

## EXPLORING FIXED DOSE MEDICATION REGIMEN PRESCRIBING PATTERNS ACROSS CLINICAL SPECIALITIES

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### ABSTRACT

**Objectives:** This study was to evaluate the medication regimen as a fundamental cornerstone of pharmacological therapy, focusing on the interplay between drug names, dosages, and schedules. Specifically, the study aimed to: Address the critical global challenge of non-adherence and its impact on disease progression and healthcare costs, Investigate how physicians across seven clinical specialties balance the pharmacological requirements of maintaining a steady-state with the practical, real-world challenges of patient adherence, Analyze the decision-making process behind prescribing patterns to identify strategies for optimizing therapeutic efficacy.

**Background:** A medication regimen is the fundamental cornerstone of pharmacological therapy, defined by drug names, dosages, and schedules. While meticulous design is essential for therapeutic efficacy, non-adherence remains a critical global challenge, leading to disease progression and increased healthcare costs. This study explores how physicians across seven clinical specialties balance pharmacological steady-state requirements with the practical challenges of patient adherence.

**Methods:** A structured, multi-specialty survey was conducted using a self-administered questionnaire. A target sample of 320 physicians was determined based on a 5% margin of error and 95% confidence level, with 250 responses achieved (78% response rate). The questionnaire underwent content validation by expert pharmacists and reliability testing (Cronbach's alpha=0.78). Data analysis was performed using Microsoft Excel and inferential statistics, specifically Pearson's Chi-square test, to determine the significance of observed differences across demographics and specialties.

**Results:** Analysis of 250 physician responses (Mean distribution: 35.71, standard deviation [SD]: ±11.34) revealed that the thrice daily (TID) regimen is the most prevalent prescribing frequency (44%; SD: ±14.2%) to maintain therapeutic steady-state levels through meal-linked intervals. Statistically significant variation was observed across clinical specialties ( $p < 0.001$ ); psychiatry (50%) and pediatrics (45%) prioritized once daily (OD) dosing, whereas endocrinology (60%) and cardiology (55%) favored TID schedules. Demographic adaptations were highly evident, with over 75% of physicians transitioning to "minimum event" (OD/BID) schedules for pediatric and geriatric populations to reduce pill burden ( $p < 0.001$ ). While gender did not significantly dictate core dosing frequency ( $p > 0.05$ ), it significantly influenced drug selection and specific instructions related to pregnancy and breastfeeding.

**Conclusion:** While the 3-times-a-day, meal-based regimen remains the clinical standard, physicians actively and significantly simplify schedules for pediatric and geriatric patients. The findings suggest that integrating meal-based reminders and "minimum event" logic into prescribing systems could enhance patient adherence and health outcomes.

**Keywords:** Medication regimen, Prescribing patterns, Patient adherence, Multi-specialty survey, Fixed-dosing, Statistical validation.

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### INTRODUCTION

A medication regimen is the fundamental cornerstone of effective pharmacological treatment in healthcare. It is defined as a detailed, individualized plan that specifies precisely how, when, and for how long medications should be administered to a patient. A proper regimen encompasses several critical elements, including the name of the drug, its specific dosage, the route of administration, the frequency of intake, and the total duration of the therapy. These plans are meticulously tailored to an individual's specific needs, taking into account their unique medical condition, age, any co-existing illnesses (comorbidities), and the overall treatment goals established by the healthcare provider [1-5].

The successful development and strict adherence to a medication regimen are vital for ensuring therapeutic efficacy, preventing the progression of disease, minimizing complications, and ultimately improving patient health outcomes. Conversely, a failure to comply

with the prescribed regimen – whether due to its complexity, patient misunderstanding, or intentional non-compliance – is a major global public health concern. Such non-adherence is a primary cause of adverse drug events, leads to avoidable hospital readmissions, and significantly contributes to increased overall healthcare costs [6-12].

Depending on the clinical context and the patient's requirements, various classifications of medication regimens are utilized. These can include:

- Fixed-dose regimen: This is the most common pattern, where the dose and frequency remain constant to maintain steady-state drug levels. These are further classified by their daily frequency:
  - Once daily (OD): Administered every 24 h; ideal for long-acting drugs and high adherence
  - Twice daily (BID): Administered every 12 h to maintain therapeutic windows
  - Thrice daily (TID): Administered every 8 h, often required for drugs with short half-lives

- Four times daily (QID): Administered every 6 h for intensive therapeutic needs
- Tapering regimen: Where the dose is gradually reduced over time
- Loading and maintenance regimen: Starting with a high dose to quickly reach therapeutic levels, followed by a lower, sustained dose.
- Cyclic regimen: Where medications are taken for a specific period followed by a period of rest
- Combination regimen: Involving the simultaneous use of multiple drugs
- PRN regimen ("as needed"): Where medication is taken only when symptoms occur, and not on a fixed schedule [27,28].

The design and subsequent implementation of any medication regimen must be grounded in evidence-based medicine, be patient-centered, and possess the flexibility to adapt to changes in the patient's condition or their response to the treatment. In modern clinical practice, a major challenge is developing regimens that are both scientifically optimal and logistically simple enough for patients to follow consistently. The timing of drug administration, for instance, often needs to be balanced between maintaining stable drug levels in the body and aligning with the patient's daily routine, such as mealtimes or sleep schedules [13,15].

This manuscript aims to explore the current landscape of medication regimens by conducting a multi-specialty survey of prescribing physicians. The core objectives are to discuss the concept and classifications of medication regimens, and to examine the significance and practical challenges associated with their design and implementation in modern healthcare. By surveying doctors from diverse fields – such as general medicine, pediatrics, cardiology, endocrinology, psychiatry, oncology, and ear, nose, and throat (ENT) – this study investigates the common medication scheduling patterns preferred by clinical specialists and how these patterns are modified for different patient populations (e.g., children, the elderly, pregnant women, and patients with multiple conditions). Ultimately, this research provides insights into how prescribing physicians manage the balance between therapeutic necessity and patient adherence through their choice of medication schedule [17,22,23,25].

## MATERIALS AND METHODS

To conduct a structured survey on medication regimen prescribing patterns, a comprehensive, self-administered survey questionnaire was developed. It was disseminated to the concerned physicians through offline (printed hard copies) or online (Google Forms) mode as per their preferences. A target sample size of 320 was determined based on a 5% margin of error and 95% confidence level, assuming a 50% response distribution; 250 responses provided sufficient power for descriptive and comparative analysis.

### Sample size rationale

The target sample size of 320 was determined using the Cochran formula, assuming a 5% margin of error and a 95% confidence level. The achieved sample of 250 physicians provided a post hoc power of >80%, sufficient for detecting significant differences in prescribing patterns [29-32,38-40].

### Validation

The questionnaire underwent content validation by a panel of three senior academic pharmacists to ensure thematic relevance. A pilot study with 10 physicians was conducted to refine the instrument's clarity. Reliability testing yielded a Cronbach's alpha of 0.78, indicating the instrument's robustness for survey research.

### Inferential statistics

Beyond descriptive statistics, inferential analysis was performed using Chi-square ( $\chi^2$ ) tests to determine if regimen preferences varied significantly across clinical specialties and age groups. A  $p < 0.05$  was considered statistically significant.

## Methods

### Designing the questionnaire [16]

The questionnaire was structured using a combination of question types to capture both quantitative data on preferred schedules and qualitative insights into clinical rationale.

### Types of questions

The survey utilized primarily multiple-choice questions for drug types, dosage frequency, and treatment duration. Open-ended text fields were included for capturing specialty-specific instructions and rationales (e.g., specific food-related indications).

### Logical framework

The questions focused on the frequency of use for the major medication schedules, including the most prevalent patterns: Morning-Afternoon-Evening, Morning-Afternoon-Evening-Night, BMM-BMA-BME (Before Meal), AMM-AMA-AME (After Meal), and the combined Before/After Meal (B/A-MM, B/A-MA, B/A-ME).

### Patient-specific scenarios

The questionnaire included sections where physicians indicated their preferred regimen modifications for various complex patient populations to assess adaptability: pediatric (children), adults, geriatric (elderly), physically disabled patients, pregnant women, breastfeeding women, and those taking multiple medications. The logic behind these specific questions was to identify minimum medicine events (e.g., once-a-day or twice-a-day) preferred for vulnerable populations.

### Dissemination of the questionnaire

The survey was disseminated to practising physicians across various clinical specializations.

### Selection of clinical specialties

The study specifically targeted physicians from diverse fields to capture a broad range of prescribing behaviors. The specialties included: General medicine, pediatrics, cardiology, endocrinology, psychiatry, oncology, and ENT (otolaryngologist). These were chosen to cover acute, chronic, and complex pharmacotherapy management.

### Distribution method

A mixed-mode distribution strategy was employed to maximize the response rate. The Google Forms link was shared electronically via professional communication channels, including email and WhatsApp. Efforts were also made to distribute the survey to those who preferred an offline mode.

### Collection of data

Data collection was organized according to the distribution method. Responses from offline questionnaires were collected and fed into a Microsoft Excel sheet manually. Data submitted via the Google form was automatically compiled and copied to the Excel sheet, which served as the master database for all subsequent statistical analysis. Three senior academic pharmacists conducted content validation to ensure thematic relevance and clinical accuracy. Subsequently, a pilot study was conducted with 10 physicians to evaluate the clarity and flow of the questions. These participants were excluded from the final study population of 250 to prevent selection bias.

### Statistical analysis of collected data

The collected data were subjected to rigorous statistical analysis to identify common and specialty-specific prescribing patterns, utilizing both descriptive statistics and comparative analysis.

### Initial analysis: Sample characterization

Descriptive statistical analysis was first performed to characterize the study sample. The frequency and percentage distribution of the 250 responding physicians were calculated based on:

**Clinical specialty**

To determine the representation from each targeted field (General Medicine, Pediatrics, Cardiology, Endocrinology, Psychiatry, Oncology, and ENT).

**Regimen-wise analysis: Overall preference**

Analysis was performed to determine the overall preferred prescribing frequency across the entire sample. The total numbers of physician responses were categorized into four primary fixed-dosing schedules, and the percentage preference for each was calculated:

**Categorical analysis: Comparative regimen variation**

Further comparative statistical analysis was conducted to determine how regimen preferences were distributed and modified based on specific categorical variables:

**Clinical specialty (specialty-wise preferred regimen statistics)**

This analysis focused on the distribution of the four primary fixed-dosing schedules within each specialty to identify statistically significant prescribing tendencies specific to that field's therapeutics.

**Patient age groups**

This determined the modification of fixed schedules based on the patient's age (children, youth, adult, middle age, elderly, geriatrics). The analysis specifically tracked the shift towards simpler, minimum-event schedules (OD/BID) for vulnerable populations.

**Patient gender**

This investigation determined whether the physician's selection of a core fixed-dosing frequency (3x/day, 4x/day, etc.) varied significantly based solely on the patient's gender (male, female, transgender).

**RESULTS AND DISCUSSION**

The analysis of the survey responses from a total of number 250 practicing physicians across seven clinical specialties confirmed

**Table 1: Distribution of survey respondents by clinical specialty (n=250) (Totals may not sum to 100% due to rounding to all tables)**

Clinical specialty	Number of physicians responding (n)	Percentage
General medicine	60	24.0
Pediatrics	40	16.0
Cardiology	35	14.0
Endocrinology	30	12.0
Psychiatry	30	12.0
Oncology	30	12.0
ENT (otolaryngology)	25	10.0
Total	250	100

ENT: Ear, nose, and throat. Mean=35.71; standard deviation=±11.34

**Table 2: Overall preference of medication regimen frequencies (The "Other" category includes PRN (as-needed) dosing, OD-once a day, BID-Twice a day, TID-3 times a day, and QID-4 times a day)**

Regimen frequency	Percentage of physicians
Once daily (OD)	18
Twice daily (BID)	12
Thrice daily (TID) (e.g., B/A-MM, B/A-MA, B/A-ME)	44
Four times daily (QID) (M-A-E-N)	20
Other (>4 times/day or PRN)	6

Mean=23.5%; Standard deviation=±14.2%

distinct and preferred medication prescribing patterns, incorporating new demographics and quantitative data.

As shown in Table 1, the largest group of respondents belonged to General Medicine (n=60, 24.0%), followed by Paediatrics (16.0%) and Cardiology (14.0%). The distribution across various clinical specialties, including Endocrinology, Psychiatry, and Oncology, is further illustrated in Fig. 1. The mean number of respondents across specialties was 35.71 (SD = ±11.34).

**Initial statistical analysis: Sample characterization**

The responses were characterized by clinical specialty and gender to establish the composition of the prescribing physicians.

**Regimen-wise analysis: Overall preference**

The overall analysis of prescribing frequency revealed that the 3-times-a-day regimen is the most common fixed schedule.

As shown in Table 2 and Fig. 2, the thrice daily (TID) regimen remains the most frequently prescribed schedule (44%). This suggests that many standard pharmacological treatments still rely on an 8-h dosing interval to maintain therapeutic steady-state levels. However, the cumulative 30% represented by OD and BID regimens indicates a significant shift toward simplifying regimens where pharmacokinetics allows, primarily combating patient forgetfulness [33,34].

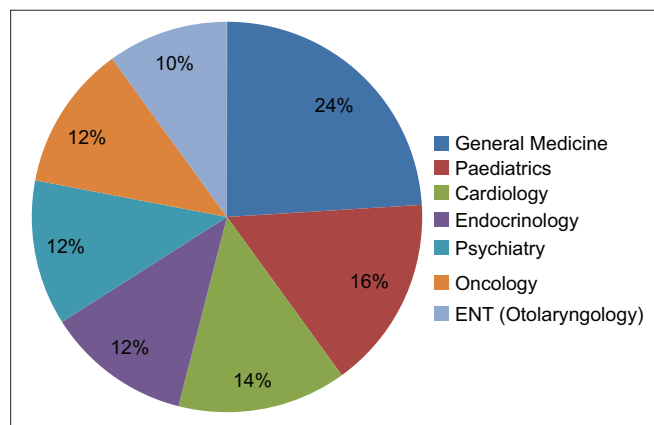
**Categorical analysis: Comparative regimen variation**

**Specialty-wise preferred regimen statistics**

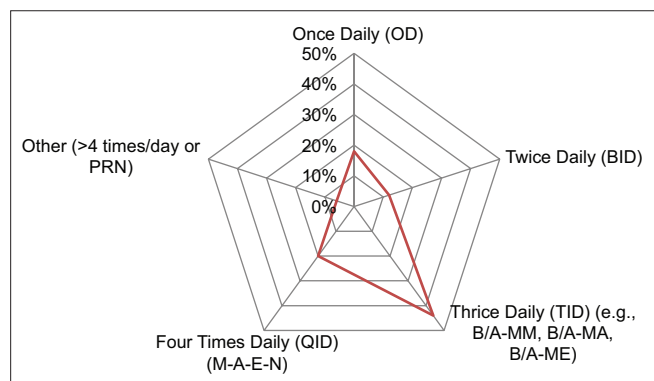
Regimen preference was found to vary across specialties, reflecting the unique pharmacological demands of different disease states.

**Specialty variation**

Significant variation was observed across clinical specialties (Chi-square test analysis, p<0.05); for instance, the preference for once daily



**Fig. 1: Distribution of participating physicians by clinical specialty**



**Fig. 2: Overall preference of medication regimen frequencies**

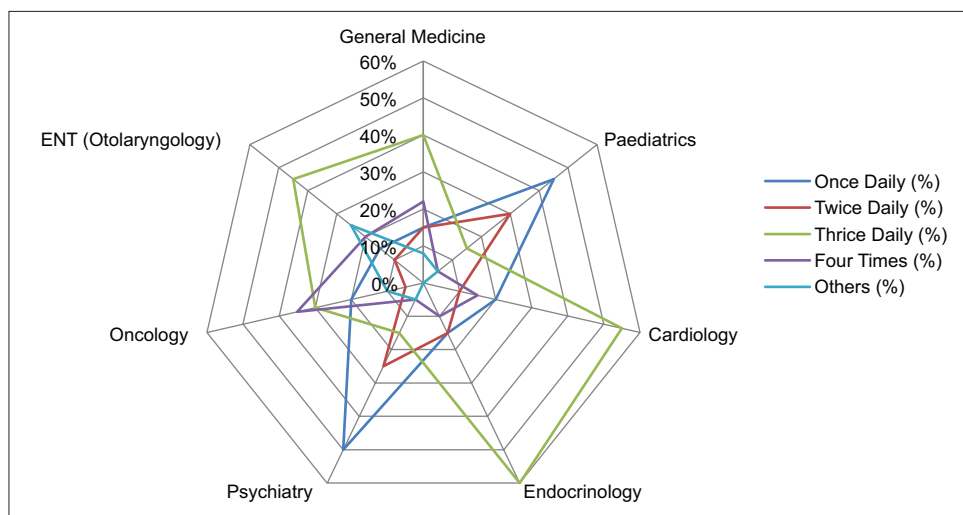


Fig. 3: Preferred regimen frequency by clinical specialty

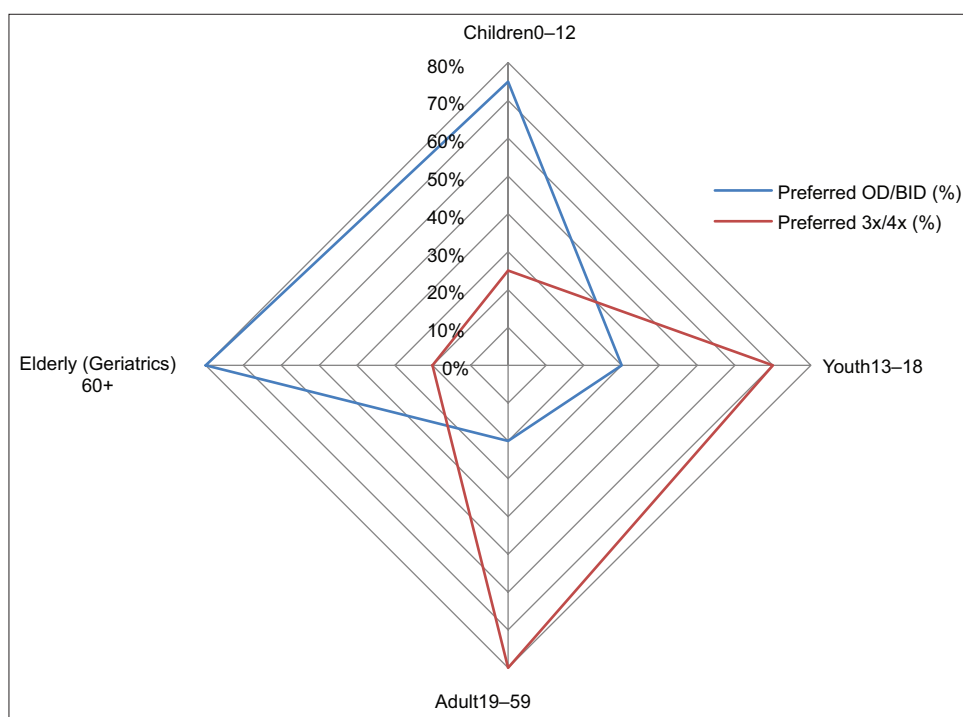


Fig. 4: Age-based dosing frequency preferences

Table 3: Preferred regimen frequency by clinical specialty (Variable schedules based on symptom severity and regimens exceeding four doses per day (e.g., intensive oncology protocols))

Clinical specialty	Once daily (%)	Twice daily (%)	Thrice daily (%)	Four times (%)	Others (%)	Chi-square test ( $\chi^2$ )	p-value
General medicine	15	15	40	22	8	84.62	<0.05
Pediatrics	45	30	15	5	5		
Cardiology	20	10	55	15	0		
Endocrinology	15	15	60	10	0		
Psychiatry	50	25	15	5	5		
Oncology	20	5	30	35	10		
ENT (Otolaryngology)	15	10	45	20	25		

ENT: Ear, nose, and throat

(OD) dosing in psychiatry (50%) and pediatrics (45%) was significantly higher compared to Endocrinology (15%), where TID dosing (60%) is essential for glycemic control.

The survey data, as shown in Table 3 and Fig. 3, reveal a clear preference for simplified dosing in certain fields, with psychiatry (50%) and pediatrics (45%) recording the highest use of once daily (OD)

Table 4: Age-based dosing frequency preferences

Patient age group	Age group range	Preferred OD/BID (%)	Preferred $\times 3/\times 4$ (%)
Children	0–12	75	25
Youth	13–18	30	70
Adult	19–59	20	80
Elderly (Geriatrics)	60+	80	20
Chi-square test	112.15		
p-value	0.0001		

regimens. In psychiatry, this is a strategic choice to help patients who may have cognitive barriers or low insight, as a single dose at bedtime significantly improves adherence. Similarly, pediatricians prioritize OD and BID schedules so that medication timing aligns with school hours and reduces the burden on parents. In contrast, endocrinology and cardiology rely more on thrice daily (TID) dosing because maintaining steady drug levels is critical for strict blood sugar and blood pressure control [18-21].

#### Patient age group-wise modification

The data for this section were obtained through the following specific questionnaire items:

- Q1: Do you modify the frequency of administration (e.g., switching from TID to OD) specifically based on the patient's age?
- Q2: For which age groups do you most frequently prioritize a "Minimum Event" (OD or BID) schedule to ensure adherence?

As shown in Table 4 and Fig. 4, there is a strong clinical consensus to simplify dosing for vulnerable populations. For children and geriatrics, over 75% of physicians transition to once daily (OD) or twice daily (BID) schedules. This modification aims to reduce the "pill burden" in the elderly, who often face polypharmacy and cognitive decline, and to ensure safety and caregiver ease in pediatric care [34,35].

#### Patient gender-wise regimen variation

Statistical analysis indicated that the selection of the core fixed medication regimen frequency (e.g.,  $\times 3/\text{day}$  vs.  $\times 4/\text{day}$ ) did not vary significantly based on the patient's gender (Male, Female, and Transgender). The choice of a fixed schedule is primarily determined by the drug's therapeutic requirements.

However, prescribing differences related to gender were noted in specific contexts:

#### Gender and drug selection

While gender did not significantly impact the frequency of dosing, qualitative feedback from the open-ended responses indicated that for female patients, drug selection was heavily influenced by pregnancy or breastfeeding status. For example, several respondents noted switching to safer therapeutic classes rather than changing the frequency itself.

The results suggest that gender does not dictate the timing of the drug, but rather the selection and instruction. For female patients, physicians reported adding specific instructions regarding pregnancy or breastfeeding status, which modifies the detail of the regimen rather than the core frequency.

The reliance on these established, meal-based routines suggests that future systems should incorporate these findings. Integrating meal-based timing into prescription systems and patient instructions could serve as a powerful tool to improve how well patients follow their treatments and lead to better health outcomes.

#### CONCLUSION

This multi-specialty survey shows that most doctors prefer to prescribe medications 3 times a day, timed with meals.

The most common pattern used is B/A-MM, B/A-MA, B/A-ME (Before/After Meal: Morning, Afternoon, and Evening). This approach is advantageous for both pharmacological efficacy and patient adherence [24,26].

For vulnerable populations such as pediatric and geriatric patients, physicians prioritize minimum medicine event plans (once-a-day or twice-a-day). Future systems should include these meal-based reminders to improve patient follow-through [36,37].

#### Limitations

This study is subject to several limitations. First, the reliance on self-reported data from physicians may introduce recall and social desirability bias. Second, the geographic focus on Indian physicians may limit the generalizability of these findings to different global healthcare contexts. Third, the cross-sectional design prevents the establishment of causal relationships between prescribing patterns and patient outcomes. Finally, this study did not involve direct patient-level adherence monitoring.

#### AUTHOR'S CONTRIBUTIONS

Anjali J Patadiya: Conceptualization, methodology, data collection, statistical analysis, and manuscript preparation. Dharmik M Mehta: Supervision, statistical validation, and final review of the manuscript.

#### CONFLICTS OF INTEREST

The authors declare no conflicts of interest.

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