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A Comparative Study of Cost Analysis of H_2 Antagonists and Proton Pump Inhibitors in a Tertiary Care Hospital

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ABSTRACT

To compare the cost analysis of H_2 antagonists and proton pump inhibitors (PPIs) prescribed in a tertiary care hospital.A prospective cross sectional study was done for three months. All hospitalized patients prescribed H_2 antagonists and PPIs in the medical and surgical wards of the hospital were included in the study. The total number of patients prescribed H_2 antagonists and PPIs, their subtypes and the indication for their prescription was noted. The cost analysis of these two groups of anti-secretory (ASD) drugs was determined and compared. 112 patients were prescribed H_2 antagonists and PPIs during their hospitalization. PPIs were prescribed more frequently than H_2 antagonists. An indication for prescription was present in only 45% of the patients. The cost analysis showed a vast difference in the cost of treatment between (PPIs) and H_2 antagonists.This study showed inappropriate prescription of PPIs.

Keywords: Proton pump inhibitors, H_2 blockers, pantoprazole, ranitidine, cost analysis.

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INTRODUCTION

Anti-secretory drugs (ASDs) constitute the backbone in the management of upper gastrointestinal bleeding and stress ulcer prophylaxis in intensive care units (ICU). Unfortunately many patients admitted to the medical and surgical wards are routinely placed on these drugs without any indication for their use in either treatment or prophylaxis.[1] It has also been shown in a study recently that stress ulcer prophylaxis is over utilized in the non ICU setting and patients are often over prescribed ASDs, resulting in significant increase in expenditure to the patient.[2] Another hospital-based study revealed that 63% of the patients had no valid indication for PPIs.[3] Thus, the initiation and the continuous use of these drugs without correct indications will result in significant costs to the patients. The significance of rational use of drugs can be emphasized by the apt WHO definition "Rational use of drugs requires that patients receive medications appropriate to their clinical needs, in doses that meet their own individual requirements for an adequate period of time, at the lowest cost to them and their community".[4]

MATERIAL AND METHODS

A prospective cross sectional study was undertaken for three months (November 2010 – January 2011) in a tertiary teaching hospital in Hyderabad. All hospitalized patients on H_2 antagonists and PPIs in the medical and surgical wards of the hospital were included in the study. The demographic data of the patients, diagnosis, investigations and the treatment (prescriptions) given to these patients was recorded.

The following indications were considered to be appropriate for initiation of an ASD therapy.

1. Prophylaxis for prevention of stress ulcers.
2. Acid peptic disease, gastro-oesophageal reflux disease, active gastric or duodenal ulcer disease confirmed by endoscopy.
3. Co-prescription with non-steroidal anti-inflammatory drugs (NSAIDS), low dose aspirin, corticosteroids or warfarin. [5]

RESULTS

Total prescriptions of H_2 antagonists and PPIs: 112

Number of H_2 antagonists and PPIs prescriptions in surgical in-patients	- 64
Number of H_2 antagonists and PPIs prescriptions in medical in-patients	- 48
Number of patients prescribed only PPIs	- 82
Number of patients prescribed only H_2 antagonists	-30
Number of patients having indication for ASD prescription	- 50

The cost analysis showed a vast difference in the cost of treatment between proton pump inhibitors and H_2 blockers. (Tables & Figures 1-8)

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Table 1

Total number of patients prescribed ASDs n= 112	
Surgical in-patients	57%
Medical in-patients	43%

Figure1

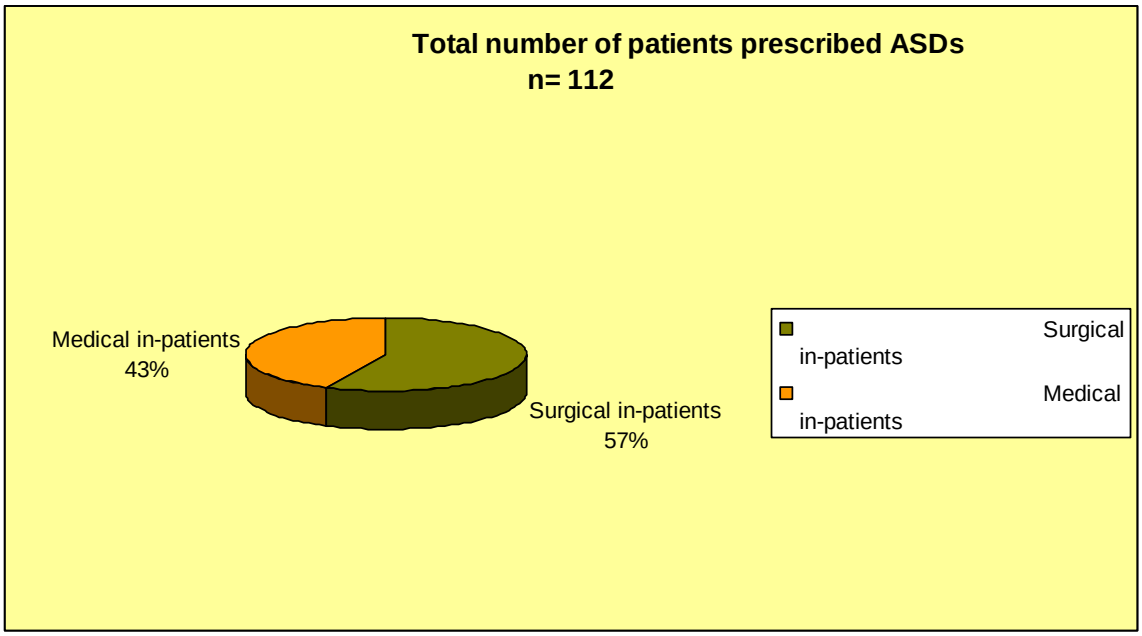

Table 2

Total number of patients prescribed ASDs n= 112	
Proton pump inhibitors	73%
H_2 antagonists	27%

Figure 2

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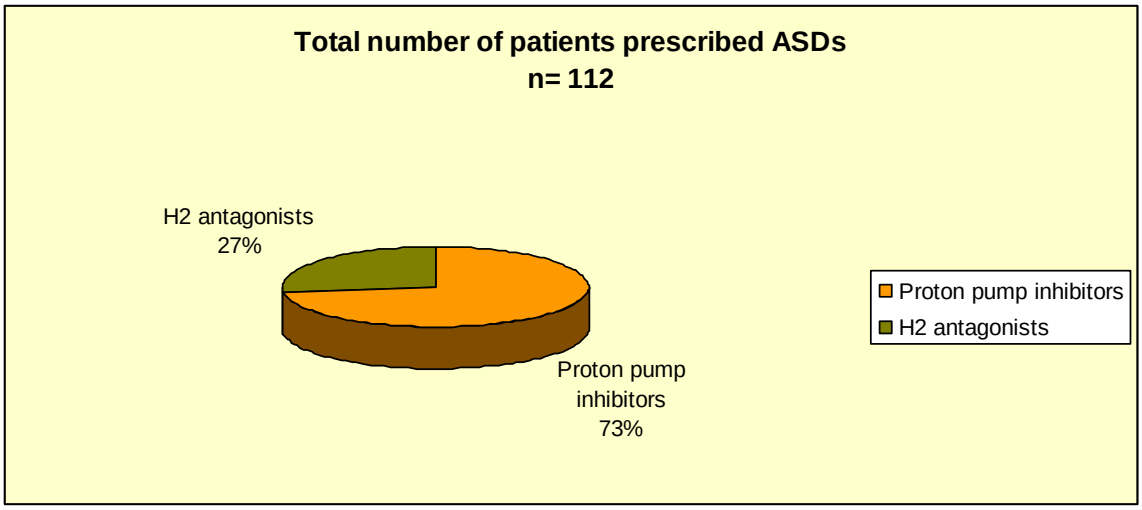

Table 3

Total number of patients on proton pump inhibitors n=82 patients	
Pantoprazole	68%
Esomeprazole	11%
Omeprazole	11%
Rabeprazole	10%

Figure 3

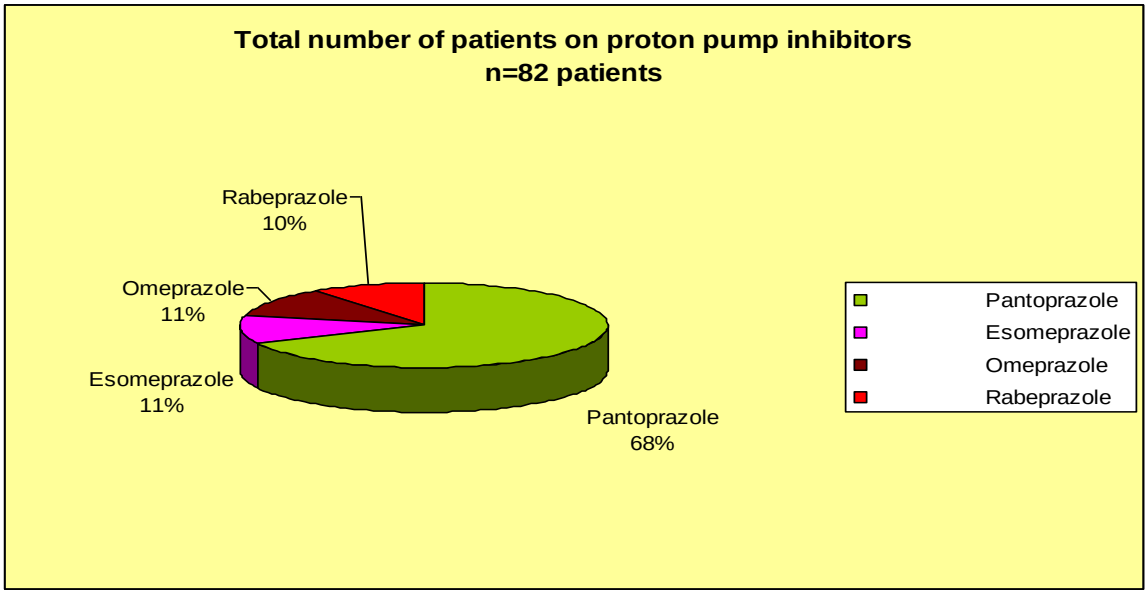

Table 4

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Total number of patients on H_2 antagonists n= 30 patients	
Ranitidine	90%
Famotidine	10%

Figure 4

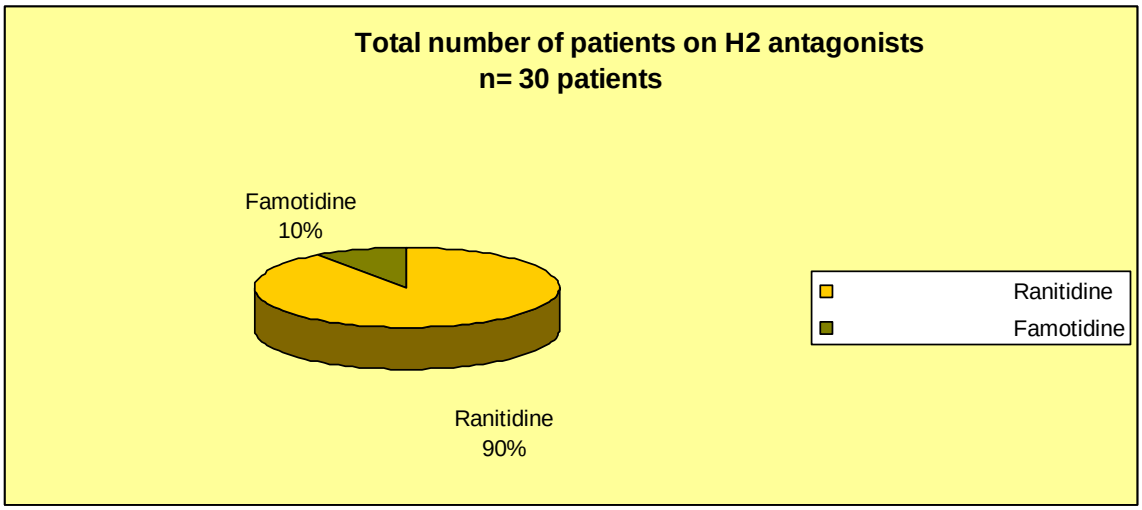

Table 5

Total number of patients prescribed ASDs n= 112	
Indication +	45%
Indication -	55%

Figure 5

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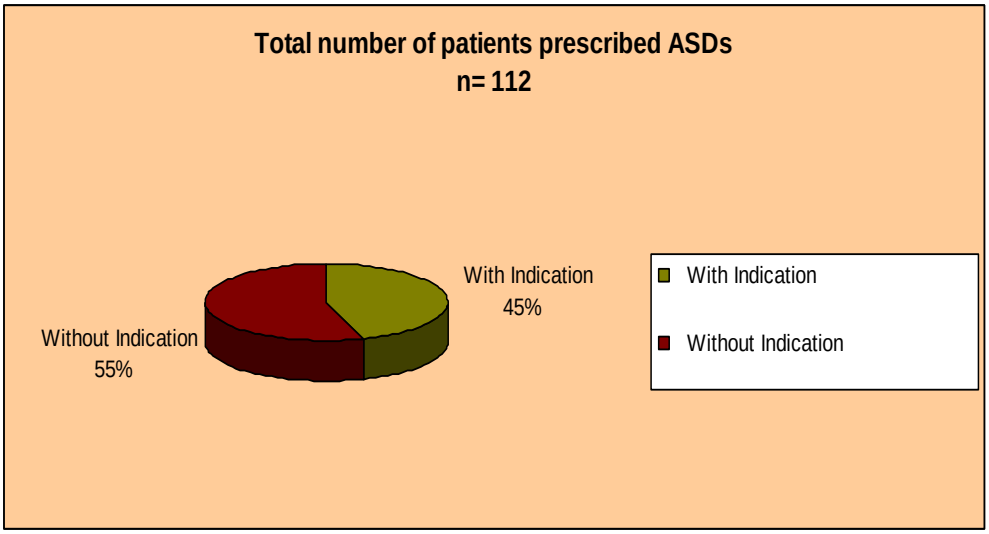

Table 6

Monthly cost analysis of ASDs			
Proton pump inhibitors			
		INR per month	USD per month
Pantoprazole	40 mg	135.6	2.90
Rabeprazole	20 mg	127.8	2.73
Esomeprazole	20 mg	76.8	1.64
Omeprazole	20 mg	113.1	2.42
H_2 antagonists			
Famotidine	40 mg	21.6	0.46
Ranitidine	150 mg	45.72	0.96

Table7

Annual cost analysis of ASDs			
Proton pump inhibitors			
		INR per year	USD per year
Pantoprazole	40 mg	1627.2	34.84
Rabeprazole	20 mg	1533.6	32.83
Esomeprazole	20 mg	921.6	19.73
Omeprazole	20 mg	1357.2	29.06
H_2 antagonists			
Famotidine	40 mg	259.2	5.55
Ranitidine	150 mg	548.64	11.74

Figure 6

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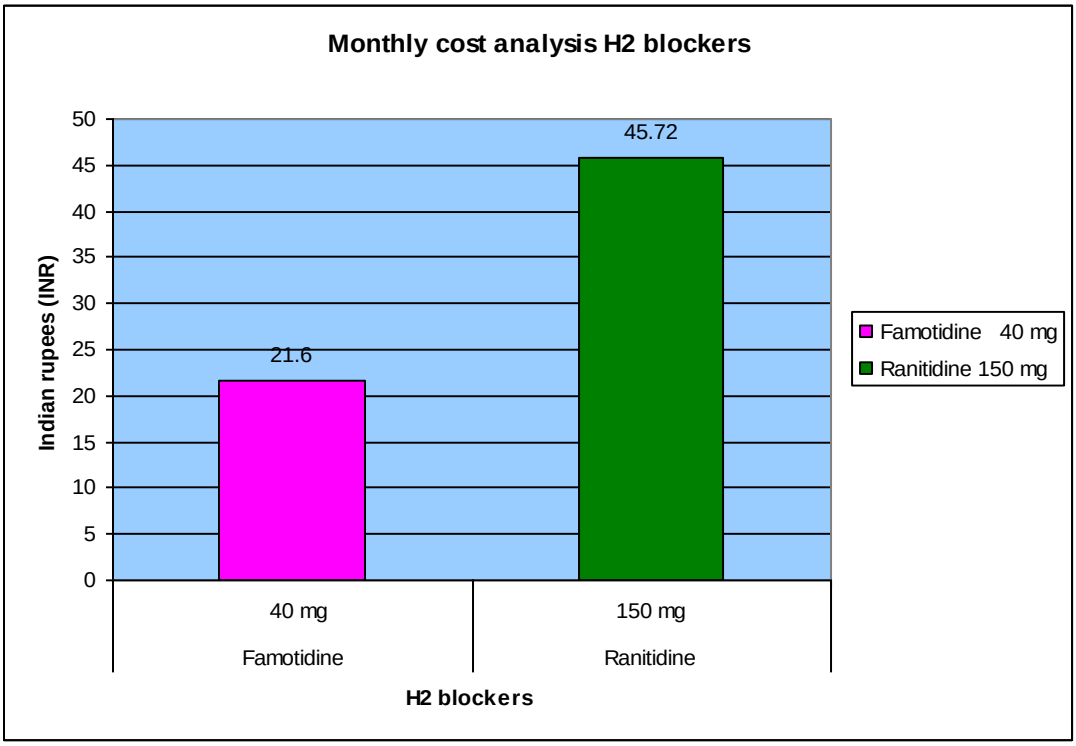

Figure 7

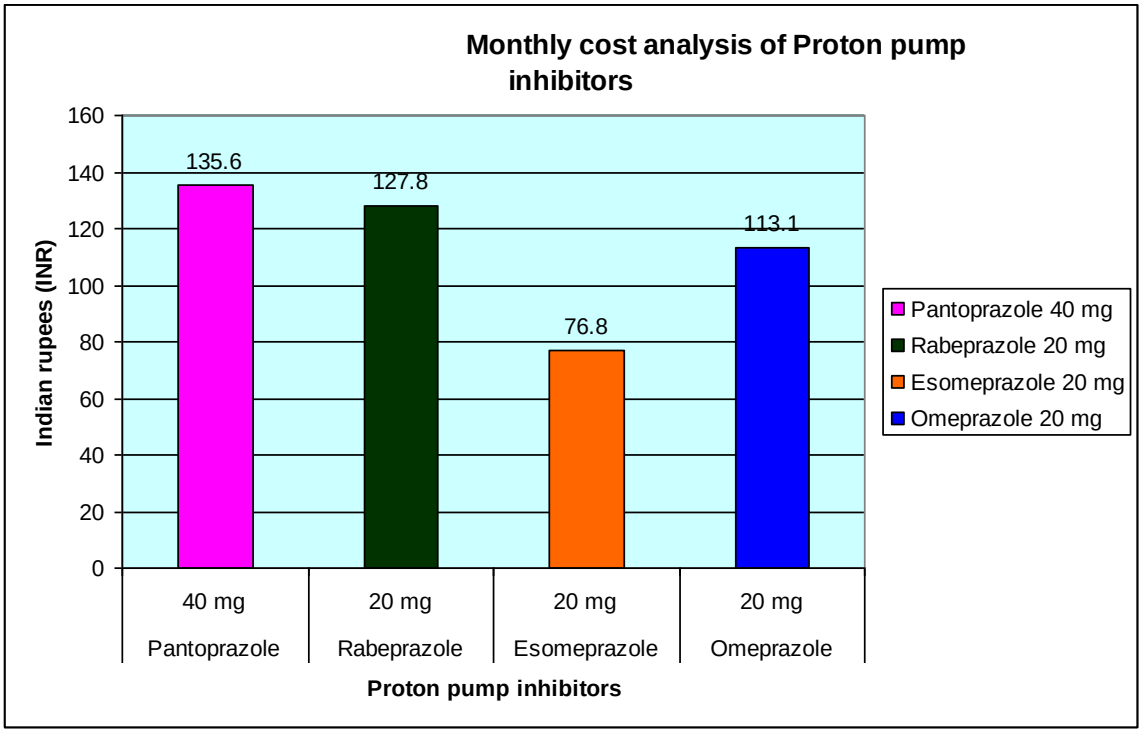

Figure 8

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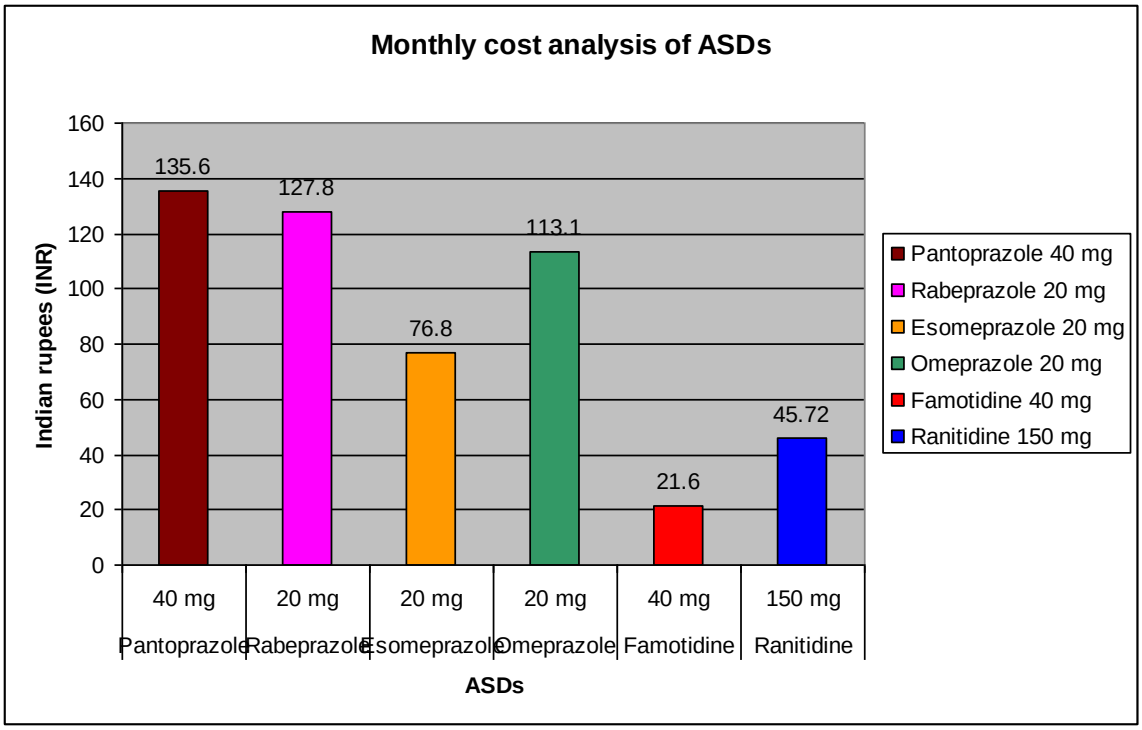

DISCUSSION

The H_2 antagonists are mainly indicated therapeutically to promote healing of gastric and duodenal ulcers, treat uncomplicated gastro-esophageal reflux disease (GERD) and to prevent the occurrence of stress ulcers.[6] H_2 antagonists are effective in mild to moderate cases of hyperacidity and are a cost saving prescription for the patients. If symptoms are not being controlled with an H_2 antagonist then long-term PPIs can be initiated. Proton pump inhibitors are the drug of choice for severe acid reflux symptoms, esophagitis and strictures. They are used mostly to promote healing of gastric and duodenal ulcers and to treat GERD including erosive esophagitis which is either complicated or unresponsive to treatment with H_2 receptor antagonists. They are also the mainstay in the treatment of pathological hypersecretory conditions including Zollinger Ellison syndrome. [6]

Stress related mucosal erosions and sub-epithelial hemorrhages develop within 72 hours in the majority of critically ill patients. The standard treatment of stress ulcers is an H_2 antagonist. As oral administration of drugs in many ICU patients with stress related ulcers is difficult intravenous H_2 antagonists have been used extensively to reduce the incidence of gastrointestinal hemorrhage due to stress ulcers. Intravenous PPIs are also available that are proved to be equally beneficial but without any evidence of superiority over less expensive agents.[7]

The patients enlisted in this study included hospitalized patients of the medical and surgical wards. The patients were either admitted directly into the medical or surgical wards or had been stabilized and shifted from the ICU. These patients were either not acutely ill patients

or had crossed the acute phase of their illness. Hence, when there is no evidence of superiority of PPIs such patients could have been well controlled by a simple prescription of an H_2 antagonist.

It is reported that there is a 10-20% prevalence of gastric ulcers and a 2-5% prevalence of duodenal ulcers in long term NSAID users. But this has to be confirmed by an endoscopy. If diagnostic endoscopy does not show significant NSAID ulceration symptomatic treatment can be given with an H_2 receptor antagonist or with proton pump inhibitor.[6] All the patients in this study were not long term users of NSAIDs.

An indication for prophylactic use of ASDs against NSAID induced gastritis was present only in 45% of patients in this study. H_2 antagonists are the drugs first indicated in the standard treatment of NSAID gastritis and PPIs are not shown to be superior to them in controlling NSAID induced gastritis. Hence, PPIs can be reserved for severe or non-responsive cases to H_2 antagonists.

Cost analysis of H_2 antagonists has revealed cost expenditure to be lower with famotidine compared to ranitidine. In the PPIs the cost expenditure was observed to be higher with pantoprazole and rabeprazole compared to omeprazole and esomeprazole.

When cost analysis of these two groups of PPIs and H_2 antagonists was compared an enormous difference in the cost of treatment was observed between them. The monthly expenditure of even the most economical PPI was twice that of H_2 antagonists. (Table 6) It is therefore remarkable that 73% patients were prescribed PPIs and even more amazing is the fact that the most expensive PPI (pantoprazole) was prescribed to the largest extent of 68% and the least expensive (esomeprazole) to an extent of only 11%. (Table 3) There is a general tendency of physicians to overlook the cost factor when prescribing to patients. They are more liberal rather than rational and overuse of PPIs has been noticed in this study. The health management and maintenance in general and drugs cost in particular, are escalating every where and most of the increased cost of drugs throughout the world is due to the use of new medicines.[8] The replacement of omeprazole an older drug belonging to PPI with a newer PPI, pantaprazole in the prescriptions is also noticeable in this study. The general tendency amongst many consultants is to prescribe the latest, more expensive and heavily promoted agent as their first choice of therapy rather than the older, less expensive but equally effective drugs.[9]

The medical institution and the compulsory internship schedules do not teach medical students and interns respectively to consider cost as a factor when choosing a drug for prescription. There is a need to educate both the prescribing doctors and the patients to make them grasp the cost-benefit concepts.[10] Measures should be taken to make prescribing doctors cost conscious and rational through continued unbiased educational programs as the educational intervention have been shown to be effective in favorable changing of patterns of drug prescriptions.[11]

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CONCLUSION

It is being observed in clinical practice that the doctors are not considering the cost of drugs when treating patients. They should realize the enormous difference in cost of formulations, and prescribe accordingly bearing in mind other indirect costs associated with drug treatment to be borne by the patients.

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