Expert Consensus and Physician Perspectives on a Low-dose Triple Fixed-dose Combination for Type 2 Diabetes in India

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Abstract

Background: Fixed-dose combinations (FDCs), particularly sulfonylurea-based triple therapies, play a central role in managing type 2 diabetes in India. With growing focus on safety and personalization, lower-dose alternatives are gaining attention, especially for early-stage and vulnerable patients.

Objective: To obtain expert consensus from Indian physicians on the clinical relevance, preferred patient profiles, and prescribing intent for a low-dose triple FDC comprising glimepiride 0.5 mg, metformin 500 mg sustained-release (SR), and voglibose 0.2 mg.

Materials and methods: A structured cross-sectional survey was conducted among 112 physicians from metro and nonmetro regions of India. The survey used close- and open-ended questions to explore the need, clinical positioning, and use scenarios for this low-dose triple combination. Responses were analyzed and synthesized into expert consensus per the Oxford Centre for Evidence-Based Medicine (OCEBM) framework (Level V evidence).

Results: Most physicians (86.6%) supported the need for this combination. Common use cases included early-stage diabetes, elderly patients, and those with postprandial hyperglycemia or hypoglycemia risk. It was also preferred for step-up therapy and deintensification with agents, such as SGLT2 inhibitors or insulin (77.7%). Advantages cited included improved safety, simplified dosing, and affordability.

Conclusion: Expert consensus affirms this FDC's clinical relevance across multiple diabetes stages. Further real-world evidence and outcome-driven studies are warranted to support broader clinical integration and guideline inclusion.

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Introduction

Type 2 diabetes mellitus (T2DM) in India presents complex therapeutic challenges due to its early onset, high-carbohydrate dietary patterns, and widespread clinical inertia.[1] Fixed-dose combinations (FDCs), especially triple oral regimens, have long served as pragmatic tools to improve adherence and address multifactorial glycemic burdens covering fasting, postprandial, and basal glucose dynamics.[2,3]

One of the most widely used triple combinations in India comprises metformin, glimepiride, and voglibose. Each agent targets distinct glycemic mechanisms: metformin improves hepatic insulin sensitivity and suppresses gluconeogenesis; glimepiride stimulates beta-cell insulin release; and voglibose blunts postprandial glucose spikes by delaying carbohydrate absorption.[2] This combination, therefore, has a role in the management of T2DM among the Indian population with diverse dietary habits frequently rich in refined carbohydrates.[1,2] Therefore, despite the availability of modern agents, this triple FDC is still commonly prescribed due to its cultural fit, cost-effectiveness, and broad clinical familiarity. However, the treatment regimens have often relied on higher doses of sulfonylureas with a relatively higher risk of hypoglycemia and weight gain compared to lower doses. To mitigate these concerns while maintaining the therapeutic efficacy, there is growing clinical and academic interest in the use of low-dose sulfonylureas, particularly glimepiride 0.5 mg.[4–6] According to the Williams Textbook of Endocrinology, doses ≤1 mg are considered low and are increasingly favored in FDCs for their better tolerability and safety profile.[7]

Real-world studies from India have shown that combining glimepiride 0.5 mg with metformin leads to significant reductions in HbA1c (~1.2%), fewer episodes of hypoglycemia, and improved tolerability.[5,8] Mechanistically, this low-dose glimepiride not only enhances insulin secretion but may also improve insulin receptor sensitivity through "insulin receptor downregulation escape," a dual action associated with improved HOMA-IR and beta-cell function.[4] Voglibose, when added to this combination, offers additional value in the Indian context. As an alpha-glucosidase inhibitor, it helps attenuate postmeal glucose surges, which is especially relevant in carbohydrate-heavy diets. Several Indian studies have observed its effect to improve glycemic parameters, body weight, and even insulin sensitivity.[3,9,10] The synergistic effect of the three agents—glimepiride, metformin, and voglibose— is summarized in Figure 1, depicting how each component contributes to basal, prandial, and stimulated glucose regulation.[4,11–13] Together, this combination targets multiple glycemic axes, fasting, postprandial, and basal—with early reports suggesting benefits in glycemic variability and time-in-range (TIR), a modern metric increasingly favored over HbA1c for predicting complications.[14] This study aims to capture real-world physician perspectives and expert consensus on the clinical relevance, preferred patient profiles, and prescribing intent associated with the low-dose triple FDC of glimepiride 0.5 mg, metformin 500 mg SR, and voglibose 0.2 mg. By synthesizing insights from a nationwide cross-sectional survey, the study aims to evaluate its positioning across the treatment spectrum, including early initiation, step-up therapy, and dose

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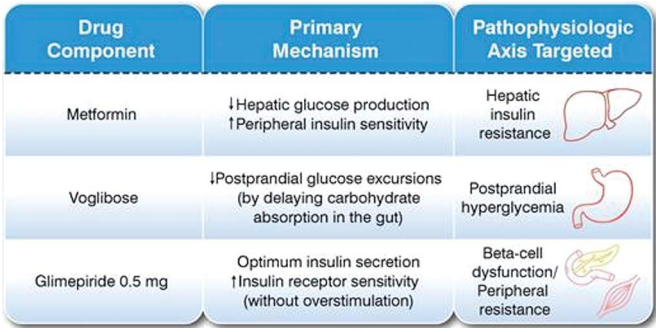

Fig. 1: Mechanism Matrix: low-dose glimepiride + metformin + voglibose, metformin improves basal glycemia via hepatic glucose suppression and insulin sensitization.[11] Voglibose blunts post-meal spikes by delaying carbohydrate absorption.[12] Low-dose glimepiride enhances beta-cell responsiveness and insulin sensitivity without excessive stimulation[4,13]

deintensification, and to inform practical recommendations for its wider clinical adoption in India's outpatient diabetes care.

Materials and Methods

Study Design

This was a cross-sectional survey conducted among physicians across India to evaluate the clinical relevance, prescribing intent, and preferred use scenarios for a novel low-dose triple FDC comprising glimepiride 0.5 mg, metformin 500 mg sustained-release (SR), and voglibose 0.2 mg in the management of type 2 diabetes mellitus (T2DM). The study was conceptualized and interpreted with guidance from a pre-identified expert panel, consisting of senior clinicians recognized for their leadership in diabetes care, participation in national guideline development, and involvement in multicenter clinical trials and/or professional societies. These experts, who are also co-authors, contributed to study design and data interpretation but did not participate as survey respondents. The findings were analyzed and synthesized into structured expert-informed insights based on aggregated physician perspectives. In alignment with the Oxford Centre for Evidence-Based Medicine (OCEBM) 2011 framework, the outputs are classified as level V evidence, representing expert opinion without direct interventional data.[15]

Ethical Considerations

This was a noninterventional, survey-based study that did not involve any patient-level or personally identifiable data. Participation was voluntary, anonymized, and nonincentivized. As no clinical outcomes or health-related data were collected, formal institutional ethics committee approval was not required.

Participants and Data Collection

The survey included 112 physicians from across India, encompassing a broad range of specialties, including general practitioners, diabetologists, endocrinologists, and internal medicine specialists. To ensure real-world applicability, participants were drawn from both metropolitan and nonmetropolitan regions using a convenience sampling approach. Between September and October 2024, a total of 200 physicians were approached through targeted outreach, with a focus on clinicians known to prescribe triple FDCs containing glimepiride, metformin, and voglibose. Of these, 112 physicians completed the survey. The survey instrument, a structured Google Forms questionnaire, was developed and reviewed by a steering group of study investigators and expert clinicians for clinical relevance, clarity, and comprehensiveness. All responses were collected digitally, anonymized at the point of submission, and processed for descriptive analysis. No personal identifiers, patient-level information, or follow-up tracking mechanisms were employed. Given the noninterventional nature of the study and the absence of patient data, institutional ethics approval was not required.

Survey Instrument

The questionnaire was developed using Google Forms and underwent multiple iterations with feedback from a preidentified expert panel comprising senior clinicians and study investigators, all of whom are coauthors of this manuscript. This panel did not participate as respondents. Their input ensured content validity, clinical relevance, and clarity in the structure and phrasing of the questions.

The final instrument included a combination of closed-ended and open-ended items, specifically designed to assess physician perceptions regarding the clinical relevance, patient suitability, and prescribing intent for a low-dose triple FDC consisting of glimepiride 0.5 mg, metformin 500 mg sustained-release (SR), and voglibose 0.2 mg. To promote uniform interpretation, a brief virtual orientation was held prior to survey distribution.

Participants were asked to respond to the following questions:

- Do you feel the need for a lower-dose triple FDC containing glimepiride 0.5 mg, metformin SR 500 mg, and voglibose 0.2 mg?
- In what patient profiles, clinical situations, or treatment scenarios would you prefer using this low-dose variant?
- How likely are you to prescribe this low-dose triple FDC for patients requiring sulfonylurea dose down-titration when initiating other agents such as SGLT2 inhibitors, insulin, or GLP-1 receptor agonists?
- Do you have any additional comments or suggestions regarding the use of this low-dose triple FDC in your clinical practice?

Before survey deployment, a short virtual briefing was held to ensure consistency in understanding among participants.

Data Analysis and Consensus Derivation

Quantitative data from closed-ended questions were analyzed using descriptive statistics, including frequency distributions and percentage summaries. Open-ended responses were thematically coded and grouped under clinical domains such as early-stage T2DM, comorbidity-specific tailoring (e.g., chronic kidney disease (CKD) and elderly), and practice-level prescribing considerations. As the questionnaire was administered via a digital platform with mandatory fields for all closed-ended items, there was no missing data for quantitative analysis.

Following data aggregation, the study team reviewed the patterns to extract consolidated insights. These insights were interpreted as expert consensus: a structured synthesis of collective physician opinion derived through a systematic survey process. As no outcome measures or interventional comparisons were involved, all conclusions are categorized under level V evidence as per the OCEBM framework.[15]

Results

Participant Demographics

A total of 112 physicians from across India participated in the survey. The majority were consultant physicians (56.3%) and diabetologists (28.6%), followed by family physicians (8.9%), endocrinologists (3.6%), and cardiologists (2.7%). In terms of experience, most respondents had over 11 years of clinical practice, ensuring a mature clinical viewpoint. This mix of specialists and generalists from both

metropolitan and nonmetropolitan regions reflects the real-world patterns of diabetes care in India. Details are summarized in Table 1.

Perceived Need for Low-dose Triple Fixed-dose Combination

A substantial majority (86.6%) of physicians endorsed the need for a low-dose glimepiride-based triple FDC in clinical practice, citing unmet needs in early-stage T2DM and the demand for safer alternatives to higher-dose sulfonylureas. These findings are presented in Table 2.

Clinical Scenarios for Low-dose Glimepiride-based Triple FDC Use (*n* = 122)

An open-ended question invited physicians to describe patient profiles or clinical situations in which the glimepiride 0.5 mg + metformin + voglibose triple FDC would be preferred. A total of 122 responses were received from 112 participants (some contributed more than one scenario). These were thematically grouped into three categories: patient profiles, therapy stage, and deintensification settings.

Patient Profiles and Risk Stratification

Out of the 122 open-ended clinical scenario responses, 65 (53.3%) specifically described patient profiles best suited for this low-dose triple FDC. Among these 65 profile-specific mentions, the most frequently cited group was patients with high postprandial glucose levels and concurrent risk of hypoglycemia (52.3%), followed by elderly patients with sensitivity to sulfonylureas (21.5%). The remaining responses (26.2%) addressed a range of additional contexts, including early-stage CKD, low body weight, gastrointestinal sensitivity, carbohydrate-rich diets, newly diagnosed diabetes, and nocturnal hypoglycemia. These subgroup preferences are summarized in Table 3.

Disease Stage and Place in Therapy

A total of 50 responses (41.0% of total open-ended clinical scenario inputs) focused on the disease stage or therapeutic context. Two prominent patterns emerged: 44.0% of these described the FDC as suitable for early-stage or newly diagnosed patients, while 56.0% saw its utility during therapy adjustment or optimization, such as patients inadequately controlled on dual oral antiglycemic drugs or those requiring titration and deintensification (Table 4). This distribution underscores the formulation's perceived versatility across the treatment spectrum.

Prescribing Intent in Deintensification Settings

Physicians were asked about their likelihood of prescribing the low-dose triple FDC during sulfonylurea down-titration, particularly when adding agents such as SGLT2 inhibitors, GLP-1 receptor agonists, or insulin. A substantial majority (77.7%) indicated a positive prescribing intent, with 33.0% responding as 'very likely' and 44.6% 'likely' to consider this formulation. An additional 15.2% maintained a neutral opinion, while only 7.1% reported they were 'unlikely' to prescribe it. The detailed breakdown is provided in Table 5.

Practical and Prescribing Considerations

- Among the 122 open-ended responses, approximately 11% (*n* = 14) highlighted practical considerations, such as ease of titration, improved adherence, and suitability for sulfonylurea-sensitive patients.
- Specifically, 13 responses (10.7%) referenced advantages such as simplified dosing, reduced need for tablet splitting, and the convenience of a fixed-dose format in everyday practice. Several physicians viewed the low-dose combination as especially suitable for patients requiring minimal pancreatic stimulation, such as those with early-stage diabetes or those nearing glycemic targets.
- Respondents emphasized economic accessibility in, especially low-resource settings, with cost barriers to advanced therapies. Some respondents indicated that in such scenarios, the triple FDC could be a logical intermediate step before

Table 1: Demographic profile of participating physicians (*n* = 112)

Parameter	*Category*	*Number of participants (n)*	*Percentage (%)*
Specialization	Consultant physician	63	56.30
	Diabetologist	32	28.60
	Family physician	10	8.90
	Endocrinologist	4	3.60
	Cardiologist	3	2.70
Experience (years)	0–5	13	11.60
	6–10	22	19.60
	11–20	42	37.50
	21+	35	31.30

Table 2: Physician opinion on the need for a low-dose glimepiride-based triple FDC (*n* = 112)

Response	*Number of respondents (n)*	*Percentage (%)*
Yes	97	86.60
No	15	13.40

Table 3: Key patient profiles for low-dose glimepiride-based triple FDC (*n* = 65)

Patient profile	*Frequency (n)*	*Percentage (%)*
High postprandial glucose with concurrent risk of hypoglycemia	34	52.30
Elderly patients with heightened sulfonylurea sensitivity	14	21.50
Other situations (chronic kidney disease, low body weight, GI sensitivity, carbohydrate-rich diets, newly diagnosed, nocturnal hypoglycemia)	17	26.2

Table 4: Preferred therapy stage for low-dose glimepiride-based triple FDC (*n* = 50)

Therapeutic scenario	*Frequency (n)*	*Percentage of total responses (%)*
Early-stage/newly diagnosed T2DM	22	44.0%
Therapy adjustment or optimization phase	28	56.0%

Table 5: Physician likelihood to prescribe in down-titration settings (*n* = 112)

Response category	*Number of physicians (n)*	*Percentage (%)*
Very likely	37	33.00%
Likely	50	44.60%
Neutral	17	15.20%
Unlikely	8	7.10%

the initiation of injectables. Additional comments citing benefits included reduction of pill burden, weight neutrality, and a sense of therapeutic satisfaction. Phrases such as "excellent synergy," "good for Indian people with diabetes," and "long-awaited combination" reflected the perception that the formulation meets evolving expectations for safer, more streamlined oral therapies. These preferences were further synthesized into evidence strength and consensus levels in Tables 6 and 7.

Discussion

Increasing use of low-dose triple FDCs reflects a strategic shift in diabetes management, from aggressive treatment regimens toward patient-centered approaches that could improve long-term adherence. In this study, 87% of the surveyed physicians practicing in India supported not only the local practice needs of such an approach, but also the global push for deintensification. International guidelines, including the ADA's 2025 standards, emphasize tailored glycemic targets and the avoidance of overtreatment, particularly in elderly or comorbid patients.[16] As newer antihyperglycemics such as SGLT2 inhibitors and GLP-1 receptor agonists gain prominence, sulfonylurea tapering is increasingly advised to minimize additive hypoglycemia risk.[17] This trend is further corroborated by population-level data from Europe, which show a reduction in high-dose SU prescriptions, particularly among older adults.[18] These converging global and regional shifts underscore the need for rational, affordable, and physiology-aligned regimens that optimize outcomes without escalating complexity or cost, especially in resource-constrained health systems like that of India.

The survey identified distinct patient subgroups that may benefit most from a low-dose triple FDC, reinforcing its role beyond conventional glycemic thresholds. Notably, physicians cited patients with high postprandial excursions and concurrent hypoglycemia risk, elderly individuals with sulfonylurea sensitivity, and those in early-stage T2DM or dual therapy failure. These real-world preferences are reflected in Table 6, emphasizing the formulation's relevance in metabolically vulnerable populations.

In line with the ADA's 2025 guidance,[16] which advocates individualized glycemic targets and a reduction in treatment intensity among older or comorbid patients, the FDC appears particularly well-suited for nuanced care pathways. Several responses also noted its value in patients with mild renal impairment, gastrointestinal sensitivity, and lower body weight, and in clinical contexts where tolerability and safety often pose treatment constraints. These patterns highlight the need for stepwise patient-tailored approaches in India's diverse diabetes care landscape.

Physician responses indicated that the low-dose triple FDC occupies a flexible therapeutic niche, usable both as a first-line strategy and as a deintensification bridge. As shown in Table 7, 23% of scenario-specific responses supported a step-up from dual oral antiglycemic drug therapy. In comparison, 41% of physicians had earlier indicated a preference for early initiation in general treatment contexts (Table 4). Meanwhile, 77.7% supported its use during SU down-titration when introducing SGLT2 inhibitors, GLP-1 RAs, or insulin, aligning with international recommendations to reduce SU dose in such settings to lower the risk of hypoglycemia.[16,17] Clinicians appreciated that this combination could maintain beta-cell responsiveness without causing overstimulation, especially in patients transitioning from high-dose sulfonylureas or postponing the need for injectable therapies. Relative to FDCs with higher doses of sulfonylureas or costlier medications, this triple FDC with low doses of SU offers a practical alternative by providing effective glycemic control, affordability, and a favorable safety profile. These insights reflect real-world prescribing practices worldwide, where tailoring treatment intensity to individual patient needs is becoming increasingly important.[18]

Beyond HbA1c, physicians increasingly emphasize glycemic stability, particularly TIR, as a more dynamic and predictive marker of metabolic health. The low-dose triple FDC's ability to target fasting, postprandial, and stimulated glucose excursions was perceived as instrumental in achieving flatter glucose profiles without precipitating

Table 6: Expert consensus on patient segments for low-dose glimepiride-based triple FDC

Patient segment/use scenario	*Physician support*	*Strength of recommendation*	*Level of evidence*
Early-stage/newly diagnosed T2DM	86.6% overall agreement	Strong	Level V (expert opinion)
High postprandial glucose (PPG) with concurrent hypoglycemia risk	52.3% (most cited subgroup)	Strong	Level V
Elderly patients with sulfonylurea sensitivity	21.5% (specific subgroup)	Moderate to strong	Level V
Patients with chronic kidney disease (CKD) or renal impairment	Qualitative mentions	Moderate	Level V

This table summarizes consensus-based insights from a cross-sectional survey of 112 Indian physicians. Recommendation strength reflects response prevalence. All scenarios are categorized as Level V evidence, based on the Oxford Centre for Evidence-Based Medicine (OCEBM, 2011) framework, as no clinical endpoints or interventional comparisons were included

Table 7: Expert consensus on treatment positioning of low-dose glimepiride-based triple FDC

Therapeutic transition Scenario	*Physician support*	*Strength of recommendation*	*Level of evidence*
Sulfonylurea down-titration with SGLT2i, GLP-1RA, or insulin	77.7% likely or very likely to prescribe	Strong	Level V
Step-up from dual OAD therapy	23% scenario-specific responses	Moderate	Level V
Transition from high-dose SU to low-dose glimepiride FDC in insulin-requiring patients	Expert communication (nonsurvey)	Moderate to strong	Level V (Expert opinion)

This table presents expert perspectives on therapeutic positioning based on physician survey responses and qualitative insights. As no interventional outcomes were evaluated, all scenarios are classified as Level V evidence under the Oxford CEBM 2011 framework. Recommendation strength reflects the frequency and consistency of physician input

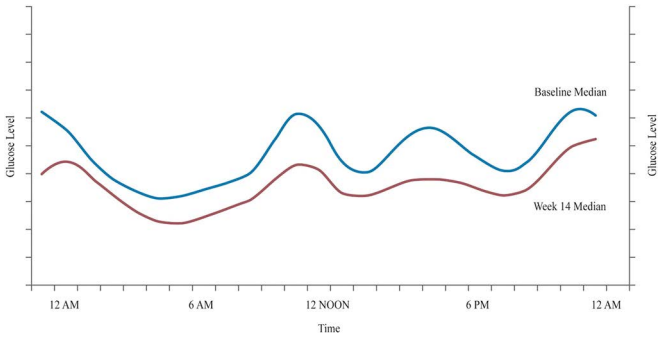

Fig. 2: Glycemic flattening with voglibose add-on to metformin + sulfonylurea. This conceptual illustration, adapted from, summarizes flash glucose monitoring (FGM) observations following the addition of voglibose to a metformin and sulfonylurea regimen. It is intended to visually represent trends in glycemic stability and postprandial control reported in existing literature, underscoring the physiological rationale for alpha-glucosidase inhibitor use in enhancing time-in-range (TIR)[14]

hypoglycemia.[1] This synergy is particularly relevant in Indian dietary contexts, where high refined carbohydrate intake and meal variability contribute to postmeal glucose surges.[1,14]

Voglibose's effect in blunting postprandial peaks, combined with glimepiride's gentle insulinotropic action and metformin's basal control, was observed by physicians to enable improved TIR. These impressions align with international evidence that links TIR to reduced microvascular and macrovascular risks.[14] As continuous glucose monitoring becomes more widespread in urban diabetes care, such physiologically rational regimens may offer a strategic advantage in optimizing both short-term metrics and long-term outcomes. Figure 2 illustrates this flattening effect as observed in flash glucose monitoring studies, particularly when voglibose is added to a metformin and sulfonylurea regimen.[15]

Physician narratives highlighted several real-world enablers that support the adoption of the low-dose triple FDC, chief among them being simplicity, ease of titration, and cost-effectiveness. The inclusion of glimepiride 0.5 mg in an FDC was considered a practical improvement, simplifying dose adjustments and removing the need for tablet splitting. General practitioners particularly valued its usefulness in high-volume, outpatient settings without specialist support. The fixed-dose formulation supports adherence, particularly for elderly and those with multiple health conditions. Clinical reports indicate improved tolerability and compliance with triple-drug combinations.[19–21]

However, adoption barriers were acknowledged, including limited familiarity with ultra-low-dose sulfonylurea strategies and the absence of large-scale outcome data. These concerns reflect real-world observations, showing resistance to changing from conventional sulfonylurea doses, even though new evidence supports their safety and effectiveness.[18,21] Overall, the sentiment was positive, with many physicians describing the combination as a "rational middle path" between safety, efficacy, and affordability in India's complex treatment landscape. Indian expert guidelines also endorse the suitability of glimepiride–metformin–voglibose combination, for outpatient care settings and for low-resource healthcare environments.[2,20]

The low-dose FDC comprising glimepiride 0.5 mg, metformin 500 mg SR, and voglibose 0.2 mg before the meals, based on individual glycemic needs.[9,16] Compared to other triple oral antidiabetic combinations available in India—such as glimepiride + metformin + pioglitazone, or combinations with DPP4 inhibitors or SGLT2 inhibitors—this FDC offers a lower-dose, cost-effective, and physiologically synergistic option.[2,3,19] While higher-dose FDCs may be more appropriate for patients with advanced disease or greater insulin resistance, the present low-dose formulation is specifically designed for early-stage disease, elderly patients, and those requiring stepwise deintensification, including SU down-titrat ion.[4,5,17] Its favorable safety profile, reduced hypoglycemia risk, and simplified dosing, along with availability as a fixed-dose tablet, make it particularly relevant for use in general practice and tier 2/3 outpatient settings in India.[8,18,20]

These observations are aligned with the principles of the "Safe and Smart Use of Sulfonylureas" approach, which emphasizes appropriate patient selection, lower dosing, and preference for modern SUs with favorable safety and cardiovascular profiles. Glimepiride 0.5 mg, as included in this FDC, represents a clinically rational starting point that minimizes hypoglycemia risk while preserving glycemic efficacy, especially in combination with metformin and voglibose. The fixed-dose formulation enhances adherence, dosing simplicity, and suitability across a range of real-world Indian settings, particularly in primary care and among elderly populations.[22]

Limitations and Future Research Needs

Although this study provides useful observations based on clinical practice, the nature of its design limits the strength and generalizability of its conclusions. As a cross-sectional survey without clinical endpoints or longitudinal follow-up, the findings are classified as Level V evidence, based solely on expert opinion, according to the Oxford Centre for Evidence-Based Medicine framework.[15] No patient-level data, glycemic outcomes, or safety metrics were directly evaluated.

To substantiate the clinical positioning of this low-dose triple FDC, future research should focus on prospective real-world studies and pragmatic trials, particularly those measuring glycemic durability, incidence of hypoglycemia, and improvements in TIR. Comparative trials against dual oral antidiabetic therapy or newer triple-drug combinations could further refine its therapeutic role. Additionally, the inclusion of patient-reported outcomes and cost-effectiveness assessments would offer crucial perspectives for formulary inclusion, clinical guideline endorsement, and national health system adoption. Future trials should prioritize clinically meaningful endpoints, including HbA1c reduction, TIR variability, hypoglycemia frequency, patient adherence, and economic outcomes.

Implications for Practice and Policy

The low-dose Glimepiride-based triple FDC addresses a critical gap in India's diabetes care by providing a simplified and cost-conscious option that meets clinical needs and system-level constraints. Its physiological synergy, flexible dosing, and affordability make it suitable for stepwise treatment approaches in tier 2 and tier 3 settings, where therapeutic inertia and access barriers are common.[23] If further supported by outcome data, this FDC could be included in national essential medicines lists, public health guidelines, and primary care protocols. From a policy perspective, its ability to delay injectable therapies, improve adherence, and reduce glycemic emergencies supports a more sustainable and equitable approach to diabetes care in India.

Conclusion

This study presents structured insights from Indian physicians on the clinical role of a low-dose triple fixed-dose combination (FDC) comprising glimepiride 0.5 mg, metformin 500 mg SR, and voglibose 0.2 mg. The formulation was broadly endorsed for early-stage initiation, therapy optimization, and sulfonylurea down-

titration, particularly in patients with a risk of hypoglycemia, elderly populations, and those facing treatment inertia. Its physiological design—addressing basal, prandial, and stimulated glucose pathways—was considered well-suited to the Indian dietary pattern and outpatient treatment setting. Experts viewed it as a safe, affordable, and flexible option in the current landscape of diabetes care. Although classified as level V evidence, these insights offer a valuable starting point for future real-world research, clinical outcome studies, and health system assessments aimed at supporting wider clinical use and policy adoption.

Declarations

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Conflict of Interest

Some of the authors are employees of USV Pvt Ltd, the organization that supported this study. The views expressed in this manuscript represent independent clinical interpretations and do not reflect any promotional intent. No honoraria or external influence affected the survey responses or data analysis.

Source of Support

This study was supported by USV Pvt Ltd. The company facilitated survey logistics and coordination but had no role in influencing physician responses or shaping manuscript content.

Data Availability

Data sharing does not apply to this article. Other than the survey responses, no datasets were generated or analyzed during the current study.

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References

1. Mohan V, Sudha V, Shobana S, et al. Are unhealthy diets contributing to the rapid rise of type 2 diabetes in India? J Nutr 2023;153:940–948.
2. Das A, Wangnoo S, Chawla R, et al. Expert consensus on triple combination of glimepiride, metformin, and voglibose usage in patients with type 2 diabetes mellitus in Indian settings. J Diabetol 2022;13:145–153.
3. Kalra S, Das AK, Priya G, et al. Fixed-dose combination in management of type 2 diabetes mellitus: Expert opinion from an international panel. J Family Med Prim Care 2020;9:5450–5457.
4. Bermúdez-Pirela VJ, Cano C, Medina MT, et al. Metformin plus low-dose glimepiride significantly improves HOMA-IR and beta-cell function (HOMA-β) without hyperinsulinemia in patients with type 2 diabetes mellitus. Am J Ther 2007;14:194–202.
5. George J. Starting with low dose sulfonylurea and metformin in early stage type 2 diabetes mellitus. Indian J Endocrinol Metab 2015;19:309.
6. Banset A, Mahato B, Shrestha BL, et al. Efficacy and safety of low dose glimepiride–metformin fixed dose combination [0.5 mg glimepiride + 500 mg metformin SR] in patients with type 2 diabetes mellitus in Nepal. Indian Med Gaz 2019;153:94–98.
7. Melmed S, Koenig R, Rosen CJ, et al. Williams Textbook of Endocrinology, 14th edition. Philadelphia: Elsevier; 2019.
8. Jain P, Kasliwal R, Singh SK, et al. Usage of low-dose glimepiride (0.5 mg) and metformin combination in the management of type 2 diabetes continuum in Indian setting. Asian J Diabetol 2022;23:8–19.
9. Murti K, Sethi MK, Dey A, et al. Addition of voglibose to glimepiride and metformin has better glucose control in diabetics: A prospective, parallel-group and open-label comparative study. Int J Pharmacol 2016;12:422–428.
10. Talaviya PA, Saboo BD, Dodiya HG, et al. Retrospective comparison of voglibose or acarbose as an add-on therapy to sulfonylureas in Western Indian patients with uncontrolled overweight/obese type 2 diabetes. Diabetes Metab Syndr 2016;10(2):88–91.
11. Foretz M, Guigas B, Bertrand L, et al. Metformin: from mechanisms of action to therapies. Cell Metab 2014;20(6):953–966.
12. Kawamori R, Tajima N, Iwamoto Y, et al. Voglibose for prevention of type 2 diabetes mellitus in Japanese individuals with impaired glucose tolerance: a randomised, double-blind trial. Lancet 2009;373(9675):1607–1614.
13. Bermúdez VJ, Bermúdez FA, Cano C, et al. Metformin plus low glimepiride doses improve significantly HOMA-IR and HOMA-β-cell without hyperinsulinemia in patients with type 2 diabetes. Arch Venez Farmacol Ter 2005;24:97–106.
14. Kasthuri S, Poongothai S, Anjana RM, et al. Comparison of glycemic excursion using flash continuous glucose monitoring in patients with type 2 diabetes mellitus before and after treatment with voglibose. Diabetes Technol Ther 2021;23:213–220.
15. Oxford Centre for Evidence-Based Medicine. (2011). The Oxford Levels of Evidence 2. [online] Available from https://www.cebm.ox.ac.uk/resources/levels-of-evidence/ocebm-levels-of-evidence [Last accessed January, 2026].
16. American Diabetes Association. Standards of medical care in diabetes—2025. Diabetes Care 2025;48 ((Suppl. 1)):S1–S200.
17. Herron E, Cencetti J, Matis J. Reducing or discontinuing insulin or sulfonylurea when initiating a glucagon-like peptide-1 agonist. Fed Pract 2024;41:52–56.
18. Foresta A, Succurro E, Baviera M, et al. Prescribing trends of glucose-lowering drugs in older adults from 2010 to 2021: A population-based study of Northern Italy. Diabetes Res Clin Pract 2023;110742.
19. Bantwal G, Ayyar V, Kovil R, et al. Assessment of clinical experience of triple drug fixed-dose combination of glimepiride, metformin and voglibose in the management of type 2 diabetes mellitus: A retrospective study. J Clin Diagn Res 2021;15(9):OC05–OC12.
20. Faruqui A. Safety and efficacy of fixed-dose combination of voglibose, glimepiride, and metformin in Indian type 2 diabetes mellitus patients. Adv Diabetes Metab 2016;4:49–54.
21. Shamanna P, Jha PK, Makwana A, et al. Observational, multicenter, retrospective study on the usage patterns of the fixed-dose combination of glimepiride, metformin, and voglibose in type 2 diabetes management. Cureus 2024;16:e52064.
22. Ministry of Health and Family Welfare. (2023). National Programme for Prevention and Control of Cancer, Diabetes, Cardiovascular Diseases & Stroke (NPCDCS). [online] Available from https://nhm.gov.in/ [Last accessed January, 2026].
23. Kapur A, Harries AD. The double burden of diabetes and tuberculosis—Public health implications. Diabetes Res Clin Pract 2013;101:10–19.