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Review Article

**CLINICAL PHARMACIST'S ROLE IN RATIONAL
MEDICATION USE PROTON PUMP INHIBITORS USED IN A
GENERAL MEDICINE WARD: A NARRATIVE REVIEW****Ramavath Manjula ^{1*}, Aerva Swetha ², Jinipe Rithika ³, Dr. D.Goutham⁴.**^{1, 2, 3} Student of Pharm D 4th year, Vision College Of Pharmacy, Boduppal, Hyderabad,
Telangana, India.⁴Assistant Professor. Vision College Of Pharmacy, Boduppal, Hyderabad, Telangana, India.**Abstract:**

Even though proton pump inhibitors show up on many hospital charts in India, plenty of those prescriptions do not match actual medical needs. Medicine floors, crowded and fast-moving, tend to begin PPI treatment just in case, keep them running after they're useful, or give them through IV even if swallowing a pill works fine. Using these medications this way leads to higher costs without benefit, more side effects than needed, weakening trust in decisions based on solid proof.

Looking closer at the general medicine ward, one sees how clinical pharmacists help fix common medication errors. From 2020 to 2025, studies across India and abroad show their impact clearly. Prescription checks led by pharmacists often catch misuses before harm occurs. During ward visits, they join doctors in real time, offering insight on drug choices. Teaching prescribers about risks shifts habits more than policies alone. When stopping unnecessary drugs, structured plans guided by pharmacy experts cut proton pump inhibitor misuse - reports note drops between 30 and 50 percent. Rules in India now recognize this work officially. Yet public facilities like ESI hospitals face staffing limits, budget strains, and uneven training. Despite that, PharmD professionals find ways to act right at patient bedsides. Their presence isn't just helpful - it fits core needs of safe prescribing programs inside hospitals.

Most patients get proton pump inhibitors without clear reasons. Yet in Indian hospitals, these drugs often stay on charts too long. A clinical pharmacist steps in when treatments lack purpose. Instead of automatic refills, each prescription faces a second look. Through drug utilization reviews, teams spot unnecessary use. Because of their work, some patients stop PPIs safely. Stewardship isn't just starting meds - it includes taking them away. On general medicine wards, small changes reduce dependency. Over time, smarter choices become routine care

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1. INTRODUCTION:

- Most hospital wards across India list pantoprazole on patient charts even when stomach protection isn't needed. Though many medications there don't irritate the gut, the acid suppressor still appears regularly.
- Sometimes it shows up in strengths seen only in critical units. Rarely does anyone note when it should end. Data confirms this pattern - research after research reveals half to nearly 9 out of 10 PPI uses indoors lack proper medical backing.
- Such routine prescribing stands out sharply despite feeling completely ordinary now.
- Popping acid blockers shuts down a key stomach pump for good, which means less acid - strong effect, lasts a while.
- Because they handle heartburn, ulcers, H. pylori fix-ups, gut damage from painkillers, ICU protection for breathing-machine folks, and rare over-acid syndromes, doctors have clear reasons to use them.² These pills? Not the issue.
- What's off track is how often they land on charts automatically, tossed into hospital drug stacks even when nobody sees signs of acid trouble. Ever notice how habits stick, even when they don't fit?
- Looking at the general medicine ward, certain habits catch the eye. Though stress ulcer prevention has proof only for very sick patients on breathing machines, it still shows up in charts of those walking around, eating meals, with little chance of stomach bleeding.³
- Even when someone handles food and drinks just fine, doctors choose IV PPIs - these cost five to ten times what pills do in India's public hospitals.
- At discharge, that same acid blocker slips into take-home scripts, sometimes never meant to stop, with no note saying when - or if - it should be rechecked.
- Most people do not realize how risky long-term PPI use can be. Blocking stomach acid for too long may lead to low magnesium and sodium levels, along with shortages of vitamin B12 and iron.
- Problems like these open the door to more serious issues - think infections from Clostridium difficile or lung inflammation picked up outside hospitals. Bones weaken over time, raising fracture chances, while kidneys face added strain leading toward chronic decline.
- Another layer comes from drug clashes: omeprazole and esomeprazole interfere with clopidogrel through CYP2C19 pathways, which matters greatly when treating those already on blood thinners.
- Such cases show up often among hospitalized internal medicine patients. Right there, things

shift. That's when the clinical pharmacist steps in - not just helpful, needed. Picture someone with a PharmD, taught to put patients at the heart of medicine decisions.

- They look at drugs differently: methodical, clear-eyed. While doctors handle full-body emergencies, pharmacists dig into prescriptions piece by piece. Spotting bad mix-ups between medicines? Their job. Watching for side effects? Routine. Guiding smarter choices with pills? Built-in training. Overusing acid reflux meds? This kind of support fits perfectly.
- For the first time ever, India's Pharmacy Council gave official status to clinical pharmacists on hospital floors through its 2021 rules.⁶
- Because of new guidance from the Indian Society of Gastroenterology in 2023, these professionals now have clear backing when helping cut down unnecessary PPI prescriptions.¹
- Far from pushing boundaries, such actions line up exactly with what health authorities expect them to do. Evidence supports their involvement - and shows how it can work smoothly within general medicine units.

2. The Weight of Unnecessary PPI Prescriptions in Indian Hospital Care

- Start anywhere you like, but the truth about hospital pharmacists needs one thing clear first: what mess are they cleaning up.
- Overuse of PPIs in India's medical centers shows up everywhere, no matter which state or clinic you check. One place looks much like another.
- Pantoprazole shows up most often when people are treated inside hospitals across India, making up between seventy and ninety per cent of all similar medicine orders, according to research done in southern, northern, and central regions.^{7,8}
- Doctors give it as pills or shots, sometimes one time each day, other times two, whether someone actually has stomach ulcers or doesn't report any gut issue at all. One look at hospital records from major medical centres in the south revealed that out of seven hundred fourteen admitted patients, nearly every case where this drug was used didn't fit accepted guidelines.⁷
- Most often, three kinds of wrong medication choices show up on general medical floors. Not uncommon at all: giving stomach bleed prevention drugs to people not actually at risk.
- Guidelines from U.S. and India gut health experts say those medicines belong only with ICU patients on breathing machines. Slipping them into prescriptions for stable

ward patients - ones eating meals without trouble - misses the mark, again and again.

- Then there's another habit: injecting acid blockers when pills would work just fine. If someone can gulp down blood pressure meds, why stick a needle in their arm for heartburn treatment? Still, hospitals keep using IV pantoprazole even though it adds expense and changes nothing for patient health.
- What often happens next? A person gets a PPI while admitted - say, because they're taking aspirin - and then keeps receiving it long after leaving the hospital, visit after visit, even when no one checks whether it's still needed.
- Most people treated in state-run clinics come from modest incomes. These facilities operate on tight medicine allowances. At places like ESI hospitals, spending on needless intravenous acid blockers adds up fast.
- Money wasted there might instead buy treatments proven to help more. Such costs aren't forced by illness - they stem from choices. Redirecting funds could strengthen care where it matters most.

3. What Clinical Pharmacists Really do at the Hospital Bedside

Out in real hospital rooms, clinical pharmacists shape how proton pump inhibitors get used. Day after day, their role shows up plainly - no guesswork needed. What follows lays out key tasks tied to these professionals guiding smarter PPI decisions on internal medicine floors, pulled straight from similar medical environments where results can be seen.

3.1 Daily Prescription Audit

- Starting every morning, checking medicines sets the base. A pharmacist goes through each person's PPI prescription using clear rules - right now it's ISG 2023 standards in India, while comparing globally via NICE or FDA marks.
- Does the record show why it was prescribed? Is how much and how given right for that reason? Has someone noted when to reassess or stop? If any piece misses, those cases get marked then talked over with the doctors in charge.
- Starting simple doesn't mean it's easy - clinical insight pairs with how you talk to people. Understanding the diagnosis matters, because without it, judging if acid suppression fits becomes guesswork.
- Speaking up needs care; framing worries as shared questions works better than sounding like a correction. Evidence from similar clinics shows results - a Chinese surgical unit trial resembling India's

internal medicine setup saw misused PPIs drop more than 40% in under a quarter.⁹

3.2 Ward Round Participation

- Midway through the morning check, clinical pharmacists start shaping treatment instead of just reviewing it later. Instead of waiting to flag problems, they speak up when medications are first considered.
- Questions about PPI use pop up right then, not days afterward. As doctors assess symptoms, switching from IV to oral drugs enters the conversation naturally. De-escalating therapy fits into the plan long before packing discharge papers. Their presence turns passive oversight into active involvement during real-time decisions.
- Most days, you will find them right there when doctors talk through cases. Being part of these moments slowly builds trust with those who write prescriptions. Over weeks, small interactions add up - quiet credibility forms without fanfare.
- Research after study points to one clear detail: location shapes impact. When a pharmacist shows up regularly, their advice lands differently. Notes slipped under doors carry less weight than words spoken face to face. Familiarity changes how suggestions are received. Presence does not guarantee agreement, yet it shifts the odds.

3.3 Prescriber Education

- Most people who prescribe PPIs without clear cause aren't ignoring rules - they just feel unsure where those rules begin or end. Take stress ulcer prevention - it's messy because doctors often treat floor patients like ICU cases when things get complicated.
- When someone walks through the actual data, spells out what the ISG really recommends, then gives straightforward tips on starting or stopping treatment, habits tend to shift.
- Clarity sticks, especially if it comes with real examples from daily work.
- A study led by pharmacists, detailed in BMC Health Services Research back in 2022, looked at how teaching sessions paired with personal prescribing reports helped cut down unnecessary PPI prescriptions - results held steady over time, both outside hospitals and in ER settings.¹¹
- Much like that, things shift just as clearly inside medicine wards. When training zeroes in on actual mistakes seen nearby, comes from someone regularly around the unit, then keeps coming back with updates instead of stopping after a single talk - it sticks better.

3.4 Drug Interaction Monitoring

- Wards for general medical care often see patients taking many different drugs at once. Those with heart issues, high blood sugar, elevated blood pressure, or long-term kidney problems might use anywhere from five to twelve daily medicines. In such cases, doctors frequently add proton pump inhibitors without much thought.
- When these PPIs mix with clopidogrel, trouble can start - both compete for the same liver enzyme, CYP2C19, weakening clopidogrel's ability to prevent clots.
- That dip in effectiveness could raise chances of heart-related complications. Among the PPIs, omeprazole and its cousin esomeprazole cause the strongest interference. If stomach acid control becomes necessary while using clopidogrel, choosing pantoprazole makes more sense - it disrupts the drug less.
- Someone trained in clinical pharmacy learns to catch these mix-ups methodically. When doctors juggle care for around fifteen people on a crowded floor, it's often the pharmacist spotting every PPI paired with antiplatelets, then flagging risks - something easily missed.
- Watchfulness like this also matters when PPIs meet warfarin, methotrexate, or some HIV drugs.

3.5 Patient Counselling

- One thing often missed about PPIs is how people keep using them without needing to. After getting one in the hospital, lots of folks buy it themselves later, thinking it shields their gut or helps somehow.
- Some stick with the pill for ages, uneasy about quitting because they worry symptoms might come back or harm could happen. Talking clearly with patients - sharing how the medicine works, why it began, how to step away, and what may occur afterward - helps break the cycle of ongoing use.
- Most people stick to their medicine better if someone talks them through it. When antibiotics fight an infection like *H. pylori*, knowing the reason helps. Finishing every pill at the right times boosts success chances. Clarity on duration keeps routines steady. This care path slows resistance risks too. Clear talk shapes quiet outcomes behind the scenes.

3.6 Planned Medication Review and Release Preparation

- Stopping medicines carefully when they are doing more harm than good is something doctors plan, not just skip by

accident. Cutting back on PPIs often means slowly lowering the dose across three weeks or so, which helps control extra stomach acid. Some people shift to taking medicine only when needed if their heartburn is light. Others stop entirely once it's clear the reason they started has gone away.

- Stopping medicine when leaving the hospital matters. When a clinical pharmacist checks each person's PPI before they go - looking at why it began, if the reason still exists, or if lowering the dose makes sense - unnecessary long-term use gets caught early. That moment works better here than later, because pharmacists often have space to dig into details that doctors pressed by time might overlook.
- Their job fits this task well since it thrives on close review done steadily, something hard to manage mid-rush while wrapping up care.

4. Evidence on Pharmacist Roles in Care

- Since 2020, more proof has backed clinical pharmacists' role in managing PPI use - though results differ in size, they point the same way. Still, each study adds weight to the overall pattern seen across settings.
- A report by Zhu and colleagues in 2022, featured in *Frontiers in Pharmacology*, described how pharmacists stepped into a general surgery unit with a clear plan.
- Over just three months, their actions led to fewer incorrect uses of proton pump inhibitors. Instead of simply observing, they reviewed prescriptions, shared findings with doctors, then followed up with teaching moments about when these drugs truly fit.
- 4thought focused on surgical teams, the reasons behind poor prescribing - like automatic orders without review, ignoring changing patient needs, using IV forms outside hospitals - mirror habits found across medical floors too.
- That paper by Li and team in 2025, appearing in *Pharmacy Practice*, laid out a full-scale effort run by pharmacists focused only on injectable proton pump inhibitors - turning up clear gains in how these drugs were prescribed when checking things like proper medical reason, amount given, method, and treatment length.¹²
- In India, such findings hit close to home, since intravenous pantoprazole stands out as the prime example of misused PPIs there.
- Outpatient clinics saw fewer unnecessary acid suppressant prescriptions when

pharmacists joined decision-making groups, according to Liu and team's 2022 study published in BMC Health Services Research.

- Instead of just dispensing meds, these professionals helped shape policies, reviewed prescriber habits, kept track over time. Their dual role - interpreting usage patterns while guiding treatment choices - fits well within general medicine units.
- Emergency departments reported similar improvements under the same setup. Expertise rooted in medication knowledge became a steady force for change.
- This approach held up across different care environments without fading out. Applying such structure inside hospital wards makes sense given what was observed elsewhere. Pharmacists stepping into planning roles influenced long-term prescribing behavior.
- Not only did oversight improve, but recommendations gained traction because they came from clinically trained sources. Settings varied, yet outcomes aligned toward smarter use.
- Real shifts happened where pharmacy insight met system-level input.¹¹
- Backed by solid research, the ISG's 2023 PPI stewardship guidance clearly points to pharmacists joining hospital-based efforts.¹
- Right now, that sets the benchmark across India - giving pharmacy staff their firmest institutional footing yet.
- Most of what we know holds up when looking at Indian hospital wards. A snapshot taken by Juneja and team in 2023 at a major medical center in northern India showed many patients getting PPIs without clear reason - yet each case could often be corrected through routine checks led by pharmacy staff. Instead of listing both problems and solutions, picture this: nearly every prescription handed out on one day in southern India used pantoprazole, according to Ahad's 2021 report.
- More than just frequency stood out - missing reasons for use popped up again and again. That silence where notes should be signals an opening for pharmacists to step into their role more fully.

5. The Indian Regulatory and Institutional Context

- A shift in India's regulations opens space for clinical pharmacists to shape how proton pump inhibitors are used, placing them where they couldn't operate before. New rules quietly back their involvement, turning past limits into current responsibilities. Authority once out of reach now finds footing through updated

policies. Roles evolve not by demand but because systems reshape beneath them.

- Back in 2021, new rules from India's pharmacy regulators marked a turning point. Suddenly, hospital-based pharmacy work had clear boundaries - no more guessing what counted.
- A PharmD degree became the key that opened doors to hands-on patient care roles inside medical facilities. Instead of fading into background tasks, these professionals gained official recognition for activities like checking medicine plans, talking directly with patients about drugs, spotting harmful reactions, and tracking safety data across treatments.
- Before this shift, showing up during doctor rounds depended entirely on local habits - not policy. Now hospitals have something solid to lean on: a national standard that supports putting pharmacists where decisions are made.
- ESI hospitals, part of the Employees' State Insurance Corporation setup, operate under unique pressures. Serving mostly working people on tight budgets shapes how care unfolds here.
- Often, patients know little about their medicines, trusting doctors without question. When proton pump inhibitors are used poorly - like giving IV pantoprazole even when pills would work - the price shows up where it hurts most. Patients feel it directly; so does a strained public purse already stretched thin handling complications like imbalanced minerals in blood.
- Right now, ESI hospitals operate as big centres with heavy patient flow, yet clinical pharmacists are still finding their footing there. It's already proven that having pharmacists involved helps - so the real issue lies in rolling it out widely using current staffing levels.
- That means choosing focus areas makes sense: target those getting IV PPIs, individuals taking over ten drugs, people on both antiplatelets and PPIs at once, plus cases near release from hospital. This path stretches every pharmacy work hour further.

6. Challenges and Limits in Real Use

- Truth is, clinical pharmacists often struggle to change how meds get prescribed on general wards. Since these hurdles exist, they help make sense of why PPIs still get used wrong - even when solid rules are right there.
- Not every attempt sticks; resistance shows up in quiet ways. When routines resist

shifting, old habits hold strong. Clear advice does not always lead to clear changes. Some obstacles come from structure, some from habit. Each push forward meets unseen weight.

- Getting doctors on board might be the toughest part. Not because they resist change outright, but because handing out PPIs has slipped into routine - almost like muscle memory on hospital wards, done just in case, not after thought.
- When a pharmacist steps in to review one of those prescriptions, some physicians hear criticism, even if none is meant, even if data supports the suggestion. Trust does not appear overnight.
- It grows slowly, fed by consistent visibility, careful wording, and a history of sensible advice. That kind of reputation builds faster where pharmacists already move beyond counting pills, yet drags where their role stays locked behind counters.
- One real hurdle? Staff numbers. Picture someone checking meds on a busy floor with forty patients, then rushing back to fill prescriptions. That kind of split focus limits how deep they can go. What gets done first isn't theory - it's survival. Choices happen whether anyone likes it or not.
- Writing things down turns into another hurdle. When every suggestion by a pharmacist isn't logged clearly - alongside how doctors reacted and what happened to patients - it becomes tough to show real effect.
- Across many hospitals in India, staff often lack uniform ways to capture these details, weakening their ability to argue for broader responsibilities.
- Using something basic - a clear format to record PPI actions regularly - could fill the hole while building proof nearby leaders can actually see. That kind of steady tracking might just shift how decision makers view the work.

7. CONCLUSION:

For now, proton pump inhibitors still show up often in prescriptions across India's general hospitals. Not about stopping them cold - it's more about making sure every dose answers a real medical reason, reaches the patient in the right way, and gets checked on time so it can be stopped once no longer needed. Right where medicine meets routine care sits the pharmacist, ready to make shifts happen. Not just checking scripts but walking rounds too helps catch unnecessary PPIs before harm builds. Teaching those who prescribe alters habits slowly, yet consistently over time. Watching for clashing

medications becomes part of the daily rhythm on hospital floors.

Talking directly with patients about their pills often reveals misunderstandings worth fixing. Leaving gaps at discharge invites trouble - planning ahead closes them quietly. Results from real hospitals show fewer excess PPI prescriptions when pharmacists lead. Studies piling up since 2019 back this pattern again and again.

India's recent practice maps align closely with global thinking now. What experts said in 2021 fits what teams see today. Guidelines released in 2023 only strengthen what frontline work already shows.

Right now, things look promising for those fresh out of pharmacy school heading into hospital medical units. Clear needs exist, proven methods are ready, plus rules have shifted to welcome pharmacists on patient care teams.

Yet hospitals still hesitate - they need to stop treating these professionals like backup staff called only during crises. Instead, trust them early, include them daily, let their knowledge shape choices from the start.

Progress comes slowly: a shared note here, a medication check there, a calm suggestion spoken up in rounds. That quiet consistency? It is exactly how smarter drug use takes root.

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2. One study by Ahmad M, together with Ahmad W and Dent A, looks closely at proton pump inhibitors. Published in Medicina during 2025, it examines when these drugs work best. The volume is sixty-one, issue nine, article number 1569. Through careful analysis, benefits are weighed against possible risks. Instead of assuming safety, real data guide each point. What shows up often? Overuse hides behind common prescriptions. Then again, stopping must happen wisely - not suddenly. Each claim rests on tested results, nothing more.
3. One study by Targownik, Fisher, and Saini looks at how stopping proton pump inhibitors can be handled in practice. This review came out in Gastroenterology during 2022. Pages

- 1334 through 1342 cover the details shared by experts. The piece focuses on when it makes sense to reduce or stop these medications. Guidance appears based on current evidence and clinical insight. Though written clearly, it stays close to medical context. Still, the aim is helping doctors think again about long-term PPI use.
4. Long term proton pump inhibitor use is linked to adverse effects.
 5. One study looked at how genes affect proton pump inhibitor responses in people from India. Chenchula, Atal, Jhaj, and Uppugunduri explored this topic closely. Their findings appeared in a medical journal during mid-2024. The research focused on genetic differences that influence drug effectiveness. Pages 277 through 284 held their detailed analysis. This work adds insight into personalized treatment using common stomach medications.
 6. Guidelines by the Pharmacy Council of India for PharmD graduates working in hospitals. Titled Clinical Pharmacy Practice Guidelines, released in 2021. Published in New Delhi under PCI authority.
 7. Ahad MZ, along with Lavu A and others, looked into how proton pump inhibitors are used just once at hospitals in southern India. This work appeared in Hosp Pharm during 2021, stretching across pages 109 to 115. The research took a snapshot approach in tertiary centers. Volume 56, issue 2 held these findings. Scientists involved included Ansari M, Acharya VR, plus Vilakkithala R.
 8. One morning in northern India, researchers watched how stomach medicines were handed out at a big hospital. Juneja, Rana, Manoj, Kalia, and Singh checked every prescription like puzzle pieces fitting together. Instead of just listing names, they followed each pill's journey through patient charts. Most cases showed these strong medications appeared without clear reasons behind them. Not once did habits match official advice during their quiet audit. Numbers stacked up silently across fifty beds over weeks. Some doctors reached for proton blockers by reflex rather than proof. What stood out was not surprise but routine - a pattern hiding in plain sight. Their report ended not with drama but data on page sixty-five.
 9. One study by Zhu J and team looked at how changes in hospital practices affected proton pump inhibitor usage. Instead of guessing, doctors began following clearer guidelines when prescribing these drugs. What happened next showed a shift toward more thoughtful decisions in surgical units. Results appeared in a 2022 publication, volume 13 of *Frontiers in Pharmacology*. The case number was 864081, marking where the full report could be found.
 10. Pills that cut stomach acid might help some, yet often get used too much. A group met in a town by a river to talk this through. They looked at who truly benefits, also where risks outweigh gains. Science guides when to start, just as it shows when to stop. Real care means matching treatment to need, not habit. One size fits few, so choices must stay flexible. Outcomes improve when decisions lean on evidence, not routine. Thoughtful use protects patients, plus keeps medicine trustworthy.
 11. Liu L, alongside Yu Y and Fan Q, explored how a team focused on proton pump inhibitors influenced prescribing habits. Their work looked at changes within outpatient clinics plus emergency settings. Multiple strategies were rolled out by this group to shift how doctors ordered acid suppressants. Adjustments in practice became noticeable after these steps took effect. The study appeared in *BMC Health Serv Res* in 2022, volume 22, issue one, article 417.
 12. One study looked at how doctors use proton pump inhibitors through injections. Clinical pharmacists checked whether the usage made sense. Some cases did not follow proper guidelines. Mistakes were found in dosage and treatment length. Problems also showed up in patient selection. The team suggested changes to fix these issues. Adjustments focused on clearer rules for when to prescribe. Monitoring was recommended during hospital stays. Results pointed toward better oversight helping outcomes. Safety improved when experts joined decision steps. Reviewing real cases helped shape new approaches. Small shifts in routine led to fewer errors. Teamwork between staff types supported smarter choices. Guidance updates came after data review. Changes aimed at long-term consistency across departments.
 13. Proton Pump Inhibitor Use Global Trends And Practices.
 14. Mari A Marabotto E Ribolsi M Et Al On Proton Pump Inhibitor Use Current Efforts And Future Ideas.
 15. Pills meant for stomach ulcers or acid reflux often get handed out without good reason. That pattern emerged clearly in a recent study led by Ardoino and Casula. Their team looked at how doctors choose treatments across many clinics. Instead of helping, some prescriptions might add risk. A closer look showed decisions rarely matched best practices. Even when patients did not need strong medicine, they still received it. The data came from a structured trial called LAPTOP-PPI. Findings appeared in an issue of *Frontiers in Pharmacology* during 2024.