



Original Article

Knowledge, Attitude and Behavior of Clinicians Towards Use of Proton Pump Inhibitors in A Tertiary Care Hospital in Nandyal, Andhra Pradesh: A Cross-Sectional Study

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OPEN ACCESS

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Received: 17-01-2026

Accepted: 10-02-2026

Available online: 21-02-2026

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Medical and Pharmaceutical Research

ABSTRACT

Background: Proton pump inhibitors (PPIs) are commonly prescribed for acid-related disorders. Evidence links prolonged or inappropriate use to adverse effects. Over-prescription and continuation without reassessment are common in hospital settings.

Aim: To assess the knowledge, attitude, and behavior of clinicians regarding PPI use in a tertiary care hospital in Nandyal.

Methods: The current hospital-based cross-sectional study was done over 90 days among 200 clinicians using a pre-designed, pre-tested, semi-structured questionnaire through Google Forms. The questionnaire evaluated socio-demographic details, knowledge (20 items), attitude (8 items), and behavior (7 items). Data were analyzed using descriptive statistics.

Results: Most patients were aged 24–33 years (81%). 98% identified common PPIs correctly and 97% understood their mechanism of action. Misconceptions existed regarding indications such as acute pancreatitis (57% responded incorrectly). 96% acknowledged PPI overuse in practice. Pantoprazole was the most commonly prescribed agent (40%). PPIs were commonly prescribed for abdominal pain (90% always/often).

Conclusion: Though clinicians showed reasonable knowledge and positive attitudes, prescribing behaviors revealed areas of irrational use. Institutional stewardship and educational interventions are recommended.

Keywords: Proton Pump Inhibitors, Knowledge, Attitude and Practice. Rational Drug Use, Prescribing Behavior, Tertiary Care Hospital.

INTRODUCTION

Proton pump inhibitors (PPIs) are one the most commonly prescribed medications globally. They are the mainstay of management of acid-related gastrointestinal disorders¹. Since their introduction in the late 1980s, PPIs named omeprazole, pantoprazole, lansoprazole, rabeprazole, and esomeprazole have replaced H₂ receptor antagonists due to superior acid suppression and mucosal healing rates².

PPIs act by irreversibly inhibiting the H⁺/K⁺ ATPase enzyme system in gastric parietal cells, suppressing basal and stimulated gastric acid secretion³. They are indicated for gastroesophageal reflux disease (GERD), peptic ulcer disease, Helicobacter pylori eradication regimens, Zollinger–Ellison syndrome, and stress ulcer prophylaxis in high-risk hospitalized patients⁴.

In spite of guideline-based indications, previous studies have showed significant overuse and inappropriate continuation of PPIs in inpatient and outpatient settings⁵. Heidelbaugh et al. reported that up to 70% of PPI prescriptions lacked

appropriate indications⁶. Forgacs and Loganayagam also reported concerns regarding long-term prescribing without reassessment⁷.

Long-term PPI use has been associated with side effects like *Clostridioides difficile* infection⁸, community-acquired pneumonia⁹, vitamin B12 deficiency¹⁰, hypomagnesemia¹¹, chronic kidney disease¹², osteoporosis-related fractures¹³, and possible cardiovascular risks¹⁴. Though causality is debated in certain associations, professional bodies -American Gastroenterological Association (AGA) have issued deprescribing guidelines for periodic review¹⁵.

In India, studies evaluating prescribing patterns have reported common empirical use, especially for dyspepsia and stress ulcer prophylaxis¹⁶. A cross-sectional study among resident doctors in Pune found moderate knowledge but inappropriate prescribing practices¹⁷. Same pattern of inappropriate PPI utilization and lack of periodic reassessment have been reported in other tertiary care settings in India¹⁸.

Understanding clinicians' knowledge, attitude, and behavior (KAB) is important in designing targeted interventions for rational drug use. Data from Andhra Pradesh is limited. So, this study aimed to assess the knowledge, attitude, and behavior of clinicians toward PPI use in a tertiary care hospital in Nandyal.

AIM

To evaluate the knowledge, attitude, and behavior of clinicians toward the use of proton pump inhibitors (PPIs) in a tertiary care hospital in Nandyal, Andhra Pradesh.

OBJECTIVES

1. To assess the level of knowledge regarding the indications, dosing, duration, mechanism of action, and adverse effects of proton pump inhibitors among clinicians.
2. To evaluate the attitudinal perspectives of clinicians toward the appropriate use, safety, and long-term prescribing of proton pump inhibitors.
3. To assess the behavioral practices of clinicians related to prescribing patterns, continuation, and rational use of proton pump inhibitors.

MATERIAL AND METHODS

Study Design: Hospital-based cross-sectional study.

Study Area: Tertiary care hospital, Nandyal.

Study Period: 90 days.

Study Population: Clinicians (consultants, residents, medical officers).

Sample Size: 200 (convenience sampling).

Sample Size Calculation

The sample size was calculated using the single population proportion formula, as the study aimed to estimate the proportion of clinicians with adequate knowledge and rational practices regarding proton pump inhibitor (PPI) use.

The formula used was:

$$n = Z^2 / p \times q / d^2$$

Since previous similar studies in India reported approximately 50% prevalence of adequate knowledge regarding PPI use, the prevalence (p) was assumed to be 50% (0.5) to obtain the maximum sample size.

Thus:

$$p = 0.5$$

$$q = 1 - 0.5 = 0.5$$

$$Z = 1.96, d = 7\% (0.07)$$

The calculated minimum sample size was 196. After rounding off and accounting for possible non-response, the final sample size was taken as 200 clinicians or postgraduates.

Study Tool: Pre-designed, pre-tested semi-structured questionnaire developed based on previously published data and guideline recommendations^{15, 17}.

The questionnaire included four sections:

Section I: Socio-demographic details

Section II: Knowledge (20 yes/no questions; max score 20)

Section III: Attitude (8 yes/no items; max score 8)

Section IV: Behavior (7 items scored as Always=0, Often=1, Never=2)

The questionnaire consisted of four sections.

1. The first section included socio-demographic questions.
2. The second, third, and fourth sections assessed knowledge (20 questions), attitude (8 items), and behavior (7 items) with respect to PPI usage.
3. The options for all twenty knowledge questions were set as “Yes” or “No.” A correct response was awarded one point, and an incorrect response was given zero points. The maximum attainable score in the knowledge section was twenty.
4. In the attitude section, the eight questions had response options of “Yes” or “No.” Participants who responded affirmatively were awarded one point, whereas negative responses were given zero points.
5. The behavior section consisted of seven questions, with response options categorized as “Always” (0 points), “Often” (1 point), and “Never” (2 points).

RESULTS

200 clinicians participated in the study. The findings are presented under four sections: socio-demographic characteristics, knowledge, attitude, and behavior.

Demography: Most participants were female. Commonly seen age group was 24-33 years. Most common qualification was MBBS with MD/MS(including pursuing candidates). Junior residents constitute most participants.

Table 1: Socio-Demographic Characteristics of Participants (n = 200)

| Variable | Category | Frequency | Percentage (%) |
|---------------------------|--------------------------------------|-----------|----------------|
| Gender | Male | 90 | 45.0 |
| | Female | 110 | 55.0 |
| Age Group (years) | 24–33 | 162 | 81.0 |
| | 34–43 | 30 | 15.0 |
| | 44–53 | 4 | 2.0 |
| | >54 | 4 | 2.0 |
| Educational Qualification | MBBS | 20 | 10.0 |
| | MD/MS(including pursuing candidates) | 180 | 90.0 |
| Professional Designation | Junior Residents | 95 | 47.5 |
| | Senior Residents | 50 | 25.0 |
| | Consultants | 35 | 17.5 |
| | Medical Officers | 20 | 10.0 |

Knowledge:

Most clinicians showed good knowledge regarding basic pharmacology and indications of PPIs. 98% correctly identified commonly used PPIs and 97% understanding their mechanism of action. But, misconceptions were seen in certain areas, like using PPIs in acute pancreatitis and the concept that all PPIs are prodrugs. Overall, the mean knowledge score indicated a moderate level of awareness among clinicians.

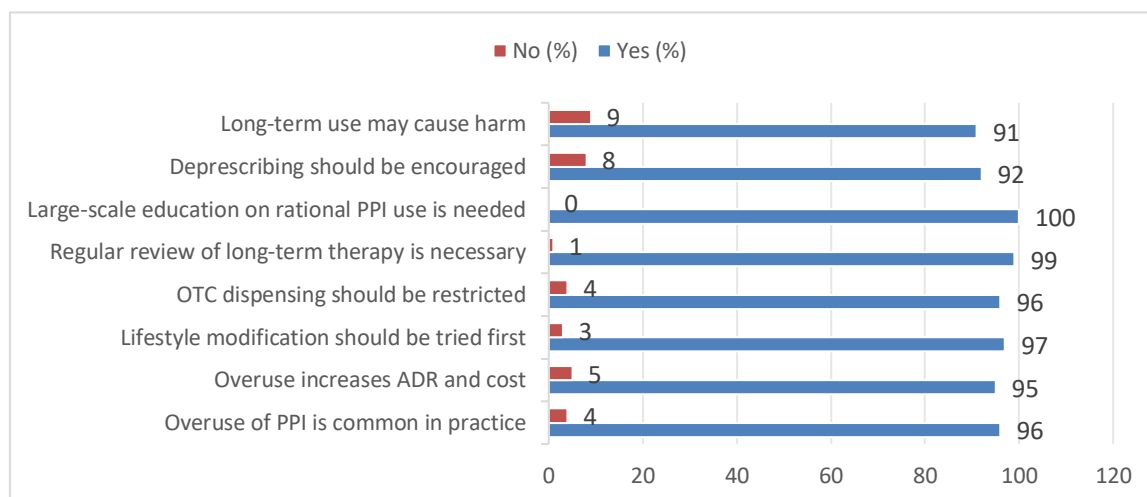
Table 2: Knowledge Regarding Proton Pump Inhibitor Use (n = 200)

| Knowledge Variable | Correct Response (%) | Incorrect (%) |
|---|----------------------|---------------|
| PPIs include omeprazole, pantoprazole, etc. | 98.0 | 2.0 |
| PPIs suppress hydrochloric acid secretion | 97.0 | 3.0 |
| All PPIs are prodrugs | 36.0 | 64.0 |
| Used for stress ulcer prophylaxis | 88.0 | 12.0 |
| Useful in acute pancreatitis | 43.0 | 57.0 |
| Omeprazole has maximum drug interactions | 85.0 | 15.0 |
| Safe in pediatric patients | 53.0 | 47.0 |
| Ideal timing before breakfast | 98.0 | 2.0 |
| Short-term use is safe | 93.0 | 7.0 |
| Prolonged use >8–12 weeks | 94.0 | 6.0 |
| Long-term use can cause adverse effects | 91.0 | 9.0 |

Attitude Toward PPI Use

Most clinicians showed positive attitude toward rational PPI use, with 96% acknowledging that overuse is common in clinical practice. Nearly all participants agreed on the necessity for regular review of long-term therapy and large-scale educational initiatives.

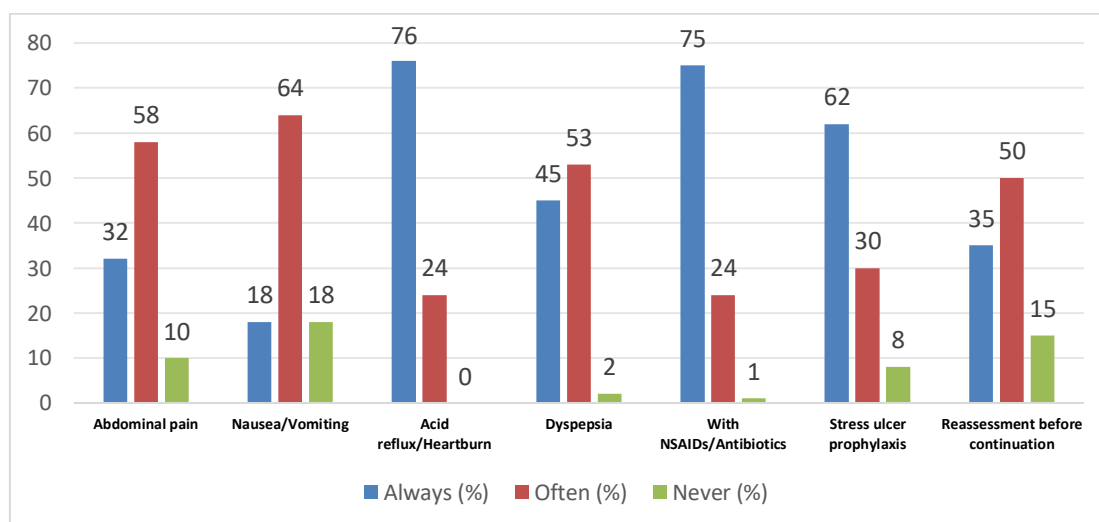
Graph 1: Attitude Toward PPI Use (n = 200)



Mean Attitude Score: 5.6 ± 1.4 (Maximum = 8)

Behavioral practices showed routine prescribing of PPIs for conditions such as abdominal pain, dyspepsia, and NSAID co-therapy. Many clinicians reported prescribing PPIs routinely, although reassessment before continuation was not consistently practiced. These findings indicate a gap between knowledge and actual prescribing behavior.

Graph 2: Prescribing Behavior of Clinicians (n = 200)



Mean Behavior Score: 8.1 ± 2.0 (Maximum = 14)

DISCUSSION

This study evaluated clinicians' knowledge, attitude, and behavior regarding PPI use in a tertiary care hospital in Nandyal. The findings showed moderate-to-good knowledge levels. The high awareness regarding mechanism (97%) and drug examples (98%) aligns with findings from Strand et al., who reported strong foundational knowledge among practicing physicians². But, misconceptions about indications like acute pancreatitis mirror findings from the Pune study by

Suryawanshi et al., in which 52% of residents incorrectly considered PPIs beneficial in pancreatitis¹⁷. The acknowledgment of overuse by 96% of respondents is consistent with Heidelbaugh et al., who documented inappropriate PPI use in 68% of hospitalized patients⁶. Scarpignato et al. Informed that prophylactic use without risk stratification is a global issue⁵.

Regarding safety awareness, 91% recognized long-term adverse effects. Lazarus et al. showed an association between PPI use and chronic kidney disease¹². Yu et al. linked long-term use to fracture risk¹³. Awareness of these risks may explain the strong support for educational initiatives observed in our study. The predominant use of pantoprazole (40%) informs similar prescribing trends reported in Indian tertiary hospitals¹⁶. Pantoprazole's relatively favorable interaction profile compared to omeprazole may influence clinician preference³.

In spite of adequate knowledge, behavioral findings indicate routine empirical prescribing for abdominal pain and dyspepsia. Forgacs and Loganayagam previously showed that PPIs are commonly used as a "quick fix" for nonspecific symptoms⁷. This suggests that system-level interventions, than knowledge alone, are required. International deprescribing guidelines recommend periodic review of indication and dose reduction where appropriate¹⁵. The near-universal agreement in our study supporting review of ongoing therapy suggests readiness for implementation of stewardship programs.

Strengths include adequate sample size and comprehensive KAB assessment. Limitations include single-center design, convenience sampling, and reliance on self-reported behavior. Future multicenter studies and prescription audits are recommended to objectively measure inappropriate use and assess intervention impact.

Proton pump inhibitors represent a classic example where highly effective drugs are frequently prescribed beyond evidence-based indications or for prolonged durations without periodic review. The high proportion of clinicians in our study acknowledging overuse (96%) shows awareness of the problem. But, bridging the gap between knowledge and rational prescribing behavior requires structured interventions like clinical audits, guideline dissemination, pharmacovigilance reinforcement, and continuous medical education programs. In a study done previous in Andhra Pradesh, knowledge and awareness of pharmacovigilance increased significantly with the year of study. First-year students showed poor awareness in most areas. Second-, third-, and fourth-year students showed progressively better knowledge regarding the definition, processes, surveillance phases of pharmacovigilance, and identification of ADRs. ¹⁹.

CONCLUSION

Clinicians showed reasonable knowledge and positive attitudes toward safe PPI use. But, prescribing behaviors indicate overuse and empirical prescribing patterns. Structured educational programs, institutional guidelines, and stewardship strategies are recommended to promote rational PPI use.

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