

**Retrospective Study on Co-prescription Patterns of Antacids for  
Outpatients, Woreta Health Center North West Ethiopia**

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**Summary**

Although antacids are popular drugs with a long history of use, their utilization patterns including over-the-counter use have rarely been documented in Ethiopia. The purpose of this study was to estimate the scale of antacid prescribing and to analyze co-prescribing patterns of antacids in Woreta Health Center (WHC). A retrospective survey of prescribing pattern was carried out using prescription records in the health center pharmacies to measure the prescribing indicators by collecting prescription records of Sept 2006-Feb 2007. The study revealed that the average number of drugs per encounter was 2.1, percentage of encounters with antibiotics prescribed 31.6%, while percentage of drugs prescribed by generic names accounted 99.7%. Antacids were present in 1,055 prescriptions (6.5%). Magnesium trisilicate was the most highly prescribed antacid tablet (93%) and Magnesium trisilicate-Aluminum hydroxide combination was the only suspension prescribed. Male to female ratio was 0.65, indicating female predominance. Antipyretics/analgesic drugs, antibiotics and drugs that interact with antacids prescribed highly in antacid prescriptions. Inappropriate use of antacid drugs is a problem in the health center. Good adherence to treatment protocols, guide lines, and formulary during prescribing is required to minimize the irrational drug use.

**Key words:** co-prescription, antacids, outpatients

### **Introduction**

A drug use study in eight southern Ethiopia hospitals indicating that the practice of poly – pharmacy, over use of antibiotics and injection were wide spread (1).

Investigation from general practice in Denmark and UK revealed that antacids were the third most prescribed drugs next to H2 blockers and proton pump inhibitors. Similarly, in Finland studies, antacids were the third most prescribed drugs but next to sucralfate and H2 blockers (2).

A retrospective study on the prescription pattern of hospital doctors, in Singapore, indicates that antacids were the most prescribed drugs next to NSAIDs (Non-steroidal anti-inflammatory drugs). Moreover, the study demonstrated that majority (84%) of prescription of antacids was for a combination of an NSAID and antacid (3). Little is known about prescription pattern of antacids in Ethiopia. Studies reported that antacids are among the most prescribed drugs (1, 4, 5). Antacids are commonly combined with other classes of drugs to minimize their gastric irritation side effects. These all will increase the amount of antacids prescribed. According to literatures antacids interact with more than 30 classes of drugs (6).

To our knowledge, no study has been conducted to assess the pattern of antacid prescriptions. Thus the aim of the present study was to assess the patterns of antacid prescriptions in particular utilization pattern of antacid types and average number of drugs per encounter.

### **Methodology**

#### **Study setting:**

The study was conducted at Woreta health center special and main pharmacies, south Gondar, North west Ethiopia. It is the only governmental health center in Fogera woreda. It cares for greater number of patients in the Woreda. From September 2005 - August 2006, the health center gave service for more than 40,000 patients. The health center has main, special and ART (antiretroviral therapy) pharmacies.

#### **Study design:**

The method was based on retrospective, cross –sectional institution based assessment of prescription in Woreta health center. Criteria used include percentage of antacids prescriptions, percentage of prescriptions with drugs that interact with antacids, percentage of prescriptions with NSAIDs, average number of drugs per antacid prescription, percentage of drugs prescribed by

generic names, percentage of prescription with vitamins and percentage of prescriptions with antibiotics combination.

**Sampling and data collection:**

Data were taken from prescriptions kept in the health center main and special pharmacies, from September 2006 to Feb 2007, six months. All prescriptions in the study period were taken and antacid prescriptions were selected out giving 1055 out of 16,117 total prescriptions. The collected data was directly recorded on the structured format core- prescribing indicators recommended by WHO (world health organization).

**Data analysis:**

The retrieved data were analyzed based on the above criteria specified. After analysis information generated were presented in the form of tables. Descriptive statistics were used to describe age, sex and pattern of drug utilization. Common combinations or mixture products for which no generic name exists were considered as generic. Abbreviations written as category of drugs and not the name of the drug such as cough syrup, normal Saline, nasal drops are also considered as generics.

In counting the number of drugs per encounter, fixed dose combination drugs are counted as one. In counting the varieties of drugs, those drugs that are given as injections once followed by maintenance dose of tablets are counted as one drug. Pharmaceuticals that are to be given simultaneously are also taken as one.

Antibiotics eye ointment and skin creams such as Oxytetracycline or Chloramphenicol are all classified under antibiotics. Co-trimoxazole, although it is not technically an antibiotic, is also included in antibiotics. Pharmaceuticals used in the treatment of malaria, amebiasis, fungal diseases and giardiasis are not included as antibiotics.

**Limitations of the research:**

The research was solely based on prescription papers only. As little research reports are available on antacid prescription patterns, it makes evaluation or comparison of the results very difficult.

**Operational Definitions:**

The core prescribing indicators and other criteria were defined in the following manner to avoid ambiguity during data collection, review and analysis.

- Average number of drugs per encounter: Dividing the total number of different drug products prescribed by the number of encounters surveyed. It is used to measure the degree of poly pharmacy.
- Percentage of encounters with antibiotics prescribed: Dividing the number of patients' encounters during which antibiotic was prescribed by the total number of antacid prescriptions, multiplied by 100.
- Percentage of encounters with vitamins prescribed: Dividing the number of patient encounters during which vitamin prescribed by the total number of antacid prescriptions, multiplied by 100.
- Percentage of encounters with NSAIDs: Dividing the number of patients encounters during which NSAIDs were prescribed by the total number of antacid prescriptions, multiplied by 100.
- Percentage of drugs prescribed by generic name: Dividing the number of drugs prescribed by generic name by the total number of drugs prescribed, multiplied by 100.
- Percentage of prescriptions with drugs that interact with antacid: Dividing the number of patients' encounters during which drugs that interact with antacids prescribed by the total number of antacid prescriptions, multiplied by 100.
- Poly-pharmacy: a trend of prescribing three or more drugs on a prescription paper.
- Antacid prescriptions: a prescription on which antacid drugs are prescribed.

**Results**

The main patient characteristics taking antacid prescriptions are shown in Table 1. The mean age is 32.8 ranging from 8-80 years. Antacid suspensions are highly prescribed for 31-44 years age group (48.2%), then 15-30 (44.4%) and 45-64 (7.4%) age group comes. Antacid tablets are prescribed for 15-30 (49.2%), 31-44(24.1%), 45-64(22%), greater than 64(3.8%) and 5-14 (0.5%) age groups in decreasing order. More than 92% antacid suspensions and 73% antacid tablet prescriptions were taken by 15-44 age groups. Below 15 and above 64 age groups accounts only

4.3% of the total antacid prescriptions. Male to female ratio was 0.65; indicating female predominance.

Table 1 Antacids dosage forms prevalence study by age group and sex of patients, WHC, Sept 2006-Feb 2007; N=1055

<i>Characteristics</i>		<i>Dosage forms</i>	
		<i>Suspension N (%)</i>	<i>Tablet N (%)</i>
<i>Age (yrs)</i>	5-14	--	5(0.5)
	15-30	12(44.4)	510(49.6)
	31-44	13(48.2)	248(24.1)
	45-64	2(7.4)	226(22.0)
	>64	--	39(3.8)
<i>Sex</i>	Male	13(48.2)	391(39.1)
	Female	14(51.8)	609(60.9)

The types and number of antacid drugs prescribed are listed with duration of treatment in table 2. As it is shown magnesium-trisilicate is the most prescribed antacid tablet (93%, N=1028) followed by magnesium trisilicate & Aluminum hydroxide combination tablet (6.7%) and Aluminum hydroxide (0.3%). Antacid tablets prescriptions comprises 97.4% While the remaining 2.6 % is of antacid suspensions. About 68.2% of antacid were given for 7days treatment period where as 18.2 % and 13.6% for 5 and 10 days, respectively.

Table 2: Types and number of antacid drugs prescribed, WHC, Sep 20006-Feb 2007.

<b>Antacid</b>		<b>Duration of treatment (days)</b>	<b>Number (%)</b>
Tablets (N=1028)	▪ Magnesium trisilicate- Aluminum hydroxide(comb)	5, 7 or 10	69(6.7)
	▪ Magnesium trisilicate	5, 7 or 10	956(93)
	▪ Aluminum hydroxide	5, 7 or 10	3(0.3)
Suspension	▪ Magnesium trisilicate- Aluminum hydroxide (comb)	—	27 (2.6)

In this study a total of 2451 drugs were prescribed on 1055 prescriptions and it was found out that the average number of drugs per encounter was 2.1 where 28.6 % of the antacid prescriptions contained one drug (antacid) and 35.6% of the prescriptions contained two drugs. Prescriptions containing three, four or five drugs were 33.1 %, 2.5 % and 0.2 % of the total antacid prescriptions, respectively. The study revealed that multiple prescribing was encountered in 35.8 % of the prescriptions, calling for at least three drugs per prescription (Table 3).

Table 3: Number of drugs per prescription containing antacid, WHC, Sept 2006- Feb 2007

<i>Number of drugs per prescription</i>	<i>Number (%)</i>
<i>One</i>	302 (28.6)
<i>Two</i>	376 (35.6)
<i>Three</i>	349 (33.1)
<i>Four</i>	26 (2.5)
<i>Five</i>	2 (0.2)

The most frequently prescribed individual drugs are shown in Table 4. The top five most frequently prescribed drugs were paracetamol (38.6 %), chloroquine (15.3%), Mebendazole, (15.3%), Amoxicillin (15.2%) and co-trimoxazole (10.4%).

The percentage of antacid prescriptions with antipyretic / analgesics (other than Acetyl Salicylic Acid) was 36.1 % while antibiotics (other than Tetracycline, Ciprofloxacin and Norfloxacin), Drugs interacting with antacids, Anthelmintics, Vitamins and antispasmodics accounted 23.1 %, 19.8 %, 12.5 % and 4.6 %, respectively (Table 5).

The prevalence of prescribed drugs that interact with antacids is shown in Table 6. Chloroquine is the top most prescribed drug (58.1%) in this class while ORS (Oral Rehydration Salt, FEFOL (Ferrous salt and folic acid), ASA (Acetyl Salicylic Acid), Ciprofloxacin, Tetracycline and Norfloxacin accounted 14.8 % , 8.7%, 7.9%, 5.8%, 4% and 0.7%, respectively.

Table 4: Top 16 prescribed drugs, WHC, Sept 2006 – Jan 2007.

Individual drugs	Number (%)
Paracetamol	407 (38.6)
Chloroquine	161 (15.3)
Mebendazole	161 (15.3)
Amoxicillin	160 (15.2)
Co-trimoxazole	110 (10.4)
NSAIDs	97 (9.2)
Oral Rehydration Salt	41 (3.9)
Vitamin B Complex	34 (3.2)
Hyoscine	31 (2.9)
Multivitamin	27 (2.6)
Acetyl Salicylic Acid	24 (2.4)
Ciprofloxacin	22 (2.1)
Procaine and Benzathine penicillin	16 (1.5)
Metronidazole	16 (1.5)
Tetracycline	11 (1)
Others	62 (5.9)

Table 5: Highly prescribed therapeutic group of drug products, WHC, Sept 2006 –Feb 2007.

DRUG CLASSES	NUMBER (%)
Antipyretic /Analgesics * <sup>1</sup>	504 (36.1)
Antibiotics * <sup>2</sup>	323 (23.1)
Drugs interacting with Antacids	277 (19.8)
Antispasmodics	31 (2.2)
Other therapeutic Group of drugs	22.(1.6)

\*1= Antipyretics/ Analgesics other than ASA

\*2= Antibiotics other than Ciprofloxacin, Tetracycline and Norfloxacin

Table 6: Prevalence of prescribed drugs that interact with antacids, WHC, Sept 2006-Feb 2007

Drugs interacting with antacids	Number (%)
Chloroquine	161(58.1)
Oral Rehydration Salt	41(14.8)
FEFOL	24(8.7)
Acetyl Salicylic Acid	22(7.9)
Ciprofloxacin	16(5.8)
Tetracycline	11(4)
Norfloxacin	2(0.7)

NB FEFOL- Ferrous salt and folic acid

### Discussion

The most commonly used indicators in assessing rational drug use and prescribing practices of drugs are: average number of drugs per encounter, percentage of prescriptions of antibiotics and generic prescribing (5). It is the opinion of the International Net work for the Rational Use of Drugs Research Team members that the prescribing indicator values for the numbers of drugs per encounter should fall within a range of 1.4-1.8, prescribing by generics, 90%-100% and antibiotics range from 20-25% (7).

Approximately 7% of the patients used antacids during the study period which is comparable with the results reported in Gondar hospital (6.1%), Bahirdar hospital (7.3%); but lower than Debretabort hospital (10.7%) (4).

Antacid suspensions are preferable to children and the elderly as tablets need to be chewed. However, in this study no antacid suspension prescriptions were given to children (<14 year old) and elderly (>64 year old) age groups. This poor prescription practice should be improved. Prescribing habit of suspension formulation rather than tablets should be encouraged for the aforementioned age group patients.



It is recommended not to take antacids more than two weeks. In this study, duration of treatments with antacids was found to be 5 (18.2 %), 7(68.2%) and 10 (13.6%) days. Therefore, prescription practice in this regard should be encouraged.

Magnesium trisilicate -aluminum hydroxide combination antacid tablet is the preferred antacid because the GI side effects of individual drugs (diarrhea from magnesium trisilicate and constipation from aluminum hydroxide) decrease when they are co-formulated. In contrary to this fact, magnesium trisilicate is the most highly prescribed antacid tablet (93%) during the study period in the health center. Antacid combination tablet accounts only 6.7%.

In settings where pharmaceutical resources are scarce, it is a common practice to impose limits on the number of especially non-antibiotic drugs (8). Despite this norm, the health center average number of 2.1 drugs per encounter was found to be very high and; there fore, indicated miss use of available resources by loading the patients with unnecessary drugs and exposing patients to extra spending. This result is also in agreement with other reports done in our country (7, 9, 10).

The use of generic prescribing varied from 37% to 94% in the studies conducted in a number of developing countries during the period of 1990 -1993, but improved with the implementation of remedial intervention strategies. This tends to depend on government regulations and enforcement efforts in those countries (8). In this study the percentage of drugs prescribed as generics was higher than reports from Jimma, Debretabora and Bahirdar hospitals 87.1%, 3.3% and 3.2 % respectively, which reflects good habit in prescription writing that need be encouraged (5, 7).

The analysis of prescription revealed that antipyretics /analgesics were the most widely prescribed drugs followed by antibiotics and drugs interacting with antacids (Table 5). The therapeutic value of a rational use of antipyretics / analgesics may not be questionable. However, excessive exposure to analgesics poses potential adverse effects and also consumes considerable amount of drug budget. Among the anti pyretic / analgesics, the frequent prescribing of Paracetamol, 407 (38.6%) , was a practice to be encouraged due to the fact that it is cheap and a relatively safer antipyretic / analgesics at therapeutic dose. The high prescribing rate of Mebendazole, 161(15.3%), as anthelmentic agent was encouraging practice because it is cheap broad spectrum anthelmentic

agent which is useful for mixed worm infestations (Table 4). The percentage of prescriptions with vitamins was 6%(table 5) which is very low as compared to reports from Sidamo (23.35 %) and Tigray (19.10%) (11).

In this study 9.2 % of prescriptions of antacids were in combination with NSAID. This practice is probably not confined to WHC but appears to be wide spread among other health centers and hospitals (personal observation). The historical reason for the combination of NSAID-antacid prescriptions has not been uncovered. Antacids have never ever been proven to reduce the incidence of NSAID- induced peptic ulcer: in fact, antacids may reduce the absorption of the NSAIDs and its efficacy when given together. This potential interaction may lead to therapeutic failure and a larger dose of the NSAIDs have to be prescribed to achieve analgesia or the desired anti-inflammatory effect. This has been shown to increase the risk for NSAIDs gastropathy and gastrointestinal hemorrhage (6, 12). A recent study by Tho *et al* (unpublished) showed that patients on NSAIDS alone did not have more dyspeptic symptoms than those on the NSAID-antacid combination (6). There fore, if 9.2% of the antacid tablets were omitted from the prescriptions, there would also be a potential cost saving for the health center .

The percentage of drugs interacting with antacids in the prescription accounts 26.3 % which is very high. Among these chloroquine – antacid combination is the most prescribed (58%) followed by ORS (14.8 %), FEFOL (8.7%), ASA (7.9%), Ciprofloxacin (5.9%), Tetracycline (4%) and Norfloxacin (0.7%) in decreasing order. As antacids decrease therapeutic effect of these drugs when given simultaneously, dispensers in the health center should take this issue seriously.

In Conclusions, the present study revealed that higher percentage of drugs interacting with antacids is prescribed with antacids. Therefore, there is a greater probability of drug -drug interaction risks unless dispensing is practiced with great care. Hence the pharmacy personnel should counsel the patients to take those drugs interacting with antacid at least before or after 2 hours of antacid administration.

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