

Expert opinion regarding early screening, patient awareness, and telemedicine practices in Indian settings

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Abstract

Objective: To collect clinicians' perspectives regarding the significance of early screening, patient awareness, and telemedicine practice in routine Indian settings for diabetes management.

Methodology: The study employed a 25-item questionnaire to gather insights from specialists across different Indian settings regarding their perspectives on early screening, patient awareness, and telemedicine practices among diabetologists.

Results: According to the cross-sectional survey, 59% of respondents believed that regular awareness programs were helpful in the early screening of diabetes among high-risk individuals. Meanwhile, 64% of clinicians reported that clinical-level screening was a more effective tool for early screening. Around 74% of clinicians reported that microvascular complications namely diabetic retinopathy, diabetic neuropathy, and diabetic kidney diseases should be targeted during early screening of diabetes. The American Diabetes Association (ADA) risk score was the most commonly used risk score for early diabetes screening, according to 54% of clinicians. Moreover, 67% of clinicians reported that 11 to 25% of diabetic individuals had complications of lipitension, and 64% reported that 11 to 20% of T2DM individuals had depression. Regarding telemedicine, 65% of clinicians preferred to use it occasionally. However, at an individual level, factors like cost, literacy, less familiarity with using the tool, and emotional reasons hindered the effective adoption of telemedicine, as reported by 56% of clinicians.

Conclusion: The survey highlighted the effectiveness of awareness programs and clinical-level screening for early diabetes management, emphasizing the importance of targeting microvascular complications. Increased prevalence of complications like lipitension and depression was noted in diabetic individuals. Telemedicine, though recognized as valuable, faces challenges due to individual-level factors.

Keywords: Diabetes; T2DM; Early screening; Lipitension; Depression; Telemedicine

1. Introduction

Diabetes mellitus (DM) is a rapidly growing public health issue worldwide, with over 415 million people estimated to have diabetes globally, accounting for nearly 9.1% of the adult population. This number is projected to increase by more than half to 642 million by the year 2040 [1]. DM has also emerged as a critical public health concern in India. The rise is attributed to urbanization, industrialization, and lifestyle changes, contributing to complications like neuropathy, nephropathy, and vascular diseases. In the global context, India ranks second in diabetes cases, exceeding 74 million in 2021 and projected to escalate to over 124 million by 2045. The country deals with a significant burden of type 2 diabetes mellitus (T2DM), second to China with 77 million cases. The deteriorating global burden of diabetes

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necessitates a shift in the approach to diabetes care. Strategies centered around early detection, patient education, and the integration of telemedicine technologies offer promising opportunities to enhance patient outcomes and alleviate the overall impact of diabetes [2,3].

However, a significant hurdle in India's diabetes landscape is the inadequate screening and treatment facilities, particularly at the primary and secondary care levels. This deficiency leads to undiagnosed cases and inappropriate management of diabetic patients, ultimately resulting in vision impairment and blindness [4]. Recent studies in developing countries, including India, reveal that the prevalence of diabetes in low socioeconomic groups has remained consistent over the past decade. Despite similar risk factors across socioeconomic groups, the awareness levels and healthcare access for screening and managing non-communicable diseases vary significantly between low and high socioeconomic groups. This inconsistency underscores the urgent need for targeted interventions and improved healthcare infrastructure, particularly at the grassroots level, to address the unique challenges faced by different socioeconomic strata in diabetes prevention and management [2,5].

Intervention strategies such as telemedicine empower patients to make informed decisions about goals, therapeutic options, and self-care behaviors, effectively enabling them to assume responsibility for daily diabetes care [6]. Despite the potential benefits, telemedicine remains underutilized by Indian physicians for patient interactions. Telemedicine can facilitate patient-physician communication from the comfort of their homes, addressing the need for frequent visits and improving accessibility. Physicians can analyze the patient's history, review their self-monitored blood glucose charts (SMBG), and self-monitored blood pressure (SMBP) values, and provide advice [7].

India is struggling with a high prevalence of prediabetes and undiagnosed diabetes, and despite advancements in therapies and technologies, a substantial proportion of individuals with diabetes struggle to achieve optimal glycemic outcomes. The personalized approach to diabetes management was hindered by limited healthcare resources and the conventional method's inherent limitations. The key obstacles include optimizing existing therapies, educating patients on self-management, improving treatment adherence, addressing delayed diagnosis, and enhancing healthcare delivery to those with chronic conditions [8].

In light of these challenges, the present survey-based study aims to gather clinicians' perspectives on early screening, patient awareness, and telemedicine practices among clinicians in Indian settings, seeking valuable insights into improving diabetes treatment.

2. Methods

We carried out a cross sectional, questionnaire based survey among physicians in treating diabetes mellitus in the major Indian cities from June 2023 to December 2023.

2.1. Questionnaire

The questionnaire booklet titled SCT (Screening, Complications and Tele-Health Questionnaire) study was sent to the physicians who were interested to participate in this study. The SCT study questionnaire included 25 questions about current feedback, clinical observations, and clinical experience of specialists in the area of early screening, patient awareness, and telemedicine practices among diabetologists. The study was conducted after receiving approval from Bangalore Ethics, an Independent Ethics Committee which was recognized by the Indian Regulatory Authority, Drug Controller General of India.

2.2. Participants

An invitation was sent to leading doctors in managing diabetes mellitus in the month of March 2023 for participation in this Indian survey. About 375 physicians from major cities of all Indian states representing the geographical distribution shared their willingness to participate and provide necessary data. The clinicians were allowed to skip any questions they did not wish to answer. They were instructed to answer the questionnaire on their own, without contacting any of their colleagues. A written informed consent was obtained from all the study participants before the initiation of the study.

2.3. Statistical analysis

The data were analyzed using descriptive statistics. Categorical variables were presented as percentages to provide a clear insight into their distribution. The frequency of occurrence and the corresponding percentage were used to

represent the distribution of each variable. To visualize the distribution of the categorical variables, bar and pie charts were created using Microsoft Excel 2013 (version 16.0.13901.20400).

3. Results

The present survey study involved 375 clinicians from clinical settings across India. According to 35% of the respondents, the appropriate age for screening diabetes among high-risk individuals was between 30 to 35 years. About 63% of clinicians opined prescribing routine glycemc investigations every 3 months in patients on medications such as glucocorticoids, thiazide diuretics, and anti-retroviral therapies. Approximately 50% of the clinicians responded that if the screening tests were within the normal range among high-risk individuals, repeat screening should be recommended after 3-month intervals.

About 59% of the respondents agreed that regular awareness programs help in the early screening of diabetes among high-risk individuals (Table 1). More than half (58.7%) of clinicians reported that awareness programs should prioritize periodic scheduling of health camps for high-risk communities, regular health camps at workplaces, community programs dedicated to screening elderly individuals, and periodic health assessment camps during cultural events.

Table 1 Distribution of response on the effectiveness of regular awareness programs in early diabetes screening among high-risk individuals

Awareness programs	Response rate (n = 375)
Yes	58.93%
In all patients >40 years	22.93%
In all patients with co-morbidities	13.07%
Yes, in elderly patients	4.27%
No	0.8%

About 64% of the clinicians responded that clinical level screening was a better tool for early screening of diabetes among high-risk individuals (Figure 1a). According to 74% of clinicians, all the microvascular complications such as diabetic retinopathy, diabetic neuropathy, and diabetic kidney disease, should be targeted during early screening of diabetes (Figure 1b).

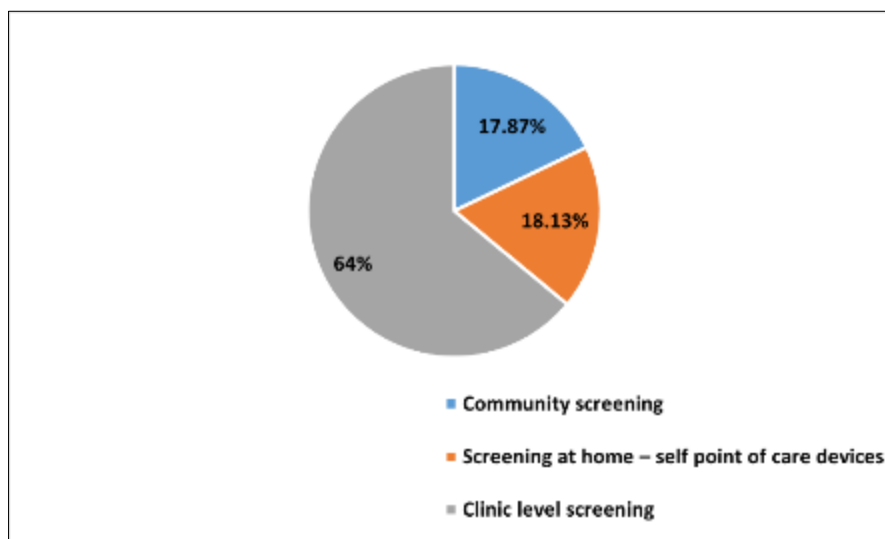


Figure 1a Distribution of response on better tool for early screening of diabetes among high-risk individuals

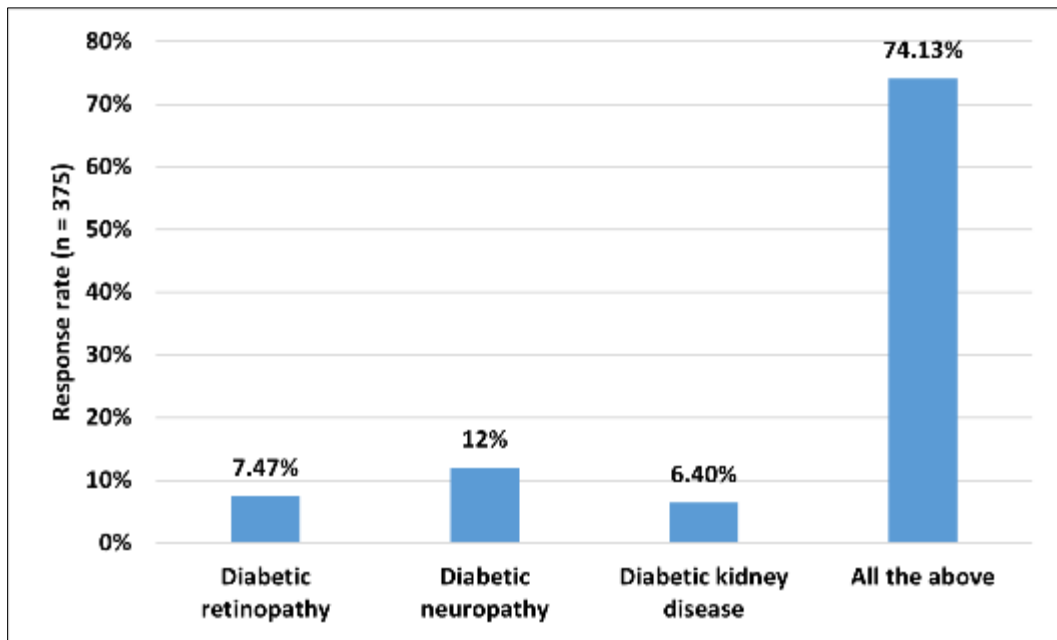


Figure 1b Distribution of response on microvascular complications that are targeted during early screening of diabetes

About 54% of the clinicians responded that the American Diabetes Association (ADA) risk score was the most commonly used risk score for early screening of diabetes (Table 2). Approximately 32% of the clinicians expressed a preference for practicing a shared decision-making model in patients who comply with medications and follow-up visits, while 31% responded that they practice exclusively in educated patients.

Table 2 Distribution of response on the most commonly used risk score for early screening

Risk score	Response rate (n = 375)
American diabetes association risk score (ADA risk score)	53.87%
Indian diabetes risk score (IDRS)	41.6%
Finnish diabetes risk score (FINDRIC)	4.53%

According to 62% of the responders, all the components of shared decision-making namely the assessment of present risk factors, communicating future risks, preventive aspects of future risks, and various treatment options available need to be emphasized in routine practice.

Approximately 65% of clinicians indicated that various strategies, such as weight loss, diet and exercise, moderation, or cessation of habits, focusing on glycemic and non-glycemic targets, an individualized approach to medications, and regular follow-up to clinic visits, were recommended for reducing future CV risk among individuals with T2DM. In high CV-risk individuals with T2DM, 45% of the clinicians reported that about 11-20% of patients were prescribed with SGLT2i as an initial choice of therapy.

About 67% of clinicians reported that 11 to 25% of diabetic individual's experience complications of lipitension (Figure 2a). Approximately 51% of clinicians reported prescribing 11 to 20% of patients with antihypertensive + statin as a therapeutic strategy to reduce CV risk in T2DM individuals. About 60% of the respondents preferred a combination of telmisartan + rosuvastatin as the most preferred fixed-dose combination (FDC) in the management of lipitension.

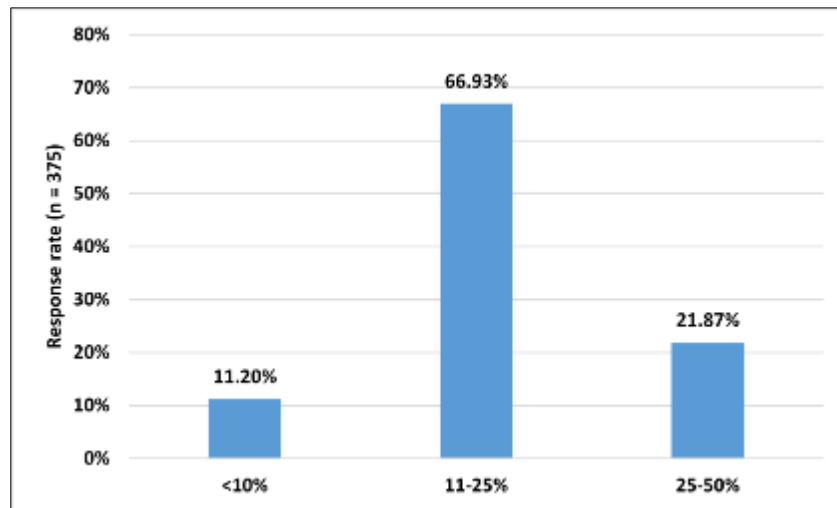


Figure 2a Distribution of response on the percentage of diabetic individuals experiencing complications of lipitension (dyslipidemia and hypertension)

More than half (64.8%) of the clinicians opined that age, duration of diabetes, cost of therapy, and co-morbidities were all important factors that influence the decision to achieve a glycemic target. According to 56% of clinicians, there were several barriers to detect diabetic kidney disease (DKD) at an early stage. These barriers include a lack of awareness about the health consequences of DKD, the asymptomatic nature of the disease from stage 1 to stage 3, economic constraints, and low acceptance and implementation of guidelines for managing the disease.

Approximately 64% of the clinicians reported observing depression in 11 to 20% of individuals with T2DM (Figure 2b). Furthermore, insights from 63% of the respondents revealed that long-term effects of depression on diabetic individuals include irregular follow-up, non-compliance to medications, development of acute complications, and a sudden surge in hyperglycemia or glycemic variability.

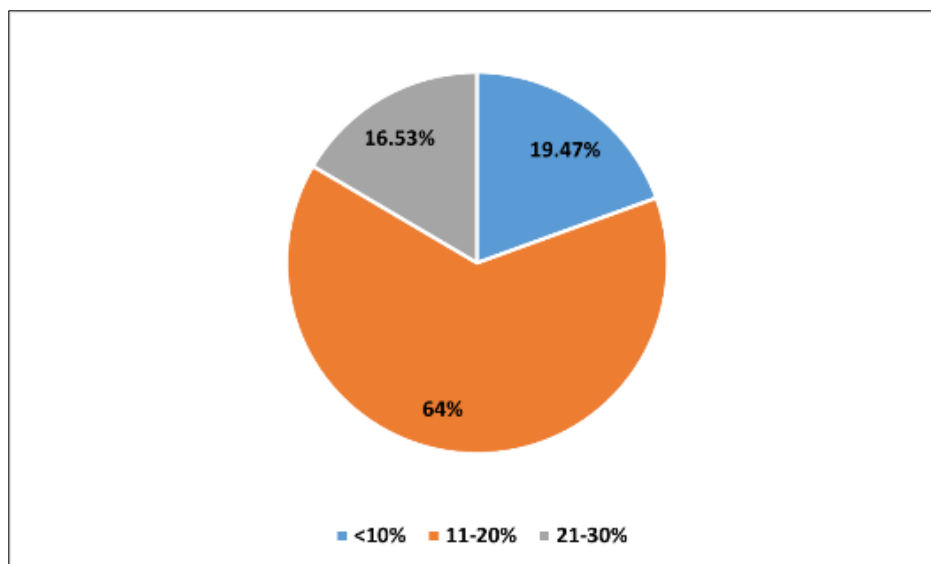


Figure 2b Distribution of response on the percentage of T2DM individuals with depression

About 46% of the respondents preferred virtual consultations, finding this platform more comfortable for both young and elderly diabetic individuals, as well as those who were newly diagnosed or have long-standing diabetes. At the level of individual diabetic patients, cost, literacy, less familiarity with using the tool, and emotional reasons were reported by 56% of clinicians as hindrances to effectively adopting telemedicine (Table 4). At the health care professional level, hindrances to effectively adopting telemedicine include awareness, inertia to change, cost, the availability of trained staff, and accessibility, as reported by 51% of the respondents.

Table 3 Distribution of table on preference use of telemedicine platform by clinicians

Use of telemedicine platform	Response rate (n = 375)
For every visit	6.67%
For every alternative visit	28.53%
Occasionally	64.80%

Table 4 Distribution of response on the hindrances for diabetic individuals to adopt telemedicine effectively

Hindrances	Response rate (n = 375)
Cost	5.6%
Literacy	10.93%
Less familiarity with using the tool	25.6%
Emotional reasons	3.2%
All the above	54.67%

4. Discussion

The study underlines the importance of early screening for diabetic patients and highlights the benefits of awareness programs in reducing the risk of diabetes and its associated health problems. According to respondents, regular awareness initiatives play a pivotal role in early diabetes screening, particularly among high-risk individuals. Clinical-level screening was identified as a more effective tool for early detection in this demographic. Deepa et al. concluded that knowledge and awareness about diabetes in India, particularly in rural areas, was poor. This underscores the need for conducting large-scale diabetes awareness and education programs [9]. Similarly, Murugesan et al. emphasized the importance of implementing awareness programs and strategies to enhance general population awareness about various aspects of diabetes [10].

The present survey underscores the significance of targeting microvascular complications such as diabetic retinopathy, diabetic neuropathy, and diabetic kidney disease during the early screening of diabetes. Vithian et al. also emphasized that preventing microvascular disease necessitates the early identification and addressing of risk factors through comprehensive screening methods [11]. The current survey emphasized that the American Diabetes Association (ADA) risk score was the predominant method for early diabetes screening. Consistent with this, Doddamani et al. identified ADA as the preferred risk score for assessing diabetes in South India, revealing a reported diabetes prevalence of 11.9%. Notably, the ADA risk score was the sole method that showed a statistically significant difference ($P= 0.05$) between low-risk and high-risk patients with diabetes [12].

According to the present survey, the majority of diabetic patient's experience complications related to lipitension, encompassing dyslipidemia and hypertension. Mithal et al., in their cross-sectional study, reported that dyslipidemia stands out as a primary risk factor for CVD in T2DM patients. They stress the importance of aggressive dyslipidemia treatment to mitigate the risk of future cardiovascular events [13]. Kaur et al. found that screening the population for diabetes and hypertension in India could lead to a shorter time for diagnosis and treatment, proving to be cost-effective. However, for this approach to be effective, it needs to be integrated with comprehensive primary healthcare delivered through health and wellness centers [4].

The present survey respondents noted an increased incidence of depression among individuals with T2DM. Arshad et al. reported the prevalence of depression to be 39.65% in their study conducted in Kashmir. Notably, it was more widespread in the age bracket of 29-38 years, among females compared to males, and in literate individuals and government employees. The prevalence of depression in type 1 diabetic patients was 60%, whereas in T2DM, it was 37.75%. Additionally, depressed patients exhibited elevated fasting blood glucose levels compared to their non-depressed diabetic counterparts [14]. In another study, Raval et al. reported that more than one-third of patients with T2DM experience moderate to severe depression [15].

The current survey respondents preferred the use of telemedicine for delivering clinical care services to patients with diabetes mellitus. Tchero et al., in a meta-analysis of 42 randomized controlled trials, demonstrated that the use of telemedicine in individuals with diabetes led to a significant reduction in glycated hemoglobin (HbA1c) levels by 0.37% ($P < 0.001$) compared to the control group. Telemedicine interventions prove more effective than traditional methods in managing diabetes, especially T2DM [16]. In a perspective study in India, Kesavadev et al. reported that telemedicine has successfully demonstrated its effectiveness, overcoming major barriers such as hypoglycemia and noncompliance to therapy in over 75% of enrolled patients [6].

In the present study at a diabetic individual level, cost, literacy, less familiarity with using the tool, and emotional reasons were the hindrances for effectively adopting telemedicine. In similar studies Venkataraman et al., it was found that various factors hinder the effective adoption of telemedicine in diabetic patients. These factors include regulatory and financial obstacles, lack of patient education, inadequate knowledge of using telemedicine tools, fear of violating patient privacy and security, and socio-economic factors. Regulatory and financial factors strongly influence telemedicine adoption, with 59% of articles highlighting cost reduction as a critical facilitator and an equal percentage citing fear of violating patient privacy and security as a significant barrier [17].

According to Ramakrishnan et al., the major obstacle hindering the acceptance of virtual consultations through telemedicine as a viable mode of healthcare delivery stems was patients' preconceived doubts regarding their quality, efficacy, and suitability at the socio-cultural level [18,19]. Similarly, Bakshi and Tandon also reported patients' difficulty in accepting telemedicine as a replacement for in-person consultations. Patients cite various reasons for preferring in-person consultations, such as their belief that the physical presence of a healthcare practitioner would lead to a better interpretation of body ailments, their lack of confidence in performing a self-exam and reporting it according to the doctor's recommendations, or simply because it was their preference [20].

The survey findings provide valuable insights into the opinions of clinicians regarding the effectiveness of early screening, patient awareness, and telemedicine practices in Indian settings. The study's major strength lies in the utilization of a carefully designed and validated questionnaire to gather expert data. This methodological approach enhances the reliability of the findings. However, it was essential to acknowledge potential limitations. Conclusions drawn from the survey may be influenced by personal perspectives and preferences, introducing the possibility of bias. Further research should be conducted to validate and expand upon the current survey findings, contributing to a more comprehensive understanding of the challenges and opportunities in diabetes management.

5. Conclusion

The survey emphasized the perceived effectiveness of regular awareness programs and clinical-level screening for early diabetes management. Microvascular complications were identified as crucial targets for early screening, and the survey noted increased prevalence of complications such as lipitension and depression in diabetic individuals. While telemedicine was recognized as a valuable tool, challenges to its widespread adoption arise from individual-level factors.

Compliance with ethical standards

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Disclosure of conflict of interest

The authors declare no conflict of interest.

Author contributions

Both the authors contributed equally.

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