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EVALUATION OF THE USE OF PROTON PUMP INHIBITORS AND H2 RECEPTOR BLOCKERS IN INPATIENT DEPARTMENT OF DISTRICT HEADQUARTERS HOSPITAL, TIRUPPUR

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ABSTRACT

H2 – receptor antagonists like Ranitidine, which is the first-choice H2 – receptor antagonist in most patients. Proton pump inhibitors (PPIs) like Omeprazole produce profound gastric acid suppression and are the most effective treatment for gastro - esophageal reflux disease. PPIs are also effective short-term treatments for gastric and duodenal ulcers. Inappropriate use of antisecretory agents can cause many problems in patients so the appropriateness of antisecretory agents is the main objective of the present study, which should be accordance to standard treatment guidelines. This study is a hospital based prospective and observational study conducted at multispecialty teaching hospital over a period of 10 months. Patients of age 18 years and above who were on antisecretory drugs prescription and willing to give consent were included in the study. Out of 154 patients enrolled in the study, it was observed that Ranitidine in 124 (72.1%) followed by Omeprazole 48 (27.9%). Different combinations are used. Ranitidine injection given to 80 (64.51%) where as Ranitidine tablet is 44 (35.48). Out of 154 patients prescribed with antisecretory medications the average cost of treatment was for Ranitidine injection (Rs.30.975) followed by Omeprazole (Rs.23.903) and Ranitidine tablet (Rs.6.443). Our study highlights the need of rational drug use practices like prescribing by generics, drugs under essential drug list and stop orders for certain PPI drugs. Continuing education about rational

drug use, awareness about the misuse of drugs and development of easy to use treatment guidelines for common diseases in General Medicine Department is recommended.

KEYWORDS: Antisecretory Drugs, PPIs, H2 receptor blockers, Rational Use.

INTRODUCTION

H2 receptor blockers(H2RA) and Proton Pump Inhibitors(PPI) are the most common medications prescribed for the treatment of gastro esophageal reflux disease (GERD) or peptic ulcer disease (PUD).Both medications work by block and decreasing the production of abdominal acid, but PPIs are considered stronger and faster in reducing stomach acids.

Histamine 2 receptor antagonists decrease gastric acid secretion by reversibly binding to histamine H2 receptors located on gastric parietal cells, thereby inhibiting the binding and action of the endogenous ligand histamine. Normally, after a meal, gastrin stimulates the release of histamine, which then binds to histamine H2 receptors and leads to gastric acid release. Histamine 2 receptor antagonists suppress both stimulated and basal gastric acid secretion that is induced by histamine. The onset of gastric H2RAs is approximately 60 minutes with a duration that ranges from 4 to 10 hours, useful for the treatment of occasional symptoms. All Histamine 2 receptor antagonists have similar efficacy in decreasing gastric acid secretion.

PPI act by irreversibly blocking the hydrogen/potassium adenosine triphosphates enzyme system of the gastric parietal cells. The proton pump is the end part in gastric acid secretion, directly involving in secreting H+ ions into the gastric lumen, making it an ideal target for inhibiting acid secretion. Blocking the last part in acid production, its irreversible nature of the inhibition, results in a class of drugs that are significantly more effective than H2 antagonist. The Proton pump inhibitors are given in an inactive form, which is neutrally charged and readily crosses cell membranes into intracellular compartments with acidic environments. In an acid condition, the inactive drug rearranges into its active form. The active form will irreversibly bind to the gastric proton pump, deactivating it.

MATERIALS AND METHODS

Study site: The study is conducted in Government district headquarters hospital, Thirupur district, Tamil Nadu.

Study period: January 2019 - October 2019.

Study type: Observational Prospective study.

Sample size: 154 patients.

Study population: A total of 154 cases were selected randomly, but having acid antisecretory agents significantly in their prescription.

Inclusion Criteria

- Patients above the age of 18 years who were on antisecretory drugs prescription.
- Patients of General wards visited daily.
- Patient consent form.
- History of Drug chart.
- Dosage form, dose, frequency, type of drug and drug pattern are collected.

Exclusion criteria

- Patients under 18 year old.
- Pregnant women.
- Patients in surgery wards.

Patients in critical conditions.

Patients in ICU.

Study procedure

The present study was conducted at Government district headquarters hospital, Tirupppur for the evaluation of the use of proton pump inhibitors and H2 receptor blockers in inpatient department. The study involves mainly 3 steps.

1. Collection of the prescriptions

The prescriptions were collected from the general wards and medical record department of Government district headquarters hospital, Tiruppur, for a period of 10 months that is from January 2019 to October 2019. The study was conducted in prospective manner, The data was collected from the respective departments of the hospital on proforma.

2. Analysing the prescription

The Collected data from the prescription were entered in proforma were analyzed. The drug distribution, dose, frequency, duration and its cost and other important parameters are noted.

3. Statistical analysis

The data were collected according to the proforma and was entered in separate excel sheets in respective of their proformas or the parameters and they were analysed for the outcomes of the individual parameters like gender, age groups, others by making a table first and then followed by a graphical representation of the data.

Prescriptions were collected from the respective departments of the hospital. Collected Data were recorded using a predesigned proforma and entered in to Microsoft Excel worksheets. Appropriate tests were applied for analysis.

RESULTS AND DISCUSSION

1. DISTRIBUTION OF ACID ANTISECRETORY DRUGS

Table 1: Distribution of Antisecretory Drugs.

Antisecretory drugs	Number of Patients	Percentage
Ranitidine	124	72.1%
Omeprazole	48	27.9%

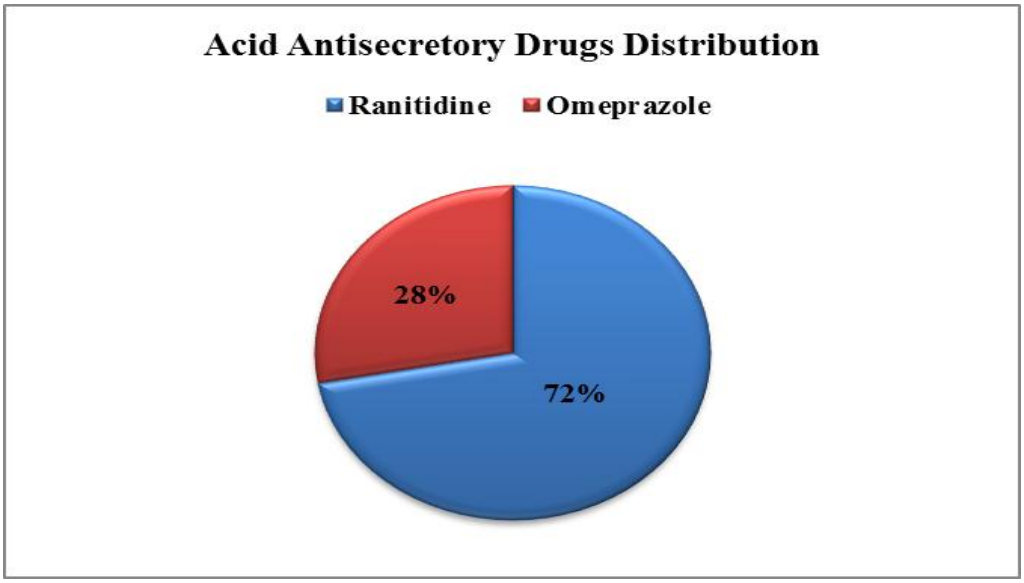

Figure 1: Antisecretory Drugs Distribution.

Ranitidine is the mostly prescribed Acid antisecretory drug, it is used 72% when comparing to Omeprazole which is only used 28% only.

2. DISTRIBUTION IN PRESCRIBED MANNER

Table 2: Distribution of Antisecretory drugs as prescribed manner.

Antisecretory Drugs	Number of Patients	Percentage
Tab.Ranitidine	36	23.4%
Cap.Omeprazole	30	19.5%
Inj.Ranitidine	70	45.4%
Tab.Ranitidine+Cap.Omeprazole	8	5.2%
Inj.Ranitidine+Cap.Omeprazole	10	6.5%

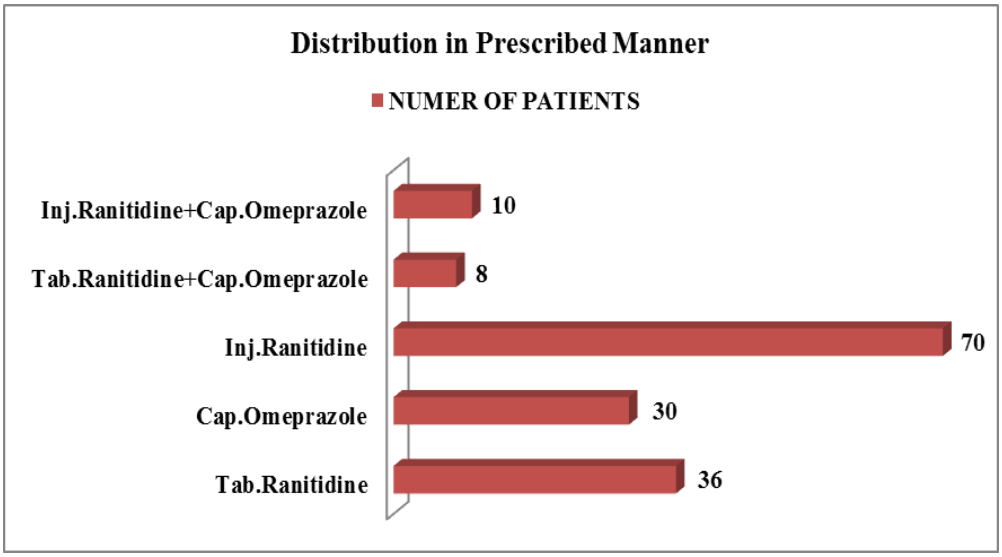

Figure 2: Distribution in Prescribed Manner.

Acid antisecretory drugs were prescribed in 5 manners, which include ranitidine tablet, ranitidine injection and omeprazole capsule given individually and also given in two combinations, i.e., one combinations is tablet ranitidine and omeprazole capsule and the second combination is injection ranitidine with omeprazole capsule.

3. DOSES OF ACID ANTISECRETORY DRUGS

Table 3: Doses of Antisecretory Drugs used in our study.

Antisecretory Drugs	Dose	Number of Patients	Percentage
Inj.Ranitidine	50mg/2ml	70	87.5%
	25mg/1ml	10	12.5%
Tab.Ranitidine	150mg	44	100%
Cap.Omeprazole	20mg	48	100%

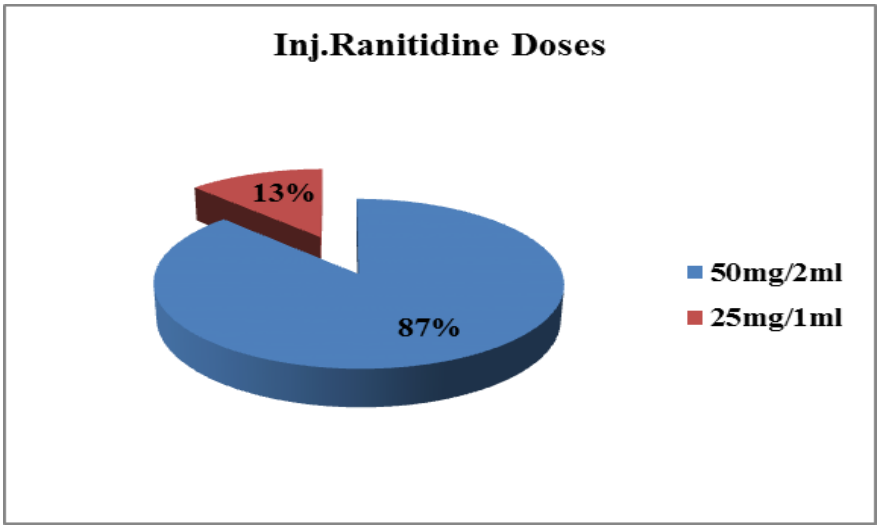

Figure 3: Inj.Ranitidine Doses.

Ranitidine injection has two doses which was 50mg/2ml and 25mg/1ml. In this 50mg/2ml is used in 88% patients and a few patients, say 12% is given 25mg/1ml.Ranitidine tablet had got only one dose that is 150mg. 20mg capsule is the only available dose of omeprazole.

4. DOSAGE FORMS OF ANTISECRETORY DRUGS

Table 4: Dosage forms of Antisecretory drugs used in our study.

Dosage forms of Antisecretory drugs Used	Number of Patients	Percentage
INJECTION	80	46%
TABLET	44	26%
CAPSULE	48	28%

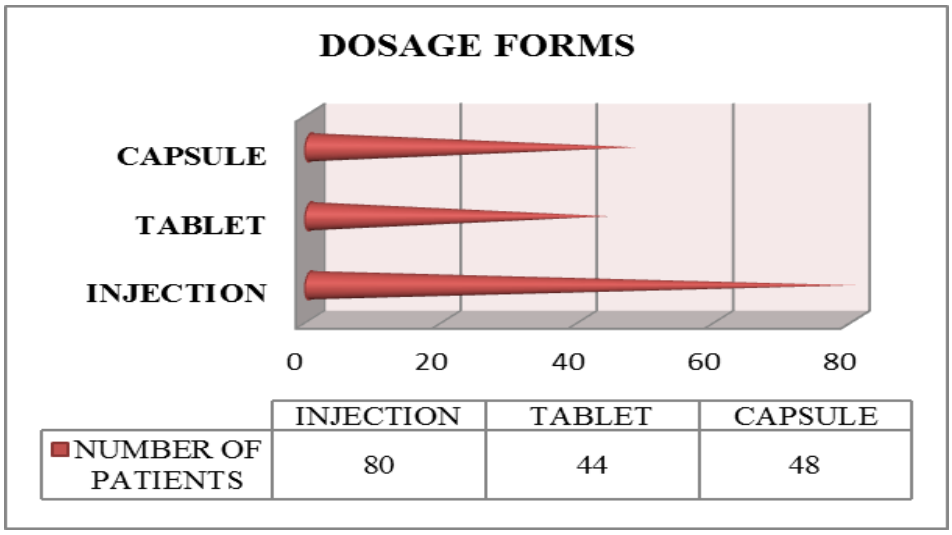

Figure 4: Dosage Forms.

Ranitidine is given in two dosage forms, i.e., Tablet and Injection. Omeprazole is only given in Capsule form. In our study, it is observed that Injection Ranitidine is used mostly which is 46%. Tablet Ranitidine was given 26% whereas Capsule Omeprazole was 28% which have a slight advantage on ranitidine tablet.

5. FREQUENCY OF TREATMENT

Table 5: Frequency of treatment observed in our study.

Frequency of treatment	Number of Patients prescribed	Percentage
Once Daily	37	24.02%
Twice a day	115	74.68%
Three times a day	2	1.30%

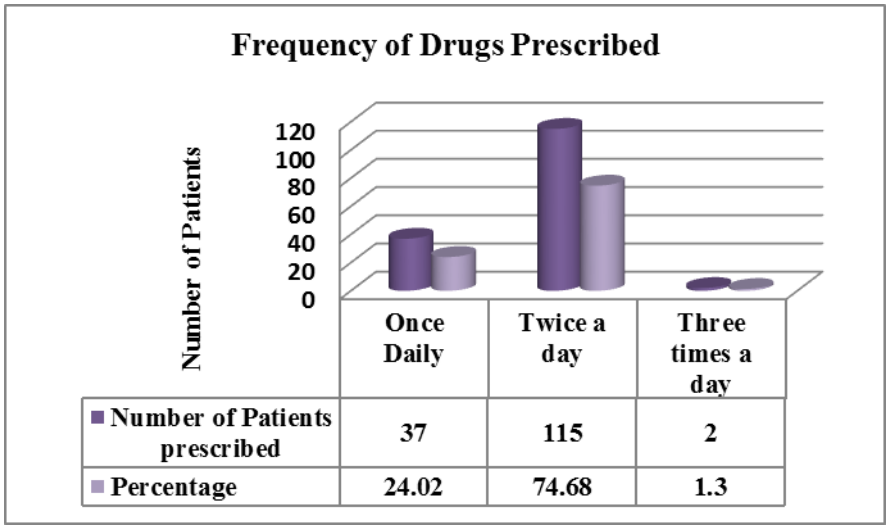

Figure 5: Frequency of Drug Prescribed.

Mostly used frequency of treatment is Twice a day that is 74.68%. Once in day is also generally seen which is up to 24.02%. Thrice a day was rarely used which counts only 1.30%.

6. DURATION OF TREATMENT

Table 6: Duration of Treatment observed in our study.

Duration of Treatment	Number of Patients	Percentage
>14 days	14	9.09%
7-14 days	47	30.52%
3-7 days	86	55.84%
1-3 days	7	4.55%

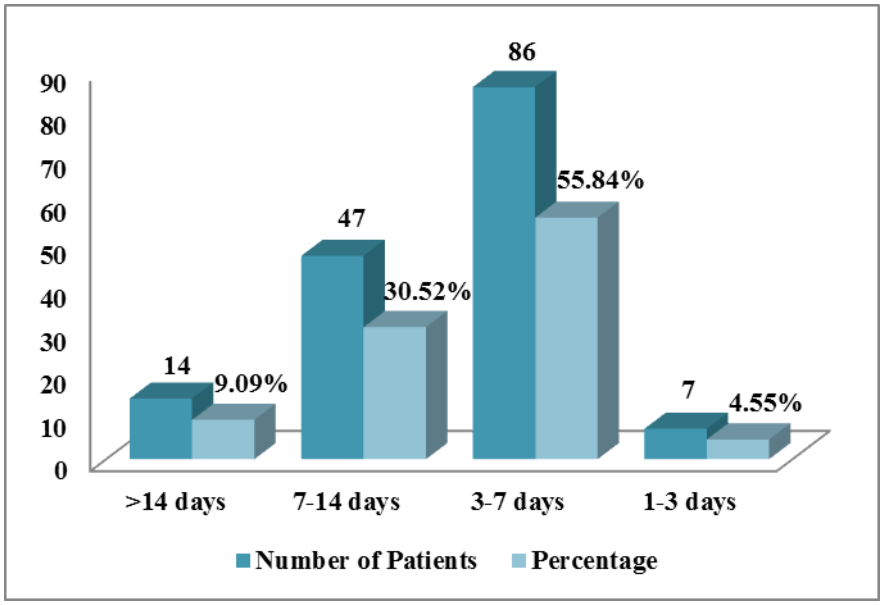

Figure 6: Duration of the Treatment.

Duration of treatment with acid antisececretory agents vary differently. It has been categorized in to mainly 4 groups. Most repeated duration is 3-5 days which is 55.84% while 6-8 days came second with 30.52%. With 9.09%, 9-10 days came third in the list. And 1-2 days is the fourth and very least used duration of time.

7. DISTRIBUTION OF COST

Table 8: Distribution of cost of antisecretory medication.

Antisecretory drugs	Total cost(rupees)	Average cost(rupees)
Inj.Ranitidine	2478	30.975
Tab.Ranitidine	283.5	6.443
Omeprazole	1147.3	23.902

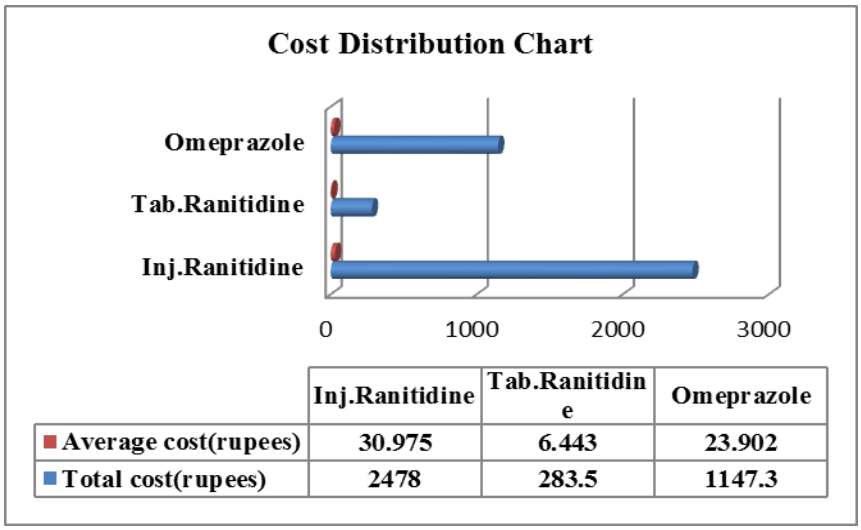

Figure 7: Cost Distribution Chart.

Cost of the Medication was analyzed by taking the average of present market rates of drugs since Govt. Hospitals provide free medication to its patients. Total cost for Ranitidine Injection in our study came to Rs.2478, which suggest that an average cost a patient pay for ranitidine in the course of his treatment is about Rs.31. Similarly, Ranitidine Tablet which seem to be cheaper in the group have a total cost of Rs.284 while average cost is Rs.6.5. Omeprazole costs upto Rs.1147 with an average of Rs.24.

Average Market rate of Ranitidine Tablet : Rs.7 per 10 tablets strip.

Average Market rate of Ranitidine Injection : Rs. 3.5 per 25mg(2ml injection).

Average Market rate of Omeprazole Capsule :Rs. 54 per 20 capsules strip.

8. INDIVIDUAL PATIENT COST DISTRIBUTION

Table 9: Distribution of total cost of antisecretory medications.

Cost of Antisecretory Drugs	Number of Patients	Percentage
Below 50	18	11.68%
50-100	62	40.25%
100-200	55	35.71%
Above 200	19	12.33%

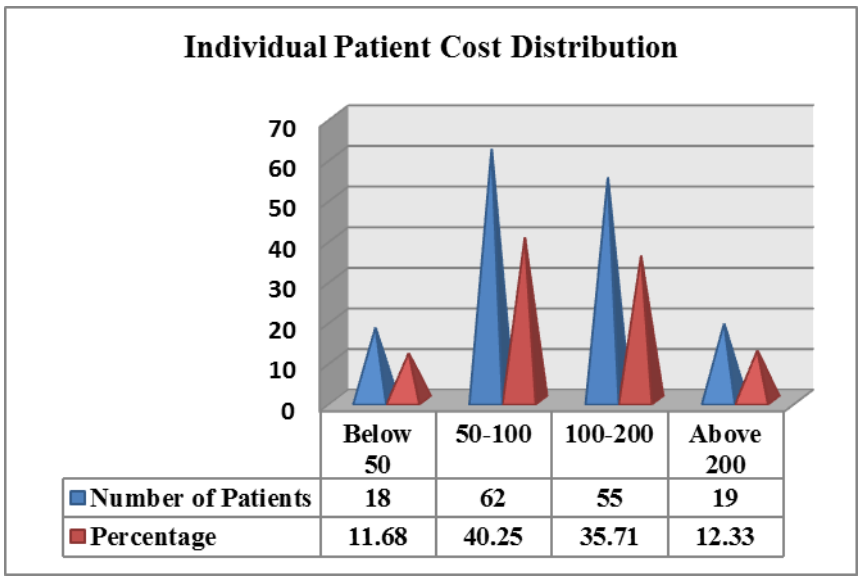

Figure 8: Individual Patient Cost Distribution.

Total cost for an individual patient in his/her course of treatment was taken into account and categorized. 62 patients got a bill between 50-100, which is 40% of all. 55 patients got to pay between 100-200 which is 35%. Below 50 and Above 200 comprise 18 and 19 patients respectively, which is about 12% to both.

9. MOST EFFICIENT RANITIDINE DOSAGE FORM

Table 9: Ranitidine Injection VS Ranitidine Tablet.

Ranitidine Dosage Forms	Number of Patients	Percentage	Duration of Treatment
Ranitidine Injection	80	65%	3-4
Ranitidine tablet	44	35%	6-7

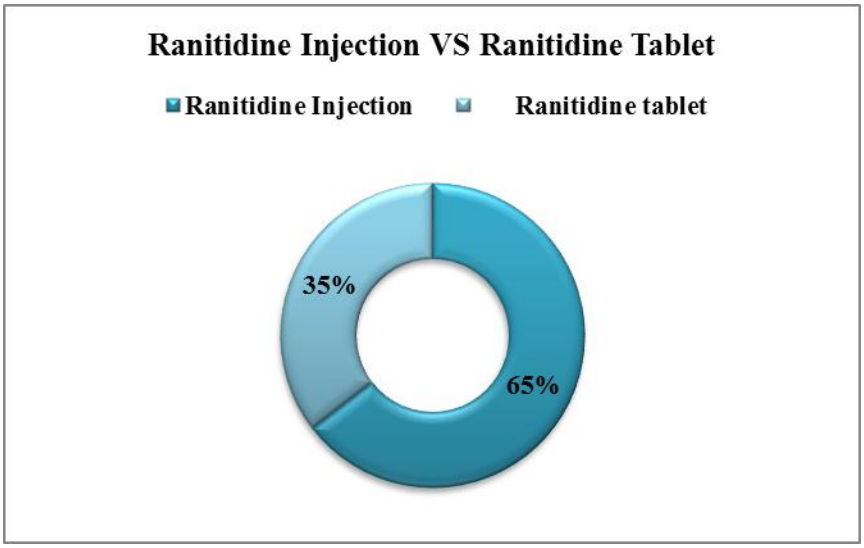

Figure 9: Ranitidine Injection VS Ranitidine Tablet.

Ranitidine injection is more effective to its tablet form because of injection's 100% bioavailability. Injection has given to 65% while tablet is given to 35%.

10. MOST EFFICIENT ACID ANTISECRETORY DRUG

Table 10: Most Effective Antisecretory Drug Used In Our Study.

DURATION OF TREATMENT WHEN GIVEN INDIVIDUALLY	
Omeprazole	4-7 days
Ranitidine	7-10 days

Omeprazole is more effective antisecretory drug than Ranitidine because Omeprazole just require an average of 5 days to cure a problem where Ranitidine takes 7-10 days. Ranitidine only partially block the secretion of stomach acid by blocking the histamine 2 receptors which activates the acid secretory receptors, whereas, Omeprazole completely block the secretion of Hcl acid by blocking proton pump inhibitors.

11. COMBINATION THERAPY

Table 12: Both Drugs When Given In Combination.

Duration of treatment when Ranitidine and Omeprazole given in combination	
Inj.Ranitidine + Cap.Omeprazole	>10 days
Tab.Ranitidine + Cap.Omeprazole	>10 days

Combination therapy cannot be recommended over proton-pump therapy alone because there is no improvement in duration of treatment when combination is given.

CONCLUSION

- Evaluation study of the H_2 receptor blockers and Proton Pump Inhibitors, had attained some very interesting conclusions. Omeprazole is significantly better drug to Ranitidine in this category. Injection dosage form is the best dosage form with better bioavailability and less side effects. Most repeated frequency of treatment is Twice a day.
- Mostly the drugs are prescribed individually which has more effect than combination therapy. Combination therapy does not provide betterment in duration of treatment or better therapeutic effect. Overall average duration of treatment with Omeprazole is 3-4 days whereas ranitidine has 5-6 days.
- By considering the present market value of these drugs, Ranitidine Tablet is the cheapest medication followed by Ranitidine injection. Omeprazole is comparatively costlier. As this was a public hospital, cheap and effective medications are given.
- There is a scope for Pharmacist intervention which helps to provide better health and cure. Rational use of drugs are promoted. Minor attack can be treated with Ranitidine while severe attacks need Omeprazole. Patient knowledge and awareness about the drug enhance the therapeutic outcome.

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