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RELEVANCE OF PRESCRIBING INDICATORS, PHARMACOECONOMICS, AND THERAPEUTIC ADHERENCE AMONG PATIENTS OF TYPE 2 DIABETES MELLITUS WITH HYPERTENSION IN INDIA- A REVIEW

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ABSTRACT: The co-occurrence of Type 2 Diabetes Mellitus (T2DM) and hypertension is a growing public health concern in India. Effective management requires careful consideration of prescribing indicators, pharmacoeconomic implications, and therapeutic adherence. This review aims to explore the current landscape of prescribing practices, economic burden, and adherence patterns among Indian patients suffering from both T2DM and hypertension. A thorough understanding of these factors can guide policymakers, healthcare professionals, and researchers toward more efficient and cost-effective treatment strategies.

INTRODUCTION: Diabetes mellitus (DM) and hypertension are two of the most prevalent chronic diseases worldwide, especially in developing countries like India. The coexistence of these conditions significantly increases the risk of cardiovascular diseases, kidney failure, and other complications, thereby leading to increased mortality and healthcare costs. In India, the burden of managing Type 2 Diabetes Mellitus (T2DM) along with hypertension is exacerbated by socio-economic factors, healthcare infrastructure limitations, and patient-related challenges such as poor therapeutic adherence.

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Therefore, it becomes essential to explore the interplay between prescribing indicators, pharmacoeconomic, and adherence patterns to ensure optimal patient outcomes.

Prescribing Indicators for Type 2 Diabetes Mellitus with Hypertension: Prescribing indicators are essential tools that help assess the quality, efficiency, and rationality of drug prescription practices. For T2DM with hypertension, these indicators provide insights into the appropriateness of pharmacological interventions, which can significantly affect patient outcomes.

Core Prescribing Indicators: The World Health Organization (WHO) has established core prescribing indicators to evaluate the rational use of medicines. These include the average number of drugs prescribed per encounter, the percentage of drugs prescribed by generic name, the percentage

of encounters with an antibiotic or injection, and the percentage of drugs prescribed from essential medicines lists. Studies in India have shown that polypharmacy or the prescription of multiple drugs, is common in patients with T2DM and hypertension due to the need to manage both blood sugar levels and blood pressure simultaneously. However, this practice raises concerns regarding drug interactions, adverse effects, and patient adherence [1]. Rational prescription practices are crucial for minimizing these risks and optimizing therapeutic outcomes.

Drug Selection and Rationality: First-line medications for T2DM, such as metformin, along with antihypertensive drugs like angiotensin-converting enzyme (ACE) inhibitors and angiotensin receptor blockers (ARBs) are frequently prescribed in Indian clinical settings. However, variations in prescribing patterns often reflect differences in physician preferences, availability of medications, and patient affordability [2]. According to a study conducted in a tertiary care hospital in South India, a significant number of prescriptions for diabetic patients with hypertension included fixed-dose combinations (FDCs), which are considered beneficial for improving patient adherence but may also increase the risk of inappropriate drug use [3].

Polypharmacy and Fixed-Dose Combinations: Polypharmacy is a common issue in the treatment of coexisting chronic conditions like T2DM and hypertension. In India, the use of fixed-dose combinations (FDCs) is prevalent as they simplify treatment regimens and potentially improve adherence. However, this comes with challenges such as increased costs, potential drug-drug interactions, and a higher likelihood of adverse drug reactions (ADRs). Studies in Indian settings have shown that irrational prescribing, especially of non-evidence-based FDCs, remains a problem, leading to suboptimal outcomes [4]. Addressing these issues through guidelines that promote rational prescribing practices is crucial.

Pharmacoeconomics in the Management of T2DM and Hypertension: Pharmacoeconomics refers to the assessment of the cost-effectiveness of pharmaceutical products and treatment strategies, particularly in chronic diseases like T2DM and hypertension, which require lifelong management. In India, where healthcare resources are limited, and a significant proportion of the population pays out of pocket for medical expenses, the economic burden of managing both conditions is considerable.

Direct and Indirect Costs: The direct costs of treating T2DM with hypertension include medical consultations, diagnostic tests, hospitalizations, and drug therapy. Indirect costs involve lost productivity due to morbidity, disability, and premature mortality. Studies conducted in India have demonstrated that the financial burden associated with T2DM and hypertension is substantial, particularly for low- and middle-income households [5]. A study on the economic burden of T2DM in India estimated that the annual cost of treatment per patient ranged from INR 5,000 to INR 30,000, depending on the severity of the disease and the presence of complications [6]. The addition of hypertension management further escalates these costs.

Cost-Effectiveness of Antihypertensive and Antidiabetic Therapies: The choice of therapy significantly impacts the overall cost of managing these co-occurring conditions. While generic medications are more affordable, branded drugs and newer agents, such as sodium-glucose co-transporter-2 (SGLT-2) inhibitors for diabetes and angiotensin II receptor blockers (ARBs) for hypertension are often prescribed, raising the overall cost [7].

Cost-effectiveness studies conducted in India suggest that metformin, a staple antidiabetic drug, is one of the most cost-effective options for diabetes management. Likewise, ACE inhibitors are seen as cost-effective first-line agents for hypertension [8].

Health Insurance Coverage and Reimbursement: Limited access to health insurance and low reimbursement rates for chronic disease management further exacerbate the economic challenges faced by patients. Despite the Indian government's initiatives such as Ayushman Bharat, which aims to provide health coverage to economically weaker sections, many patients with T2DM and hypertension still lack adequate

financial protection, making it difficult for them to access consistent and comprehensive care [9].

Therapeutic Adherence among Patients with T2DM and Hypertension: Therapeutic adherence refers to the extent to which patients follow prescribed treatments, including medication regimens, lifestyle changes and regular monitoring. In India, poor adherence remains a significant barrier to the successful management of T2DM and hypertension.

Factors Influencing Adhere: A variety of fact contribute to poor therapeutic adherence among Indian patients. These include complex medication regimens, the high cost of drugs, lack of awareness about the importance of adherence, forgetfulness, and the absence of symptoms, especially in hypertension, which is often referred to as a "silent killer" [10].

Social determinants such as poverty, illiteracy, and inadequate access to healthcare services also play a crucial role in determining adherence levels. Cultural beliefs and misconceptions regarding modern medication further compound these challenges [11].

Adherence to Antidiabetic and Antihypertensive Medications: Adherence rates to antidiabetic and antihypertensive therapies in India are often suboptimal, leading to poor glycaemic and blood pressure control, respectively. A study conducted in an urban Indian setting revealed that less than 50% of patients with T2DM and hypertension adhered to their prescribed medications [12]. The use of FDCs has been proposed as one way to improve adherence by reducing the pill burden. However, this approach also carries risks related to patient reluctance, increased costs, and potential side effects [13].

Strategies to Improve Adherence: Several strategies have been proposed to enhance therapeutic adherence among Indian patients. These include patient education programs, the simplification of treatment regimens, the provision of affordable and accessible medications and regular follow-up and monitoring. Additionally, the use of digital health technologies, such as mobile health (mHealth) applications and telemedicine, has shown promise in improving medication adherence by providing patients with reminders and real-time access to healthcare providers [14].

DISCUSSION: The co-management of T2DM and hypertension presents unique challenges in terms of prescribing practices, economic burden, and patient adherence. In India, where the healthcare system is already stretched thin, these challenges are compounded by socio-economic disparities and healthcare access issues. Rational prescribing practices, such as adhering to essential medicines lists and avoiding unnecessary polypharmacy, are essential for minimizing costs and reducing the risk of ADRs. Pharmacoeconomic evaluations are necessary to determine the most cost-effective treatment strategies, while addressing therapeutic adherence is key to improving patient outcomes. Improving adherence requires a multifaceted approach that considers the patient's socio-economic context, education level, and access to healthcare services. Policymakers should focus on expanding health insurance coverage, promoting the use of generic medications, and developing guidelines for the rational use of FDCs in the management of T2DM and hypertension. Healthcare providers should emphasize patient education and simplify treatment regimens wherever possible to promote adherence. Finally, the integration of digital health solutions can further enhance adherence and streamline the management of these chronic conditions.

CONCLUSION: The intersection of prescribing indicators, pharmacoeconomic, and therapeutic adherence in the management of T2DM with hypertension in India presents complex challenges that require coordinated efforts from healthcare providers, policymakers, and researchers. By focusing on rational prescribing practices, cost-effective therapies, and strategies to improve patient adherence, it is possible to enhance clinical outcomes and reduce the economic burden of managing these chronic diseases. Further research is needed to assess the long-term impact of these interventions and to develop tailored solutions for the diverse Indian population.

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CONFLICT OF INTEREST: NIL

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