



(RESEARCH ARTICLE)



Clinicians perspectives on the utilization of antidiabetics for the management of diabetes in India

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Abstract

Background: Diabetes is a potentially epidemic health problem that is spreading rapidly throughout the low- and middle-income nations like India. On the other hand, the economic and social costs of diabetes in India are substantial, underscoring the urgent need for effective diabetes management strategies. So, this study was conducted to assess the opinions of clinical experts on the preference of antidiabetic agents in the management of type 2 diabetes among Indian patients.

Methodology: A cross-sectional, questionnaire based study was conducted to collect opinion among physicians involved in managing diabetes mellitus across India between June 2022 and December 2022. Convenient sampling method was used. Descriptive statistics were used to summarize the characteristics of the study by employing frequencies and percentages.

Results: About 323 doctors involved in this study, providing valuable insights into diabetes management and treatment preferences in the Indian healthcare landscape. It was observed that majority of clinicians (64%) reported that they observed 31-60% of diabetes patients in their clinical practice and 77% of physicians indicated their preference for dipeptidyl peptidase-4 (DPP4) inhibitors. Most of the respondents (56%) considered DPP4 inhibitors + metformin as the first-line therapy followed by 53% of respondents prioritizing medications with proven cardiovascular benefits. About 83% of responders selecting metformin sustained release, it was evident that majority of medical professionals preferred sustained release and only 17% favoured the immediate release form of metformin.

Conclusion: This study concluded that the most commonly recommended and prescribed drug for the management of diabetes was sitagliptin with a more emphasis on the effectiveness and dosage flexibility in diabetes management.

Keywords: Diabetes; Oral Antidiabetics; Sitagliptin; Metformin; Glycemic Control

1. Introduction

Diabetes mellitus (DM), is a widespread chronic health condition that poses a significant challenge to both individuals and healthcare systems around the world. It was characterized by elevated blood sugar levels resulting from either insufficient insulin production or ineffective utilization of insulin by the body. Diabetes can lead to severe complications, including heart disease, kidney dysfunction, neuropathy, and vision problems, making it a critical public health concern [1].

In recent decades, the prevalence of diabetes has surged globally, and India has no exception to this alarming trend. Diabetes is a potentially epidemic health problem that is spreading rapidly throughout the low- and middle-income

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nations like India. It was projected that by 2025 the number of cases with diabetes in India would be 69.9 million with a vast majority still undiagnosed [2].

In India, 69.1 million people have DM and was estimated to become the second highest number of cases of DM in the world after China in 2015. The prevalence of DM in India ranged from 5 to 17% with higher levels found in the southern part of the country and in urban areas. DM continues to increase as a result of rapid cultural and social changes, which include ageing populations, increasing urbanization, dietary changes, reduced physical activity and unhealthy behaviour. Historically, a disease of the affluent, recent epidemiological evidence indicated a rising DM incidence and prevalence in urban India's middle class and worsening further. Indians were also believed to have a greater degree of insulin resistance and a stronger genetic predisposition to diabetes [3]. However, patterns of diabetes incidence were related to the geographical distribution of diabetes in India. Rough estimates showed that the prevalence of diabetes in rural populations was one-quarter that of urban population for India [4]. As India continues to urbanize and modernize, these factors contribute to the rising rates of diabetes in both urban and rural areas. Managing diabetes necessitates a multi-faceted approach, including lifestyle modifications, dietary adjustments, and medication when required. The economic and social costs of diabetes in India are substantial, underscoring the urgent need for effective diabetes management strategies.

This study aims to shed light on the prevalence and occurrence levels of diabetes in India, taking into account regional disparities and the broader implications for public health. By examining the expert opinion and current data on diabetes in an Indian context, it was expected to contribute to a better understanding of this critical health issue and promote effective strategies for its prevention and management.

2. Materials and Methods

We carried out a cross sectional, questionnaire based survey among physicians in treating diabetes mellitus in the major Indian cities from June 2022 to December 2022.

2.1. Questionnaire

The questionnaire booklet titled SITANORM (Expert opinion on the current practice of antidiabetics preferably sitagliptin and its combinations) study was sent to the physicians who were interested to participate in this study. The SITANORM study questionnaire included questions on the prevalence of diabetes, common symptoms, contributing factors, clinical manifestations, available treatments, and challenges faced in diabetes management. The study was conducted after receiving approval from Bangalore Ethics, an Independent Ethics Committee which is 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 2022 for participation in this Indian survey. 323 physicians from major cities of all Indian states representing the geographical distribution shared their willingness to participate and provide necessary data. Physicians were asked to complete the questionnaire without discussing with peers. A written informed consent was obtained from each physician prior 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 understanding of 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, pie, and bar charts were created using Microsoft Excel.

3. Results

A total of 323 doctors participated in the study, providing valuable insights into diabetes management and treatment preferences in the Indian healthcare landscape. Majority of the respondents held an MBBS degree, either with or without additional qualifications such as MD, DNB, or DM (67%), while 19% had an MBBS degree alone, and 11% had MBBS with MD and DM qualifications. Physicians had a diverse range of experience, with 36% of clinicians not specified their experience, 16% with 5-10 years of experience, and 48% respondents with experience ranging from 11-25 years and beyond. The survey reached clinicians in various cities across India, with Delhi (11%), Bangalore (9%), Mumbai (9%),

and Guwahati (8%) being the most represented areas. Healthcare professionals from different zones in India participated, with the West (32%), South (26%), and East (26%) regions being the most well-represented.

Majority of clinicians (64%) reported that they observed 31-60% of diabetes patients in their clinical practice, with 29% of them observed 16-30%, and 7% seen less than 15% diabetic patients (Table 1).

Table 1 Distribution of diabetic patients observed by the physicians

Percentage of diabetic patients observed by the physicians	Response (%)
31-60%	64%
16-30%	29%
<15%	7%

Dipeptidyl peptidase-4 (DPP4) inhibitors were the most commonly preferred anti-diabetic medications among respondents, with 77% of physicians indicated their preference for DPP4 inhibitors. Next to that, sodium glucose cotransporter-2 (SGLT2) inhibitors were preferred by 19% of doctors, while sulfonylureas (SUs) were chosen by only 5% of clinicians (Figure 1). Among the DPP4 inhibitors, sitagliptin was the most preferred agent chosen by 96% of respondents, followed by vildagliptin (2%) and linagliptin (2%). For the second-line medication in diabetes treatment, DPP4 inhibitors were favoured by 77% of respondents, followed by SGLT2 inhibitors (16%), sulfonylureas (6%) and insulin (1%).

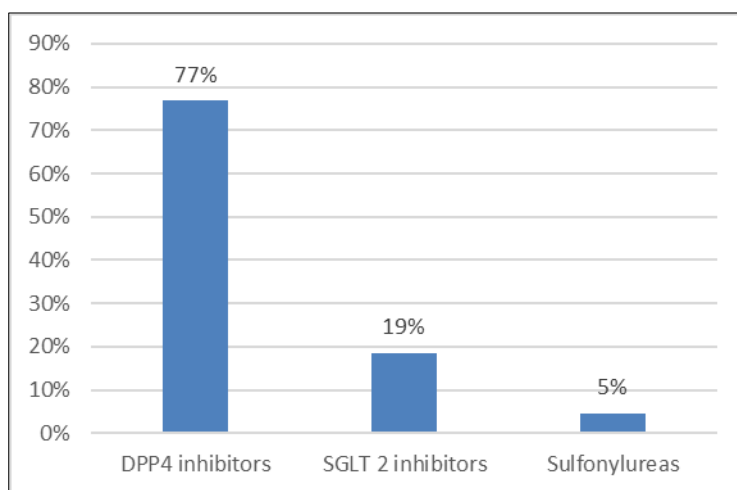


Figure 1 Distribution of preference of antidiabetics among clinicians

The majority of respondents (56%) considered DPP4 inhibitors + metformin as the first-line therapy, while 38% prescribed it after one drug failure and 7% after two drug failures. It was also noted that the majority of healthcare professionals (84%) favoured the combination of DPP4 inhibitors + metformin for managing type 2 diabetes, emphasizing its effectiveness. A smaller percentage of respondents preferred SGLT2 inhibitors + metformin (14%), while the combination of SU + metformin was less favoured (2%), highlighting the popularity of DPP4 inhibitors in diabetes therapy (Figure 2).

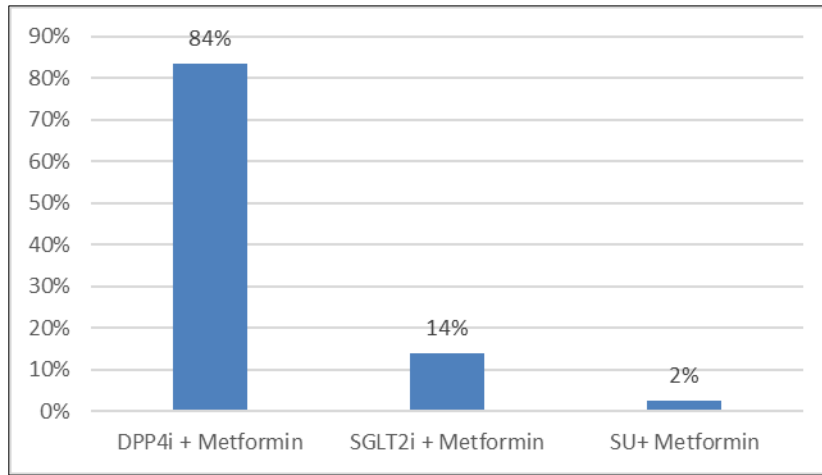


Figure 2 Distribution of preference of combination therapy

Healthcare professionals consider several pivotal factors in choosing diabetes medications to ensure optimal patient care. Minimizing glycemic variability stands as a critical objective, as it curtails the risk of short-term and long-term complications, promoting stable blood sugar levels. Prioritizing medications with glycemic durability ensure sustained effectiveness over time, a crucial facet in preventing diabetes-related complications. Preserving beta cell function remains paramount, as it bolsters insulin production, fostering better glucose control. Equally significant was selecting weight-neutral medications to side step weight-related challenges, particularly in overweight patients. Collectively, these considerations underpin patient-centered diabetes management, aiming for robust and sustainable health outcomes (Figure 3). Lesser glycemic variability was the factor observed by 30% of the respondents while 22% observed glycemic durability and an equal number of participants, 22% considered preserving beta cell function and all factors were equally considered in yet another 22%. Weight neutrality was not excluded by 4% of the respondents.

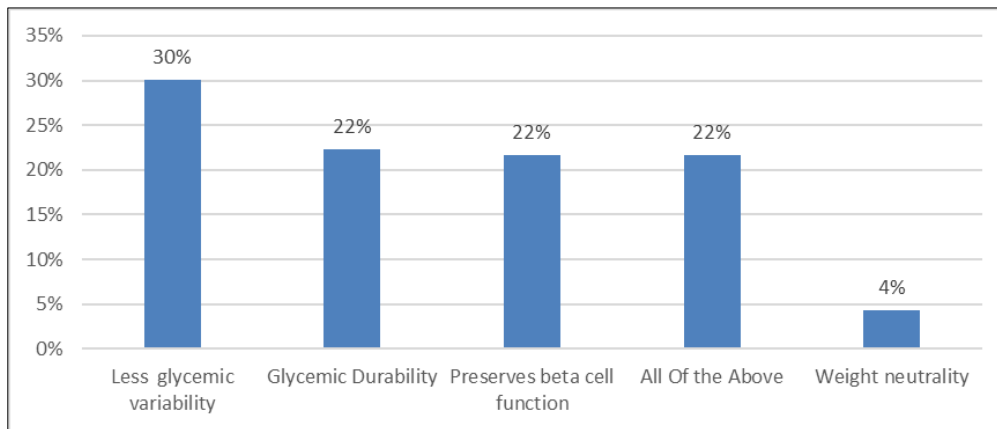


Figure 3 Distribution of factors to be considered when choosing medication

Two vital factors considered in selecting DPP4 inhibitors for diabetes management were observed as 53% of respondents prioritizing medications with proven cardiovascular (CV) benefits to reduce heart-related risks in diabetic patients and the fact that DPP4 inhibitors could be prescribed in all stages of diabetes. However, 12% of doctors found DPP4 inhibitors emphasizing good tolerability profiles while 10% of them found that DPP4 inhibitors delay progression for insulin treatment (Figure 4).

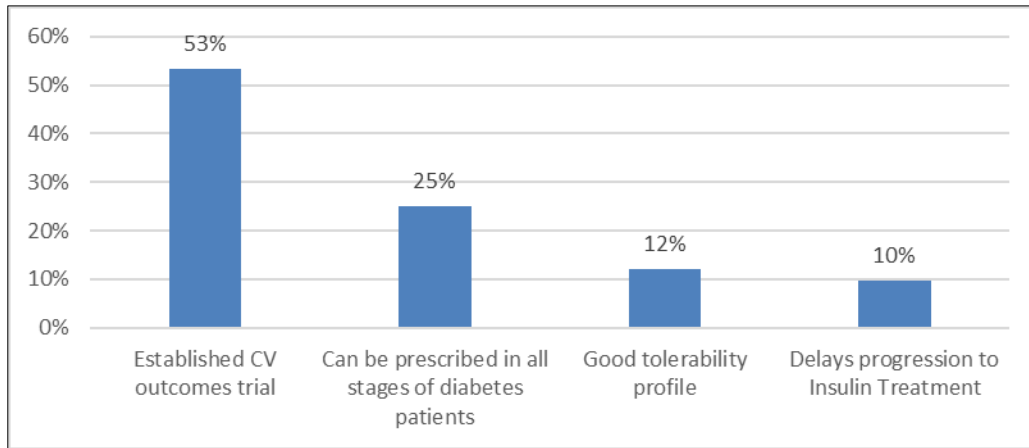


Figure 4 Distribution of factors involved in choosing DPP4 Inhibitors

When the clinicians were enquired about the special considerations made during the choice of drug in diabetic management, 59% prioritized medications suitable for type 2 diabetes patients with established cardiovascular disease, addressing both conditions to reduce heart-related risks and 19% focused on drugs that do not increase the risk of major adverse cardiovascular events. Furthermore, 10% prioritized medications with minimal or no hypoglycemia episodes. Only 8% of respondents considered the drug to be used in elderly and 4% considered hospitalization for heart failure even on long term usage to enhance patient safety and adherence, ensuring stable blood sugar levels. These considerations enhanced overall diabetes care and patient well-being.

With 83% of responders selecting metformin sustained release, it was evident that majority of medical professionals preferred sustained release and only 17% favoured the immediate release form of metformin. This preference likely stems from the extended-release version's ability to provide gradual and sustained blood sugar control, leading to improved patient compliance and outcomes in diabetes management (Figure 5).

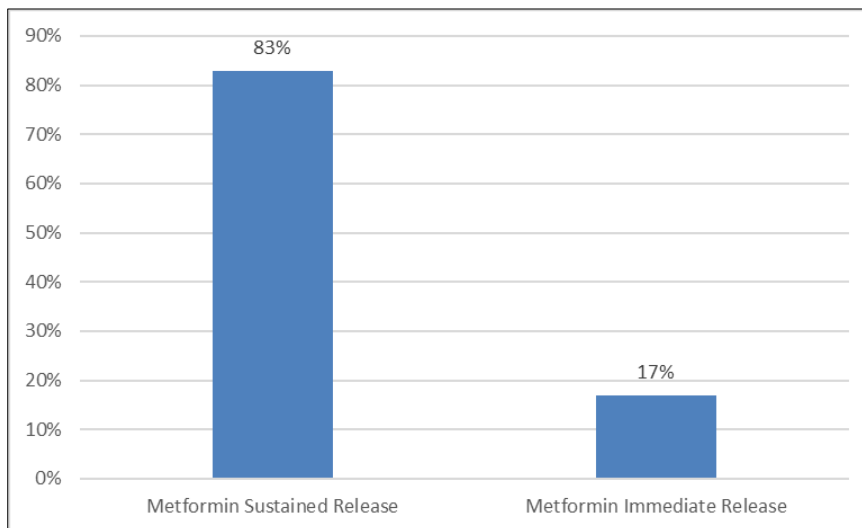


Figure 5 Distribution of preferred metformin formulation among clinicians

The majority of healthcare professionals indicated that 50 mg (48%) and 100 mg (47%) of sitagliptin were their preferred dosages. This preference likely reflected the effectiveness and flexibility of these dosages in managing blood sugar levels in individuals with diabetes while minimizing side effects (Figure 6).

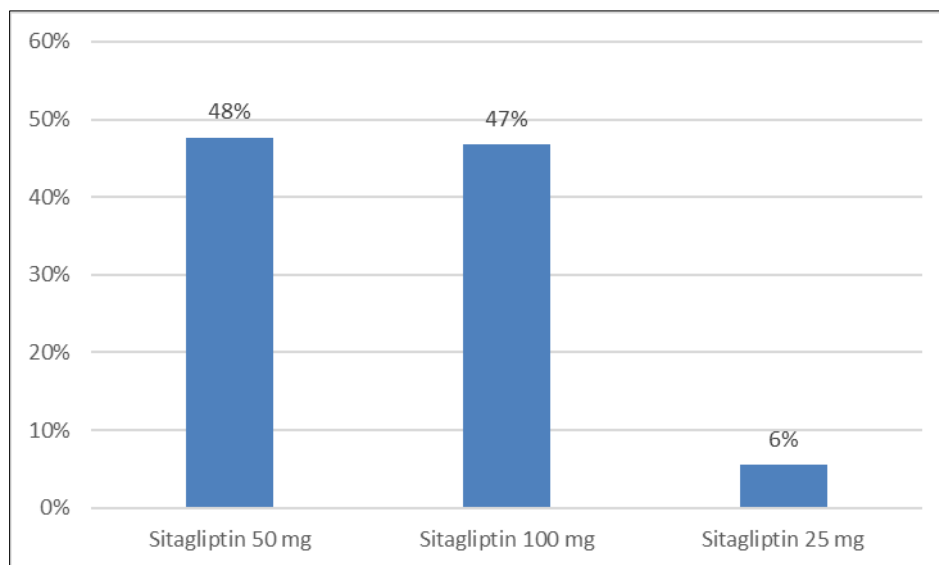


Figure 6 Distribution of preference of sitagliptin dosage among physicians

4. Discussion

The findings from the survey among physicians provided valuable insights into the pattern of patient presentation in diabetes mellitus and the factors influencing medication choices for diabetes management. Notably, respondents prioritize medications with established cardiovascular benefits and good tolerability profiles to enhance the overall well-being of individuals with diabetes. Furthermore, the ability to administer medications to patients with established cardiovascular disease and the minimization of hypoglycemia episodes were identified as key considerations in treatment selection. These considerations underscore the importance of a holistic approach to diabetes care, addressing both glycemic control and cardiovascular health while ensuring patient safety and adherence.

The response rate observed in the current study was 92%, which was remarkably greater compared to other similar research where Meyer et al. on global overview of response rates in patient and health care professional surveys in surgery stated the average response rate was 53% over 1746 doctor surveys [5]. Also, Cunningham et al. found an overall survey response rate was 35% [6].

DPP4 inhibitors were the most commonly preferred anti-diabetic medication among respondents. Sitagliptin ranked top among the physician preferences. The majority of respondents considered DPP4 inhibitors combined with Metformin as the first-line therapy. The results were supportive of findings of Elnaem et al. where they elaborated sitagliptin 50 mg was the most commonly prescribed DPP4i regimen (72.1%), and its combination therapy with metformin contributed to 67.1% of the total DPP4i prescriptions [7]. The prescription pattern in diabetes management had a dramatic shift from the dominance of sulfonyl urea to DPP4i across a span of five years. Dating back to the studies in 2015 or before, presented sulfonyl urea as the widely prescribed, physician preferred medication for the diabetic patients. As narrated by Agarwal et al., sulfonylureas were the most commonly prescribed class, but metformin was the commonest prescribed individual drug among oral hypoglycemic agents (OHA). Fixed dose combination of biguanide and sulfonylurea was prescribed commonly where monotherapy dominated over combination therapy [8]. The results of Vengurlekar et al. had a similar observation that prescription of metformin and glimepiride were found to be maximum among various available antidiabetic drugs [9]. However, by 2022, the prescribing pattern proved fixed dose combinations found to be efficacious than monotherapy [10,11].

Minimizing glycemic variability was the major factor considered by the doctors in choosing the appropriate anti diabetic medication. Murayama et al. found that the most influential factors when a DPP-4i was selected, were found to be improved glycated hemoglobin (HbA1c), postprandial glucose (PPG)-lowering effect, and a low risk of hypoglycemia, which were considered by more than 80% of physicians.

Two crucial factors considered in selecting DPP4 inhibitors for diabetes management were observed as prioritizing medications with proven cardiovascular benefits to reduce heart-related risks in diabetic patients and the fact that DPP4 inhibitors could be prescribed in all stages of diabetes patients. But the study by Brown and Ewans recommended that

safety and tolerability profiles and minimal drug interactions with a number of medications commonly prescribed in T2DM must be prioritized [12].

Sustained release metformin was the unanimous choice of the participants. The ability of the extended-release metformin to provide steady, gradual blood sugar control which enhances patient compliance and improves diabetes management outcomes was probably the reason for this preference. However, Jabbour and Ziring et al. comprehended extended-release metformin to provide an appropriate option for patients with type 2 diabetes mellitus who require several medications to achieve glycemic control or manage comorbid conditions, and for those who have GI intolerance with the immediate-release formulation [13]. Sitagliptin was effective in lowering HbA1c, and fasting as well as postprandial glucose in monotherapy and in combination with other oral antidiabetic agents [14]. The recommended dosage of sitagliptin as per the doctors was 50 mg. This choice was probably due to the doses' flexibility and efficacy in controlling blood sugar levels in diabetics while reducing adverse effects.

This study unveiled the priorities and preferences of prescribers in diabetes management. The role of DPP4 inhibitors likely sitagliptin dominance remains the mainstay of the study. Further, this study being a survey of drug use design remains easy and quick to conduct and the comprehensible questionnaire determines the strength of the study. Yet, cost implications and medication adherence were not included in the study when pharmacoeconomic considerations and adherence were crucial in drug therapy of chronic illness.

5. Conclusion

From the analysis of response among clinicians, it was determined that the most commonly recommended and prescribed drug for the management of diabetes was a DPP4 inhibitor, specifically sitagliptin. Nonetheless, it was necessary to take into account the effectiveness and safety of metformin. Additionally, the preference for metformin sustained release highlighted the significance of extended-release formulations in achieving stable blood sugar levels and improving patient compliance. Moreover, the preference for sitagliptin dosages of 50 mg and 100 mg emphasizes the effectiveness and flexibility of these options in diabetes management. Overall, these insights underscore the need for personalized, patient-centered approaches to diabetes treatment, where healthcare providers consider a multitude of factors to optimize care and enhance the quality of life for individuals living with diabetes.

Compliance with ethical standards

Acknowledgments

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Disclosure of conflict of interest

The authors declare no conflict of interest.

Author contributions

Both the authors contributed equally.

Statement of informed consent

Informed consent was obtained from all individual participants included in the study.

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