

KNOWLEDGE, ATTITUDE AND PRACTICES (KAP) REGARDING DIET AMONG
DIABETES MELLITUS PATIENTS IN WESTERN MAHARASHTRADr. Saima Istayaque^{*1}, Dr. Farha Rizwan Sikalgarg², Dr. Ejaz Parvez Shaikh³, Dr. Shaikh Sana Kausar⁴¹P.G. Scholar, Dept. of Tahaffuzi wa Samaji Tibb, Z.V.M. Unani Medical College & Hospital, Pune. (MH) India.²Associate Professor & HOD, Dept. of Tahaffuzi wa Samaji Tibb (PSM) Z.V.M. Unani Medical College & Hospital, Pune (MH) India.³Professor, Dept. of Tahaffuzi wa Samaji Tibb (PSM) Z.V.M. Unani Medical College & Hospital, Pune (MH) India.⁴P.G. Scholar, Dept. of Jarahat (Surgery), Z.V.M. Unani Medical College & Hospital, Pune (MH) India.***Corresponding Author: Dr. Saima Istayaque**

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ABSTRACT

Diabetes mellitus (*Ziyabetus Shakari*) is a major chronic metabolic disorder characterized by persistent hyperglycemia and associated with significant morbidity and long-term complications. Dietary knowledge, attitudes, and practices play an important role in diabetes management. However, gaps in nutritional knowledge and adherence to recommended dietary practices remain important concerns, particularly among patients in Maharashtra. A cross-sectional study was conducted among 250 patients with Type 2 Diabetes Mellitus, aged 20–60 years, attending the IPD/OPD of the concerned hospital. Patients with random blood sugar below 180 mg/dl were included. Data were collected through a structured **30-item questionnaire** assessing dietary knowledge, attitudes, and practices, along with relevant sociodemographic information. Face-to-face interviews were conducted, and ethical approval and informed consent were obtained. Among the 250 participants, **48.8% were aged 41–50 years**, while 38.8% were aged 51–60 years. Males constituted 57.2% and females 42.8%. Regarding knowledge, **63.2% had low knowledge**, 33.6% had moderate knowledge, and only 3.2% had high knowledge. Attitude was negative in 69.6%, neutral in 17.6%, and positive in 12.8% of participants. Self-care practices were poor in **92.8%**, while 7.2% demonstrated moderate practices and none demonstrated good practices. The association of knowledge, attitude, and practice with age was statistically non-significant. The study demonstrates substantial gaps in dietary knowledge, attitude, and self-care practices among patients with Type 2 Diabetes Mellitus. The high proportion of patients with poor knowledge and inadequate practices indicates a need for structured, culturally appropriate dietary education, continuous counseling, and community-based interventions to improve diabetes self-management and reduce the risk of complications.

KEYWORDS: Diabetes Mellitus; Type 2 Diabetes Mellitus; *Ziyabetus Shakari*; Dietary Knowledge; Attitude; Dietary Practices; KAP; Nutritional Education.**I. INTRODUCTION DIABETES MELLITUS (ZIYABETUS SHAKARI)**

Diabetes mellitus (*Ziyabetus Shakari*) is one of the oldest recognized diseases and has become a major global public health concern. The prevalence of diabetes is increasing rapidly worldwide, with Type 2 diabetes accounting for the majority of cases. India carries a particularly high burden, emphasizing the need for effective prevention, early diagnosis, and accessible

treatment. The term *diabetes* refers to excessive passage of urine, while *mellitus* denotes sweetness, reflecting the presence of glucose in urine. Diabetes mellitus is a chronic metabolic disorder characterized primarily by hyperglycemia resulting from impaired insulin secretion, reduced insulin action, or both. It involves disturbances in carbohydrate, protein, and lipid metabolism and develops through interactions between genetic and environmental factors. Persistent hyperglycemia can lead

to serious microvascular complications, including neuropathy, nephropathy, and retinopathy, as well as macrovascular complications such as myocardial infarction, stroke, and peripheral arterial disease. Therefore, diabetes represents a significant and growing health challenge requiring comprehensive prevention, early detection, and long-term management.^[2-9]

Type 2 diabetes mellitus (T2DM), known as *Ziyabetus Shakari* in Unani terminology, is a common chronic metabolic and endocrine disorder characterized by persistent hyperglycemia resulting from impaired insulin secretion, insulin resistance, or both. It causes disturbances in carbohydrate, protein, and lipid metabolism and is increasingly prevalent worldwide, particularly in developing countries such as India. Long-term uncontrolled diabetes can produce serious microvascular complications, including retinopathy, nephropathy, and neuropathy, and macrovascular complications, including atherosclerosis and cardiovascular disease. Diabetic neuropathy may contribute to foot ulcers, Charcot arthropathy, and amputation, while nephropathy can progress to renal failure and retinopathy may result in visual impairment or blindness. Autonomic complications, including sexual dysfunction, may also occur. Once considered primarily a disease of older adults, T2DM now increasingly affects younger and middle-aged populations and has become an important cause of morbidity and mortality worldwide.^[10-12]

Diabetes mellitus is a major and rapidly increasing global public health problem, particularly in developing and economically transitioning countries. Earlier WHO and IDF estimates demonstrated a substantial rise in diabetes prevalence worldwide, with India identified as one of the countries carrying a particularly high burden. Diabetes is often described as an “iceberg disease” because a large proportion of affected individuals remain undiagnosed. The disease contributes substantially to premature mortality and disproportionately affects low- and middle-income countries.

The history of diabetes dates back to ancient Greek, Indian, and Egyptian civilizations, which recognized the characteristic sweetness of urine. Major advances in understanding its pathophysiology occurred in the late nineteenth century when **Mering and Minkowski** demonstrated the important role of the pancreas in diabetes. A major therapeutic breakthrough followed in **1922**, when **Frederick Banting and Charles Best**, with their collaborators, successfully isolated insulin, leading to an effective treatment for diabetes. Despite significant advances in diagnosis, prevention, and treatment, diabetes remains one of the most common chronic diseases worldwide and continues to impose a considerable burden through its complications, disability, and premature mortality.^[14-15]

Diabetes mellitus, particularly Type 2 diabetes mellitus (T2DM), is a major and growing non-communicable disease with a substantial burden in India. T2DM tends to occur at a younger age among Indians compared with Western populations and may develop even during early adulthood. Moreover, unlike the typical association with obesity observed in Western populations, a considerable proportion of Indian patients may be non-obese or underweight, highlighting the influence of genetic, dietary, metabolic, and lifestyle factors.

Uncontrolled diabetes can lead to serious complications such as retinopathy and blindness, nephropathy and renal failure, neuropathy, diabetic foot and gangrene, cardiovascular disease, and coma, contributing significantly to morbidity and premature mortality. Although advances in modern medicine have improved diabetes management, the increasing prevalence and long-term complications emphasize the need for safer, effective, affordable, and sustainable therapeutic approaches.

The Unani system of medicine has traditionally recognized and managed diabetes-related disorders since the Greco-Arab period and contains numerous medicinal substances documented in classical *Qarabadeen*. However, many of these traditionally used drugs require systematic scientific evaluation to establish their efficacy, safety, pharmacological mechanisms, and therapeutic potential. Therefore, research on naturally derived Unani medicines may provide valuable opportunities for developing complementary or novel approaches for the prevention and management of Type 2 diabetes mellitus, particularly in populations at high risk of early-onset disease.^[16]

Diabetes mellitus (DM) is a chronic metabolic disorder characterized by persistent hyperglycemia resulting from inadequate insulin secretion, insulin resistance, or a combination of both. The global burden of diabetes has increased substantially over recent decades and is projected to continue rising, making it a major public health challenge. India contributes significantly to this growing burden and is often described as the “**diabetes capital of the world**,” with a large and rapidly increasing adult diabetic population. Maharashtra also reports a considerable prevalence of diabetes, particularly in urbanized and economically developed districts, where changing dietary patterns, reduced physical activity, obesity, and sedentary lifestyles contribute to the increasing incidence. These trends highlight the urgent need for early screening, prevention, lifestyle modification, timely diagnosis, and effective long-term management of diabetes, particularly among high-risk populations.^[19]

Diet plays a crucial role in the prevention and management of diabetes mellitus. The **ICMR-NIN Dietary Guidelines for Indians (2024)** emphasize adequate dietary fiber, moderation of fats and sweets,

balanced nutrition, and culturally appropriate dietary practices.^[20] However, studies in Maharashtra report significant gaps in nutritional knowledge and dietary practices. A mixed-method study in Vidarbha found gender differences in nutrition awareness, while rural populations in Western Maharashtra showed poorer dietary practices and lower awareness than their urban counterparts.^[17,19,20]

KAP research offers vital information on patient behavior:

Knowledge: Misconceptions regarding food (e.g., rice consumption, fruit limitations) continue to exist, despite the fact that many patients acknowledge diabetes as a lifestyle-related disorder.^[17]

Attitude: Although there are positive attitudes on changing one's lifestyle, socioeconomic barriers and cultural dietary preferences frequently hinder these attitudes.^[18]

Practice: In rural Maharashtra, less than 45% of patients follow suggested diet and monitoring regimens, indicating that actual dietary adherence is still low.^[18]

These results highlight the need for community-based awareness campaigns, culturally relevant treatments, and specialized nutrition education programs to close the knowledge gap.

Western Maharashtra reflects India's growing diabetes burden, influenced by poor health literacy, urbanization, and changing dietary habits. Therefore, assessing dietary **knowledge, attitude, and practices (KAP)** among diabetic patients is important for improving self-management and reducing complications.

This cross-sectional study includes 250 Type 2 Diabetes Mellitus (*Ziyabetus Shakri*) patients aged 20–60 years, selected from the IPD/OPD of a hospital or clinic in Western Maharashtra. The study will be conducted for six months, with ethical approval and informed consent. Random blood sugar (BSL-R) will be measured using an Accu-Chek glucometer, and patients with values below 180 mg/dl will be included. A 30-item questionnaire will assess dietary knowledge, attitudes, and practices.

The dissertation covers the history, Unani and modern concepts, classification, pathophysiology, clinical features, complications, diagnosis, and management of diabetes. The literature review includes Unani medicines such as Jamun, Neem, and Methi, formulations such as Majoon Dabeed-ul-Shakari and Qurs Tabasheer, and regional and international KAP studies.^[19-20]

II. AIM AND OBJECTIVE

- How do knowledge, attitude and practices regarding diet interact and influence diabetes management in patients?
- What are the most effective strategies for healthcare providers to support diabetic patients in adopting and maintaining a healthy diet.
- To Know about Knowledge, attitude and practices regarding Diet Among Diabetes Mellitus Patients.

III. Historical background of Diabetes in Ancient period

The history of diabetes mellitus reflects a gradual evolution from ancient clinical observations to modern scientific understanding. Ancient Egyptian, Indian, Greek, and Chinese physicians recognized characteristic features such as excessive urination, sweetness of urine, weight loss, and weakness. The term *diabetes*, meaning “to pass through” or “siphon,” was later associated with the condition by Greek physicians, while Thomas Willis introduced *mellitus*, meaning “sweet,” highlighting the presence of sugar in urine. In the nineteenth century, Claude Bernard's work on the liver and glucose metabolism further established the metabolic basis of diabetes. These historical developments laid the foundation for the modern understanding of diabetes as a complex metabolic disorder.^[20-21]

IV. Diabetes in the light of the Unani system of medicine

In Unani medicine, **Zayabeetus (Ziyabetus Shakri)** is a recognized disorder characterized primarily by excessive thirst, increased water intake, and frequent or excessive urination. Various traditional terms, including *Silsilul Maul*, *Istisqa-e-Anmas*, *Dolab*, *Moattasha*, *Baul-e-Sheere*, and *Baul-e-Sakri*, reflect different clinical manifestations and historical interpretations of the disease. The terminology is closely related to the Greek concept of *diabaino*, meaning “to pass through,” describing the rapid passage of fluids through the body. The later addition of *mellitus*, meaning “sweet like honey,” emphasized the presence of sugar in urine. Thus, both Unani and historical Greco-Arab medical literature recognized important clinical features of diabetes, providing an early foundation for its subsequent scientific understanding.^[22-25]

V. History of Diabetes – Simplified Overview^[25-27]

Table No. 01: Historical Background of Diabetes.

Period / Year	Region / Physician	Major Contribution
2000 BC	Ancient Egypt – Kahun Papyrus	Mentioned excessive thirst and related symptoms, although diabetes was not clearly defined.
1500 BC	Ancient Egypt	Early descriptions of excessive thirst and frequent urination; treatment mainly involved plant-based remedies.
1st Century AD	Rufus of Ephesus & Galen	Described diabetes as a condition involving excessive passage of urine.
5th Century AD	Ancient India – Sushruta	Described <i>Madhumeha</i> (“honey-like urine”) and recognized characteristic symptoms.
400–500 AD	Charaka	Classified forms of diabetes and described features resembling modern concepts of diabetes.
2nd–3rd Century AD	Ancient China – Chang Chung-Ching	Reported excessive urination, thirst, and weight loss.
7th Century AD	China – Chen Chuan	Described <i>Hsiao Kho Ping</i> , associated with intense thirst and sweet urine.
8th Century onward	Various physicians	Recognition of complications such as skin infections, ulcers, boils, and eye problems.
11th Century AD	Avicenna (Ibn Sina)	Described diabetes and complications including gangrene and sexual dysfunction in <i>The Canon of Medicine</i> .
Medieval Period	Maimonides	Documented symptoms suggestive of severe metabolic complications of diabetes.
17th Century	Thomas Willis	Noted the sweetness of urine and associated diabetes with the term <i>mellitus</i> .
19th Century	Claude Bernard	Advanced understanding of metabolism, glucose regulation, and the role of the liver.
1889	Oskar Minkowski & Joseph von Mering	Demonstrated the essential role of the pancreas in glucose regulation and diabetes.
1920	Moses Barron	Linked the Islets of Langerhans with the development of diabetes.
1921–1923	Frederick Banting, Charles Best & John Macleod	Discovery and development of insulin, representing a major breakthrough in diabetes treatment; Banting and Macleod received the 1923 Nobel Prize .

VI. Diagnostic period & Insulin Era^[25-27]

The diagnostic and therapeutic history of diabetes mellitus demonstrates a remarkable progression from simple clinical observation to a detailed understanding of metabolic and endocrine mechanisms. Early observations by **Thomas Willis** and **Matthew Dobson** established the association between diabetes and sugar in urine and blood, while **Claude Bernard**’s work highlighted the importance of hepatic glucose metabolism. Subsequent experiments by **Minkowski and von Mering** confirmed the essential role of the pancreas, and studies of the **Islets of Langerhans** further clarified the endocrine basis of the disease.

The discovery and therapeutic use of **insulin in the early 1920s** represented a major milestone, transforming diabetes from a frequently fatal condition into a manageable chronic disease. The development of insulin preparations, glucose-monitoring methods, and the recognition of insulin resistance subsequently improved diabetes management. The work of **Harold Himsworth** also contributed to the distinction between different forms of diabetes, particularly the concepts underlying

Type 1 and Type 2 diabetes. Overall, these historical advances established the scientific foundation for modern diagnosis, classification, monitoring, and treatment of diabetes mellitus.

VII. The Rise of Modern Diabetes Treatments

The development of diabetes management has progressed from insulin-based therapy to a wide range of pharmacological, technological, and biological approaches. The discovery of **sulfonylureas in the 1940s** introduced effective oral treatment and expanded therapeutic options beyond insulin. The subsequent classification of Type 1 and Type 2 diabetes and the establishment of standardized diagnostic criteria improved disease identification and treatment planning.

Recent advances have focused on improving insulin delivery and glucose monitoring through sensor-pump systems, artificial pancreas technologies, oral and inhaled insulin, and other innovative delivery methods. At the same time, pancreatic/islet transplantation, genetic approaches, and immunotherapies are being investigated, particularly for Type 1 diabetes. These developments

demonstrate the continuing evolution of diabetes care toward more personalized, effective, minimally invasive, and potentially disease-modifying therapies, although many emerging approaches still require further clinical validation.^[20]

VIII. General Concept of *Ziabetus Shakari*

In Unani medicine, *Ziabetus Shakari* is described primarily by persistent thirst, excessive water intake, and frequent urination, with the consumed water believed to pass rapidly through the kidneys without adequately benefiting the body. This classical description is

reflected in the term *Zalaq-ul-Kuliya*, emphasizing the rapid passage of fluid through the kidneys. The condition is associated with weakness and persistent thirst despite increased water consumption. In contemporary medicine, diabetes mellitus is understood as a chronic metabolic disorder characterized by hyperglycemia resulting from inadequate insulin secretion, impaired insulin action, or both. Thus, while the explanatory frameworks of Unani and modern medicine differ, both recognize excessive thirst and urination as important clinical manifestations of diabetes.^[28]

CLASSIFICATION OF DIABETES (UNANI & MODERN)^[31-32]

Table No. 02: Classification of Diabetes in Unani and Modern system of Medicine.

System	Type / Classification	Description
Unani	Ziyabetus Har (Hot Diabetes)	Traditionally associated with a hot temperament (Mizaj Har) and characterized by intense thirst, excessive urination, dryness, and weakness.
Unani	Ziyabetus Barid (Cold Diabetes)	Associated with a cold temperament (Mizaj Barid) and may be described with relatively less intense thirst and manifestations related to weakness of digestive/metabolic functions.
Unani	Ziyabetus Shakari / Baul-e-Shakri	Refers to diabetes associated with sweet urine and corresponds broadly to diabetes mellitus in contemporary medicine.
Unani	Ziyabetus secondary to organ dysfunction	Classical descriptions may relate the condition to disturbances involving organs such as the liver, kidneys, and digestive system , according to the prevailing Unani pathophysiological framework.
Modern	Type 1 Diabetes Mellitus (T1DM)	Usually results from autoimmune destruction of pancreatic β-cells , causing absolute insulin deficiency.
Modern	Type 2 Diabetes Mellitus (T2DM)	Characterized by insulin resistance with progressive impairment of insulin secretion ; it accounts for the majority of diabetes cases.
Modern	Gestational Diabetes Mellitus (GDM)	Diabetes first diagnosed during pregnancy that does not clearly represent pre-existing diabetes.
Modern	Other specific types of diabetes	Includes diabetes caused by monogenic defects, diseases of the exocrine pancreas, endocrinopathies, genetic syndromes, infections, or certain drugs and chemicals .

IX. METHODOLOGY

Type of Study Design and sample size

This is a Cross-sectional study in which total 250 patients have been included.

Setting: IPD/ OPD of concern Hospital.

Method of selection of study subjects (eligibility criteria)

Patients of type2 diabetes mellitus who attended the OPD/IPD of a related hospital between January 2025 to June 2026 of type 2 diabetes mellitus have been evaluated through Glucometer and patients having BSL(R)<180mg/dl was included in the study.

SELECTION OF PATIENTS

INCLUSION CRITERIA

- Age group from 20 – 60 years.
- Diagnosed cases of Ziyabitus Shakri (Diabetes Mellitus Type II) without complication.
- Patients ready to participate in the study

EXCLUSION CRITERIA

- Patients below 20 and above 60 years of age.
- Patients of Insulin dependent diabetes mellitus (Type-I)
- Patients of Malnutrition related diabetes mellitus (MRDM)
- complicated cases of Diabetes Mellitus (Diabetic ketoacidosis, retinopathy, nephropathy, coronary artery disease).
- Patients having complications like retinopathy, nephropathy etc.

WITHDRAWAL CRITERIA

- Voluntary withdrawal of the subjects from study or incomplete study
- If a patient is not following the instruction regarding as per the schedule explained to them.
- patient who will not turn up for a regular follow up

schedule.

- Any serious condition
- Uncontrolled hypertension
- Subject himself /herself wants to withdraw from the study,
- Patient who will fail to give consent.
- Rapid progression of disease

Matching criteria

Age: 20-60 years of age

Gender: Either gender (Male Female both)

APPROVAL FROM INSTITUTIONAL ETHICAL COMMITTEE (IEC)

Before starting the study the protocol was presented before the institutional Ethical committee (IEC) for the Ethical clearance and approval.

After getting approval from institutional Ethical committee (IEC), patients enrolment have been done.

INFORMED CONSENT

Informed consent was obtained for overall Patients which are enrolled in study.

Data collection

A structured questionnaire was used in data collection. The questionnaire covered questions regarding dietary knowledge, attitudes and Practices (KAP) of the Type 2 diabetes mellitus (T2DM) patients. In addition to KAP, we collected socio-demographic data that included information related to age, gender educational attainment, marital status, income and number of family members as factors that influence KAP and the dietary choices. The questionnaire consisted of 30 questions of which 15 questions were related to knowledge, one question was related to Practices and

four questions were related to attitudes about diet for T2DM patients. The data on each part of the questionnaire was obtained by face-to-face interview with the interviewer. For KAP, 30 was the maximum possible score in which each Yes answer was given one point and No or an answer of which the patient was not sure, was given zero point. The maximum possible score for attitude was four where each positive attitude was given a solitary point while a negative attitude was not awarded any point. Regarding Practices, we only asked whether the person was following the recommendations provided by the health service providers in that hospital regarding their diet. Based on the previous studies and the Modified Below cut off points 22 to classify knowledge as poor knowledge and give a negative attitude a score of less than the mean score while the mean or above mean scores were considered as good knowledge and a positive attitude.

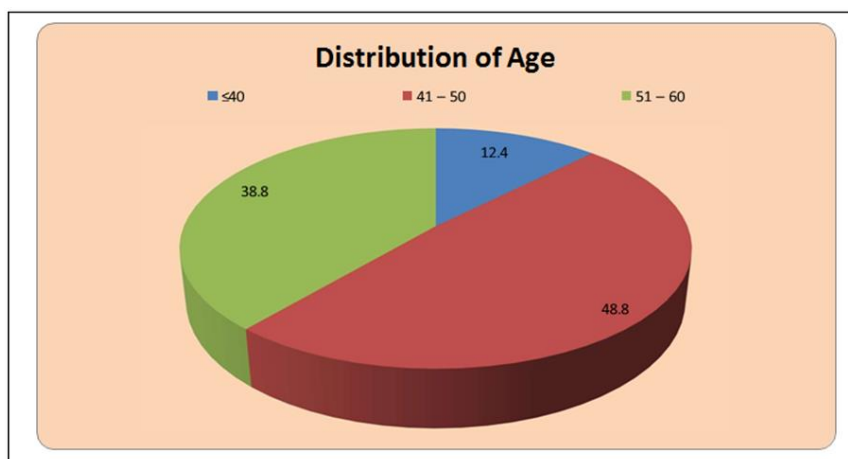
The protocol for this cross-sectional study was approved by the Ethical Committee of the Medical and Health Studies Board of the University of MUHS. Verbal informed consent was obtained from the participants. Privacy and anonymity were maintained at the highest level throughout the research and publication processes.

X. OBSERVATIONS AND RESULTS

Table No. 03: Age distribution of patients with diabetes mellitus (n=250).

Age Group (years)	No. of cases	% of cases
≤40	31	12.4
41 – 50	122	48.8
51 – 60	97	38.8
Total	250	100.0

Values are n (% of cases).

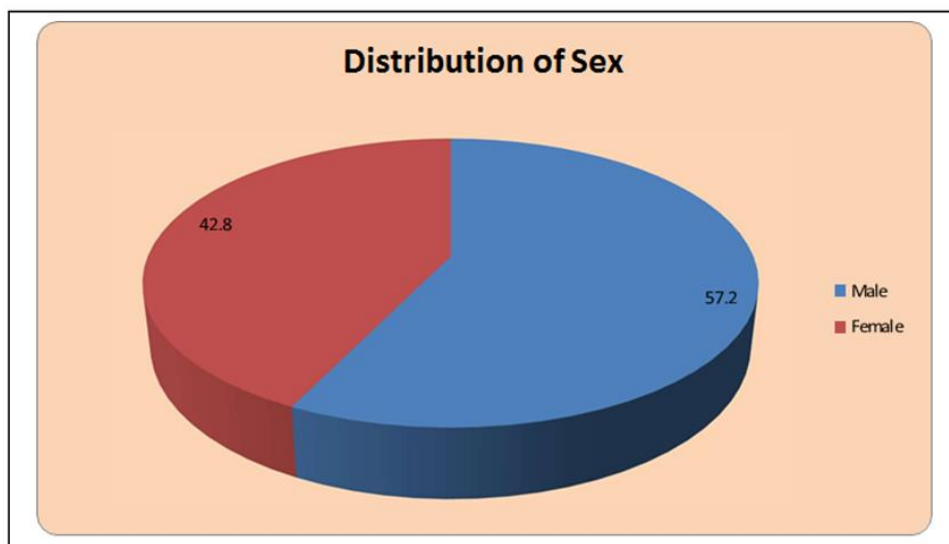


Graph No. 01 Age distribution of patients with diabetes mellitus (n=250).

Table No. 04 The sex distribution of the cases with diabetes mellitus (n=250).

Sex	No. of cases	% of cases
Male	143	57.2
Female	107	42.8
Total	250	100.0

Values are n (% of cases).

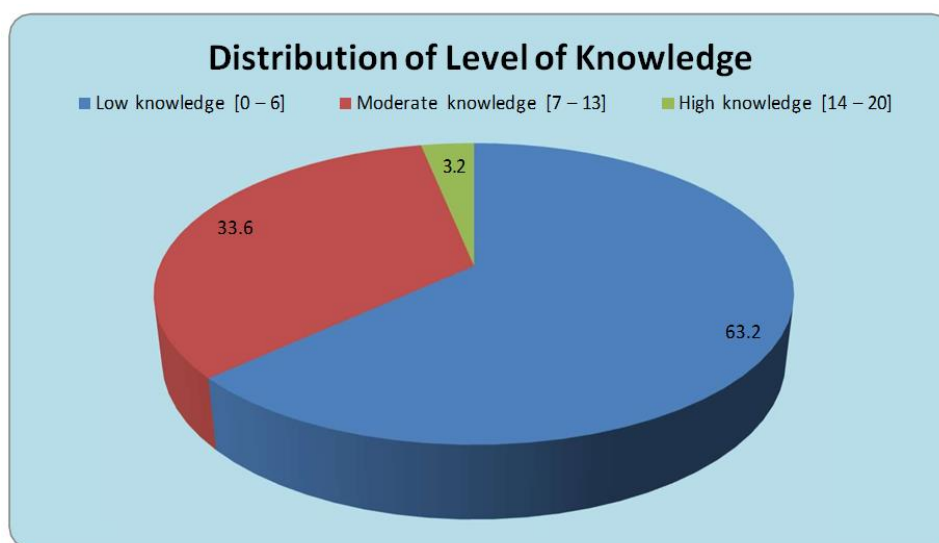


Graph No. 02 The sex distribution of the cases with diabetes mellitus (n=250).

Table No. 05 Distribution of level of knowledge about diabetes mellitus among the cases with diabetes mellitus (n=250).

Level of Knowledge	No. of cases	% of cases
Low knowledge [0 – 6]	158	63.2
Moderate knowledge [7 – 13]	84	33.6
High knowledge [14 – 20]	8	3.2
Total	250	100.0

Values are n (% of cases).

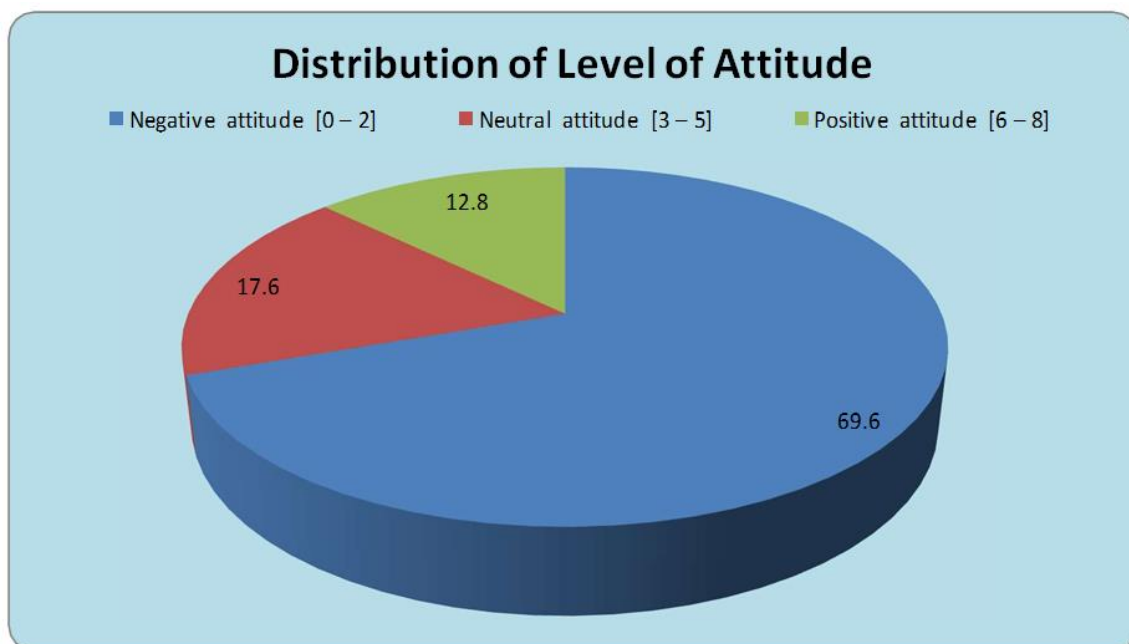


Graph No. 03 Distribution of level of knowledge about diabetes mellitus among the cases with diabetes mellitus (n=250).

Table No. 06 Distribution of level of attitude towards diabetes mellitus among the cases with diabetes mellitus (n=250).

Level of Attitude	No. of cases	% of cases
Negative attitude [0 – 2]	174	69.6
Neutral attitude [3 – 5]	44	17.6
Positive attitude [6 – 8]	32	12.8
Total	250	100.0

Values are n (% of cases).

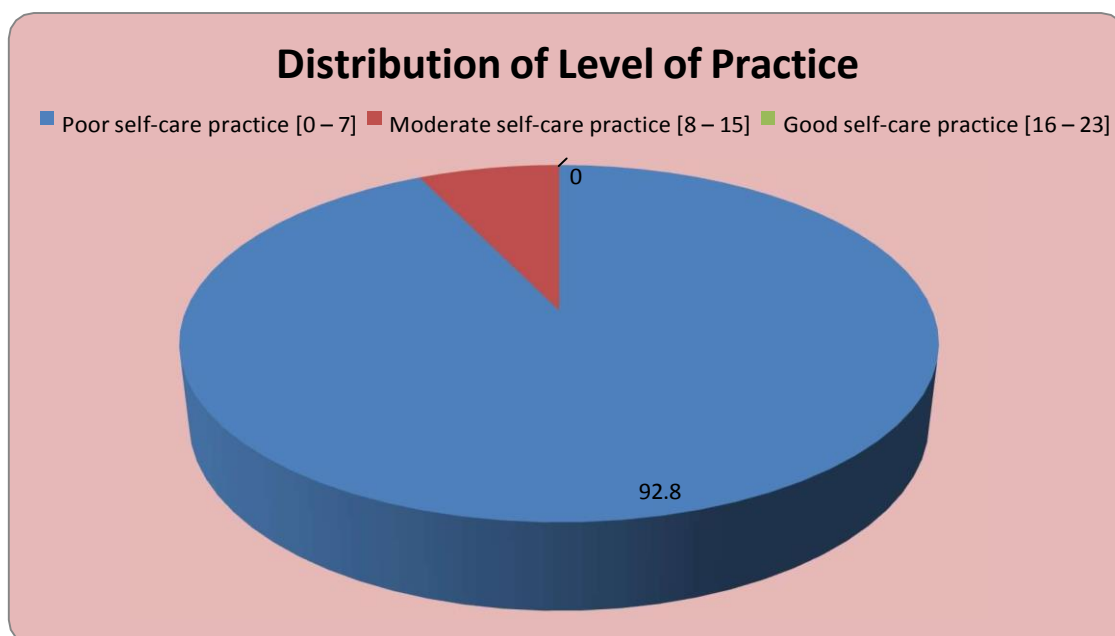


Graph No. 04 Distribution of level of attitude towards diabetes mellitus among the cases with diabetes mellitus (n=250).

Table No. 07: Distribution of level of practice regarding self-care among the cases with diabetes mellitus (n=250).

Level of Practice	No. of cases	% of cases
Poor self-care practice [0 – 7]	232	92.8
Moderate self-care practice [8 – 15]	18	7.2
Good self-care practice [16 – 23]	0	0.0
Total	250	100.0

Values are n (% of cases).

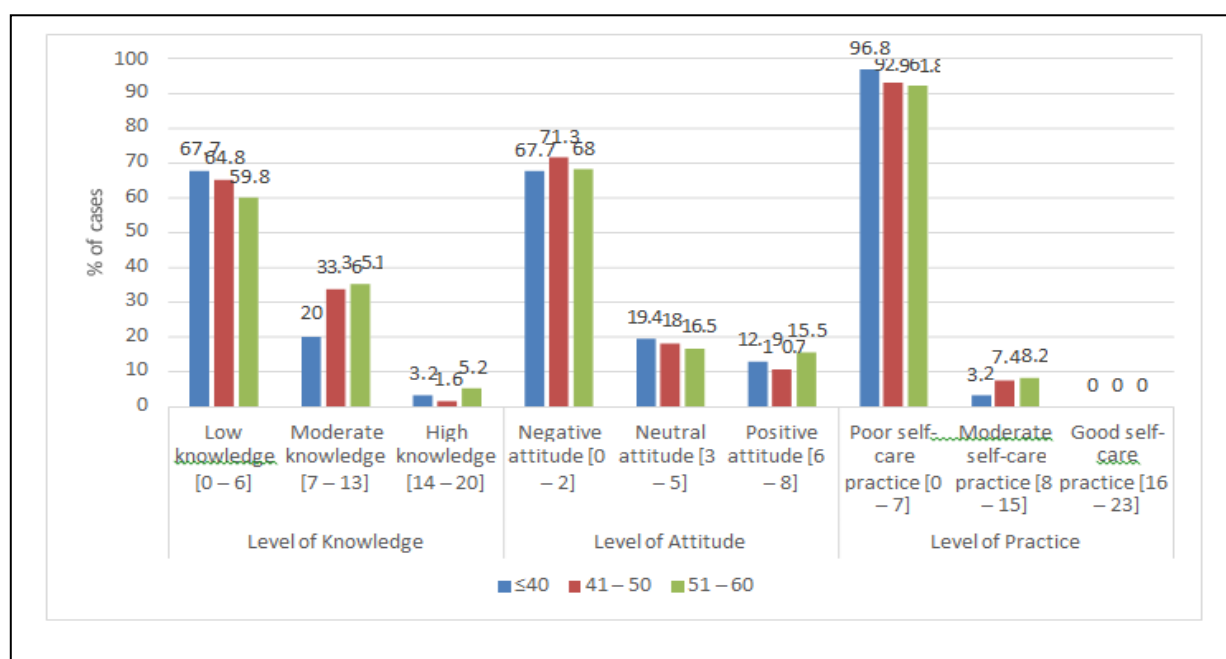


Graph No. 05 Distribution of level of practice regarding self-care among the cases with diabetes mellitus (n=250).

Table No. 08 Distribution of level of knowledge, level of attitude and level of practice about self-care among the cases with diabetes mellitus according to age (n=250).

		Age Group (years)						
		≤40		41 – 50		51 – 60		
		n	%	n	%	n	%	P-value
Level of Knowledge	Low knowledge [0 – 6]	21	67.7	79	64.8	58	59.8	0.615 ^{NS}
	Moderate knowledge [7 – 13]	9	20.0	41	33.6	34	35.1	
	High knowledge [14 – 20]	1	3.2	2	1.6	5	5.2	
Level of Attitude	Negative attitude [0 – 2]	21	67.7	87	71.3	66	68.0	0.876 ^{NS}
	Neutral attitude [3 – 5]	6	19.4	22	18.0	16	16.5	
	Positive attitude [6 – 8]	4	12.9	13	10.7	15	15.5	
Level of Practice	Poor self-care practice [0 – 7]	30	96.8	113	92.6	89	91.8	0.638 ^{NS}
	Moderate self-care practice [8 – 15]	1	3.2	9	7.4	8	8.2	
	Good self-care practice [16 – 23]	0	0.0	0	0.0	0	0.0	

P-value by Chi-Square test. P-value<0.05 is considered to be statistically significant. NS – Statistically non-significant.

**Graph No. 06: Distribution of level of knowledge, level of attitude and level of practice about self-care among the cases with diabetes mellitus according to age (n=250).**

DISCUSSION

The present cross-sectional study assessed the knowledge, attitude, and practices (KAP) regarding diet among 250 patients with Type 2 Diabetes Mellitus (T2DM) in Western Maharashtra. Dietary management is an essential component of diabetes care because appropriate food choices, portion control, dietary balance, and adherence to recommendations contribute to better self-management and prevention of complications. The study findings indicate substantial deficiencies in dietary knowledge, attitude, and self-care practices among the participants.

A. Age and Gender Distribution

In the present study, the largest proportion of participants belonged to the **41–50 years age group (48.8%)**, followed by those aged 51–60 years (38.8%). Only 12.4% were aged ≤40 years. This distribution indicates

that T2DM was predominantly represented among middle-aged and older adults in the study population. The increasing occurrence of T2DM among middle-aged individuals is of particular concern because prolonged exposure to hyperglycemia may increase the risk of chronic complications and impose a considerable long-term health burden. Males constituted **57.2%** of the study population, while females constituted **42.8%**. The higher representation of males may reflect differences in healthcare-seeking behavior, access to healthcare services, or characteristics of the study population. However, the present study was not designed to establish gender-based differences in KAP.

B. Knowledge Regarding Diabetes and Diet

A major finding of the study was the low level of dietary knowledge. **63.2% of participants had low knowledge**, 33.6% had moderate knowledge, and only 3.2%

demonstrated high knowledge. These findings suggest that a considerable proportion of patients may lack adequate understanding of dietary recommendations necessary for effective diabetes management. The knowledge deficit is consistent with the concerns described in the study background, where misconceptions regarding foods such as rice and fruits and inadequate awareness of appropriate dietary practices have been reported among diabetic patients in Maharashtra. The study also notes that rural populations may have poorer dietary awareness and practices than urban populations. Poor dietary knowledge may adversely influence food selection, meal planning, portion control, and adherence to dietary recommendations. Therefore, simply prescribing a diabetic diet may not be sufficient unless patients understand the reasons behind the recommendations and are able to apply them in their daily lives.

C. Attitude Towards Dietary Management

The study demonstrated an unfavorable attitude towards diabetes-related dietary management. **69.6% of participants had a negative attitude**, 17.6% had a neutral attitude, and only 12.8% had a positive attitude. This finding is important because knowledge alone does not necessarily result in appropriate dietary behavior. The study background indicates that although some patients may express willingness to modify their lifestyle, socioeconomic limitations and cultural dietary preferences can interfere with the adoption of healthier practices. A negative attitude may reduce motivation to follow dietary advice consistently. Cultural food preferences, family eating patterns, affordability, availability of recommended foods, and misconceptions about dietary restrictions may further influence patients' willingness to change established habits. Hence, dietary counseling should be individualized and culturally appropriate rather than limited to general instructions.

D. Dietary Self-Care Practices

The most striking finding was observed in dietary self-care practices. **92.8% of participants demonstrated poor self-care practices**, 7.2% had moderate practices, and none demonstrated good practices. This finding indicates a substantial gap between recommended diabetes care and actual patient behavior. The very high proportion of poor practices may reflect inadequate dietary knowledge, unfavorable attitudes, socioeconomic barriers, limited counseling, or difficulty translating health advice into everyday behavior. The study methodology indicates that practice was assessed in relation to whether participants followed dietary recommendations provided by healthcare providers. Thus, the findings emphasize the importance of continuous reinforcement and follow-up rather than providing dietary advice only at the time of diagnosis or routine consultation.

E. Relationship Between Age and KAP

The analysis of KAP according to age demonstrated **no statistically significant association** between age and knowledge, attitude, or practice. The p-values were **0.615 for knowledge, 0.876 for attitude, and 0.638 for practice**, all above the predefined significance level of 0.05.

Although some variation was observed across age groups, the differences were not statistically significant. This suggests that inadequate dietary knowledge and practices were not confined to a particular age group in this study. Therefore, dietary education should be provided across the entire adult diabetic population rather than being targeted exclusively at older or younger patients.

F. Implications for Diabetes Management

The findings demonstrate that the major challenge in this population is not merely the presence of diabetes but the ability of patients to implement appropriate dietary self-care. The combination of **low knowledge, predominantly negative attitude, and poor self-care practices** indicates the need for a comprehensive patient-centered approach. Dietary counseling should incorporate locally available and culturally acceptable foods, practical meal-planning strategies, portion control, reduction of excess fats and sweets, adequate dietary fiber, and regular reinforcement of recommended practices. The study background also highlights the importance of the **ICMR-NIN Dietary Guidelines for Indians (2024)**, which emphasize balanced nutrition, adequate dietary fiber, and moderation of fats and sweets. Healthcare professionals should therefore focus on repeated counseling, individualized education, family involvement, and community-based awareness programs. Such interventions may help convert knowledge into positive attitudes and sustainable dietary practices.

CONCLUSION

The present cross-sectional study assessed the **Knowledge, Attitude and Practices (KAP) regarding diet among 250 patients with Type 2 Diabetes Mellitus in Western Maharashtra**. The study demonstrates considerable deficiencies in dietary knowledge, attitude, and self-care practices among the participants. The majority of patients belonged to the **41–50 years age group (48.8%)**, followed by 51–60 years (38.8%), while males constituted 57.2% of the study population. Regarding dietary knowledge, **63.2% had low knowledge**, 33.6% had moderate knowledge, and only 3.2% had high knowledge. Similarly, **69.6% demonstrated a negative attitude** towards diabetes-related dietary management, whereas only 12.8% showed a positive attitude. The most significant finding was that **92.8% had poor self-care practices**, 7.2% had moderate practices, and none demonstrated good practices.

The association between age and KAP was statistically non-significant for knowledge ($p=0.615$), attitude ($p=0.876$), and practice ($p=0.638$). This indicates that inadequate dietary KAP was observed across the different age groups rather than being restricted to a particular age category. The findings highlight an important gap between diabetes-related dietary recommendations and their implementation in daily life. **Low knowledge, negative attitude, and poor self-care practices** may adversely affect long-term diabetes management and increase the risk of complications. Therefore, there is a need for **structured, culturally appropriate, continuous dietary education and individualized counseling** for patients with Type 2 Diabetes Mellitus. Healthcare professionals should emphasize practical dietary guidance, patient motivation, regular follow-up, family involvement, and community-based awareness programs. Strengthening these interventions may improve patients' understanding, attitudes, and adherence to appropriate dietary practices and ultimately support better diabetes self-management. In conclusion, the study establishes that **improving dietary KAP should be an integral part of comprehensive diabetes care in Western Maharashtra**. Continued patient education and culturally relevant nutritional interventions are essential for promoting sustainable lifestyle changes and improving the overall management of Type 2 Diabetes Mellitus.

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