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STUDY ON AWARENESS AND KNOWLEDGE IN PATIENTS WITH TYPE 2 DIABETES MELLITUS IN TUMKUR, KARNATAKA

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ABSTRACT

Background: Type 2 diabetes mellitus is a life long illness characterized by hyperglycemia. The present study aimed to determine the level of Knowledge, Attitude, and Practice (KAP) of patients with type 2 diabetes using questionnaires. **Materials and Methods:** A prospective interview-based interventional study was carried out for six months among patients with T2DM in Tumkur. A total of 115 patients were interviewed. Patients were subjected to 2 health education sessions where information about type 2 diabetes was provided. Knowledge, awareness, and glycemic control were assessed before and two months after the intervention. Data were collected, analyzed, and interpreted using descriptive statics. **Results:** After implementation of educational intervention study results reveal a significant improvement in KAP among both the men and women following counseling. The mean score during the pre-intervention was 13 (SD ±5.54), and it was improved to a mean score of 25(SD±4.24). **Conclusion:** From these results suggest that education and intervention programs are needed to increase awareness of type 2 diabetes mellitus for enhancing their knowledge and practice, whichin turn help them to lead a healthy life.

KEYWORDS: Type 2 diabetes mellitus, knowledge, attitude, practice, education intervention.

INTRODUCTION

According to the World Health Organization, Global report on diabetes- Geneva 2016, diabetes mellitus in South East Asian countries like India is increasing at an alarming rate. The increase in the number of pre-diabetes and diabetes mellitus is not proportional to the

developments in technologies, socio-economic class, physical activity, food consumption, and different occupations (Shewtha et al.).[1] It is estimated that India will have 134.3 million diabetes by the end of 2045.

Knowledge plays a crucial role in any future disease complication and its early prevention and detection. Positive KAP are essential for diabetes mellitus patients. Elements of KAP are relevant and dependent on each other. If one aspect is higher, the other two factors should be affected positively (Fatema et al.).[2] KAP regarding diabetes vary greatly depending on socio- economic conditions, cultural beliefs, and habits. Knowledge of diabetes can prevent the impending chronic comorbidities of diabetes mellitus, which significantly impact the quality of life of diabetic patients. Awareness of disease can help people assess their risk of diabetes, motivate them to seek proper care and treatment, and inspire them to take charge of their illness for their lifetime (Berhe et al.).[3]

A literature search on awareness of diabetes mellitus among the Arar population, Northern Border Region of Saudi Arabia. A total of more than 700 participants were interviewed; among them, 77.8% had high education level, 10.4% were diabetic, 78.9% did not have a regular checkup, and 58.5% lacks regular exercises, 60% thought it is due to a partial or complete decrease in insulin secretion, and 12.4% thought it is expected to high sweets consumption and 33.2% thought it is scheduled to genetic disease. The majority of them believed that weight loss and modification of lifestyle were the most preventive measures. This study recommends that health policymakers need to conduct more effective health education sessions (Alanazi A M et al.).[4]

From the above studies, we concluded there is a need for educational interventions to improvethe KAP of type 2 diabetes mellitus in diabetes patients.

Hence the study is intended to access the knowledge on type 2 diabetes and improve their habitual routine regarding self-care among diabetic patients.

MATERIALS AND METHODS

Study design

It is a Prospective Interviewed based Interventional study.

Study population

A total of 115 patients were included in the study.

Study period

Study was carried out for 6 months among patients with type 2 diabetes mellitus in Tumkur fromSeptember 2019 to February 2020.

Study site

Study was carried out in selected rural and urban areas with type 2 diabetes mellitus patients in Tumkur, Karnataka.

Ethical approval for the study

Ethical approval was obtained from the Institutional Ethics Committee of Siddaganga Hospitaland Research Center, Tumkur, Karnataka.
(Reference no: SSCPT/SHRC/PPD/2019-20)

Study criteria

The study was carried out by the following inclusion and exclusion criteria.

Inclusion criteria

- Patients undergoing any anti-diabetic treatment were included in the study irrespective of their gender.
- Type 2 diabetes patients with or without co-morbid conditions.
- Patient with Type 2 diabetes mellitus and Adults of age ≥ 30 years.
- Participants must be willing and able to provide informed consent.

Exclusion criteria

- Pregnant women.
- Patients with insufficient data or records.
- Patient with type 1 diabetes mellitus.
- Mentally compromised patients.
- Patients below the age of 30 years.

Role of clinical pharmacist

- To provide patient counseling.
- To analyze the knowledge of patient regarding disease and drug.
- To examine the extent of medication adherence.
- To improve the medication-taking pattern of the patient.

- To educate about the lifestyle modifications.

Data collection tool

Data were collected by a pre constructed and pre structured questionnaire that was designed toinclude following

a) Personnel data(Name, age, gender, height, weight, education, social history, family history, diet duration of type 2 diabetes mellitus and co-morbidities).
b) Questions about KAP of different aspects of Type 2 diabetes. (open and close ended questions).[2,4,5,6,7,8]

For assessing the KAP questionnaire (in English and Kannada) used were divided into three-part likely knowledge (9), attitude (4), and practice (4). Each part of the questionnaires represents the patients' overall knowledge and practice for type 2 diabetes. The patients' knowledge and attitude towards the disease and daily practice are known through the KAP questionnaire. (Table 1 and Table 2)

Table 1: Questions used for assessing knowledge of type 2 diabetes patients.

Questions
1. Do you know what diabetes is? Yes □ No □
2. Is diabetes a communicable disease? Yes □ No □ Don't know□
3. What are the factors you think that contribute to type 2 diabetes? Obesity □ Decreased physical activity □ Mental stress □ Family history of diabetes □ Consuming more sweets □ Don't know □
4. Does smoking/drinking alcohol increases your blood glucose levels? Yes □ No □ Don't know □
5. Do you know what the symptoms of type 2 diabetes are? Yes □ No □ Don't know □
6. What are the symptoms of diabetes? Increased thirst □ Delayed wound healing.□ Increased urination□ Increased hungry□All the above □ None of the above □
7. Do you know regarding blood glucose meter? Yes □ No □ Don't know □
8. What do you think the average value of blood sugar? 90-140 mg/dl □ Don't know □ Others ……
9. Do you know that diabetes can cause complications in other organs? Yes □ No □ Don't know □ If yes, Eye problems□ Foot infection□ Kidney problems□ Heart problems□Skin infections□ All the above □

Scoring for knowledge of type 2 diabetes

The answers to the questions were analyzed and a scoring system was used as follows:

a. For closed ended questions 1,2,4,5,7,9 correct answers were graded as 1 and incorrect answers (inclusive of don't know) were graded as 0

b. For question No.3 which was on factors that contribute to type 2 diabetes, highest score of 2 each was awarded for subjects who ticked obesity, decreased physical activity, family history ,1 was given for mental stress, and 0 was given for consuming more sweets and don't know

c. Thus the least possible was zero if all answers were incorrect and the maximum score was 7 if all answers were correct

d. For question No. 6 what are the symptoms of diabetes, score of 1 each was given for increased thirst, delayed wound healing, increased urination, increased hungry and 0 was given for don't know. Hence highest score awarded is 4

e. For question No. 10 the average value of blood sugar score 1 was given for 90-140 mg/dl and those values which are having close proximity with the normal value was also awarded with score 1 and score 0 for don't know

Table 2: Questions used for assessing attitude and practice of type 2 diabetes patients.

Question
I. Attitude
1. Can type 2 diabetes be controlled or cured? Can be cured □ Cannot be cured □ Can be controlled □
2. Can we self-control diabetes by diet alone, or medication is compulsory? Diet□ Medication□ Both is needed□ Don't know□
3. Once diabetes is controlled, can the drugs be stopped? Yes □ No □ Don't know □
4. Does the diet for those with diabetes differ from that of non-diabetic persons? Yes □ No □ Don't know □
II. Practice
1. Are you taking your medicines regularly? Yes □ No □
2. How often do you check blood sugar? Monthly once □ Once in 6 months □ Yearly once □ Never
3. Do you carry any source of sugar with you? Yes □ No □ If yes what kind…….
4. What type of lifestyle changes are you practicing to control your disease? Physical activity □ Yoga □ Meditation □ All the above□ None of the above □

Scoring for attitude and practice for type 2 diabetes

a. For close ended attitude questions 3,4 and practice questions 1,3 correct answers were

graded as 1 and incorrect answers (inclusive of don't know) were graded as 0.

b. For attitude question No. 1 type 2 diabetes can be controlled/cured, score of 1 each was given for cannot be cured, can be controlled and score 0 was given for can be cured and don't know.
c. For attitude question No. 2 Can we self-control diabetes by diet alone or medication is compulsory score of 1 each was given for medication and diet. Hence the maximum score was 2 and 0 was given for don't know.
d. For practice question No. 2 how often do you check blood sugar highest score of 2 each was awarded for monthly once, 6 months , score 1 for yearly once and 0 for never.
e. Practice question No.4 type of lifestyle changes practicing to control diabetes each score of 1 was given for physical activity, yoga and meditation. Hence total score was 3.

The questionnaire was tested on 20 patients to estimate the time needed to complete the questionnaire and to carry out the health education sessions. Those patients were not included in the study sample.

Data collection phase

The research work was divided into 3 parts; the first visit (pre intervention), the intervention (health education), and the second visit, (post intervention).

The Pre intervention

- **STEP 1:** To obtain consent from the patient through informed consent form in English and Kannada languages.
- **STEP 2:** Collection of demographics of the patient and the data regarding diagnosis, prescribed drugs, indication and their route of administration, relevant laboratory data and blood samples were taken to measure random blood sugar.
- **STEP 3:** Initial assessment of the participants KAP on type 2 diabetes mellitus by the structured interview questionnaire.

The intervention

The study participants received health education message in 2 different sessions, one session per week with duration of 3 hours, for each session. Repetition of each health education was done before giving the next session by providing patient information leaflets.

The post intervention

- **Step 1:** After 2 months Reassessment of patients KAP was done by repeating the questionnaire.
- **Step 2:** Random blood sugar level were rechecked and compared to baseline.

Statistical analysis

The data obtained was analyzed by using simple descriptive statistics were used to produce results in percentage, Mean, and Standard deviation.

RESULTS

The questionnaire was administered to 115 type 2 diabetes patients of selected areas of Tumkur. Among the respondents, 71 were males, and 44 were females. The mean time taken to complete the questionnaires was approximately 30 minutes. The survey had a response rate of 100%. Among the received questionnaires, 115 met the inclusion criteria of the study were included. The mean age was 60 years, and the average duration of the disease is seven years. The source of information for the entire population was doctors, thereby meaning a lack of awareness by other health care providers. The following results were obtained in the study.

Personal data

Among the total survey population of type 2 diabetes patients (n=115) males represented 62% (n= 71) of the total participants and females represented 38% (n = 44). Only 12.17 % of the participants were illiterates. Most of the study population were either agriculturists or self- employed. Males were approximately twice educated as compared to females [Male – 92% (n = 65) and Female – 82% (n = 36)]. Regarding the family history of type 2 diabetes, 13% had a family history of diabetes, and 87% did not have a family history of diabetes mellitus. The personal data of study subjects were summarized in Table 3.

Table 3: Socio-demographics of study population.

Variable	Number(n=115)	Percent (%)
Gender		
Male	71	62
Female	44	38
Age		
31-40	9	7.82
41-50	19	16.5
51-60	36	31.3
61-70	28	24.3

70+	23	20
Area		
Rural	40	34.78
Urban	75	64.21
Literacy		
Literate	101	87.82
Illiterate	14	12.17
Social History		
Alcohol	3	2.6
Smoking	6	5.21
Chewing tobacco	3	2.6
Diet		
Vegetarian	32	27.82
Mixed	83	72.17

It is worrisome that only 38 % of the populations had a body mass index ranging from 18-23, which is considered normal for the Asian population because of having a thrifty phenotype. 38% of the population were overweight, had a body mass index (BMI) between 24-30, and 23 % hada BMI > 30. Based on the findings concerning BMI, most men (51%) and women (27 %) were either overweight or obese. **(Fig: 1)**

Fig 1: BMI of patients with T2DM.

Four percent (n=5) of the respondents had diabetes for less than 1 year, 46.08% (n=53) for 1-5 years, 41.73% (n=48) for 6-10 years and 7.82% (n=9) of them for more than 10 years. Regardingthe treatment profile of the study group, it was evident that doctors treated 78.2% (n=90) with MBBS qualification and 9.56% (n=11) by specialists.12.17% (n=14) were treated by M.D. physician. Among the participants, almost more than half of the 62% (n=71) with no comorbidities. Among those who knew of comorbidities in them, the majority of them accepted to have hypertension 30.4% (n=35) followed by hypothyroidism, Coronary

Artery Disease(CAD), Inferior Wall Myocardial Infarction (IWMI), Chronic Kidney Disease (CKD), Ischemic Heart Disease (IHD), and diabetic foot.(Table:4)

Table 4: Disease duration with co-morbidities.

Duration of type 2 diabetes mellitus	No. of participants	%
Less than 1 year	5	4.34
1-5 years	53	46.08
6-10 years	48	41.73
More than 10 years	9	7.82
Co-morbidities		
Hypertension	30	26.08
Hypothyroidism	2	1.73
CAD and IWMI	3	2.60
Diabetic Foot	4	3.47
HTN with Hypothyroidism	1	0.86
HTN with CKD	3	2.60
HTN with IHD	1	0.86
Nil	71	61.73

Assessment of knowledge, attitude and practice

A questionnaire was prepared to assess the patients' knowledge regarding diabetes having content about diet, insulin, and diabetes and its complications. Among the study participants of 115, around 66 were aware of diabetes, whereas it improved to 100% after the intervention. The participant has poor knowledge regarding the complications of diabetes. 62% of the population didn't know any complications regarding diabetes. Only 3% of the population knows that diabetes can affect the proper functioning of the heart. About 26 % are aware that consuming more sweets causes diabetes during the pre-intervention phase, and around 25% said it due to family history. When it comes to the factors contributing to type 2 diabetes mellitus, 39 subjects said they don't know, and after counseling, not a single member was unaware of the contributing factors. Concerning whether smoking or drinking alcohol increases blood sugar, 40 members have accepted the fact, and after the successful intervention, it has been improved to 99%.

Knowledge of the symptoms, causes, complications, prevention, and control of diabetes was more significant among patients during post-intervention. A maximum number of patients who participated in the study were aware that frequent urination and increased thirst are due to increased blood sugar levels. In regard to knowledge of the blood glucose meter, only 33% (n=38) were aware, and it improved to 95% (n=109).

The participant's attitude and practice towards type 2 diabetes was inadequate. Only 81 participants still believe that type 2 diabetes can be controlled, and it is not curable. Whereas 65% of the population were checking their blood sugar either monthly once or once in six months or yearly once, and it has been improved to 99%. About 106 participants had a practiceof taking their medicines regularly. Among 115 participants, 50% (n=58) have a habit of doing exercise, and it has been improved by 92% (n=106). (Table 5)

Table 5: Distribution of participant's knowledge, attitude and practice about type 2 diabetes before and after health intervention.

Questions	Pre intervention N=115		Post intervention N=115	
	Correct response	Incorrect response	Correct response	Incorrect Response
What is diabetes	66	49	115	0
Is diabetes a communicable disease	99	16	113	2
Factors contributing to type 2 diabetes	76	39	115	0
Type 2 diabetes mellitus can be controlled or cured	81	34	115	0
Smoking /drinking alcohol leads to an increase in the blood glucose level	40	75	114	1
Do you know the symptoms of type 2 diabetes	43	72	106	9
Symptoms of diabetes mellitus	80	35	115	0
Do you know regarding blood glucose meter	38	77	109	6
How often do you check blood sugar	109	6	114	1
What is the normal value of blood sugar	53	62	110	5
Do you know that diabetescan cause complications in other organs	44	71	113	2
Can we self-control diabetes by diet alone or medication is compulsory	86	29	115	0
Are you taking your medicines regularly	106	9	112	3
Once diabetes is controlled, can the drugs be stopped	73	42	110	5
Does the diet for those withdiabetes differ from that of non-diabetic persons	46	69	105	10
Do you carry a source of sugar with you	13	102	73	42
What type of lifestyle changes youare practicing to control your disease	58	57	106	9

Table 6: Comparison between pre and post intervention visits as regard total knowledge, attitude and practice score participant's (n=115).

Category	Min. score	Max. score	Mean	SD
Pre-intervention	2	27	13	±5.540
Post-intervention	17	33	25	±4.24

Table: 6 show a statistically significant difference between pre and post intervention results in KAP after the implementation of health education program. Also there was statistical significant decrease of random blood sugar at post intervention visit compared to pre intervention visit.

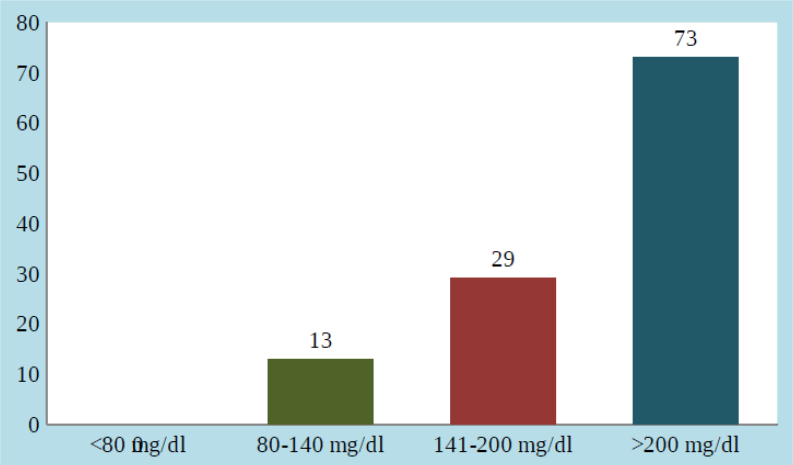

Fig. 2: Random blood sugar value of participant's during pre-intervention.

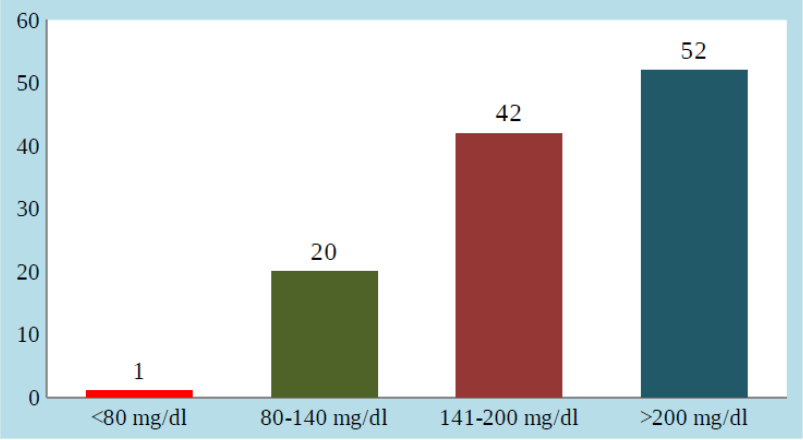

Fig. 3: Random blood sugar value of participants during post-intervention.

DISCUSSION

This study evaluated the interventions made by a pharmacist in improving the KAP towards type 2 diabetes mellitus among diabetes patients. Patient education is an important key to

accomplish the therapeutic outcome and bring a profound change in treatment. Diabetes education programs develop patient's awareness and understanding of the disease and strengthen motivation and self- care. Also, it has an important role in preventing acute complications, reducing the threat of long-term complications, and consequently reducing the economic costs of diabetes treatment bypreventing complications.[9]

As for education, 12% of patients are illiterate or have not completed primary level which is lower when compared to a study conducted in Brazil and Ribeirao Preto-SP.[10]

In the present study consciousness and knowledge about diabetes were less among diabetes patients. The mean age of our study subjects was 60 years, as age is one of the risk factors for the development of diabetes. Similar findings are seen in a study done in Puducherry, India, which reports that age is one of the major concerns for the development of diabetes mellitus.[5]

By asking questions on the knowledge-based "Do you know what diabetes is?" during pre-intervention phase around 49 (42.60%) out of 115 said that they don't know the condition they are suffering from. When comes to the question "Do you know what are the symptoms of type 2 diabetes 72 (62.60%) responded that they don't know the symptoms. The ignorance regarding their disease condition was equal both in males and females. This study was constant with a study done in the Semi-Urban community of Omani population showed participants had good knowledge about the precision of diabetes mellitus (46.5%), symptoms of diabetes mellitus (57%), and complications of diabetes mellitus (55.1%).[11]

This study claim higher knowledge on a different level of knowledge about diabetes mellitus as compared to a similar study in Kenya, which showed respondents, had good knowledge on definition of diabetes mellitus (29%), objectives and subjunctives of diabetes (29%), risks of diabetes mellitus (26.1%) and complications of diabetes (26.4%) (20), and the finding is lower compared to a study done in Nigeria, which showed that 80.2% participants knew what diabetes is, its signs & symptoms and complications.[12]

In the present study, 51% of men and 27% of women were obese. These results were matched with a study done in Pune, Maharashtra India.[13] A question regarding physical activity "which type of lifestyle changes you are practicing to control your disease" about 57 (49.56%) were responded as they are not practicing any changes. Only a few of them

answered as they practice walking, yoga, and meditation during the pre-intervention. Once after the counseling 106 (92.17%) patients answered that they are practicing physical activities like walking, exercises, yoga, and taking medicines to control diabetes.

A study accompanied in India found that among the study subjects 48% followed nutritional modifications to prevent diabetes. The Indian Diabetic Risk Score (IDRS) guidelines were used to assess physical activity at the workplace, home, and involvement in physical exercise. Most of them had a sedentary to mild physical activity pattern, 47% did not undertake any physical exercise.[14]

In these findings, more than half of the participants 66%(n=76) know the cause of type 2 diabetes; which was found to be higher than a study conducted at the University of Gondar hospital.[15]

A total of 65% of subjects, had their blood sugar level checked either monthly once or in six months, or annually. This result was lower than the study conducted in Pondicherry, India (78.8%).[16] but it has improved to 99% after the intervention.

In our study, providing two sessions of diabetic knowledge and awareness the mean total score increased from 13 to 25 after successful educational intervention and there was also a marked improvement in patient awareness regarding different aspects of diabetes. These outcomes are similar to other studies, where patients who attended diabetes education had higher knowledge, attitude, and glycemic control of their disease.[17,18]

CONCLUSION

Knowledge of type 2 diabetes mellitus patients was inadequate, and practice to reduce type 2 diabetes symptoms was not satisfactory with they had a remarkably negative attitude during the pre-intervention visit. The study results reveal a significant improvement in KAP among both men and women following counseling. The mean score during the pre-intervention was 13 (SD±5.54), and it was improved to 25(SD ±4.24). These results suggest that education and intervention programs to increase awareness of type 2 diabetes mellitus are necessary for enhancing their knowledge and practice, which in turn help them to lead a healthy life.

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Conflict of interest

There is no conflict of interest in this work.

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