the prevalence of hypertension among diabetics was 25.6%⁽³³⁾. The prevalence of hypertension among diabetics was more (73.1%) in the current study. The prevalence of foot ulcers (9%) in our study is less than that of Shahi et al. in India,

which was found to be 14.3%⁽³⁴⁾. This may be related to the regularity of the medications taken by the patients since less than 75% of participants had awareness regarding diabetic foot care. Further self-care improvement like proper diet, exercise, and foot care is needed. It can be achieved by increasing the health education given to the patients on a one-to-one basis, which will increase their self-care responsibility. Awareness can be improved among diabetic patients on diet changes, complications of diabetes, foot care, eye checkup, etc.

Ours is a cross-sectional study; hence the data was limited to the day of follow-up visits, and we did not have a long-term follow-up. Also, we cannot establish a temporal relationship and causality. We lack laboratory values to diagnose and identify metabolic derangements. We lack evidence of the microvascular and macrovascular complications that would have occurred in the participants. Future studies should use appropriate clinical screening tools combined with laboratory evidence to assess the full scope of the complications. Also, studies should focus on the barriers preventing the diabetic population from better healthcare.

Conclusion

The study comprised 156 diabetic patients, with a majority of females in the 46-60 age group and belonging to the Hindu religion. The mean family size was 3.9, and almost 19% had a family history of diabetes. The majority of patients had to travel more than 5 km to reach the center. Hypertension was the most common co-morbidity, and most patients received treatment with two medications. Free medication was availed by most patients from a government hospital, and a satisfaction rate of 93% was reported. Issues with forgetfulness and frequent changes in medication doses were noted. A proportion of patients experienced foot ulcers, poor foot sensation, and moderate low vision. The study found that 85.9% had low awareness scores, and 73.7% had poor awareness of diabetic foot care. Awareness programs can be strengthened to improve the physical activity and dietary changes required for diabetic patients. It may also include avoidance of missing doses and avoidance of changing the doses on their own. Screening for diabetes also needs to be stepped up, as early diagnosis will prevent complications.

Declaration

Ethics approval and consent to participate: Institutional Ethics Committee approval was obtained from The Department of Community Medicine in KAPV Government Medical College with Ref No KAPV/IEC/2022/03/007. The guidelines and regulations relevant to our study were explained to us by the ethics committee. All the methods in the study progressed strictly adhering to the relevant guidelines and regulations, which was also overlooked by the

senior authors, namely A. R. Parveen Gani and Vanitha Krishnaswamy. Patients were interviewed at the non-communicable disease clinic after getting their informed consent. Informed consent was obtained from all subjects and/or their legal guardian(s) for illiterate and minor participants too. The study's participants were informed that their data would be gathered, de-identified, analyzed, and published. The interviews were conducted strictly conforming to the relevant guidelines and regulations.

Consent for publication: The study's participants were informed that their data would be gathered, de-identified, analyzed, and published.

Availability of data and materials: The data is publicly available, and specific details related to data and/or analysis will be made available upon request. All data generated or analyzed during this study are included in this published article.

Conflict of Interest: Nil

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