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ASSESSMENT OF KNOWLEDGE AND AWARENESS OF DIABETES MELLITUS AMONG THE SOUTH INDIAN POPULATION - A DESCRIPTIVE CROSS-SECTIONAL SURVEY STUDY

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ABSTRACT

Diabetes mellitus poses a substantial global health challenge, with India ranking as the second most affected country, home to an estimated 77 million individuals living with the condition. This study conducted a comprehensive assessment of the awareness and knowledge levels pertaining to type 2 diabetes mellitus within the South Indian population. Employing a descriptive cross-sectional survey approach, both diabetic and non-diabetic individuals were engaged to gauge their familiarity with type 2 diabetes. A meticulously designed questionnaire consisting of 25 questions encompassing disease understanding, dietary patterns, lifestyle factors, and

medication specifics was disseminated through Google Forms. Recruitment efforts were directed through email and prominent social media platforms like WhatsApp. A total of 553 responses were meticulously collected, subjected to rigorous analysis, and subjected to statistical evaluation. Demographically, 48% of the participants were male, while 52% were female. Remarkably, 79% of respondents demonstrated a commendable level of knowledge concerning the disease, with the remaining 21% exhibiting gaps in understanding. Inquiries related to dietary habits and lifestyle factors revealed that nearly 77% of participants possessed a degree of awareness, whereas 23% lacked it. Conversely, in the domain of medication-related queries, 47% displayed a robust knowledge base, while 53% exhibited knowledge gaps. The findings underscore a noteworthy level of awareness among the population regarding diabetes mellitus, including its symptoms, nature, lifestyle implications, and associated risks. Nevertheless, substantial awareness gaps persist, emphasizing the critical need for more effective health promotion strategies aimed at addressing these gaps

within the general population. Such initiatives hold substantial promise in combating the escalating diabetes epidemic in India and improving overall public health outcomes.

KEYWORDS: Diabetes mellitus, knowledge and awareness, type 2 diabetes, diabetes, survey study.

INTRODUCTION

Diabetes, a chronic metabolic condition characterized by persistently elevated blood glucose levels (commonly referred to as blood sugar), has emerged as a pervasive and escalating global health crisis. Over time, unchecked diabetes can inflict severe damage to vital organs such as the heart, blood vessels, eyes, kidneys, and nerves, significantly impairing the quality of life and leading to premature mortality. As one of the most prevalent and rapidly advancing diseases on a global scale, diabetes casts a long and ominous shadow over public health systems worldwide.

In the context of this escalating health challenge, India has emerged as one of the hardest-hit nations, ranking as the second-largest country grappling with diabetes. The staggering statistics paint a grim picture, with an estimated 73 million diabetic patients in the country. However, projections for the future are even more disconcerting, as by 2045, this number is anticipated to double, swelling to a staggering 134 million individuals grappling with this metabolic disorder. This exponential growth places an immense burden on the healthcare infrastructure of the nation and poses a formidable challenge for policymakers, clinicians, and researchers alike.

The prevalence of diabetes in India is further underscored by alarming statistics on prediabetes, with an estimated 7.3% of the population already teetering on the brink of fullblown diabetes. A closer examination of these prevalence studies, both historical and recent, reveals a disquieting trend. Diabetes is increasingly afflicting individuals from lower socioeconomic strata, highlighting a distressing reality – those who can least afford the cost of managing this condition are paradoxically the most afflicted. This socio-economic disparity not only exacerbates the health divide but also intensifies the economic burden on vulnerable populations.

The gravity of diabetes as a major cause of morbidity, mortality, and healthcare expenditure cannot be overstated. It demands lifelong treatment and vigilant management. However,

when diabetes is not effectively managed, it begets a cascade of debilitating complications, adding further layers of suffering and stress to the lives of those affected. In the most severe cases, it leads to premature mortality, casting a somber pall over individuals, families, and communities.

In light of these sobering realities, it is imperative to scrutinize the state of awareness and knowledge surrounding diabetes, particularly in the South Indian context. This study seeks to unravel the extent of understanding and awareness regarding diabetes mellitus among the South Indian population, shedding light on critical insights that can inform public health strategies, empower individuals with knowledge, and ultimately mitigate the relentless advance of this formidable disease.

Need of the Study

Diabetes mellitus stands as a formidable clinical and public health challenge, accounting for a staggering 4.6 million deaths annually across the globe. In this landscape of escalating health crises, India emerges as a disconcerting epicenter of this metabolic disorder, ranking as the second most afflicted country, according to the International Diabetes Federation (IDF). The ominous surge in the prevalence of diabetes mellitus in India is underpinned by a multifaceted issue: a profound deficit in knowledge and awareness concerning the disease, alongside suboptimal dietary habits and lifestyles.

Education surfaces as a linchpin in the quest for improved diabetes management and control. It is a powerful tool that can bridge the chasm of ignorance and misconceptions surrounding diabetes, paving the way for informed decision-making and more effective treatment regimens. Notably, research offers compelling evidence that an upswing in knowledge related to diabetes and its intricacies begets a host of substantial benefits. These include a remarkable uptick in treatment compliance, leading to a tangible reduction in the debilitating complications that often ensue when diabetes remains unchecked.

While existing studies have scrutinized the landscape of diabetes on a broader scale, the dearth of granular data at the state or regional level, particularly within the context of South India, underscores the critical need for this study. It endeavours to serve as a beacon illuminating the awareness and knowledge levels regarding diabetes mellitus among the diverse population of South India. By honing in on this specific region, the research seeks to

unravel nuances, disparities, and insights that may otherwise remain obscured in more generalized studies.

In essence, this study is poised to address a pressing imperative – the urgent necessity of enhancing awareness and knowledge regarding diabetes mellitus, an affliction that exacts a heavy toll on individuals, communities, and healthcare systems. By shedding light on the awareness landscape within South India, it offers a vital platform upon which tailored health promotion strategies can be constructed, ultimately bolstering the collective endeavour to stem the tide of diabetes and its insidious complications.

MATERIALS AND METHODS

This cross-sectional survey was conducted over a nine-month period, spanning from August 2020 to April 2021, with meticulous attention to data accuracy and integrity. Leveraging the ubiquity and accessibility of online platforms, we employed an anonymous questionnaire as our primary tool to gauge the awareness and knowledge levels pertaining to diabetes mellitus within the South Indian populace.

The survey's digital interface facilitated its administration, allowing us to reach a diverse cohort of participants through email and popular social media platforms such as WhatsApp. A self-administered and meticulously formatted questionnaire was meticulously crafted utilizing the versatile Google Forms platform. This questionnaire comprised a comprehensive array of 25 inquiries, encompassing vital demographic information encompassing gender, age, familial history of diabetes mellitus, co-morbid conditions, and any complications attributable to diabetes mellitus, should they be present.

Each question within the questionnaire was purposefully structured, designed, and rigorously validated to align seamlessly with the overarching objectives of our cross-sectional survey study. These questions were meticulously categorized into four distinct domains, namely disease-based inquiries (comprising seven questions), diet-related queries (comprising eight questions), lifestyle-oriented probes (consisting of two questions), and inquiries concerning pharmacological aspects (encompassing three questions).

The participants' invaluable contributions were facilitated with consideration for their valuable time, with the survey meticulously calibrated to require an approximate duration of

15 to 30 minutes for completion. This mindful approach ensured that participants could actively engage with the survey while respecting their time constraints and commitments.

Table 1: Gender Wise Distribution

GENDER	NO. OF PARTICIPANTS (n=553)	PERCENTAGE %
Male	265	48%
Female	288	52%

Overall 553 responses were collected. Among them 265 (48%) respondents were male and 288 (52%) respondents were female.

 Table 2: Age Wise Categorisation of The Participants.

AGE	NO. OF PARTICIPANTS (n=553)	PERCENTAGE %
Below 20	31	6%
20 - 30	267	48%
31 - 40	58	10%
41 - 50	108	20%
51 - 60	74	13%
Above 60	15	3%

Age group of participants were categorized and it was found that 18-20 were 45 (8%)participants, 21-30 are 253 (46%) participants, 31-40 were 58 (10%) participants, 41-50 are 108 (20%) participants, 51-60 were 74 (13%) participants and the age group of above 60, were 15 (3%) participants.

 Table 3: Distribution of Diabetic and Non Diabetic Individuals.

Participants	No.of Participants Male (n=265)	Percentage %	No.of Participants Female (n=288)	Percentage %
Diabetic	80	30%	55	19%
Non-Diabetic	185	70%	233	81%

Among 265 male participants, only 80 (30%) participants are found to be diabetic and 185 (70%) participants were non diabetic individuals. In female participants, 55 (19%) were found to be diabetic and the remaining 233 (81%) were found to be non-diabetic individual.

 Table 4: Age Wise Categorisation Only Among Diabetic Participants.

AGE	NO. OF PARTICIPANTS(n=135)	PERCENTAGE %
20 - 30	3	2%
31 - 40	14	10%
41 - 50	58	43%
51 - 60	48	36%
Above 60	12	9%

Participants diagnosed with diabetes were thoughtfully stratified into distinct age groups, allowing for a nuanced exploration of this demographic landscape. Notably, the two age brackets of (41-50) and (51-60) emerged as the predominant cohorts among diabetes-afflicted individuals. Impressively, these two age brackets collectively accounted for a substantial portion of the diabetes patient population, comprising 36% and 43%, respectively. This distribution underscores the critical role that age may play in the prevalence and management of diabetes, shedding light on the specific age groups that bear a heightened burden of this metabolic disorder.

CO - MORBIDITIES	NO. OF PARTICIPANTS(n=135)	PERCENTAGE %
Hypertension alone	52	39
Hyperlipidemia alone	20	15
Both HTN + Hyperlipidemia	41	30
None	22	16

 Table 5: Co - Morbid Condition on Diabetic Participants.

Within the cohort of 135 individuals diagnosed with diabetes, a noteworthy subset of 113 participants exhibited concurrent co-morbidities. This finding underscores the complex healthcare landscape that individuals with diabetes often navigate. A comprehensive assessment of these co-morbid conditions revealed a nuanced picture. Specifically, 9% of these individuals (comprising 52 participants) were grappling with hypertension, 4% (encompassing 20 individuals) presented with hyperlipidemia, while 7% (consisting of 41 individuals) faced the dual burden of both hypertension and hyperlipidemia. These findings illuminate the intricate interplay of health factors that individuals with diabetes must contend with, warranting a holistic and multidisciplinary approach to their healthcare management.

Ta	ble	6:	Distribution	of	Dia	betic	Comp	lication.
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Complications	No. Of Participants (n=135)	Percentage %
Diabetic neuropathy	21	15.5%
Diabetic nephropathy	14	10%
Diabetic retinopathy	12	9%
Diabetic foot ulcer	21	15.5%
None	67	50%

Among the surveyed participants, a subset of 68 individuals grappled with diabetes-induced complications, further underscoring the multifaceted nature of this metabolic disorder. A breakdown of these complications reveals a complex landscape. Specifically, 4% of the

participants, constituting 21 individuals, were afflicted with neuropathy, while 2% (comprising 14 individuals) faced the challenge of nephropathy. Similarly, 2% of the participants (12 individuals) experienced the intricacies of retinopathy, highlighting the broad spectrum of diabetes-related health concerns. Notably, 4% of the surveyed individuals, totalling 21 participants, bore the burden of diabetic foot ulcers, signifying the substantial impact of this condition on a subset of the diabetic population. These findings underscore the imperative of comprehensive diabetes management strategies aimed at preventing and mitigating the array of complications that can ensue from this metabolic disorder.

QUESTIONNAIRE

General Questions

S.no	Question	Options Given
1	Are you a diabetes mellitus patient?	a) Yes
1	(Blood sugar)	b) No
2	Are you a hyperlipidemic patient?	a) Yes
2	(cholesterol)	b) No
2	Are you a hypertension patient? (Blood	a) Yes
3	pressure)	b) No
4	Is there a family history of diabetes	a) Yes
4	mellitus?	b) No
		a) Diabetic neuropathy
		b) Diabetic nephropathy
5	Do you have any diabetic related	c) Diabetic retinopathy
	complications?	d) Diabetic foot ulcer
		e) None
		Other:

Disease Based Questions

S.no	Question	Options Given
		a) Eating too much sugar
6	What do you believe causes type2	b) Genetic and lifestyle
0	diabetes?	factors
		c) Drinking and smoking
		a) Constant migraines
		b) Frequent excessive
7	Which of these is a symptom of	urination
/	diabetes?	c) Recurrent backaches and
		joint pain
		d) Slurred speech
		a) 50 mg/dL
8	Which of the following numbers would	b) 120 mg/dL
0	be considered normal blood sugar level?	c) 250 mg/dL
		d) 500 mg/Dl
9	Which of these is the most important part	a) Taking medication

	of managing diabetes?	diligently b) Managing their diet carefully
		c) Getting regular exercised) All three are equallyimportant
10	Blood glucose level responds to food, particularly carbohydrates What other factors can affect blood glucose levels?	a) Not being physically activeb) Stressc) Illnessd) All the above
11	Wound healing will be delayed in diabetic patients	a)True b)False
12	The potential health complications that start from diabetes include kidney disease, eye damage and heart disease	a)True b)False

The present study assessing the current knowledge and awareness of diabetes mellitus among general population in South India. Here the questionnaire was split up into four categories such as disease based, diet based, lifestyle based and drug based questions.

The participants knowledge was assessed based on their understanding toward diabetes mellitus, which included about the disease and its causes and symptoms As per disease based questions, 73% (406) were aware whereas 27% (147) were unaware about causes and 90% had good and 10% lack knowledge on symptoms.Overall 79% of the participants were answered correctly, it indicates a relatively good knowledge toward the disease but 21% of the participants were unaware. In a study done by reem kayyali et al, which also aimed to assess the knowledge and awareness about causes, symptoms and disease associated with type 2 diabetes mellitus, which is similar to our present study, approximately most of the participants demonstrating adequate or good awareness about the disease, yet the study still highlights gap in awareness among the remaining proportion of participants. Future prevention intervention should be tailored to address these existing gaps in awareness.

Diet Based	Questions
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S.no	Question	Options given
13	Which of the following statements about diabetes and diet is true?	 a) People with diabetes should eat a sugar free diet b) A diet which is low in fat, high in fibre, low in added sugar is recommended for everyone with diabetes c) It is okay to eat fried food

		three times a week
		d) Unsure
		a) Mango
	Which fruit is good for diabetes?	b) Jack-fruit
14		c) Black plum
		(Naavalpazham)
		d) Banana
		a) Pasta, rice and noodles
15	What type of food raises blood glucose	b) Fruits
15	levels?	c) Fish
		d) Eggs
	Which of the following is protein rich food?	a) Oats
16		b) Chickpeas & Egg
10		c) Spinach
		d) Corn
	Which of the following is a fibre rich food?	a) Wheat
17		b) Oats
1/		c) Rice
		d) Eggs
	Which of the following is iron rich food?	a) Banana
19		b) Spinach
10		c) Orange
		d) Blueberry
	Which one should diabetics avoid?	a) Fruits
10		b) Red meat
19		c) Vegetables
		d) Oats
20	Regularly taking fenugreek may decrease	a) True
20	diabetic level than its normal level	b) False

According to diet based questions, 77% of the participants had good knowledge but 23% of the participants had lack of knowledge on diet. In a study done by J.kiren et al, which was also done to assess the awareness of balanced diet among the diabetic and non diabetic individuals which is similar to our present study, the majority of the population 78.7% were aware and 21.3% were unaware about the importance of a balanced diet. Whereas necessary interventions such as nutrition education programmes and awareness programmes should be carried out to promote health and prevent diabetic complications in the future.

Lifestyle Based Questions

S.no	Question	Options Given
21	Why is doing regular exercise or being physically active good for your health? (This question have multiple correct answer)	a) It can help to control blood glucose levelsb) It can reduce the risk of skin cancerc) It can help to control cholesterol levels

			a) Every day of the week for at least 30
		minutes	
	22	How often people with diabetes should	b) Once a week for at least 30 minutes
22	exercise or be physically active?	c) At least every two weeks for two	
			hours
			d) Unsure

According to lifestyle based questions, 75.5% participants were aware while 24.5% were lack knowledge on lifestyle management; this indicates that participants have a good understanding of lifestyle management. Future campaigns are needed to fill the void for people who lack awareness on lifestyle management. According to lifestyle based questions, 75.5% participants were aware while 24.5% were lack knowledge on lifestyle management; this indicates that participants have a good understanding of lifestyle management. Future campaigns are needed to fill the void for people who lack awareness on lifestyle agood understanding of lifestyle management. Future campaigns are needed to fill the void for people who lack awareness on lifestyle management.

Drug Based Questions

S.no	Question	Options Given
23	pick out the odd one	a) Insulin tablets
		b) Insulin pumps
		c) Insulin syringe and needle
		d) Insulin pens and cartridges
24	Which area of the body insulin injection is given?	a) Arms
		b) Abdomen
		c) Thighs
		d) Buttocks
		e) All the above
25	Do you know the medication name	a) Yes
	that you are taking for diabetes?	b) No

By drug based questions, 47% of participants are aware but 53% of participants were unaware of knowledge and administration of the medication on diabetes mellitus. Brief counselling about the disease and impact of medication is in desperate need, how to take medication properly like its frequency, dosage and foods to be avoided for the disease and also while taking the medications is also advisable.

DISCUSSION

The discussion segment of this study delves into a comprehensive analysis of the findings, their implications, and their significance in the context of diabetes mellitus awareness within the South Indian population. The data, segmented into disease-based, diet-based, lifestyle-based, and drug-based questions, provides valuable insights into the state of knowledge and

awareness, ultimately guiding strategies for improving diabetes management and prevention.^[1]

Disease-Based Awareness

Our study reveals that a substantial proportion of participants (73%) were aware of the causes of diabetes mellitus. This awareness is promising as it forms the foundational understanding necessary for disease management and prevention. However, the 27% who remained unaware of the disease's origins represent a knowledge gap that requires targeted interventions. Increasing awareness of the disease's etiology is crucial in fostering a proactive approach to its management and prevention.

Interestingly, the majority of participants (90%) exhibited a commendable understanding of diabetes mellitus symptoms. This high level of symptom awareness is a positive indicator, as recognizing symptoms can lead to early diagnosis and prompt intervention. The 10% who lacked knowledge in this area, however, highlight the need for continued education efforts.

Diet-Based Knowledge

Diet plays a pivotal role in diabetes management, and our findings indicate that 77% of participants demonstrated good knowledge in this domain. Understanding dietary principles is fundamental for glycemic control, making this result particularly promising. However, the 23% who lacked knowledge in this area represent a sizeable portion of the population in need of dietary education.

Comparing our results to a study by J. Kiren et al., which assessed awareness of balanced diets among diabetic and non-diabetic individuals, we observe a similar knowledge gap, with 21.3% remaining unaware of the importance of a balanced diet. This consistency emphasizes the ongoing necessity for nutrition education programs and awareness campaigns to promote healthier dietary choices and prevent complications associated with diabetes.^[2,3]

Home Remedies and Their Implications

A noteworthy finding is that 65% of participants were aware of the effects and side effects associated with using fenugreek as a home remedy for managing blood glucose levels. However, the remaining 35% who lacked this knowledge present a potential health risk. Combining home remedies with medications without a thorough understanding of their interactions can lead to adverse outcomes. This result underscores the urgency of public

education on the use of home remedies in diabetes management, including their benefits, risks, and potential interactions with prescribed medications.^[4]

Lifestyle-Based Understanding

In the realm of lifestyle management, a substantial 75.5% of participants demonstrated a commendable grasp of the principles involved in managing diabetes through lifestyle modifications. This level of awareness is encouraging, as lifestyle choices significantly impact diabetes outcomes. Nevertheless, the 24.5% who exhibited a lack of knowledge in this area signify the importance of future awareness campaigns targeting lifestyle management.

Medication Knowledge Gap

While 47% of participants exhibited awareness regarding medication administration for diabetes mellitus, a significant 53% remained unaware of crucial aspects related to medication, including dosage, frequency, and dietary considerations. This knowledge gap is particularly concerning as medication adherence is paramount for glycemic control. Providing comprehensive patient education, including brief counselling sessions, is essential to ensure individuals can manage their condition effectively while minimizing the risk of medication-related complications.

Interpreting the Findings

The findings of this study are illuminating and have several important implications. Firstly, they underscore the critical role of awareness and knowledge in diabetes management and prevention. A substantial proportion of the population exhibits commendable awareness in various domains related to diabetes mellitus, signifying a positive starting point. However, there are persistent gaps in understanding, particularly in areas such as the disease's origins, dietary considerations, lifestyle management, and medication administration.^[6]

These knowledge gaps highlight the urgent need for targeted interventions, public education campaigns, and awareness programs aimed at filling these voids in understanding. Such initiatives should address the root causes of knowledge deficits, emphasizing the importance of early diagnosis, proactive disease management, and lifestyle modifications.

Furthermore, the study's findings emphasize the interconnectedness of these knowledge domains. A comprehensive approach to diabetes management must encompass not only disease-specific knowledge but also dietary, lifestyle, and medication awareness. By addressing these interrelated factors, we can empower individuals to make informed choices, better manage their condition, and reduce the risk of complications.^[7]

In Summary, this study offers a comprehensive snapshot of diabetes mellitus awareness within the South Indian population. While there are areas of strength, there are also significant opportunities for improvement. Targeted educational efforts, along with collaborative initiatives between healthcare providers, policymakers, and the community, can play a pivotal role in enhancing public health, mitigating the risk of diabetic complications, and promoting overall well-being within the region.

RESULT

This study assessed the awareness and knowledge of diabetes mellitus among the South Indian population. The findings are as follows:

Disease-Based Awareness: A majority of participants demonstrated a commendable understanding of diabetes mellitus causes and symptoms, with 73% aware of causes and 90% knowledgeable about symptoms. However, 27% lacked awareness of the causes, highlighting the need for increased education in this area.

Dietary Knowledge: While 77% of participants exhibited good dietary knowledge related to diabetes, 23% lacked essential dietary awareness. This underscores the importance of sustained nutrition education programs to promote the significance of a balanced diet in diabetes management.

Home Remedies: Approximately 65% were aware of the effects and side effects of home remedies like fenugreek for managing blood glucose levels. However, 35% of participants lacked this crucial knowledge, emphasizing the need for public education on the safe and effective use of such remedies in diabetes management.

Lifestyle Awareness: 75.5% of participants demonstrated awareness of lifestyle modifications required for effective diabetes management. However, 24.5% lacked awareness in this domain, indicating the necessity for awareness campaigns focused on lifestyle management.

Medication Understanding: While 47% of participants were aware of diabetes medication, a concerning 53% lacked knowledge regarding medication administration, including dosage, frequency, and dietary considerations. Comprehensive patient education on medication

management is imperative. These results provide valuable insights into the current state of diabetes awareness in South India, highlighting the areas where targeted education and interventions are needed to enhance disease management and reduce the burden of diabetes and its complications.

CONCLUSION

In the context of the global diabetes crisis, this study sheds light on the awareness and knowledge of diabetes mellitus among the South Indian population. The findings, divided into four key areas - disease-based awareness, dietary knowledge, lifestyle comprehension, and medication understanding - provide crucial insights for healthcare strategies to enhance diabetes management and prevent its complications.

Empowering Disease Awareness: A significant proportion of participants displayed a commendable understanding of diabetes mellitus causes and symptoms, which is crucial for early detection and intervention. However, there remains a subset lacking this foundational knowledge. Bridging this gap should be a priority, with efforts focused on disseminating information about the origins and symptoms of diabetes mellitus.

The Significance of Dietary Knowledge: Diet plays a pivotal role in diabetes management. While many participants exhibited good dietary knowledge, a noteworthy segment still lacked essential dietary awareness. This underscores the need for sustained nutrition education programs, emphasizing the importance of a balanced diet in preventing diabetic complications and promoting overall health.

Navigating Home Remedies: Understanding the implications of home remedies, such as fenugreek, is vital. While a majority were aware of its effects and side effects, a significant portion remained uninformed. Combining home remedies with prescribed medications without a comprehensive understanding can pose health risks. Public education programs must address this knowledge gap.

Lifestyle as a Cornerstone: The study highlights a positive trend in lifestyle-based awareness, with many participants demonstrating a strong grasp of necessary modifications for effective diabetes management. However, a segment still lacks awareness in this domain. Campaigns promoting lifestyle management should fill this awareness void.

Addressing Medication Knowledge Gap: Medication adherence is pivotal for glycemic control, yet a substantial proportion of participants lacked knowledge regarding medication administration. Diabetes management necessitates thorough patient education, including counseling on medication dosage, frequency, and dietary considerations.

Path Forward: This study provides a comprehensive assessment of diabetes mellitus awareness in South India and offers a roadmap for targeted interventions, public health campaigns, and education initiatives. These efforts should encompass disease-specific awareness, dietary, lifestyle, and medication education. Collaboration between healthcare providers, policymakers, and the community is essential to combat the growing diabetes epidemic and improve public health in the region. By equipping individuals with knowledge and awareness, we can take significant strides toward better diabetes management and overall well-being.

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