



# Trends of Proton Pump Inhibitor Uses among Pharmaceutical Promotional Workers

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## Article information

Received: 10.11.2022

Accepted: 05.02.2023

## Cite this article:

Saha SK, Saha M, Shil BC, Saifullah MANM, Hasan M, Chowdhury NF. Trends of Proton Pump Inhibitor Uses among Pharmaceutical Promotional Workers. *Sir Salimullah Med Coll J 2023; 31: 41-46*

## Key words:

Proton pump inhibitor, Pharmaceutical promotional workers, Peptic ulcer disease.

## Abstract:

**Background:** Proton pump inhibitors (PPIs) are one of the most frequently used drugs in the world for the management of gastric- acid related diseases. The aim of this study was to assess the trend of PPIs uses among the pharmaceutical promotional workers in Bangladesh.

**Methods:** A questionnaire-based survey was conducted on pharmaceutical promotional workers from different regions in Bangladesh. The study data were collected which includes demographics, PPIs uses in terms of duration, dose, generics, symptoms for which they took PPIs and effects of PPIs on symptoms. Drugs or diseases that influenced the intake of PPIs were also recorded.

**Results:** Among six hundred surveys issued for the study, 581 valid questionnaires were returned. Among the respondents 520 individuals (89.5%) were male and 61 individuals (10.5%) were female. Common indications for taking PPIs were abdominal discomfort (51.5%), vomiting (34.1%) and abdominal pain (24.6%). Two hundred seventy (48.56%) respondents had satisfactory relief of symptoms, 125 (22.48%) had symptoms reappeared after stopping PPIs and 77 (13.85%) had complete cure of symptoms. Most of the participants (42.60%) were on PPIs therapy for up to one year. Most of the participants (64.49%) took PPI once daily. Most of the participants (60.75%) started PPI by themselves. Esomeprazole (40.1%) and rabeprazole (30.1%) were the most frequently used PPIs.

**Conclusion:** PPI is found to be a frequently used medication among pharmaceutical promotional workers. Further well-designed study with adequate work up may be designed to see misuse and overuse of PPI among workers of pharmaceutical sector as well as general population.

## Introduction:

Proton pump inhibitors (PPIs) are most widely prescribed class of medications worldwide. They are widely used for the treatment and prophylaxis of gastroesophageal reflux disease (GERD), peptic

ulcer disease, *helicobacter pylori* eradication therapy, dyspepsia, nonsteroidal anti-inflammatory drugs (NSAID) induced ulcers, stress ulcers and other hypersecretory conditions.<sup>1,2</sup>

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Since the first PPI omeprazole was introduced in 1989, gradually other drugs in the class have been marketed: lansoprazole, pantoprazole, rabeprazole, esomeprazole, dexlansoprazole. There has been a substantial, continuing and unexplained rise in prescribing PPIs. In 2006, the global expenditure on PPIs was 7 billion USD, whereas between April 2013 and March 2014, the PPI esomeprazole (Nexium) was the third best-selling drug in the USA with 19.3 million prescriptions and revenue of nearly 6.3 billion USD.<sup>3</sup> The dramatic increase in PPI prescribing pattern over the past several years has raised key questions relating to their inappropriate utilization.<sup>4</sup> Irrational use of PPIs has been associated with increased risk of adverse effects, such as bone fracture,<sup>5</sup> kidney disease,<sup>6</sup> microscopic colitis<sup>7</sup> and hypomagnesia.<sup>8</sup> Overutilization of PPIs causes significant risks of *clostridium difficile* infection<sup>9</sup> and chronic liver disease.<sup>10</sup>

Published literatures suggested the positive result of clinical pharmacist intervention in reducing the inappropriate utilization of PPIs.<sup>11</sup> Another investigation showed lack of awareness on the normal utilization of PPIs among health care professionals especially nurses, while the degree of awareness of pharmacists were more compared to doctors and nurses.<sup>12</sup>

Many drug utilization studies have identified overutilization of PPIs at various countries, especially in developed countries.<sup>13</sup> This is of special relevance to developing countries where health resources are limited. In view of this, we carried out a questionnaire-based study to assess the trend of PPIs use among pharmaceutical promotional workers so that it will help health care authorities on developing strategies for safe PPIs use.

### Materials and Methods:

This was an observational study and was carried out using a two – pages questionnaire, developed to assess the trend of acid suppressive drugs, particularly PPI intake among pharmaceutical promotional workers (21 years or older) during the period of 1 July 2021 through to 31 December 2021 from different regions in Bangladesh. We personally visited the participants in their working

places and were demonstrated about the objective of the study by verbal interaction. There was no incentive or coercion for the participants. Their identity was kept anonymous and secrecy of their responses were guaranteed to them.

The items of the questionnaire were developed by earlier studies based on the guidelines for the safe and appropriate use of PPIs.<sup>14,15</sup> The questionnaire was designed to elicit demographic information (name [optional], age, sex, marital status, experience), personal habits (smoking habit, alcohol habit, chewing betel nut). The questionnaire also consisted of taking PPIs with other concomitant diseases, other drugs (NSAID, aspirin), duration of using PPI, dose of PPI, symptoms for which they were taking PPI and effects of PPI on symptoms. In addition, there were questions whether they started PPI as self-medication or prescribed by physician or pharmacist, choice of acid suppressive drug and some investigations (upper GIT endoscopy and ultrasonography of abdomen).

### Results:

A total of 600 questionnaires were distributed, out of which 581 were considered valid and suitable for analysis (response rate 96.83%).

Basic characteristics of respondents were provided in Table-I. Five hundred twenty individuals (89.5%) were male and 61 individuals (10.5%) were female, since the pharmaceutical promotional worker is still a mainly male domain in Bangladesh. The average age of respondents was  $35.09 \pm 7.83$  years. Four hundred seventy (80.9%) participants were married, 107 (18.4%) were single, 03 (0.52%) were separated and 01 was widower. Among 581 participants 438 (75.4%) were nonsmokers, 119 (20.5%) were smokers and 21 (3.6%) were ex-smokers. Among 581 respondents 566 (97.4%) never took alcohol, taking alcohol 7 (1.2%) and ex-alcohol user 8 (1.4%). Four hundred ninety-nine (85.9%) respondents never chewed betel nuts, 78 (13.4%) chewing betel nuts and 4(0.7%) were ex-betel nuts chewer. Duration of experience of participants were up to 5 years 254 (43.72%), 6-10 years 188 (32.36%) and more than 10 years 139 (23.92%).

**Table-I.** Characteristics of respondents. Data presented are number and percentage responded except for age (N=581).

Features	Number	Percentage
Gender		
Male	520	89.5
Female	61	10.5
Mean age	35.09±7.83	
Marital status		
Married	470	80.9
Single	107	18.4
Separated	03	0.52
Widower	01	0.12
Smoking habit		
Nonsmoker	438	75.4
Smoker	119	20.5
Ex-smoker	24	4.13
Chewing betel nuts		
Never chewing	499	85.9
Chewer	78	13.4
Ex-chewers	04	0.7
Alcohol habit		
Never took	566	97.4
Taking	07	1.2
Ex-user	08	1.4
Duration of experience		
Up to 5 years	254	43.72
6-10 years	188	32.36
>10 years	139	23.92

Table - II shows symptoms for PPI intake. Majority of participants taking PPI for abdominal discomfort (51.5%), followed by vomiting (34%), abdominal pain (24.6%), with NSAID (13%), chest pain (9%), abdominal distention (9%), constipation (7.9%), post prandial abdominal fullness (6.7%), nausea (6.5%), anorexia (6.2%), heart burn (4%), early satiety (4%), with antiplatelet / anticoagulant (3.8%), dysphagia (2.6%). Among 581 respondents upper GIT endoscopy was done on 4 persons and ultrasonography of abdomen was done on 25 persons. Findings of upper GIT endoscopy and ultrasonography were normal.

Table -III shows proton pump inhibitors related information. Out of 581 respondents 566 (95.7%) were taking PPIs and 25 (4.3%) respondents were not taking PPIs. Two hundred sixteen (38.85%) were on PPIs for up to one year, 139 (25%) were on for one to three years, 80 (14.39%) were on for

**Table -II.** Symptoms or conditions for which PPI were used.

Symptoms	Number of participants	Percentage
Abdominal pain	143	24.6
NSAID	75	12.9
Chest pain	53	9.1
Distention of abdomen	52	9
Constipation	46	7.9
Post prandial abdominal fullness	39	6.7
Nausea	38	6.5
Anorexia	36	6.2
Heart burn	23	4
Early satiety	23	4
Other drugs	22	3.8
Dysphagia	15	2.6
History of surgery	9	1.5
Odynophagia	8	1.4

three to five years, 67 (12.05%) were on for five to ten years and 5 (0.9%) were on for more than ten years. One hundred twenty-three (22.12%) participants were taking PPIs regularly and 384 (69.06%) were taking PPIs intermittently or irregularly. Dosing frequency of PPIs were once daily in 327 (58.81%) participants and twice daily in 180 (32.37%) participants. Three hundred eight (55.39%) participants had taken PPI by themselves, 184 (33.09%) had taken PPI prescribed by physicians and 15 (2.70%) had taken PPIs advised by pharmacists. Esomeprazole (40.1%) and rabeprazole (30.1%) were the most frequently used PPIs classes. Associated co-morbid conditions were hypertension (71), diabetes mellitus (65), ischemic heart disease (23), rheumatic disease (54), chronic liver disease (10), renal disease (7), chronic obstructive pulmonary disease (26) and bronchial asthma (19).

Table-IV shows the effects of PPI on symptoms. Two hundred seventy (48.56%) users have satisfactory relief of symptoms, 125 (22.48%) have relief of symptoms but symptoms reappear after stopping of PPI, 77 (13.25%) feels complete cure of symptoms and 35 (6.24%) have no change of symptoms.

**Table -III.** PPI use related information.

Features	Description	Number	Percentage
PPI uses	Not taking	74	12.73
	Taking	507	87.27
Duration of using PPI	Up to 1 year	216	38.85
	1-3 years	139	25
	3-5 years	80	14.39
	5-10 years	67	12.05
	>10 years	05	0.9
Regularity of taking PPI	Regularly	123	22.12
	Intermittently	384	69.06
Dose of PPI	Once daily	327	58.81
	Twice daily	180	32.37
PPI started	Self	308	55.39
	Physician	184	33.09
	Pharmacist	15	2.70
Generics of PPI	Esomeprazole	233	40.1
	Rabeprazole	175	30.1
	Omeprazole	77	13.3
	Pantoprazole	45	7.7
	Dexlansoprazole	7	1.2
	Lansoprazole	2	0.3

**Discussion:**

Predominant respondents in our series are male. Although exact data is not available, in our country most of the pharmaceutical workers in marketing are male. In India females are occupying about 11% posts in pharmaceutical sector.<sup>16</sup> In our series about one fourth of respondent were smoker (both current and ex-smoker) which is almost similar to prevalence of current smoking in our country.<sup>17</sup>

In our series almost 95% respondents were using PPI. But nationwide survey in France<sup>18</sup> and Denmark<sup>19</sup> showed 29.8% and 14-16% of total population were using PPI. Another study in France revealed that the prevalence of PPI use in nursing homes was found 34%.<sup>20</sup> Difference of prevalence of use of PPI may be due to difference in study population, study design and socio-economic and cultural factors. In addition, our respondents were a specific professional group. Common indications of PPI intake in our series are abdominal discomfort, vomiting, abdominal

pain, co-prescription with NSAID and chest pain. But report of hospital-based study from Dhaka found heart burn, pain or discomfort in abdomen and fullness of abdomen are common indications of PPI intake.<sup>21</sup> Difference in study design and study population may be the factor for contradiction.

In our series, about one third respondents had initiated PPI intake prescribed by physicians. Report from Dhaka found that 67% patients were taking PPI prescribed by physicians.<sup>21</sup> Another report from Dhaka found PPI in 87% patients during discharge from a tertiary care hospital.<sup>22</sup> In India PPI prescription is also very common. In Delhi one study found the use of PPI in 62% inpatients and 27% outpatients.<sup>23</sup> Another study from India showed PPI in prescription about 90% patients at one day survey.<sup>24</sup> But all were hospital-based study and reports like ours was not available. Our respondents may take PPI due to their professional knowledge and also easy availability

of the drug. In our series about one third people were taking PPI more than one year and only 12.9% above 5 years. But in France only 4% people and mostly older people use PPI more than 6 months.<sup>18</sup> Again in Denmark<sup>19</sup> and UK<sup>25</sup> 14-16% and 27% people respectively use PPI more than one year. Study design and study population may be the cause of this disparity. In addition, our food habit and food quality may be the cause of abdominal symptoms leading to prolonged PPI use.

In our series negligible number of respondents underwent endoscopic examination. But in France about 13.7% new users were investigated for gastrointestinal complaints.<sup>18</sup> This difference may be due to difference in study population, health system and difference in attitude of study population.

In our series more than half of respondents took PPI once daily. In addition, more than two third of respondents were taking PPI intermittently. But both the published hospital-based reports from our country contradict these.<sup>21,22</sup> Difference in the study population may be the cause. Esomeprazole followed by rabeprazole were commonest PPI used by our respondents but omeprazole and rabeprazole were commonly prescribed PPI in reports from Dhaka.<sup>21,22</sup> In India pantoprazole is the most frequently prescribed PPI.<sup>23,24</sup> This difference could not be explained.

In our series about half of respondents reported satisfactory relief of symptoms with use of PPI which is higher than report from Dhaka.<sup>21</sup> Difference in study population and socio-economic status may be the cause of this result.

PPI is one of the most commonly used drugs in our country. Recent studies revealed that prolong use of PPI was related with renal and cardiovascular diseases, increased risk of GI neoplasm and other diseases with increasing mortality.<sup>26,27</sup> So awareness campaign should be encouraged to avoid overuse and misuse of PPI for both physicians and users.

### Conclusion:

Most of the pharmaceutical promotional workers use PPI and majority of them were taking PPI without advice of physicians. They also use PPI for prolong period. Adequate workup investigations and justification of uses were lacking. So proper

guidance and making awareness regarding use of PPI should be done. Further studies involving all the sectors of people of our country with large sample size may be done to see the actual scenario and make national policy for PPI use.

### References:

1. Raghunath AS, Hungin AP, Mason J, Jackson W. Symptoms in patients on long-term proton pump inhibitors: prevalence and predictors. *Aliment Pharmacol Ther.* 2009; 29(4): 431–439.
2. Dent J, El-Serag HB, Wallander MA, Johansson S. Epidemiology of gastro-oesophageal reflux disease: a systematic review. *Gut.* 2005; 54(5): 710–717.
3. Lundell L, Miettinen P, Myrvold HE, Hatlebakk JG, Wallin L, Engström C, et al. Comparison of outcomes twelve years after antireflux surgery or omeprazole maintenance therapy for reflux esophagitis. *Clin Gastroenterol Hepatol.* 2009; 7(12): 1292–1298.
4. Mahon D, Rhodes M, Decadt B, Hindmarsh A, Lowndes R, Beckingham I, et al. Randomized clinical trial of laparoscopic Nissen fundoplication compared with proton-pump inhibitors for treatment of chronic gastroesophageal reflux. *Br J Surg.* 2005; 92(6): 695–699.
5. Mehta S, Bennett J, Mahon D, Rhodes M. Prospective trial of laparoscopic nissen fundoplication versus proton pump inhibitor therapy for gastroesophageal reflux disease: seven-year follow-up. *J Gastrointest Surg.* 2006; 10(9): 1312–1316.
6. Alqudah MA, Al-Azzam S, Alzoubi K, Alkhatatbeh M, Rawashdeh N. Overuse of proton pump inhibitors for stress ulcer prophylaxis in Jordan. *Int J Clin Pharmacol Ther.* 2016; 54(8): 597–602.
7. Heidelbaugh JJ, Goldberg KL, Inadomi JM. Overutilization of proton pump inhibitors: a review of costeffectiveness and risk [corrected]. *Am J Gastroenterol.* 2009; 104 Suppl 2: S27-32.
8. Brooks M. Top 100 Most Prescribed, Top Selling Drugs. *Medscape Medical News.* 2014.
9. Nasser SC, Nassif JG, Dimassi HI. Clinical and cost impact of intravenous proton pump inhibitor use in non-ICU patients. *World J Gastroenterol.* 2010; 16(8): 982–986.
10. Zhou B, Huang Y, Li H, Sun W, Liu J. Proton-pump inhibitors and risk of fractures: an update meta-analysis. *Osteoporos Int.* 2016; 27(1): 339–347.
11. Lazarus B, Chen Y, Wilson FP, Sang Y, Chang AR, Coresh J, et al. Proton pump inhibitor use and the risk of chronic kidney disease. *JAMA Intern Med.* 2016; 176(2): 238–246.
12. Law EH, Badowski M, Hung YT, Weems K, Sanchez A, Lee TA. Association between proton pump inhibitors and microscopic colitis. *Ann Pharmacother.* 2017; 51(3): 253–263.

13. Cheungpasitporn W, Thongprayoon C, Kittanamongkolchai W, Srivali N, Edmonds PJ, Ungprasert P, et al. Proton pump inhibitors linked to hypomagnesemia: a systematic review and meta-analysis of observational studies. *Ren Fail.* 2015; 37(7): 1237–1241.
14. Naito Y, Kashiwagi K, Takagi T, Andoh A, Inoue R. Intestinal dysbiosis secondary to proton-pump inhibitor use. *Digestion.* 2018; 97(2): 195–204.
15. Llorente C, Jepsen P, Inamine T, Wang L, Bluemel S, Wang HJ, et al. Gastric acid suppression promotes alcoholic liver disease by inducing overgrowth of intestinal Enterococcus. *Nat Commun.* 2017; 8: 837.
16. Masurkar A. How women are bridging the gap in the pharmaceutical industry. *The Times of India.* 2022; March 8.
17. World Health Organization, Global Adult Tobacco Survey: World Health Organization; 2009.
18. Lassalle M, Tri TL, Bardou M, Biour M, Kirchgessner J, Rouby F, et al. Use of proton pump inhibitors in adults in France: a nationwide drug utilization study. *Eur J Clin Pharmacol.* 2020;76(3):449-457.
19. Pottegård A, Broe A, Hallas J, de Muckadell OB, Lassen AT, Lødrup AB. Use of proton-pump inhibitors among adults: a Danish nationwide drug utilization study. *Therap Adv Gastroenterol.* 2016;9(5):671-678.
20. de Souto Barreto P, Lapeyre-Mestre M, Mathieu C, Piau C, Bouget C, Cayla F, et al. Prevalence and associations of the use of proton-pump inhibitors in nursing homes: a cross-sectional study. *J Am Med Dir Assoc.* 2013;14(4):265-9.
21. Hasan MQ, Mondal NT, Parvin R, Perveen I. Uses of Proton Pump Inhibitors and Their Prescribing Pattern among the Patients Attending the Out-Patient Department at a Tertiary Care Hospital in Bangladesh. *J Enam Med Col.* 2020; 10(1): 10–16.
22. Biswas S, Sufian AA, Sarkar PK, Chowdhury MK, Chowdhury JA, Bala CS, et al. Over prescription of proton pump inhibitors on discharge of medical inpatients. *J Medicine.* 2017; 18: 27-29.
23. Verma N, Tayal V, Roy V. Proton Pump Inhibitors: Prescribing Practices, Appropriateness of Use, and Cost Incurred in a Tertiary Care, Public, Teaching Hospital in New Delhi, India. *MAMC J Med Sci.* 2019;5(3):113-120.
24. M ZA, Lavu A, Ansari M, V RA, Vilakkathala R. A Cross-Sectional Study on Single-Day Use of Proton Pump Inhibitors in Tertiary Care Hospitals of South India. *Hosp Pharm.* 2021;56(2):109-115.
25. Othman F, Card TR, Crook CJ. Proton Pump inhibitor prescribing pattern in the UK: a primary care data base study. *Pharmacoepidemiol Drug Saf* 2016;25(9): 1079-1087.
26. Freedberg DE, Kim LS, Yang YX. The Risks and Benefits of Long-term Use of Proton Pump Inhibitors: Expert Review and Best Practice Advice From the American Gastroenterological Association. *J.gastro.* 2017;152(4): 706-715.
27. Xie Y, Bowe B, Yan Y, Xian H, Li T, Al-Aly Z. Estimates of all cause mortality and cause specific mortality associated with proton pump inhibitors among US veterans: cohort study. *BMJ.* 2019; 365: 11580.