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Assessment of prescription writing skills among undergraduate medical students: A cross-sectional study.

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Abstract:

Background:
Accurate prescription writing is a vital clinical skill introduced during the second phase of the undergraduate medical curriculum, particularly within Pharmacology and Therapeutics. Although students receive formal instruction during this period, concerns persist regarding their ability to apply these skills effectively in practice, even at this early stage of training.

Objective:
To assess the prescription writing skills of second-year undergraduate medical students and identify common deficiencies in their performance.

Methods:
A cross-sectional study was conducted among second-year MBBS students. Participants were given a clinical case scenario and instructed to write a complete prescription. Each prescription was evaluated for essential components, including patient details, drug name, dose, frequency, route of administration, and prescriber information.

Results:
Out of the total participants, 76% scored in the moderate range for overall prescription writing, while only 18% achieved high scores. Drug-related components were moderately addressed by 58% of students, but prescriber and additional components showed poorer performance. Specifically, 35% scored low in prescriber-related and 51% in additional components. These findings reveal gaps in completeness and adherence to prescription standards.

Conclusion:
Despite formal teaching in Pharmacology, second-year undergraduate medical students show considerable gaps in prescription-writing skills.

Recommendation:
These findings suggest a need for repeated practice sessions, formative assessments, and integration of clinical context to enhance competency and ensure safe prescribing habits early in medical education.

Keywords: *Prescription skills, medical students, Competency in prescribing*
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Introduction
Prescription writing is one of the important competencies expected from a medical graduate; it is an essential and basic skill to be acquired by a medical student. A prescription is a written order from the prescriber that gives a detailed instruction about the medicine to be given to a patient. Decision-making and proper transcribing are quintessential attributes of writing an ideal prescription.1,2 The word "prescription" comes from the Latin word praescriptus, meaning to write or to designate or order the use of a drug as a remedy. World Health Organization (WHO) emphasizes the inclusion of some essential components of

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prescription, which are name, address of the prescriber, date of prescription, name and strength of the drug, dosage form, prescriber's initials or signature, name, age, and address of the patient.3 This information may come in handy in case of an adverse drug reaction, so the prescription must include complete information about the patient and the prescriber.4 The most important requirement is that the prescription be clear. It should be legible and indicate precisely what should be given.5 The parts of a prescription include doctor and patient details, the superscription or heading with the symbol 'R' or 'Rx', which stands for the word recipe (in Latin, to make); the inscription, which focuses on the rational use of medicines; the subscriptions or directions for compounding the drug; and the signature of the prescriber.6 Prescription errors can arise from inappropriate choice of the drug, its dose, the route of administration, and the frequency or duration of treatment.7 Prescription writing is taught in the second year of medical school in India in Pharmacology. The subject of pharmacology enhances the knowledge and skills of medical students about the different drug formulations and their usefulness in the treatment of various diseases.8 There are many studies done in the past, evaluating the prescription skills of junior doctors and medical undergraduates.6, 9-12. Despite prescription writing being an essential competency taught during pharmacology in the second year of medical training, many medical undergraduates struggle to apply these skills effectively in practice. Given the potential risks associated with prescription errors and the lack of emphasis during clinical training, this study was undertaken to assess existing prescription writing skills among undergraduates and highlight the need for continued reinforcement throughout the medical curriculum.

Methodology

Study design

The design of this study was a sectional survey.

Study setting

The study is conducted in D Y Patil Medical College and Hospital, Navi Mumbai, India. The study duration was February to May 2025.

Inclusion criteria

Second-year medical undergraduates.

Exclusion criteria

If a student is not willing to participate and does not complete the questionnaire, they are not included in the study.

Sample Size

A pilot study involving 50 prescriptions revealed an error prevalence of 36%. Using the formula $n = 4pq / l^2$, with an allowable error of 10% of the prevalence, the calculated sample size was approximately 444. Hence, a sample size of **440** was considered adequate for the study.

Methods of collection of data

Students were invited to take part in the study and were asked to write prescriptions for a given clinical case scenario. The prescriptions written by the participants were collected and analyzed.

Data Analysis

All submitted prescriptions were evaluated using a pre-validated scoring system, assessing multiple components. Each parameter was assigned a score of 1, with a maximum total score of 25. Further, each parameter was categorised under low, moderate, and high scores.

Scoring Parameters:

a. Prescriber-related components:
-Prescriber information: Name of prescriber, qualification, registration number, date of the prescription, symbol Rx (take thou), diagnosis, and prescriber signature
-Patient information: Name, age, gender, weight, and address.
b. Drug-related components: Mention of generic name, dosage form, route of administration, dose, unit, frequency, directions for use, duration of treatment, and quantity.
c. Additional components: Legible handwriting, information in capital letters, non-pharmacological advice, and review visit.

Statistical Analysis

The data obtained were analyzed using simple descriptive statistics, and the parameters were expressed in percentages.

Ethics Statement

Ethical approval was obtained from the Institutional Ethics Committee (IEC: 2025/062)
Informed Consent Statement:

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Informed consent was taken from all the students involved in the study.

Clinical Trial Registration:

This research does not involve any clinical trials

A total of 440 medical undergraduates were approached for the study, comprising 240 MBBS students and 200 students from the dental stream. This is a cross-sectional study conducted over one hour involving all the students willing to participate in the study.

Results

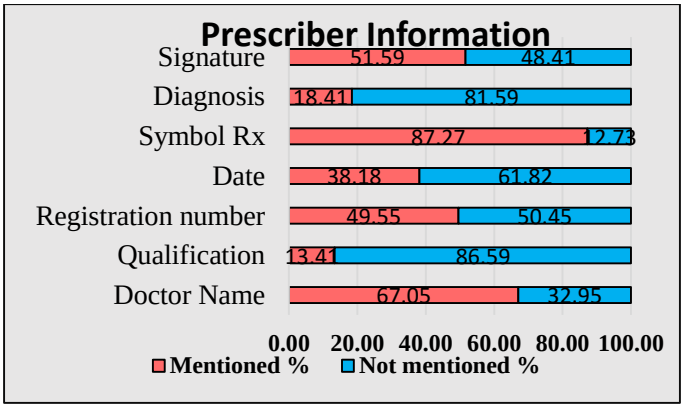

Figure 1: Assessment of Prescriber Information in Submitted Prescriptions

The analysis showed that many important prescriber details were missing in the prescriptions. While most students included basic elements like the Rx symbol and doctor's name, other key components, such as signature, date, registration number, and diagnosis, were often omitted. Figure 1 highlights that students are familiar with the basic structure but lack consistency in providing complete professional details. This indicates a need for focused educational reinforcement to improve thoroughness in prescription writing.

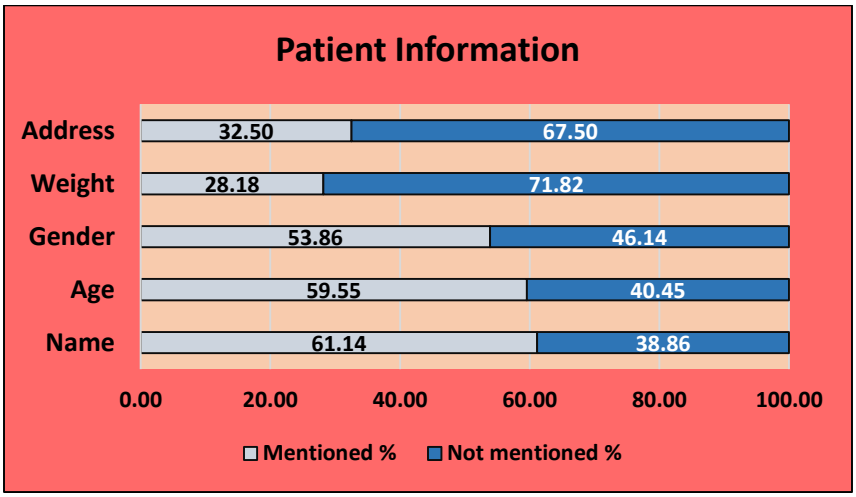

Figure 2: Assessment of Patient Demographics in Prescriptions

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Figure 2 shows that while most students included basic patient details like name and age, important information such as weight and address was often omitted. Gender was recorded in about half of the prescriptions. These findings indicate a gap in awareness regarding the inclusion of clinically relevant patient details, emphasizing the need for improved training in comprehensive prescription writing.

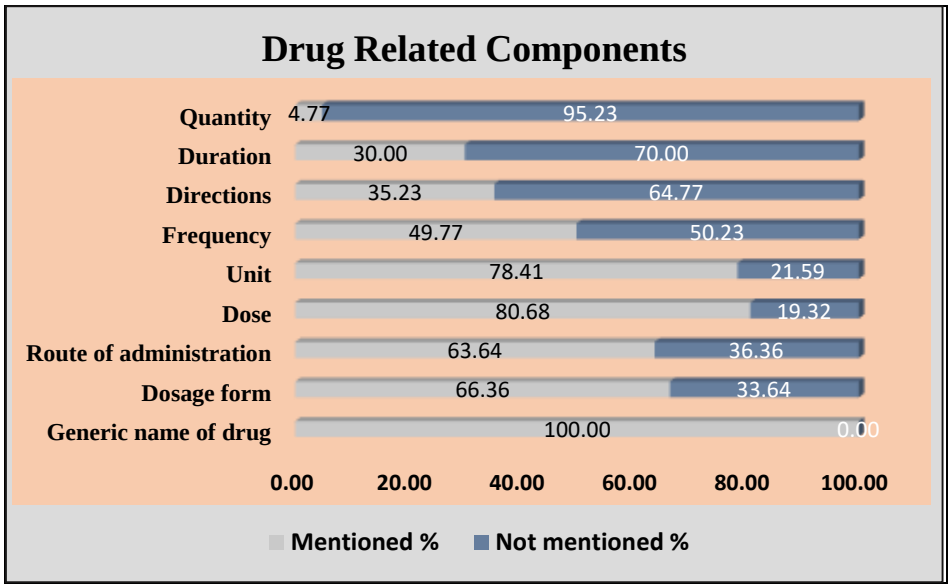

Figure 3: Drug-Related Components in Prescriptions.

Figure 3 highlights the variability in how students documented drug-related details in prescriptions. While most included the generic name of the drug, dose, and dosage form, important components like quantity, duration, and directions were frequently missed. This suggests that while students grasp the core elements, there is a lack of attention to supporting details essential for complete and rational prescribing.

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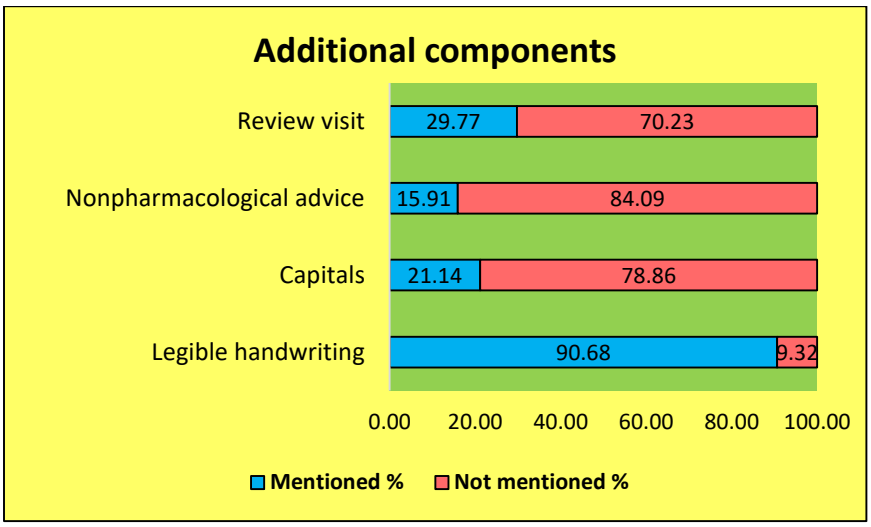

Figure 4: Additional Prescription Quality Indicators

Figure 4 highlights the attention given to certain non-drug aspects of prescription quality by students. While legible handwriting was maintained in the majority (90.68%) of prescriptions and capital letters were used in many cases, key elements such as advising on review visits (only 29.77%) and providing nonpharmacological advice (15.99%) were largely neglected. These findings show that students focus on writing clearly and neatly but often forget to include important advice and follow-up instructions for the patient.

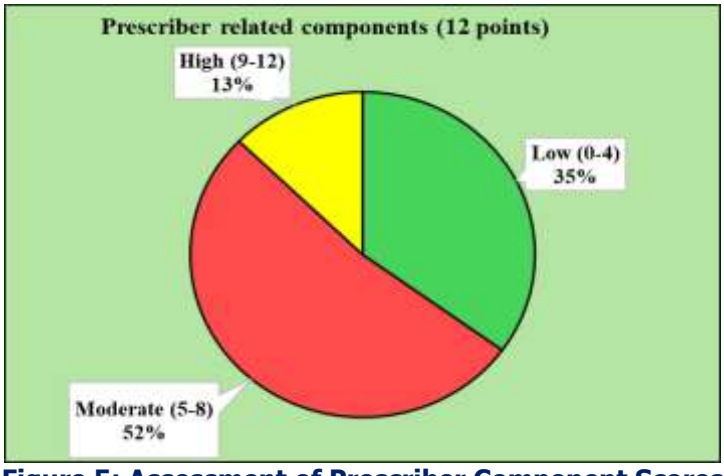

Figure 5: Assessment of Prescriber Component Scores

Figure 5 represents the evaluation of prescriber-related components, showing that 52% of students scored in the moderate range (5–8 points), 35% in the low range (0–4 points), and only 13% achieved high scores (9–12 points). This indicates partial adherence to prescriber responsibilities such as signature, date, and registration number.

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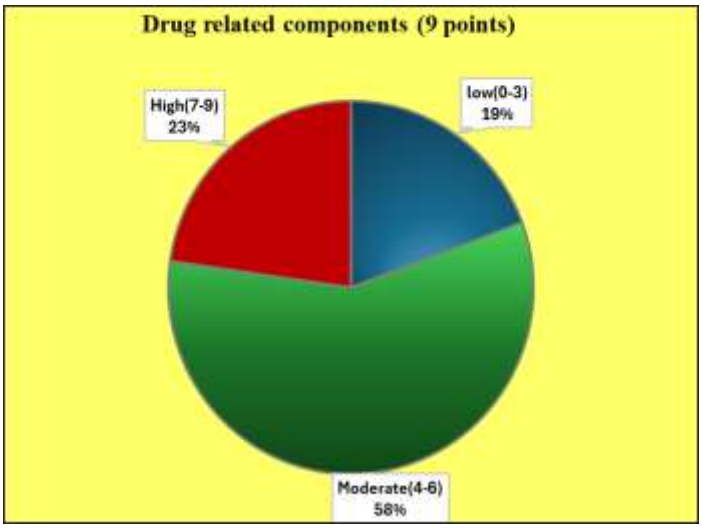

Figure 6: Assessment of Drug-Related Component Scores in Prescriptions.

Figure 6 shows the assessment of drug-related components (maximum 9 points), revealing that 58% of students scored in the moderate range (4–6 points). Additionally, 23% achieved high scores (7–9 points), while 19% scored in the low range (0–3 points), indicating variable understanding of drug-specific prescription elements.

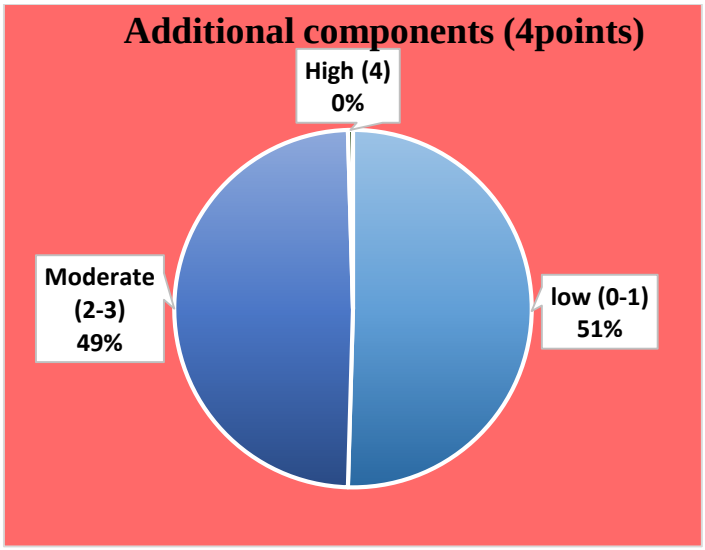

Figure 7: Assessment of Additional Prescription Components

Figure 7 presents the assessment of 'other' prescription components, where over half the students (51%) scored low (0–1 points), and the remaining 49% scored in the moderate range (2–4 points). No student achieved full marks,

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highlighting a consistent neglect of additional but important details in prescription writing.

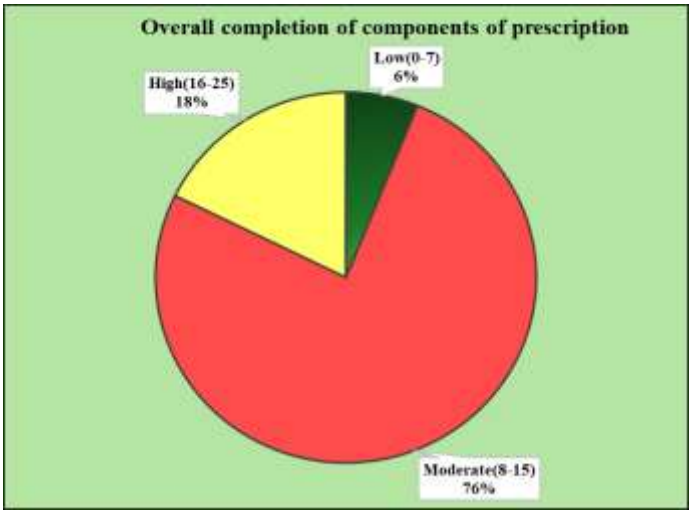

Figure 8: Cumulative Score Analysis of Prescription Elements

Overall evaluation showed that 76% of students fell in the moderate range (8–15 points), while 18% demonstrated high completeness (16–25 points), and only 6% scored low (0–7 points). The majority showed partial adherence to prescription standards. The findings demonstrate partial competence, though critical elements of prescription writing are still frequently overlooked.

Discussion:

Prescription writing is a fundamental clinical skill that ensures safe, effective, and legal drug therapy. Inadequate training can lead to errors, compromising patient safety and treatment outcomes. Medical students often struggle with completeness and accuracy in prescriptions due to limited practical exposure. Assessing their prescription-writing skills can help identify gaps and guide targeted educational interventions.

The analysis of prescriber-related components revealed several notable gaps in students' understanding of standard prescription practices. While the symbolic use of "Rx" was mentioned by the majority (87.27%), key medico-legal elements such as diagnosis (18.4%), qualification (13.4%), and registration number (49.54%) were frequently omitted. Notably, fewer than 20% of students included the diagnosis—a trend consistent with earlier studies . 13 reported diagnosis documentation in only 21.3% of prescriptions, while.14 found it in 15.6% of cases. Internationally, 15 reported diagnostic mentions in just 17% of prescriptions written by medical trainees in Nigeria.

Although the doctor's name (67.04%) and signature (51.6%) were mentioned by over half of the participants, nearly half failed to record essential identifiers such as the date (38.18%) and registration number (49.54%), reflecting an inadequate grasp of prescription validity and traceability. These findings support earlier reports by 16, suggesting that while students may recall commonly emphasized elements (e.g., the Rx symbol), they often lack awareness of the legal and clinical significance of other components.

The assessment of patient-related components revealed moderate inclusion of basic demographic details, with name (61.13%), age (59.54%), and gender (53.86%) present in over half the prescriptions. However, clinically important fields like weight (28.18%) and address (32.5%) were frequently omitted.13 similarly reported patient name in 67.5%, age in 60%, gender in 57.5%, but weight and address in only 30% and 26%, respectively.15 found even lower values, with weight documented in only 21% and address in 18% of prescriptions. The consistent underreporting of weight is especially concerning given its importance in dose calculation, particularly in pediatric and geriatric patients.

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The evaluation of drug-related components revealed significant variability in completeness. While the generic name of the drug was correctly mentioned in 100% of prescriptions reflecting effective theoretical recall, other critical parameters were frequently omitted. Only 5% of students mentioned the quantity to be dispensed, and just 30% included the duration of therapy, both of which are essential for treatment accuracy and minimizing misuse. Key elements such as frequency (49.77%), directions for use (35.22%), and route of administration (66.63%) were also inconsistently recorded. These findings are in line with more recent studies by 17-18, which reported similar lapses, particularly in the omission of quantity and duration. Such trends highlight a common issue among undergraduate medical students: an emphasis on drug naming over the precision and safety of drug delivery.

The evaluation of additional prescription components revealed that while legible handwriting was observed in 90.68% of prescriptions, other important aspects were commonly overlooked. Only 29.77% included a review visit, 21.13% used capital letters for clarity, and just 15.9% offered nonpharmacological advice. These findings are consistent with 17, who reported inclusion of review instructions in 32% and nonpharmacological advice in 18% of prescriptions.18 similarly found low emphasis on review planning (27%) and lifestyle advice (20%), suggesting a persistent gap in holistic prescribing habits among undergraduates.

Similar deficiencies in prescriber-related elements were reported by 19, where omission of prescriber signature was observed in 42% of prescriptions and missing registration details in 37%. In contrast, 20 found a slightly better adherence pattern, with only 18% missing signatures and 21% lacking registration numbers, which was attributed to structured clinical exposure and supervised prescription writing. In this study, 35% of students scored low (0–4) in prescriber-related components, showing the need to improve awareness of legal and professional responsibilities in prescription writing.

Similar findings were observed in the study by 17, where only 25% of students demonstrated adequate knowledge of drug-related prescription components. In contrast, 18 reported slightly better performance, with 35% achieving high scores. This variation underscores the need for structured pharmacology teaching and practical exposure to enhance rational prescribing skills among medical undergraduates.

Comparable findings were reported by 13, who observed poor documentation of auxiliary prescription components such as route, frequency, and prescriber details. Similarly, 15 emphasized that neglect of these elements can compromise patient safety and care continuity. The lack of high scores in this study reinforces the need to integrate comprehensive prescription writing training early in the medical curriculum.

Consistent with these study findings, 21 reported moderate completion levels in undergraduate prescriptions, with key elements often missing. In contrast, a study by 22 that integrated regular formative assessments observed a higher proportion of high scorers. This highlights the positive impact of continuous evaluation and feedback on improving prescription-writing competency.

Conclusion:

The majority of students showed moderate proficiency in prescription writing, but key deficiencies were noted in prescriber-related and supplementary components. These findings underscore the need for improved training through structured clinical exposure, continuous feedback, and integration of prescription writing into routine assessments to ensure safe and rational prescribing.

Limitations

The findings in the present study only reflect the skills of students at the moment the prescription writing was assessed. It doesn't track their improvement or decline over time in a world scenario. The present study was conducted in only one institute; the results may not be generalizable to all medical undergraduates.

Recommendation

These findings suggest a need for repeated practice sessions, formative assessments, and integration of clinical context to enhance competency and ensure safe prescribing habits early in medical education.

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Conflict of Interest

None declared

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Dr.Abhay Nambiar, Sweta Bhagat, Yash Wazir: Tutors, D Y Patil Medical College, Navi Mumbai, contributing to data presentation and validation of study findings

Author's Contribution

Dr. Pradnya Deolekar: Conceptualization, study design, supervision, and manuscript drafting.

Dr. Kavitha V. Dongerkery: Questionnaire preparation, data analysis, interpretation, and manuscript review.

Dr. Sankeerth Chanamolu: Clinical input and critical revision of the manuscript.

Dr. Movva Navya, Abhay Nambiar, Prateek D. T., Sweta Bhagat: Data collection, literature review, and assistance in manuscript preparation.

Yash Wazir and Jennee M: Drafting tables, Data presentation.

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