

Drug Utilization Evaluation of Proton Pump Inhibitors in a Private Tertiary Care Teaching Hospital

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ABSTRACT

Proton Pump Inhibitors (PPIs) are the standard treatment for acid related disorders. Although PPIs have been considered relatively safe, recent literatures shows risk associated with their use including variety of infections, including Salmonella and Campylobacter gastroenteritis and community acquired and nosocomial pneumonia. The major objective of this study was to evaluate the utilization pattern and rationality in the usage of PPIs. A prospective observational study including 100 patients was carried out for a period of 3 months in in-patient population who were prescribed these drugs. Defined route of administration, rational use and convenience of the indication for PPIs were taken into consideration. In the study population males were found more (55%) than female (45%). Most of the PPIs are prescribed to the male population to a mean age group of 60-69 (20%). Concomitant use with NSAIDs and antibiotics, and GIT related disorders were the most prominent indication in which PPIs were used. Out of total prescriptions Pantoprazole (62%) was the most commonly prescribed drug and most of the PPIs were given in oral route (75%). The major brand prescribed in this study was PAN-D (PANTOPRAZOLE) in 27 patients. The major drug interactions were found along with the use of Clopidogrel, Escitalopram and Mycophenolate Mofetil and others belong to the category moderate and minor. The study found PPIs being prescribed without clear indications was common. This study may be useful to the physicians in reducing the usage of PPI without clear indications and to promote the rational use of PPI by prescribing for its robust indications.

KEYWORDS: Proton pump inhibitors (PPIs), Prospective, Drug utilization

I. INTRODUCTION

Proton pump inhibitors (PPIs) combines the qualities of high efficacy and low toxicity and remains as one of the most prescribed or consumed class of drug in the world [1]. The proton pump

inhibitors are the gold standard in the treatment of peptic ulcer as they are safe and effective in the patients with the disorder [2]. The various examples of proton pump inhibitors include Pantoprazole, Omeprazole, Lansoprazole, Esomeprazole and Rabeprazole. Proton pump inhibitors are widely used made use of in various conditions such as Peptic Ulcer, GERD, Zollinger-Ellison syndrome, Idiopathic hypersecretion and including in conditions such as Barrett's Esophagitis and Erosive Esophagitis occurring as complications with GERD and also it has been successfully used in the case of Helicobacter pylori infection and Gastrointestinal bleeding [3].

Besides their high efficacy and low toxicity profile they also possess some limitations and exhibit variations in pharmacokinetic profiles and drug interactions. The amount of food ingested and time of dosing of the drug significantly affects the efficacy of the drugs in gastric acid suppression [4]. When comparing to older agents, newer agents such as Rabeprazole and Esomeprazole has been found out to be highly efficient in gastric acid suppression and the suppression is sustained over 24 hours providing control and symptom relief [5].

The successful therapy of Gastroesophageal Reflux Disease (GERD) is difficult to achieve with proton pump inhibitors as the extent of mucosal damage has nothing to do with or has no correlation with the severity of the symptoms. Consumption of Pantoprazole 40mg has achieved in providing symptom relief in GERD related symptoms in both cases of Erosive Reflux Disease (ERD) and Non Erosive Reflux Disease (NERD) in majority of the patients and according to Andrzej Dabrowski et al Pantoprazole 40mg once daily is an effective and well tolerated choice for patients with GERD [6].

Various studies have reported various infections including Salmonella, Campylobacter gastroenteritis, community acquired and nosocomial Pneumonia associated with the use of proton pump inhibitors and other related gastric acid suppressants [7]. Long term use of proton

pump inhibitors has also been reported various potent complications such as Carcinoid formations; development of gastric adenocarcinoma in patients with Helicobacter pylori infections, Bacterial outgrowth; enteric infections; and fat and mineral malabsorptions [8]. Another study by Yu-Xiao Yang et al shows an increased risk of hip fracture with long term proton pump inhibitor therapy particularly at higher doses [9].

Side effects are mild and usually self limiting and various side effects includes Headaches, Nausea, Abdominal pain, Constipation, Flatulence and Diarrhea [10]. Serious adverse events are rare with proton pump inhibitors but has various case reports demonstrating adverse events such as various risks of infections such as small bowel bacterial growth, Clostridium difficile Colitis, Enteric infections and may also lead to the formation of spontaneous bacterial peritonitis, there are also various serious consequences reported other than adverse events with the use of proton pump inhibitors such as Hypergastrinemia, Rebound hypersecretion of acid, and development of various cancers including Carcinoid tumours.[11]

Abraham et al suggests to prescribe proton pump inhibitor only in robust indications and caution should be taken in prescribing proton pump inhibitor especially in the geriatric patients and other patients having risk factors for bone fractures or Clostridium difficile infection [12].

Proton pump inhibitors also shows drug interactions and the most serious drug-drug interaction is with Clopidogrel especially with Omeprazole and Pantoprazole is the drug that should be used in situations where a Clopidogrel and proton pump inhibitors are both indicated as Pantoprazole is less likely to interact with Clopidogrel [13].

Proton pump inhibitors are the most commonly prescribed drugs in a hospital setting including both in-patient and out-patient departments and they seem to be often prescribed to the patients without a clear and robust

indication. Due to increasing reports of potentially serious adverse effects and drug- drug interactions with the extensive use of PPIs in hospitalized patients require further evaluation and this is a prospective study conducted in the inpatient population of KFMS&R to determine the utilization pattern and to evaluate the rational use of PPIs who were treated with these drugs.

II. MATERIALS AND METHODS

A Prospective observational study was conducted over a period of 3 months from Jan 2019 to Mar 2019 at Karpagam Faculty of Medical sciences and research (KFMS&R), A 800 bedded tertiary care teaching hospital at Coimbatore, Tamil Nadu, India

Ethical clearance

The study was approved by Humans Research Ethical Committee, KFMS&R, Coimbatore

STUDY MATERIALS

Patient data collection form was prepared for the study. A total of 100 cases were selected and reviewed their case sheets to evaluate defined route of administration, rationality, and convenience of the indication for the PPIs prescribed.

Inclusion criteria

Patients in the medicine, surgery, OBG and orthopaedics who were treated with PPIs.

Exclusion criteria

Patients in Paediatrics, ICU and Casualty.

III. RESULTS AND DISCUSSION

The clinical study was carried out in 100 patients who were prescribed with Proton pump inhibitors (PPIs) in the departments of Medicine, surgery, OBG and orthopaedics.

Gender-wise distribution of study population

In the study population, out of 100 patients 55 were Male patients and 45 Female patients. It indicates male patients were found to be more 55 than females as shown in Figure 1.

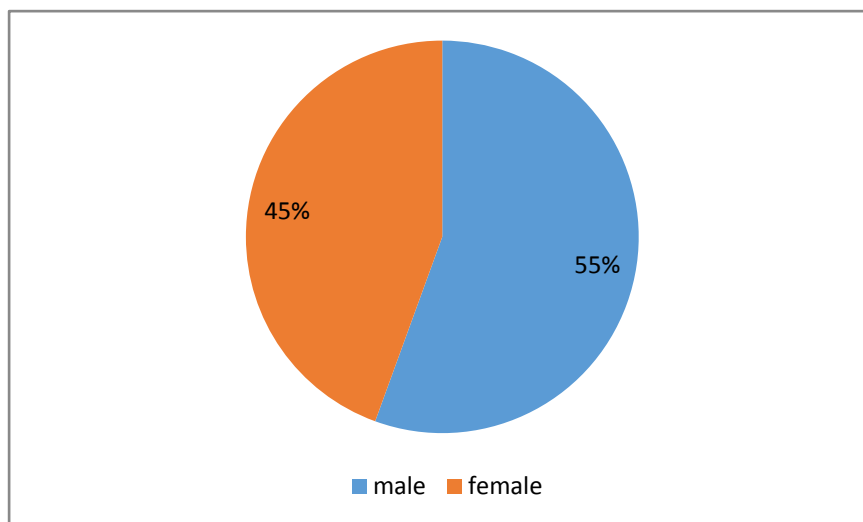


Fig 1: Gender-wise distribution of Study population

Age-wise distribution of study population

Out of 100 patients, most of patients prescribed with PPIs belong to the age group of 60-

69 years (20%).It shows that PPIs are mainly used in geriatric patients ,complete details are furnished in Table No. 1.

Table 1: Age Distribution of Study population

S.NO	AGE GROUP(YEARS)	NO.OF PATIENTS
1	<20	6
2	20-29	6
3	30-39	18
4	40-49	15
5	50-59	17
6	60-69	20
7	70-79	14
8	>80	4

Clinical Diagnosis of Study Population

Out of 100 patients cases; Gastro intestinal tract (GIT) related problem were most prominent, diagnosis found in 26 patients (26%).It is followed by infectious disease like Urinary Tract

Infection(UTI), enteric fever, Malaria, dengue fever, Tubular meningitis in 12 patients, Cardiovascular disorder in 5 patients, Respiratory Tract Infections in 15 patients and other diagnosis as shown in Table 2.

Table 2: Diagnosis of Study Population

S. NO	DIAGNOSIS	NO. OF PATIENTS
1	Infectious Disease	12
2	RTI(Respiratory Tract Infections)	15
3	CV(Cardiovascular Disorder)	5
4	Diabetes Mellitus(DM)	15
5	GIT	26
6	HTN	15
7	Fever	12

Breakups of Proton Pump Inhibitors (PPIs) Prescribed

Out of 100 prescriptions prescribed; Pantoprazole was prescribed in 62% cases,

Rabeprazole 18%, Esomeprazole 10%, and Omeprazole 10% of the most cases and it suggests that Pantoprazole is the most commonly used PPI in the study population as shown in the figure No.2.

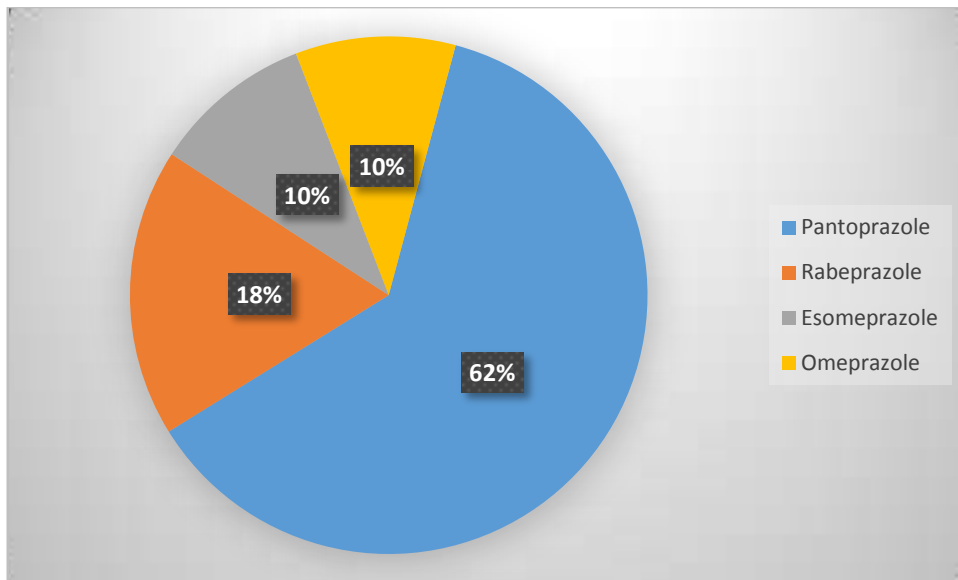


Fig 2: Breakups of PPIs Prescribed to the Study Population

Route of Administration of PPIs

In 50% of the prescription PPIs were given by oral route followed by 75% for parenteral

route and 15% were given by both oral and parenteral route 10% as shown in Figure No. 3.

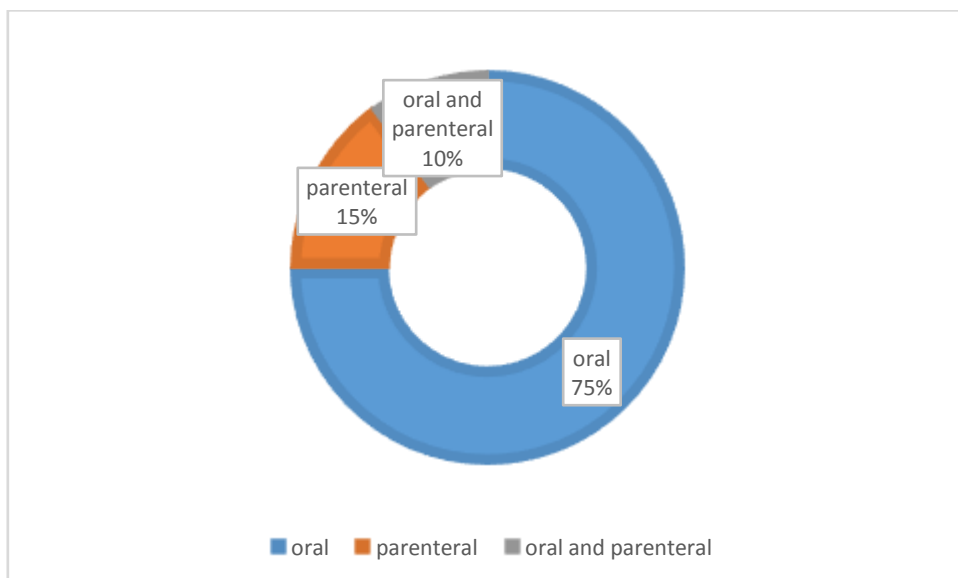


Fig 3: Route of Administration of PPIs given in the Study population

Different bands of PPIs prescribed

The most commonly prescribed brand of Proton pump inhibitors (PPIs) was PAN-

D(n=100;27% PANTOPRAZOLE) in 27 prescriptions as shown in table no.3.

Table No.3: Different bands of PPIs prescribed in the study population

S.NO	BRAND NAMES	NO. OF PATIENTS
1	PAN-40	25
2	PAN-D	27
3	OMEZ	10
4	ESOZ	6
5	RABELIN	6
6	OMECIP-D	5
7	PANTODAC INJ	4
8	RABY DSR	6
9	NEXPRO INJ	9
10	NEXIUM INJ	2

PPIs use evaluation

In our study population PPI was prescribed mostly along with NSAID/Antibiotics containing prescriptions in 57 prescriptions which is justified, followed by NSAIDs in 9 cases, antibiotics in 5 cases, for Gastroenteritis disease in 6 cases, Acid Peptic Disease 6 cases, Gastritis 3

cases, anticancer drugs 4 cases, Diabetes Mellitus 6 cases, GERD 4 cases as shown in Figure No. 4.

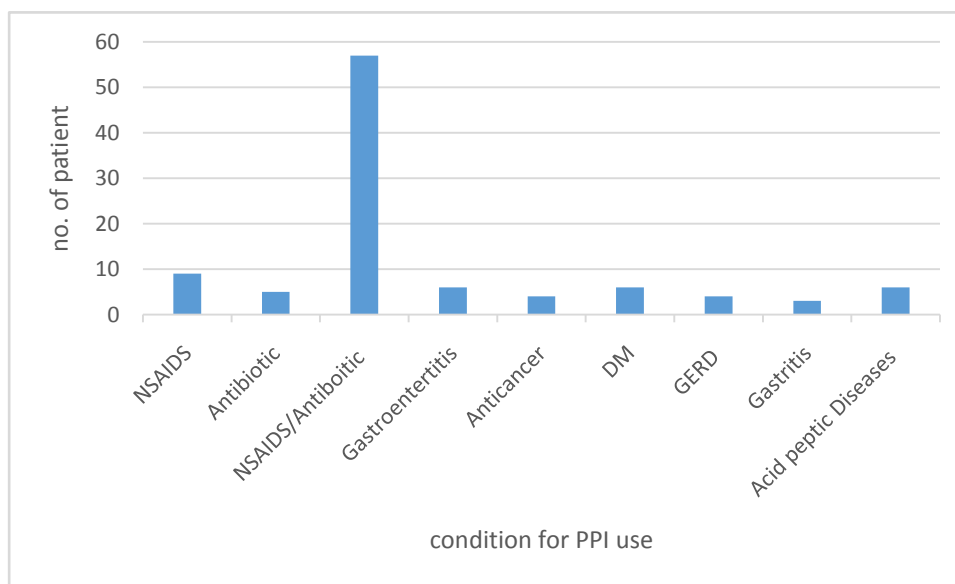


Figure No.4: Condition for PPI use in study population

Concurrent Drugs Prescribed

In our study population antibiotics were most common drugs prescribed in 34 patients

followed by NSAID/ analgesics in 26 patients as shown in Table No. 4.

Table No. 4: Concurrent Drugs prescribed

S.NO	CONCURRENT DRUGS(n=100)	NO. OF PATIENTS
1	Antibiotics	34
2	NSAID/Analgesics	26
3	Anti Hypertensive	12
4	Antidiabetics	21

5	CNS Drugs	4
6	Cold/ cough/Antiallergics	20
7	Multivitamin/Mineral/Supplement	23
8	GIT Drugs(laxative/purgative/anthelmintic)	11
9	Corticosteroids	4
10	Anticoagulant/Antiplatelet	3
11	Others	6

Drug interaction of PPIs with other drugs

The major drug interactions was found with the use of PPIs along with Clopidogrel,

Escitalopram and Mycophenolate Mofetil, and other interactions were found to be moderate and minor as furnished in figure No.5

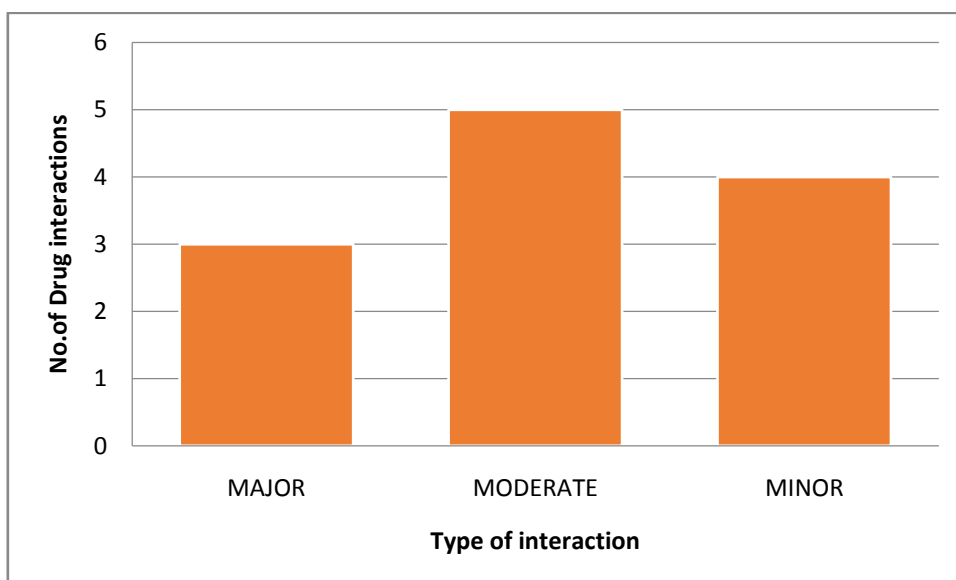


Fig.No.5: Drug interaction of PPIs with other drugs

IV. CONCLUSION

The study found out the use of Proton pump inhibitor in a wide range of indications, but they are often used without a clear indication. This study may be useful to the physicians in reducing the PPI prescriptions in patients with no apparent and clear indications thereby reducing unwanted side effects, inappropriate use, associated adverse effects with PPIs and health care costs and thereby promoting rationalized drug therapy. Interventions such as educational or awareness programmes and development of guidelines at the hospital level to reduce the PPI in inpatient population appears promising. The role of clinical pharmacist in these kind of situation are appealing and should exercise strong interventions in identifying and solving deficiencies in pattern of prescribing these drugs.

REFERENCES

- [1]. Ian Forges, Aathavan Loganayagam, Overprescribing proton pump inhibitors, BMJ 2008;336(03 Jan 2008)
- [2]. Alan BR Thompson, Michel D Sauve, Narmin Kassam, Holly Kamitakahara, Safety of the long term use of proton pump inhibitors, World journal of Gastroenterology 2010 May 21, V16(19), 2323-2330
- [3]. Der G, An overview of proton pump inhibitors, Gastroenterology nursing: The official journal of the society of Gastroenterology nurses and associates, 2003 Sep-Oct;26(5): 182-90
- [4]. Tytgat GN, Shortcomings of the first generation proton pump inhibitors, European Journal of Gastroenterology and



- Hepatology, [01 May 2001, 13 Suppl1 :S29-33]
- [5]. Robinson M, New- generation proton pump inhibitors : Overcoming the limitations of early-generation agents, European journal of Gastroenterology and Hepatology[01 May 2001, 13 Suppl:S43-7]
- [6]. Andrzej Dabrowski, Meta analysis of the efficacy and safety of pantoprazole in the treatment and symptom relief of patients with GERD-PAN-STAR, Gastroenterology Rev 2018;13(1);6-15
- [7]. Amy Linsky, Kalpana Gupta, Elizabeth V Lawler, JAMA internal medicine, May 2010; 170(9): 772-778
- [8]. Lanie L, Ahnen D, McClain C, Solcia E, Walsh JH, Potential gastrointestinal effects of long term acid suppression with proton pump inhibitors, Alimentary pharmacology and Therapeutics [01 Jun 2000 Jun 14(6);651-68]
- [9]. Yu-Xiao Yang, James D Lewis, Solomon Epstein, Long term proton pump inhibitor therapy and risk of hip fracture, The Journal of American medical association ,JAMA-2006;296(24):2947-2953
- [10]. Rajendra Singh Airee, Aastha Rawal, Nimmy N John, Binu KM, Drug use evaluation of proton pump inhibitors in a private tertiary care teaching hospital, World journal of pharmacy and pharmaceutical sciences, Vol-5, Issue 1, P922-930
- [11]. McCarthy, Denis M, Adverse effects of proton pump inhibitor drugs: Clues and conclusions, Current opinion in Gastroenterology: November 2010- Volume-26-Issue-6-p624-631
- [12]. Abraham, Neena S, Proton pump inhibitors:Potential adverse effects, Current opinion in Gastroenterology, Nov-2012,Vol-28, Issue-6,P615-620
- [13]. Nicholas B Norgard, Kathryn D Mathews, Geoffrey C Wall, Drug-Drug interactions between clopidogrel and the proton pump inhibitors, Annals of pharmacotherapy, Vol-43, Issue 7-8, 2009