Study on Knowledge Attitude and Self-Care Practice Towards Glycemic Control in Type 2 Diabetes Mellitus Patients

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Abstract

Diabetes is a clinical syndrome characterized by hyperglycemia due to absolute or relative insulin deficiency. Lack of awareness about diabetes contributes to a more significant extent to the development of its complications. Self-care encompasses lifestyle modifications, medication-taking behavior, self-monitoring of blood glucose, and foot care. The study aimed to analyze the level of knowledge, attitude, and self-care practice toward type 2 diabetes mellitus and to determine the knowledge versus practice gap among the patients. A self-administered questionnaire survey was conducted to know the knowledge, attitude, and practice-oriented issues prevailing among type 2 diabetes mellitus patients. Out of 85 patients, 49 were male and 36 were female, generating 57.6 % and 42.3 % respectively showing more prevalence in males than in females. The disease was predominantly present in patients aged 55- 67 years. This study showed that 57.6 % (n= 49) of patients had glycated hemoglobin (HbA1c) values above 7.5 %. Female patients showed higher HbA1c > 9.6 % than males. Among the 51 patients whose fasting blood glucose sugar (FBS) was assessed, only 9.8 % had FBS <90 mg/dL. This study shows that people with type 2 diabetes mellitus have at least one other condition that can influence the self-management of diabetes and its progression. Dyslipidemia was found to be the most prevalent (10.58 %) among the study population. Sulfonylureas (69.41 %) are the most commonly prescribed oral hypoglycemic agents (OHAs). Among the study population, 52.9 % of them use insulin. 48.2 % are hypertensive patients and 34.11 %, 23.52 %, and 10.58 % are under anti-hypertensives, anti-hyperlipidemic, and anti-platelet drugs respectively. Diabetic neuropathy was common (2.35 %) compared to other microvascular complications. (n= 63) patients were prescribed fixed-dose combination (FDC), which is crucial in effectively achieving glycemic targets. 88.23 % of patients had a profound knowledge of their conditions. 30.58 % of patients were not aware of the serious complications of diabetes. Self-care practice is lacking among 80 % of people who do not regularly take self-care measures to prevent diabetes.

Keywords

Glycated hemoglobin (HbA1c), Knowledge, Attitude, Self-care practice, Type 2 Diabetes Mellitus.

INTRODUCTION

The World Health Organization (WHO) describes diabetes mellitus as a long-term metabolic disorder marked by hyperglycemia brought on by insufficient or no insulin secretion, along with or without concurrent impairment of insulin action, which harms the heart, blood vessels, eyes, kidneys, and nerves. One of the most prevalent metabolic illnesses in the world is type 2 diabetes mellitus (T2DM), which develops as a result of a confluence of two key factors: impaired insulin production by pancreatic beta-cells and impaired insulin sensitivity in tissues [1]. T2DM, which is characterized by insufficient insulin secretion by pancreatic islet beta-cells, tissue insulin resistance (IR), and an insufficient compensatory insulin secretory response, accounts for almost 90 % of diabetes mellitus cases. As the illness worsens, insulin secretion becomes unable to keep glucose levels in balance, leading to hyperglycemia [1]. There are several insulin-deficient conditions: 1) Reduced insulin secretion by beta cells; 2) insulin antagonists in plasma, either as a result of counter-regulatory hormones or non-hormonal substances that affect insulin receptors or signaling, and 3) reduced insulin responsiveness in target tissues. Our study aims to: 1) Assess the level of knowledge, attitude, and self-care practice towards type 2 diabetes mellitus. 2) Determine the knowledge versus practice gap among the patients.

The figure explains the micro and macrovascular complications of T2DM.
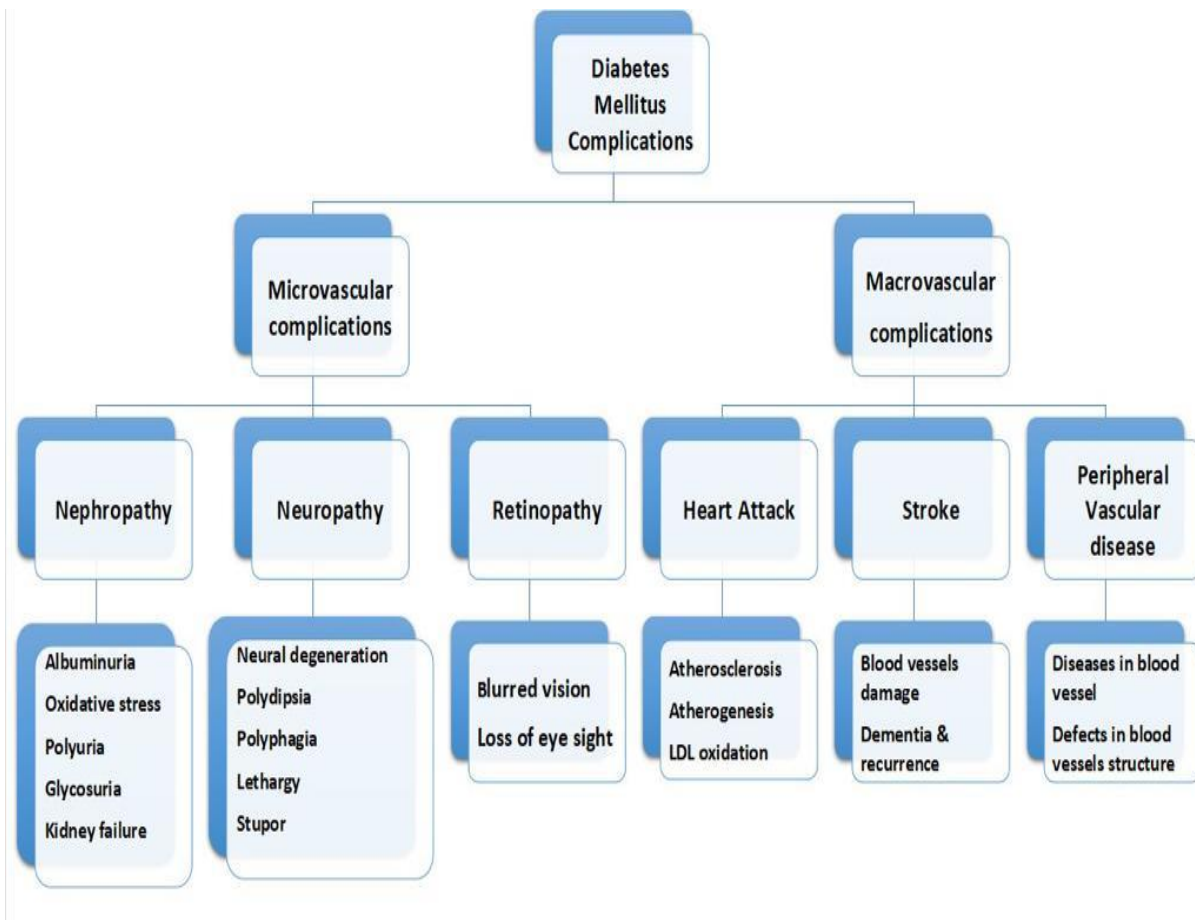
A higher risk of coronary heart disease (CHD) is linked to diabetes. The risk of myocardial infarction (MI) in diabetic patients over 7 years was comparable to the risk of MI in non-diabetic patients who have already experienced a MI, suggesting that diabetes has a significant impact on the onset of MI and can be viewed as a risk equivalent CHD [2].

KAP and its significance

KAP regarding diabetes varies greatly depending on socioeconomic conditions, cultural beliefs, and habits. Knowledge of diabetes can prevent the imminent chronic comorbidities of diabetes mellitus, which impact significantly the quality of life of diabetic patients. Information can help people to assess their risk of diabetes, motivate them to seek proper treatment and care, and inspire them to take charge of their disease for their lifetime [3].

HbA1c

Given the expected half-life of red blood cells (RBCs), glycated hemoglobin (HbA1c) in blood offers information about a person's typical blood glucose levels over the past 2 to 3 months [4]. It is advised as the standard of care (SOC) for diagnosing, managing, and treating type 2 diabetes mellitus chronically [5]. When someone is being tested for diabetes or prediabetes, HbA1c is a trustworthy biomarker and a fantastic indicator of insulin resistance. It is also a good predictor of lipid profile, helping to identify diabetes patients who are more likely to develop cardiovascular issues. It is inversely correlated with high-density lipoprotein cholesterol and directly correlated with triglycerides, low-density lipoprotein cholesterol, and cholesterol [6]. Even a 1 % increase in HbA1c concentration was linked to a 40 % increase in cardiovascular or ischemic heart disease (IHD) mortality and a 30 % increase in overall mortality in those with diabetes. However, lowering the HbA1c level by 0.2 % could result in a 10 % reduction in mortality [7].

Relationship between HbA1c and its Complications

Maintaining HbA1c < 7 % over 5 years was associated with a reduced rate of diabetes-related complications relative to having sustained HbA1c greater than or equal to 7 % [7].

OBJECTIVES

The study entitled "Study on Knowledge, Attitude and Self- care Practice towards glycaemic control in Type II Diabetes Mellitus" was designed to achieve the following objectives: 1) To assess the level of knowledge, attitude, and self-care practice toward T2DM. 2) To determine the knowledge versus practice gap among the patients.

METHOD

A cross-sectional observational study was conducted to assess the knowledge, attitude, and self-care practice towards T2DM. The consent of the patients was taken and the study was carried out using a self-administered questionnaire. It also focused on the knowledge versus practice gap and the association between KAP and glycemic control. The study population included patients with T2DM who visited the study site. Patients of both genders and within the age limit of 18-80 years of age were invited to take part in this study. The demographic details of the patients were collected. The HbA1c, random blood sugar (RBS), fasting blood sugar (FBS), and postprandial blood sugar (PPBS) were noted. Other laboratory

investigations were also taken into consideration which contributed to the final results. The questionnaire used in this study was developed to collect data on participant's KAP towards glycemic control, its risk factors, and management. A self-administered questionnaire containing 26 questions was used to check the KAP among the patients. Out of 85 patients, 49 were male and 36 were female, generating 57.6 % and 42.3 % respectively. Knowledge was measured using 8 questions related to causes, symptoms, complications of diabetes, and newer drugs used for the treatment of T2DM. An attitude was assessed using 10 questions about adherence to self-care practices among the patients. Practices were assessed using 8 questions on the frequency of visits to the physician, use of insulin, and a few tests like eye examination, urine examination, cardiac examination, etc. Responses to the individual questions were assessed to evaluate the impact of self-care practices and the knowledge versus practice gap among T2DM patients.

RESULTS

The study showed that the percentage of male patients affected by T2DM was higher when compared to that of female patients. The participants' mean (SD) age was 59.9(10.3) years. The age group between 55-67 years was the most affected. The study showed that 37.64 % of patients had a history of diabetes for 1-3 years, 25.88 % had it for more than 10 years, 20% for 4-6 years, 14.11 % for 7-9 years and 2.35 % were newly diagnosed. There were no significant variations in liver function tests (LFT) and differential leukocyte counts (DLC). anti-hypertensives, anti-hyperlipidemic, and antithrombotics were the most commonly prescribed drugs at 34.11 %, 23.52 %, and 15.28 % respectively. The study findings showed that 48.2 % of patients are hypertensive. In this population, diabetic neuropathy was common (2.35%) compared to that of other microvascular complications. Dyslipidemia was found to be very prevalent (10.58%) among the study population. Sulfonyl ureas (69.41%) are the most commonly prescribed oral hypoglycemic agents (OHAs). Sodium- glucose cotransporter 2 (SGLT 2) inhibitors and di-peptidyl peptidase (DPP-4) inhibitors are not commonly prescribed when compared to those with sulfonylureas. **(Table 1) shows the sociodemographic and clinical characteristics of the study participants**

Table 1: Sociodemographic and clinical characteristics of the study participants (n=85)

Variable	Frequency (n=85)	Percentage
Gender		
Male	49	57.6
Female	36	42.3
Age (years)		
18 – 28	0	0
29 – 41	3	3.52
42- 54	24	28.23
55-67	36	42.35
68-80	22	25.88
Duration of Diabetes		
1-3 years	32	37.64
4-6 years	17	20
7-9 years	12	14.11

≥10 years	22	25.88
Newly diagnosed	2	2.35
HbA1C (%)		
5.5-7.5	36	42.35
7.6-9.5	21	24.7
9.6-11.5	17	20
11.6-13.5	6	7
13.6-15.5	3	3.52
≥15.5	2	2.35
Fasting Blood Sugar (mg/dL)		
50- 100	12	23.5
101- 150	19	37.2
151- 200	15	29.4
201- 250	3	5.9
251- 300	0	0
301- 350	1	2
351- 400	1	2
Post Prandial Blood Sugar (mg/dL)		
100- 200	12	48
201- 300	11	44
301- 400	2	8
Random Blood Sugar (mg/dL)		
100- 200	23	50
201- 300	11	23.9
301- 400	11	23.9
401- 500	1	2.1
Laboratory Investigations		
Blood counts	82	96.47
Differential Leucocyte Count	45	52.94
RFT	72	84.7
LFT	28	32.94
Thyroid Function Test (mlU/L)	44	51.76
OHAs Prescribed		
Sulfonyl Ureas	59	69.41
Biguanides	19	22.35
Thiazolidinediones	4	4.7
Alpha Glucosidase Inhibitors	5	5.88

SGLT 2 Inhibitors	4	4.7
DPP4 Inhibitors	13	15.29
Incretin Mimetics	3	3.53
Insulin Prescribed		
Inj.Humalog	5	5.88
Inj.Toujeo	3	3.53
Inj.Basaglor	9	10.59
Inj.Fiasp	5	5.88
Inj.Lantus	6	7.06
Inj.Actrapid	3	3.53
Inj.Tresiba	5	5.88
Inj.Apidra	3	3.53
Inj.Basalog	2	2.35
Others	4	4.7
FDC		
T. Abvida M	9	14.2
T. Diamicron XR	1	1.58
T. Trajenta Duo	17	26.9
T. Vylda M	12	19.04
T. Zavamet	1	1.5
T. Istamet	1	1.5
Inj. Humalog Mix	3	4.7
Inj. Eglucent Mix	1	1.5
Inj. Ryzodeg	1	1.5
T. Galvus Met	1	1.5
T. Torglip M	3	4.7
T. Glyxambi	3	4.7
T. Glizid M	1	1.5
T. Dianorm M	1	1.5
T. Xigdu XR	1	1.5
T. Jalra M	2	3.1
T. Glucobay M	1	1.5
Others	4	6.3
Major categories of drugs		
Antibiotics	13	15.29
Proton Pump inhibitors	17	20
Anti-inflammatory	13	15.29
Anti emetics	6	7.05
Anti-hypertensives	29	34.11
Anti platelets	9	10.58
Sedatives	1	1.17

Anti coagulants	4	4.7
Anti epileptics	6	7.05
Antidepressants	3	3.5
Anti Hyperlipidemic agents	20	23.52
Anti asthmatics	2	2.35
Anti histamines	4	4.7
Diuretics	2	2.35
Anti anginal	6	7.05
Anti thyroid	10	11.76
Multivitamins	24	28.25
Others	19	22.35
Macrovascular complications		
SHT	41	48.2
CAD	12	14.1
Dyslipidemia	9	10.5
Stroke	1	1.17
Angina	1	1.17
Microvascular complications		
Diabetic neuropathy	2	2.35
Diabetic retinopathy	1	1.17
Diabetic foot ulcer	1	1.17
Number of comorbidities		
One	22	25.88
Two	40	47.05
Three	6	7.05
Four	2	2.35
Five	1	1.17
Other comorbidities		
Respiratory disorder	2	2.35
Blood disorder	4	4.7
Dyslipidemia	9	10.58
UTI	4	4.7
Hypoglycemia	1	1.17
Hypothyroidism	8	9.41

Knowledge of study subjects towards diabetes (Table 2)

Based on the responses obtained from our study, 88.23 % of patients had a profound knowledge of their conditions, other major causes, and their symptoms. 20 (30.58 %) of patients were not aware of the serious complications of diabetes.79 (93 %) did not know about the newer anti-diabetic drugs. The mode of transmission of disease was unbelieved by 6 (7.05 %) patients as communicable and another 6 (7.05 %) had no knowledge of their mode of transmission. 14 (16.47 %) of the patients believed that taking insulin

injections can cure their diabetes condition which is a major drawback. A KAP study conducted by Muhammad Uthman et al (2015) revealed that the patient's level of knowledge was observed to be low at 46 %, medium at 39 %, and high at 63 %.

Table 2: Knowledge of study subjects towards T2DM (n=85)

KNOWLEDGE QUESTIONNAIRE		RESPONSES (%)		
		YES	NO	DON'T KNOW
1	Diabetes is a condition in which the body contains higher levels of blood glucose than normal	82 (96.4)	3 (3.5)	0
2	The major causes of diabetes are hereditary, obesity, and unhealthy eating habits	75 (88.2)	5 (5.88)	5 (5.88)
3	The symptoms of diabetes are frequent urination, increased thirst, and hunger	76 (89.4)	7 (8.23)	2 (2.35)
4	The most accurate method of monitoring diabetes is by checking blood glucose levels	75 (88.2)	7 (8.23)	3 (3.5)
5	Are you aware of any diabetes complications like diabetic foot ulcer, retinopathy, neuropathy, heart complications, dyslipidemia, etc	59 (69.4)	20 (23.5)	6 (7.05)
6	Diabetes is a communicable disease that spreads from person to person	6 (7.05)	73 (85.9)	6 (7.05)
7	Are you aware of newer diabetic drugs like Semaglutide and liraglutide?	6 (7.05)	37 (43.5)	42 (49.4)
8	Can taking insulin injections cure diabetes?	14 (16.4)	55 (64.7)	16 (18.8)

Maximum score: 16

Minimum score: 0

The highest knowledge score was found to be **16**.

The lowest knowledge score was found to be **4**.

The average score was found to be **12.**

Attitude of study subjects towards T2DM (Table 3)

Self-care practice is lacking among 68 (80 %) people who do not have the regular habit of taking self-care measures to prevent diabetes. 17 (20 %) of people lacked a glucometer which is a major drawback in their glycaemic control. 38 (44.7 %) of people followed a diabetes diet. Only 66 (77.64 %) of people had an

awareness that missing their anti-diabetic drugs can have a negative impact on disease control. 19 (22.35 %) lacked awareness. Only 13 (15.29 %) of patients had an awareness of carrying sweets/toffees when they go out preventing them from hypoglycemia whereas 72 (84.7 %) lacked behavioral practices. The same KAP study conducted by Muhammad Uthman et al (2015) [8] showed the patient's attitudes were reported as low at 8%, medium at 15%, and high at 7%.

Table 3: Attitude of study subjects towards T2DM (n=85)

	ATTITUDE QUESTIONNAIRE	RESPONSES (%)		
		YES	NO	DON'T KNOW
1	Do you have the habit of cleaning your feet with water every day?	72 (84.7)	13 (15.2)	0
2	Do you apply any oil or cream to your feet before sleeping?	17 (20)	68 (80)	0
3	Are you aware of Continuous Glucose Monitoring (CGM)?	61 (71.7)	19 (22.3)	5 (5.8)
4	Are you aware of Ambulatory Glucose Monitoring?	21 (24.7)	38 (44.7)	26 (30.5)
5	Do you own a glucometer?	68 (80)	17 (20)	0
6	Are you following any diabetes diet?	38 (44.7)	47 (55.2)	0
7	Do you think missing doses of your diabetic medication will hurt your disease control?	66 (77.6)	19 (22.3)	0
8	Have you got the habit of carrying sweets/toffees when you go out?	13 (15.2)	72 (84.7)	0

	ATTITUDE QUESTIONNAIRE	RESPONSES (%)			
		DAILY	ONCE A WEEK	ONCE IN A MONTH	RARELY
9	How often do you consume sugary foods/ sweets?	7 (8.23)	30 (35.2)	7 (8.23)	41 (48.2)
10	How often do you exercise?	ONCE WEEKLY	DAILY	WHENEVER TIME PERMITS	NEVER

	2 (2.3)	31 (36.4)	44 (51.7)	8 (9.4)

Maximum score: 24

Minimum score: 0

The highest attitude score was found to be **23**.

The lowest attitude score was found to be **4**.

The average score was found to be **15.**

Practice of study subjects towards T2DM (Table 4)

34 (41.17 %) had no regular screening of their blood pressure. 57 (67.05 %) had regular monitoring of their blood glucose. But 28 (33 %) had a poor glycaemic control. The level of practice of study subjects according to the KAP survey of T2DM conducted by Mohammad Uthman et al (2015) [9] was found to be low at 78 %, medium at 15%, and high at 7%.

Table 4: Practice of study subjects towards T2DM (n=85)

	PRACTICE QUESTIONNAIRE	RESPONSES (%)			
		RECENTLY	A MONTH AGO	6 MONTHS AGO	>OR A YEAR AGO
1	When was the last time you checked your blood pressure?	50 (58.8)	26 (30.6)	9 (10.9)	0
2	When was your last eye examination?	13 (15.3)	21 (24.7)	20 (23.5)	31 (36.5)
3	When was your last urine examination?	37 (43.5)	25 (29.4)	16 (18.8)	7 (8.2)
4	When was your last visit to your physician?	30 (35.3)	40 (47.05)	15 (17.6)	0
5	When was your blood glucose last checked?	57 (67.05)	23 (27.05)	5 (5.9)	0
6	When was your lipid profile last checked?	22 (25.9)	32 (37.6)	21 (24.7)	10 (11.8)
7	When was your last cardiac examination done?	19 (22.4)	20 (23.5)	29 (34.1)	17 (20)

		YES	NO	DON'T KNOW / NOT TAKEN	
8	Does using insulin injection make you anxious?	7 (8.2)	44 (51.8)	34 (40)	

Maximum score: 30

Minimum score: 1

The highest practice score was found to be **29**.

The lowest practice score was found to be **15**.

The average score was found to be **24.**

Knowledge Attitude and Self-care Practice among T2DM (Table 5)

The mean values of KAP among the male and female patients were assessed. It was discovered that the values of KAP were higher in men than in women.

Table 5: Knowledge Attitude and Self-care Practice among T2DM

	KNOWLEDGE (mean)	ATTITUDE (mean)	PRACTICE (mean)
MALE	11.87755	14.65306	23.57143
FEMALE	11.61111	13.88889	22.91667
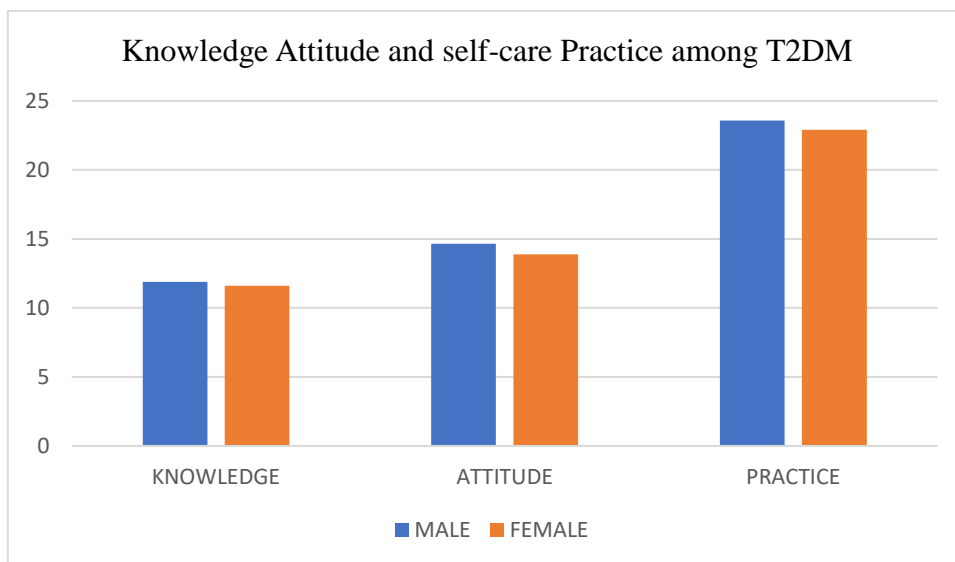
KAP and HbA1c (Table 6)

According to the KAP scores, it may be deduced that women's HbA1c levels were greater than those of men because of their extensive knowledge and lack of self-care habits.

Table 6: KAP and HbA1c

	KNOWLEDGE (mean)	ATTITUDE (mean)	PRACTICE (mean)	HbA1c (mean)	STANDARD DEVIATION (mean)
MALE	11.87755	14.65306	23.57143	8.56862	0.70262
FEMALE	11.61111	13.88889	22.91667	9.13235	0.83208
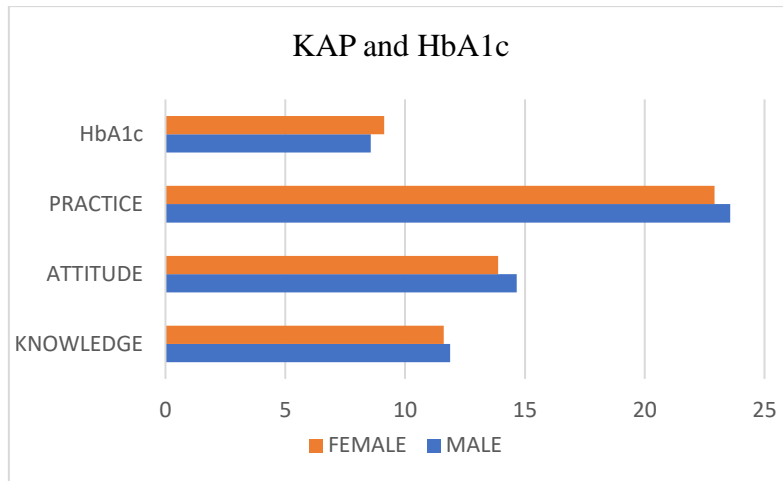
Linear regression (Knowledge vs Practice- male and female)(Table 7a and 7b)

The knowledge vs practice related to type 2 diabetes patients was evaluated using a linear regression model. In general, male patients possessed more knowledge than female patients, although both sexes did not adhere to their practices well.

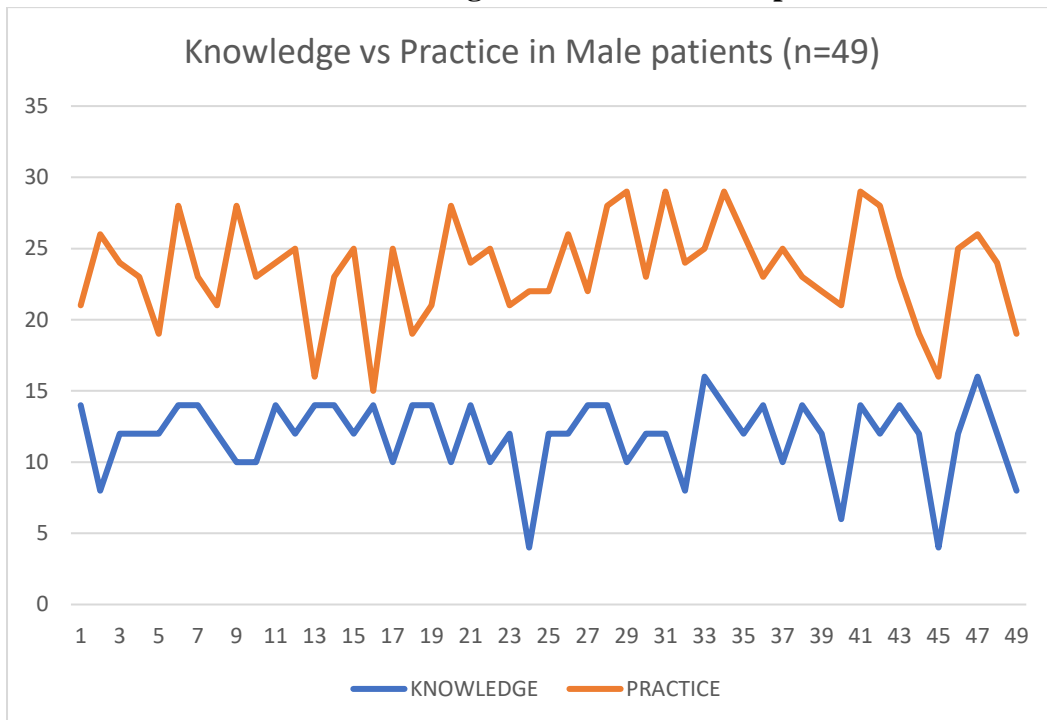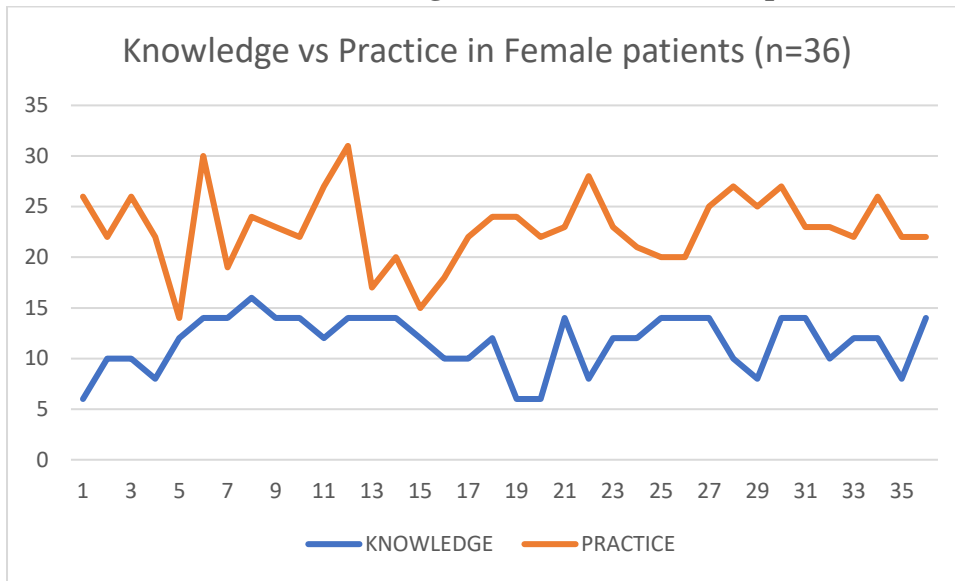**Table : 7a Knowledge vs Practice in Male patients**

Table: 7b Knowledge vs Practice in Female patients

Knowledge vs Practice in Female patients (n=36)

DISCUSSION

Knowledge vs Practice gap:

In our study, 88.23 % study population were found to have good knowledge. The KAP scores were slightly greater among males than females, which is similar to the study conducted by Mohammad A. Mahzari et al (2022) [9]. Though 88.23 % of patients had good knowledge of T2DM, their symptoms, and complications, there was a slight deviation when it came to practice. 88.2 % knew checking their blood glucose levels was the accurate method for monitoring the disease, and only 67.05 % of the subjects checked their blood glucose regularly. The study population lacked knowledge only of the newer drugs in the market for the treatment of T2DM. Knowledge of foot care has been seen, as 84.7 % clean their feet every day. As diet and exercise play an important role in controlling T2DM, 55.2 % of them failed to follow a proper diabetic diet and only 36.4 % exercised daily. Patients who were on FDC and did regular exercise were found to have fewer or no co-morbidities compared to those who did not exercise regularly. A Chinese study implied that knowledge of Diabetes doesn't necessarily guarantee that people will achieve good glycaemic control [10]. Considering the above fact, this study showed profound knowledge but self-care practices were inappropriate.

CONCLUSION

The study findings showed good knowledge but poor attitude and practice behavior towards diabetes. So, there is a need for structured community programs to increase attitudes and practices towards diabetic patients and to promote better compliance towards diet, exercise, and drug regimens to prevent further complications related to diabetes.

LIMITATIONS

This study had a few limitations that should be taken into consideration while interpreting the results of the present study.

1. As this study was carried out in tertiary care, there may be bias in the participants' understanding of T2DM because they are exposed to information on the disease at the clinics through hospital-provided booklets and posters or easily accessible education.
2. The population with low economic status and poor literacy rates is not fully represented by the sample size.

CONFLICT OF INTEREST

There are no conflicts of interest concerning the research, authorship, and publication of this article.

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