

## Brief Communication

# Prescribing Pattern of Proton Pump Inhibitors in Qatar Rehabilitation Institute: A Retrospective Study

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ABSTRACT

**Objective:** Proton pump inhibitors (PPIs) are still widely used despite increasing reports of their adverse events. This drug use evaluation study was conducted to assess the prescribing pattern of PPIs for patients admitted to the Qatar Rehabilitation Institute (QRI). **Methods:** An observational, retrospective, patients' chart-based study included all patients who received a PPI in QRI between April 1, 2017, and October 1, 2017. A standardized tool was prepared and reviewed by the involved clinical pharmacists to collect appropriate data for the evaluation. Statistical analysis was performed using the 25<sup>th</sup> Version of the Statistical Package of the Social Sciences (SPSS®). **Findings:** A total of 119 patients received PPIs during the audit period, of which esomeprazole was the most frequently prescribed (34%). Majority of the patients (94%) were started on PPI without further investigations for confirming the indication, and the indication was not documented in 78% of the participants. Nonsteroidal anti-inflammatory drugs were the most commonly co-prescribed medications with PPIs (59%). Pantoprazole was co-prescribed with clopidogrel in 42% of the patients. **Conclusion:** This drug utilization study shows the need for a proper prescribing practice considering a clear indication and recommendations about the duration of therapy and the need for reassessment in QRI.

**KEYWORDS:** Drug use evaluation, gastroesophageal reflux disease, proton pump inhibitors

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## INTRODUCTION

The health of millions of people across the world is affected by acid-related diseases, such as active duodenal ulcers, gastric ulcers, gastroesophageal reflux disease (GERD), nocturnal acid breakthrough, severe erosive esophagitis, and pathological hypersecretory conditions, such as Zollinger–Ellison syndrome.<sup>[1]</sup> Taking into consideration the various pathogenic mechanisms, the treatment goal of these diseases usually focuses on decreasing acid production by the stomach.<sup>[2,3]</sup>

Antacids, H<sub>2</sub>-receptor antagonists (H<sub>2</sub>RAs), and proton pump inhibitors (PPIs) are the main groups of medications that can be used to modulating gastric acid production.<sup>[3]</sup> Moreover, in patients treated with H<sub>2</sub>RAs, symptomatic relief is expected in up to 60% of patients and healing rates can be achieved in approximately 50%, whereas symptomatic relief rates and healing rates are

83 and 78%, respectively, for PPIs.<sup>[3]</sup> PPIs which include pantoprazole, omeprazole, lansoprazole, esomeprazole, and rabeprazole are now among the most widely prescribed drugs worldwide because of their outstanding efficacy and safety,<sup>[4]</sup> with a maximum recommended a treatment duration of 4–8 weeks.<sup>[5]</sup>

The most common side effects of PPIs include headaches, nausea, abdominal pain, constipation, flatulence, and diarrhea. These side effects are unrelated to dosage or age and usually are mild and self-limiting.<sup>[6]</sup> The long-term use of PPIs may be associated with a higher risk of pneumonia and Clostridium difficile infections and a decrease in the absorption of calcium, magnesium,

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iron, and Vitamin B<sub>12</sub>. Moreover, chronic use of PPIs may lead to atrophic gastritis which could be a precursor of cancer (e.g., gastric cancer and colon cancer). Furthermore, patients on PPIs are at increased risk of fractures including hip fractures.<sup>[7]</sup> Due to increasing reports of serious adverse effects of PPIs, their prescribing in hospitals requires further investigation through drug use evaluation (DUE) studies.

Drug utilization studies are ongoing, systematic, criteria-based programs for medication evaluations that will help to ensure rational medicine utilization.<sup>[8]</sup> They are dynamic audit systems for improving the quality of medication use in hospitals and also can be designed and performed to identify any type of suspected inappropriate prescribing behavior by identifying, documenting, and measuring the probable problem while analyzing and understanding the underlying causes of it. If therapy is determined to be inappropriate, interventions with providers or patients will be necessary to optimize the outcomes of drug therapy. This terminology is similar to drug use review and medication use review.<sup>[8]</sup>

In the present study, we aimed to investigate the appropriateness of PPIs prescribing at Qatar Rehabilitation Institute (QRI) and compare it to the recently published literature.

## METHODS

This observational descriptive clinical study was conducted retrospectively at QRI in 2017 using the electronic medical records of eligible patients to retrieve data. QRI is a tertiary care facility, which offers inpatient and outpatient rehabilitation services. Inpatient wards include four main units; stroke unit, spinal cord injury unit, traumatic brain injury unit, and female mixed diagnosis unit with an overall capacity of 64 beds. All patients who were admitted to QRI and prescribed a PPI from April 1, 2017, to October 1, 2017, were included in the evaluation.

A standardized data collection tool was developed by utilizing the selected DUE criteria. Variables were designated to measure the prespecified outcomes. The tool was validated through piloting on ten randomly selected files. Collected data included (1) patient's demographics; (2) type of PPI used; (3) dose; (4) duration; (5) route of administration; (6) the clinical condition for which the PPI was prescribed; (7) whether the indication was documented or not; (8) time of starting the PPI; (9) whether investigations were done to confirm the indication; (10) whether clopidogrel was co-prescribed with the PPI; (11) whether nonsteroidal anti-inflammatory drugs (NSAIDs) were co-prescribed with the PPI;

(12) if yes, which NSAID; (13) whether steroids were co-prescribed; (14) if yes, which steroid; (15) whether the patient was on calcium supplement; (16) whether the patient was on iron supplement; and (17) if yes, which iron.

Ethical approval of the study was obtained from the Medical Research Center (MRC) of Hamad Medical Corporation (HMC) with the registration number of MRC-01-17-059.

The appropriateness of PPIs usage at QRI was determined by assessing the relevance of their prescribing with regard to the indication, dose, duration, frequency, and drug interactions. These were compared to the recommended in Lexicomp<sup>®</sup> online medications database as it is the most commonly accessed and readily available for all HMC healthcare providers.

We described our data statistically using the Statistical Package of the Social Sciences (SPSS<sup>®</sup> by IBM Corp, USA) version 25.

## RESULTS

A total of 119 records were included during the audit period. The patients' demographics are summarized in Table 1. Majority of the patients were males (70%). Most of the participants were aged 40–59 years (48%).

In QRI, mainly four PPIs are used; esomeprazole, pantoprazole, lansoprazole, and rabeprazole. In our study, esomeprazole and pantoprazole were the most frequently prescribed (34% and 31%, respectively) compared to lansoprazole (8%) and the least prescribed PPI, rabeprazole (1%). Multiple PPIs were prescribed for almost a quarter of the included patients (27%). The findings of the prescribing pattern are illustrated in Figure 1.

The duration of prescribed PPIs was between 3 and 6 months in most of the cases (34%). In 16% of the included patients, PPIs were prescribed for less than a month. Only 8% of the included patients were prescribed PPIs for less than a year. Compared to the intravenous

**Table 1: Age groups and gender distribution of the studied patients**

	<i>n</i> (%)
Age (years)	
<20	4 (3)
20-39	26 (22)
40-59	57 (48)
>60	32 (27)
Gender, <i>n</i> (%)	
Male	83 (70)
Female	36 (30)

route of administration (2%), the oral route was most commonly prescribed for the patients (94%).

Most of the participants (94%) were started on PPI based on signs and symptoms only, without further confirmatory investigations (e.g., endoscopy, laboratory test to rule out *Helicobacter pylori* infection). The indication to prescribe a PPI was documented in 22% of the participants, of which 6% only were medically investigated before starting the treatment. The most indication for which PPIs were prescribed for more than a year was stress ulcer prophylaxis ( $P = 0.52$ ) as demonstrated in Figure 2.

NSAIDs were the most co-prescribed medications with PPIs as illustrated in Figure 3.

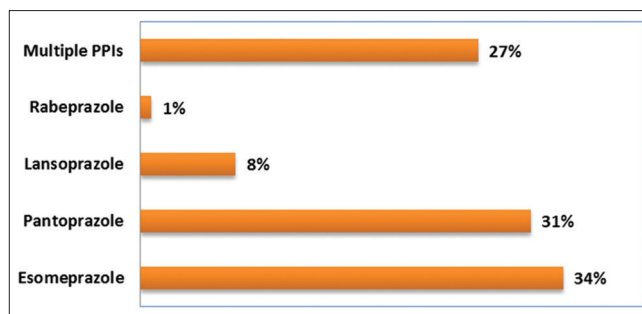
Aspirin, dexamethasone, and ferrous sulfate were the most frequently co-prescribed NSAIDs, steroids, and iron types, with a percentage of 56%, 43%, and 68% respectively. Pantoprazole was the most PPI that is co-prescribed with clopidogrel, in around (42%) of the cases ( $P = 0.056$ ). Figure 4 shows the co-prescribed PPIs with clopidogrel.

## DISCUSSION

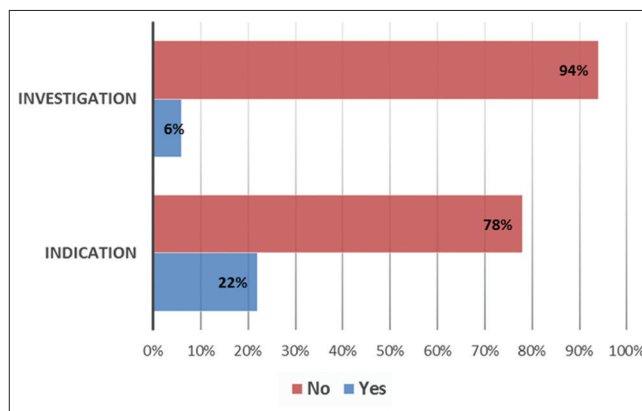
This study elucidated the prescribing pattern of PPIs in the first rehabilitation specialized facility in Qatar, QRI. It revealed that the majority of the patients who were started on PPI therapy were men. Although peptic ulcer diseases are known to be more prevalent in men, this increase in number can be related to the fact that there is only one female ward in QRI while there are three male wards. The average age of participants was 40–59 years. This is consistent with the findings of Pendhari *et al.*<sup>[9]</sup> The oral route was the most commonly used route of PPIs administration. This is consistent with the findings of Airee *et al.* (2016).<sup>[4]</sup>

PPIs were prescribed for more than a year for 8% of the participants. The findings emerged are concerning. According to the guidelines, prolonged treatment with PPIs is only indicated in specific cases such as GERD in NSAID-induced gastroduodenal ulcers. However, the indication in 77% of the patients who were prescribed PPIs for more than a year was stress ulcer prophylaxis. This is well beyond the recommended duration for this indication. The risk of adverse effects is substantially increased when PPIs are used for periods that exceed 1 year as mentioned above. However, this correlation was found to be statistically insignificant ( $P = 0.52$ ). This finding was consistent with the findings of Haroon *et al.*<sup>[10]</sup>

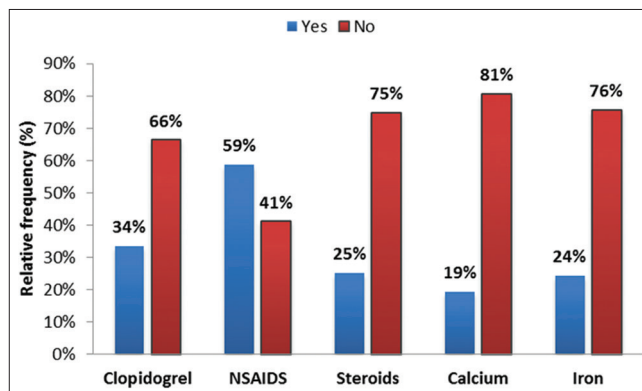
A chief obstacle that was pinpointed in this study was that the indications for prescribing a PPI were rarely documented. Proper documentation is vital to



**Figure 1:** Relative frequency of the prescribed proton pump inhibitors for the studied patients in Qatar Rehabilitation Institute

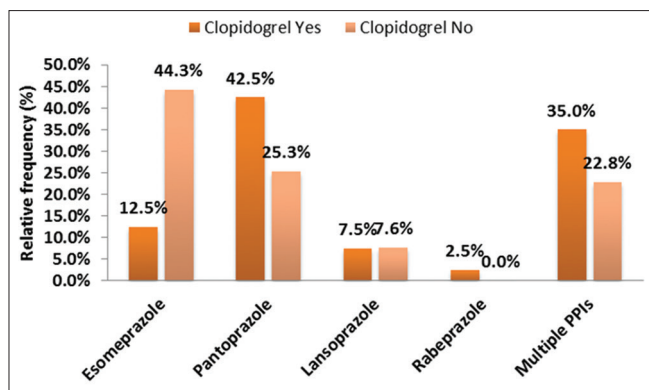


**Figure 2:** Documentation of the indication and performing a medical investigation before starting proton pump inhibitor



**Figure 3:** Relative frequency of the co-prescribed medications with proton pump inhibitors in the studied patients

rationalizing the use of PPI therapy, as in a typical hospital setting; one patient might be seen by different health professionals at the same time. Esomeprazole and pantoprazole resembled 65% of the total number of prescriptions, while rabeprazole accounted for only 1% of the prescriptions, and omeprazole was not prescribed at all. Economically, this is reassuring as omeprazole is the most expensive PPI compared to the available alternatives at HMC hospitals, including QRI. However, rabeprazole which is the least expensive PPI was scarcely prescribed. This finding supports the findings of Haroon



**Figure 4:** Type of proton pump inhibitors co-prescribed with clopidogrel in the studied patients

*et al.*<sup>[10]</sup> and Airee *et al.* (2016)<sup>[4]</sup> and inconsistent with the findings of Pendhari *et al.*<sup>[9]</sup> Ferrous sulfate was the most frequently prescribed iron type in patients using PPIs. This is significant as ferrous sulfate's absorption is decreased when used with agents that decrease acidity. However, ferric-OH polymaltose which does not require ionization is not subject to this interaction and can be a good choice when the iron is needed while the patient is on a PPI. Our results showed predominance for pantoprazole being prescribed in patients receiving clopidogrel. This is assuring as clopidogrel prescribing information recommends avoiding concurrent use with omeprazole due to the possibility that combined use may result in decreased clopidogrel effectiveness. Rabeprazole or pantoprazole may be lower risk alternatives to omeprazole.<sup>[11,12]</sup> This study was retrospectively relying on that the documentation on patient files is proper. Hence, it is possible that some patients have had an indication to be prescribed a PPI but was missed due to lack of proper documentation.

We recommend that the reasons for using a PPI should be appropriately quoted and the need for reevaluation of the condition to identify the need for therapy be emphasized.

It is crucial to periodically monitor the practice pattern of stress ulcer prophylaxis to further minimize its overuse in noncritically ill patients. PPIs contribution toward adverse effects is to be evaluated with continued pharmacovigilance studies.

Interventions such as educational programs and institution-specific prescribing guidelines may be developed and implemented to control the use of PPIs in the inpatient population.

## AUTHORS' CONTRIBUTION

All authors contributed in manuscript writing, data analysis, data collection, manuscript drafting and final approval of it. They also are accountable about the content of this manuscript and guarantee the integrity of research.

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## Conflicts of interest

There are no conflicts of interest.

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