Drug Prescribing and Despensing Practice in Public Hospitals in Tigry Regional State, Ethiopia

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Keywords: rational drug use, prescribing, dispensing, ethiopia.

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DRUGPRESCRIBINGANDDESPENSINGPRACTICEINPUBLICHOSPITALSINTIGRYREGIONALSTATEETHIOPIA

Strictly as per the compliance and regulations of:

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Methods: A total of 768 prescriptions were reviewed retrospectively from outpatient departments of public hospitals from August 04 -21 2011. The selected hospitals include, one Referral, two zonal and two district hospitals and 384 patients/care takers were interviewed after they collect their drugs.

Results: A total of 768 prescriptions were analyzed, average number of drugs per encounter were 1.77 which is in line with World health Organizations recommendation. Three hundred forty eight 45.3% prescriptions had antibiotics. Majority 72.4%, of the drugs were prescribed by generic name and 16% prescriptions had injections per encounter. Most of the drugs were prescribed from essential drug list 98.0%. However, only 11.7 were adequately labeled. Similarly, patient interview revealed that, only36.0% of patients has adequate knowledge regarding the prescribed drugs. More than half 56.9 % of patients don't know for what disease the drug is prescribed. Most 83.9% of patients know how frequent they should take the drug but only 46.2% of the patients know the dose of the drug they supposed to take.

Conclusion: The prescription pattern in terms of the number of drugs prescribed per prescription is good. Prescribing drugs by generic name, antibiotic and injection prescriptions, filling of prescriptions with the necessary information, and drug leveling were not in compliance with WHO recommendation. Prescribers and dispensers should follow the WHO guidelines.

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I. Background

Drugs have become one of the most essential components of the health Care systems worldwide, drugs saves lives. This indisputate fact makes rational selection, procurement, distribution and rational uses of drugs of paramount importance in health care. (1)

Drugs are an essential component of health care delivery. When used rationally, they produce the desired effect of improving patient's illness. Their irrational use on the other hand leads to prolongation of the illness, development of adverse effects, and unnecessary expense. Irrational drug use pertains to the use of drugs when they are not needed. It also means prescribing drugs without adequate study regarding their efficacy, safety, affordability, and suitability to the patient. Many countries are doing their best to limit the problem of irrational drug use by developing national programs that promote appropriate prescribing behavior. (2)

The concept of rational drug use during the past few years has been the Theme of various national and international gatherings; in simple words rational drug use means prescribing the right drugs in adequate dose for the sufficient duration and appropriate to the clinical needs of the patient at the lowest cost. The definition implies that rational use of drugs, especially rational prescribing should meet certain criteria as follows: Appropriate indication. The decision to prescribe drug(s) is entirely based on medical rationale and that drug therapy is an effective and safe treatment. Appropriate drug*:* The selection of drugs is based on efficacy, safety, suitability and cost considerations. Appropriate patient: No contra-indications exist and the likelihood of adverse reactions is minimal, and the drug is acceptable to the patient. Appropriate information. Patients should be provided with relevant, accurate, important and clear information regarding his or her condition and the medication(s) that are prescribed.(3)

The world health organization /International Network for Rational Use of Drugs (WHO/INRUD) has set standards that should apply to prescribing, under-prescribing can result in sub therapeutic effects. Secondary infections, a false sense of wellness and delayed treatment. Over-prescribing on the other hand, can lead to unwanted drug interactions, adverse effects and ultimately patient noncompliance. As a result, treatment failure usually leads to the prescribing of newer treatment regimens that are usually more costly and less tolerable, thus reducing the chances of treatment success. (5)

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Rational use of drugs took the stage after whose 1985 Nairobi conference experts used its central theme. The conference emphasized the need for the public understand and use of drugs better, particularly in view of all that was known about non adherence to treatment. In many cases, neither the prescriber nor the patient was to blame for irrational use, it is often resulted from lack of proper information and training, compounded in some cases by fear, carelessness, or miss leading persuasion from the seller or others.(6)

II. Statement of the Problem

Irrational drug use has been occurred for as long as drugs have been available. In treating patients with modern medicine there exist several choices of therapy rather than just one that all providers must follow. This increase the irrational drug treatment encounters and, ultimately, poor patient outcomes. (3) In effective and irrational use of drugs is a wide spread problem at all levels of health care. Per capital wastage from inefficiencies and irrational use tends to be greatest in hospitals. Despite this, medicines are often managed and used inefficiently and irrationally. (7)

The overall use of drugs at hospital in many countries at least from the point of view of consumption is relatively small compared to the national drug budgets. But this is not the case in Ethiopia were hospitals consume about 50% of the total drugs budgets. The spectrum of the therapeutic classes of drugs employed in hospitals is also wider than in other types of health facilities. More over physicians may also have an influence on drug prescription. (8)

The actual use of drugs is influenced by a wide range of factors, including drug availability, providers experience, economic influences, cultural factors, community belief systems and the complex interactions among these factors. Drug use pattern reflect human behavior and must be viewed from a social science perspective rather than a biomedical perspectives. (9)

The rational use of drugs demands prescription of appropriate drugs; availability of drugs at the right time, at a price people can afford, that it be dispensed correctly and that it be taken in the right dose at the right intervals and for the right length of time. Irrational drug use is a common practice in developing countries. In India, a baseline hospital survey showed that poly-pharmacy was common, in both inpatient and outpatient departments. The use of antibiotics and injections was higher in inpatients compared to outpatients (11).

In countries like Uganda, the Sudan and Zimbabwe such national programs were shown to positively influence the drug use pattern. In Ethiopia, several efforts have been made to promote the rational use of drugs. Among these, the publication of Essential and National Drug List for Ethiopia, and the recent introduction of the Standard Treatment Guidelines (STG) are the most notable. (12)

In the above cited studies in addition to this encouraging trend of generic prescribing, low averages number of drugs and low cost per prescription were among the positive trends noted. Although the commendable efforts of the Drug Administration and Control Authority and relevant professional schools and associations have produced some good results, there are indications that the rational use of drugs in Ethiopia is far from satisfactory. Results from the following studies illustrate some of the common problems of irrational drug use in Ethiopia. A baseline survey conducted in 8 hospitals in southern Ethiopia looked in to the prescription pattern and factors that influence prescribing behavior. This study indicated that the practice of poly-pharmacy, overuse of antibiotics and injections were widespread. The survey revealed that acquired habits, patient's demand, lack of drug information, and peer norms were the major underlying factors for irrational prescribing. The study clearly demonstrated the patterns of drug utilization in rural hospitals. However, the picture could be different in referral and teaching hospital, because the composition and qualification of technical staff and the financial capacity are not comparable. (12) The aim of this study will be to investigate rational prescribing and dispensing indicators in public hospitals in Tigray Regional state, Ethiopia. (12)

Irrational Drug Use can destroy all the benefits of careful, cost effective selection, procurement and distribution of drugs. Resources spent on procurement are lost if the correct drugs are not prescribed and dispensed to the correct patient. (14)

Some of the most common irrational drug use in Ethiopia's health institutions includes, prescribing drugs when the health problem is self-limiting and the patient would get better without taking any drugs, prescribing several drugs or poly pharmacy would provide the same effects. Providers may use three, four and five and sometimes more drugs to treat the most trial conditions for the sake of satisfying patients need to receive drugs, medical practitioners and other health professionals giving less time to patients and not explaining some basic information about use of drugs, (15)

In some studies conducted in North West Ethiopia, the overuse of antibiotics and injections in primary health care facilities, misuse of antibiotics in inpatients, low adherence of prescribers to the basic principles of prescription writing and over consumption of anti-infective, have been reported. But, less is known regarding the overall rational drug use in Ethiopian hospitals, particularly at outpatient health care levels. Some studies have attempted to evaluated the general drug prescribing profiles among out patients, in dispensaries, for specific classes of drugs, and in pediatric in patients. Most of these studies are neither patients nor diagnosis linked. Drug prescribing for

outpatients is done by various types of health professionals, and outpatient clinics deliver therapeutic service to a large segment of the patients. It follows that assessment of prescribing pattern in these important medical care facilities is of obvious relevance to identify problems regarding rational use and to propose interventions. Adherence of patients to a treatment program is necessary for the success of the program. Non-adherence or noncompliance results from factors related to the drug, the patient, the prescriber and the environment. One important prescriber factor leading to non-compliance is not giving the patient adequate information regarding his illness or the importance, effect, and adverse effects of the treatment. Result of a study illustrated that great majority of our patients are not given such essential information. In this study, out of 200 patients from four hospitals in Addis Ababa, asked whether they were given information about their medications, only 5.5% were informed about drug-drug interaction, 7% About adverse effect of the drug, and only 9.5% were given information about contraindication of the drug they were given. (12)

The above cited examples probably show only the tip of the ice-berg regarding the problem of irrational prescribing. However, appraisal of such local data is essential in formulating remedial strategies. (12)

The increase in the quantities and variety of pharmaceuticals worldwide often leads to in appropriate use. This phenomenon often associated with health risk and economic burden to government since increase in the number of drugs available has incredible complicated the choice of appropriate drug for particular indications. The increase in the cost of drug is often linked to factors such as higher medical service utilization rates, irrational drug use as well as consumer behavioral aspects that lade to wastage. (17)

One study shows that globally more than 50% of all medicines are prescribed, dispensed or sold in appropriately, while 50% of patient's fail to take them correctly. (18)

The major health risk associated with the behavior of in appropriate or irrational pharmaceutical drug use by consumers is drug induced illness which can be avoided by better patient care. The mechanism that lied to drug induce illness are errors in dispensing or administration of drugs or poor compliance by the patient resulting In under use, over use, misuse or complete cession of the therapy that render patients complete cure. (19)

Unfortunately, in the real world, prescribing patterns do not always conform to these criteria & can be classified as inappropriate or irrational prescribing. Common patterns of irrational prescribing, may, therefore be manifested in the following forms: The use of drugs when no drug therapy is indicated, e.g., antibiotics for viral upper respiratory infections, The use of the wrong drug for a specific condition requiring drug therapy, e.g., tetracycline in childhood diarrhea requiring ORS. The use of drugs with doubtful/unproven efficacy, e.g., the use of ant motility agents in acute diarrhea, The use of drugs of uncertain safety status, e.g., use of dipyrone ,Failure to provide available, safe, and effective drugs, e.g., failure to vaccinate against measles or tetanus, failure to Prescribe ORS for acute diarrhea, The use of correct drugs with incorrect administration, dosages, and duration, e.g., the use of IV metronidazole when suppositories or oral formulations would be appropriate. The use of unnecessarily expensive drugs, e.g. the use of a third generation broad spectrum antimicrobial when a first-line, narrow spectrum, agent is indicated. (21)

There are many different factors which affect the irrational use of drugs. In addition, different cultures view drugs in different ways, and this can affect the way drugs are used. The major forces can be categorized as those deriving from patients, prescribers, the workplace, the supply system including industry influences, regulation, drug information and misinformation, and combinations of these factors. (22)

The impact of irrational use of drugs can be seen in many ways: Reduction in the quality of drug therapy leading to increased morbidity and mortality, Waste of resources leading to reduced availability of other vital drugs and increased costs, Increased risk of unwanted affects such as adverse drug reactions and the emergence of drug resistance, e.g., malaria or multiple drug resistant tuberculosis, Psychosocial impacts, such as when patients come to believe that there is "a pill for every ill". This may cause an apparent increased demand for drugs (22)

III. Methods and Materials

a) Study area and period

The study was conducted from Feb 10 March 11 /2011 in selected public hospitals, Dansha, Adigrat, Ayder referral, lemlem Karl and kuha which are located in western, eastern and southern zones of Tigray regional state respectively. Tigray regional State is located to the northern extreme of the nation stretching approximately 120 -150 North and 35.30-40.30 East with an estimated area of 53.6 thousand square kilometers. It bordered from the North with Eritrea, in South with Amhara, from the East Afar, and from the West with Sudan. According to the new administrative set up, Tigray is divided in to 7 zones, 34 rural weredas, 12 municipalities and about 600 Tabias (the smaller administrative unit).

b) Study design

A cross sectional study was conducted in five selected public hospitals.

c) Populations

Source of population was all patients who came to the respective hospitals during study period, all

prescriptions and all health care providers in the respective hospitals and Study population was all clients who got the service at OPD department in study period and number of prescriptions which was prescribed by respective health professionals for the last one year, that is from September 2009-October 2010 and all out patient prescribers.

d) Eligibility criteria

Numbers of prescriptions that were prescribed in outpatient department, those patients treated at outpatient department and those prescribers in outpatient department were included in the study and all patients who are critically ill, unable to respond to the survey and under chronic care follow up like diabetics, tuberculosis and hypertensive patients were excluded from the study.

e) Sampling Technique

Total of 13 public hospitals found in the region were divided in three strata based on their status (referral, zonal and district). Simple random sampling method was used to select five hospitals from each category and each participant was selected using systemic random sampling methods.

f) Sample Size determination

i. For Prescription Review

Sampling size was determined using single population proportion formula, n = z2p (1-p)/d2, Where z= z value for 95% confidence interval =1.96, P= estimated proportion of rational prescribing since there is not study done in this issue in the locality is taken as50% to get maximum sample size. d= marginal error at 95% confidence level Therefore n= (1.96)2(.5) (.5)/(.05)2 = 384. Since the multi stage method was applied, design effect was considered. So the sample size was multiplied by 2 to account for design effect. Therefore the final sample size is 384x2 = 768

The calculated sample size was allocated to each hospital proportionally, according to the number of patients seen in the outpatient department in the respective hospitals. Systematic random sampling technique was used to select prescriptions. By calculating sampling interval (K) = N/n where n= sample size and N= total number of the prescriptions (sampling frame). Accordingly, every Kth prescription was selected for the study, but the first prescription was selected randomly. 48000/768 = 1/62 then every 62th prescription was selected from the sample frame

ii. For the Patients Exit Interview

Interview of patients was conducted to assess the rational drug use. In both hospitals since the study population is greater than 10000. Sampling size was determined Using single population proportion formula and sample size for the prescriptions was: n = z2p (1-p)/d2, Where z= z value for 95% confidence interval =1.96 p= estimated proportion which is 50%, d=

confidence interval (marginal error) suppose we desire a 95% confidence level and + 5% precision. Therefore n= (1.96)2(.5) (.5)/(.05)2 = 384, 10% contingency was consider = 38.4, the total sample size was 422

Therefore the number of patients was selected from the study hospital by systematic sampling method according the proportion of patients they serve. Assuming those patients who had been served in the selected hospitals they have similar experience and exposure having the knowledge about drug use. Therefore they were not stratified and design effect was not considered.

g) Variables

Study variables: Socio demographic Characteristics (educational status, marital status, age sex), Average number of drugs per prescription, Percentage of drugs prescribed by generic name, Percentage of encounters with antibiotics, Percentage of drugs prescribed by injection, Number of drugs prescribed from EDL, Number of drugs properly labeled Dispensing time, Consultation time, Number of Patient's knowledge with adequate knowledge about their drugs usage Availability of facility formulary drug list, Presence of national treatment guide line at all out patient departments, Access to update drug information, Follow treatment guide line, Provision of information and instruction to patients

h) Data collection instruments

For patient interview standard structured questionnaire which was adapted from WHO core dug use indicators was designed to collect relevant data and cheek lists which was adapted from WHO also prepared targeted at prescribers, dispensers to review the prescriptions. The questionnaire were translated to Tigrigna and back translated to English.

i) Pretesting the tools

Pre testing the questionnaire were done prior to the actual data collection in a hospital different from the selected Hospitals on 5% of the calculated sample size to see the appropriateness, clarity of the questions, and the appropriateness of the orders. According to the pretest finding corrections were made.

j) Data collectors' selection and training

To collect data in addition to the principal investigator five pharmacy personnel and five BSC nurse were recruited for patient exit interview. Three supervisors also recruited to supervise the day today data collection activity. All data collectors were trained on the objectives of the study by the principal investigator then, separately pharmacy personnel's were again briefed on the prescribing indicators of the assessment tool and for those prescribers on dispensing indicators and patient drug use indicators assessment tool.

k) Data Management and Analysis Procedures

The collected data were submitted to the principal investigator on daily basis. The collected data were finally verified by the principal investigators for its completeness. Different mechanisms were applied to ensure data quality. These were: Data collection tools had been pre tested before the actual data collection started. And close supervision were conducted during the data collection period. The collected data were put in a secured place so that no one had access except the principal investigator.

Quantitative data collected by using the client exit interview, and prescriptions review were cleaned, coded and entered in to SPSS version 16 statistical package. Descriptive statistics had been computed and the results of the study presented by frequency tables, charts and graphs. X_2 (chi squire) tests were applied to assess variables any significant association between them. Besides, triangulations of data from different sources were done to obtain more valid result.

l) Ethical considerations

Ethical clearance was obtained from Jimma University PUBLIC Health and Medical Science Ethical Clearance Committee. Written letter were obtained from Jimma University. Tigray regional Health bureau wrote a support letter to the selected study Hospitals. Hospital Managers was contacted and permission secured. During data collection the purposes of the study were explained, their willingness to be interviewed was asked and informed verbal consent was obtained from participants of the study. They were told that they can discontinue the interview at any time if they don't feel comfortable. Name and other identifiers of those patients and professionals interviewed were not being recorded on the questionnaires. The filled documents were archived properly to ensure confidentiality.

m) Dissemination plan

First the study result will be presented to Jimma University Public Health and Medical Faculty, after comments are incorporated, hard copies of the findings will be disseminated to Tigray regional health bureau, respective hospitals and to different organization that have a contribution on improving rational drug use in hospitals. It will also be presented in various seminars and workshops held in the region. And finally the study will be published in to reputable journals.

IV. Results

a) Socio demographic characteristics of respondents

The main characteristics of patients attending in the outpatient department of the five hospitals are shown in the table 1. The percentage of male to female in all hospitals are 54.3 t0 45.7 respectively. Male is predominance than female; educational status of the patients were 32% (illiterate), 25.8 % (attending elementary school), 22.3 % (attending secondary school), 13.7% (college certificate and diploma), 6.2% (first degree & above)

Table 1: Socio demographic characteristics of the respondents in selected public hospitals in Tigray regional state, Ethiopia February 2011(N= 422)

Variable	Category	Frequency	
		N	%
Age in year	15-19	104	24.6
	20-24	101	23.5
	25-29	61	14.5
	30-34	57	13.5
	35-39	40	9.5
	40-44	14	3.5
	45 and above	45	10.6
Sex	Male	229	54.3
	Female	193	45.7
Educational status	Illiterate	135	32
	Elementary	109	25.8
	Secondary	94	22.3
	College certificate and above	84	19.9
Marital status	Married	247	58.5
	Single	130	30.8
	Divorced and widowed	45	13.1

b) *Patient knowledge on correct u se of drugs*

This study revealed that 240 (56.9 %) of patients didn't know for what disease the drug is prescribed. And only 46.2% of the patients know the dose of the drug they supposed to take. Most 354(83.9%) of patients know the frequency of use. Besides the above finding, significant proportion of patients 171(40.5%) didn't know the duration of treatment. Although they are few in number, 8.3% of patients have misconceptions about sharing of drugs to other members of the family in case they are sick. See table2:

Table 2: Patient knowledge on drug use in selected public hospitals in Tigray regional state, Ethiopia February 2011

Variables	Category	Frequency	
		N	%
Knowledge of patients on use of drugs	Yes	182	43.1
	No	240	56.9
Knowledge of patients on dose of medications	Yes	195	46.2
	No	227	53.8
Knowledge of patients on frequency of use	yes	354	83.9
	No	68	16.1
Knowledge of patients with length of treatment	yes	251	59.5
	No	171	40.5
sharing medication to family or others	yes	34	8.1
	No	388	91.9
action will be taken for getting Excellency before the period of treatment is finished	Continue the medication	361	85.5
	Stop immediately	61	14.5
actions will be taken in the event of missing to take medication	Continue the rest	356	84.4
	Take the rest & the missing ones	63	14.9
	Stop immediately	3	0.7

c) *Patient's knowledge on drug use disaggregated by hospitals*

Percentage of patients having adequate knowledge on drug use in each hospital were analyzed and listed in table 3. According the finding those patients who got the service in zonal hospitals have adequate knowledge were 34.24%, in district hospitals 26.2% and in referral hospital 43.5%

Table 3: Number of patients with adequate knowledge on drug use disaggregated by hospitals in selected public health hospitals in Tigray regional state, Ethiopia April2011

Hospital name		Number of patients with		Total
		Adequate knowledge on drug use	In adequate knowledge on drug use	
Lemlem Karl zonal hospital	No	21	71	92
	%	22.8	77.2	
Quha district hospital	No	12	30	42
	%	28.6	71.4	
Adigrat zonal hospital	No	42	50	92
	%	45.7	54.3	
Ayder referral hospital	No	67	87	154
	%	43.5	56.5	
Dansha district hospital	No	10	32	42
	%	23.8	76.2	
Total	No	152	270	422
	%	36.0	64.0	100

d) Consultation and dispensing time

One of the patient care indicators are counseling time and dispensing time. This study found that on average 4.9 minutes are spent for consultation and 3.1 minutes for dispensing. When we see this indicator across level of Hospitals, referral hospitals has average time (4.9, 3.2 min) whereas district hospitals (4.3,2.5 min) and zonal hospitals has(5.7,3.8 min) the higher average consultation and dispensing time is in zonal hospitals . The interview of patients revealed that only 115(26.3%) of them, the side effect of the drug was explained to them by the dispenser. Besides, similar number of patients responded that they got instruction on how to store the drugs. (See table)

Table 4: Counseling and dispensing time in selected public hospitals in Tigray regional state, Ethiopia February 2011

Variables	Over all	Referral hospital	Zonal hospital	District hospital
Dispensing time in minutes	3.1	3.2	3.8	2.5
Counseling time in minutes	4.9	4.9	5.7	4.3

e) Drug Labeling

Other patient care indicators were percentage of drugs adequately labeled; this is use full to measure the degree to which dispensers record essential information on the drugs package they dispense the result showed that 919 (77.8%) of the drugs were labeled by their generic name (_69%)% for the referral hospital, _(65%%) for zonal hospitals and_(34.5%)for district hospitals. The strength of the drugs was recorded in average 87.7% of the time. Moreover, dose of the drug was written only for 848(71.3%) of the drugs. Quantity of the drugs and frequency of use were written in 80.9% and 75.5% of the time respectively. However, only 99(11.4%) of the drugs have all the required labels. (See table5)

Table 5: Percentage of drugs labeled with essential information in selected public hospitals in Tigray regional state, Ethiopia February 2011

Variables	Overall		Referral hospital		Zonal hospital		District hospital	
	No	%	No	%	No	%	No	%
Generic name	919	77.8	380	69.5	428	65.7	100	34.5
Strength	1037	87.7	142	44.2	294	45.65	77	25.0
Dose	848	71.3	424	77.8	483	73.8	135	45.0
Quantity	956	80.9	451	82.5	555	84.75	189	64.3
Frequency of use	892	75.5	384	68.8	428	81.5	184	61.9
Patient name	177	14.9	38	10.4	147	22.3	34	10.5
Having all labels	99	11.7	46	14.2	40	12.3	13	9.0

f) Average number of drugs per Encounter

Prescribing indicators were analyzed in all the studied hospitals. A total of 768 encounters with 1324 drugs were prescribed. Average number of drugs per encounter over all the hospitals was 2. From the 1324 prescriptions reviewed, 958 (72.4%) of drugs prescribed by generic name in the studied hospitals.
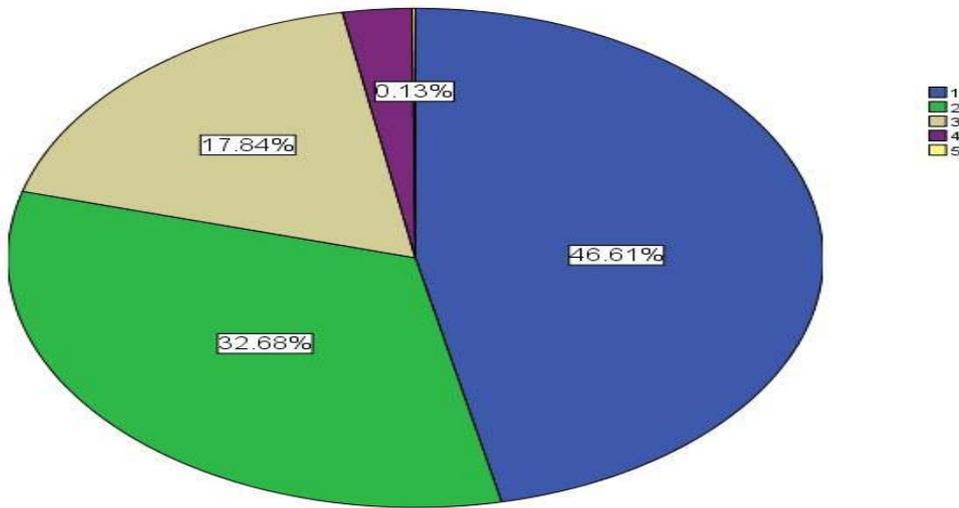
Fig. 4: Percentage of prescriptions with corresponding number of drugs in selected public hospitals in Tigray regional state, Ethiopia April2011

g) *Percentage of drugs prescribed by generic name*

Percentage of drugs prescribed by generic name in the studied hospitals was in referral hospital 232(83.2%), zonal hospitals 419(77.65) and district hospitals 307(60.3) and in over all hospitals 958(72.4%)

h) *Percentage of antibiotics prescribed per encounter*

In this study percentage of antibiotics per encounter was 348(45.3) and 420(54.7) of prescriptions

were with no antibiotics prescribed. Prescriptions with antibiotics in referral hospitals 66(34.4%); Zonal hospitals 154(48.15%) and district hospitals were 128(49.9%) (Table 6).

Table 6: Percentage of prescriptions with one or more antibiotics in selected public hospitals in Tigray regional state Ethiopia, February 2011

Hospitals	With one or more antibiotics		With no injections	
	Frequency (N)	%	Frequency (N)	%
zonal hospitals (n=320)	154	48.8	166	51.2
District hospitals (n=256)	128	60.9	128	39.1
Referral hospital (n=192)	66	34.4	126	65.6
Total (n=768)	348	45.3	420	54.7

i) *Percentage of encounter with injections*

This study revealed that on average 123 (16%) of the prescriptions have at least one injections with the highest for zonal hospitals 70 (21.9%) and the lowest for

referral hospital 19 (9.9%) Prescriptions with one or more injections in over all the study were 123(16.0) (table 7).

Table 7: Prescriptions with one or more injections in selected hospitals in Tigray regional state, Ethiopia April 2011

Hospitals	With no injection		With one or more injections	
	Frequency	%	Frequency	%
zonal hospitals (n=320)	256	78.15	70	27.1
District hospitals (n=256)	222	60.9	34	26.6
Referral hospital (n=192)	173	90.1	19	9.9
Total (n =786)	645	84.0	123	16.0

j) *Percentage of drugs prescribed from FDL/EDL*

Percentage of drugs prescribed from EDL/FDL were in zonal hospital 525(97.3%), district hospitals 497(98.2%), referral 275 (98.5%). According to this study, number of drugs prescribed from EDL/FDL LKZH

254(100%), QDH 235(99.5%), and ADZH 271(100%), ARH 275(99.2 %), DDH262 (99.4%). The most commonly prescribed drugs were antibiotics 404(52.6%),antipyretics 337(43.9%), anti-protozoa 109(14.2%), anti-acid or anti-ulcer 84(10.9%),

electrolytes 60(7.8%), minerals and vitamins 57(7.4%), steroids 51(6.6%), antihistamine 29(3.8%), antiemetic 25(3.3%), antispasmodics 25(3.3%), anti-fungal 16 (2.1%), sympatolytics 14(1.8%) antiseptics 14(1.8), TAT (1%), diuretic s 10(1.3%) local anesthesia 2(0.3%).

k) Availability of facility formulary drug list and Guideline

All studied health facility except one of the district Hospital didn't have published facility drug formulary list but they have drug and therapeutic committee and national treatment guide line. In this study in all the study area except one of the district hospital there is no treatment guide line at OPD.

l) Prescribers who have an access to update drug information

Prescribers who had an access to update their knowledge in drug prescribing and number of prescribers who follow national treatment guide line in Lemlem Karl, Quha, Adigrat, Ayder and Dansha were listed in (table 9).

Table 8: Facility based indicators in selected public hospitals in Tigray regional state, Ethiopia February 2011

Hospital name with number ofprescribers	Follow treatment Guide line		Access to update drug knowledge	
	Yes	No	Yes	No
LemlemKarl (n=5)	4	1	4	1
Quha (n =2)	0	2	0	2
Adigrat (n=5)	3	2	2	3
Ayder (n= 5)	4	1	5	0
Dansha (n= 3)	3	0	0	3

m) Binary Logistic regression analysis result

Binary Logistic regression analysis was done to check association between the different factors such as; socio-demographic characteristics of clients and consultation time, with adequate knowledge of patients were analyzed. It was revealed that educational status of patients has statistically significant association with knowledge of patients about drugs use P value < 0.01 however age, sex, marital status was not significantly associated with knowledge of patients about drug use. In addition, consultation time and knowledge were not significantly associated.

Table 5: Association between educational statuses and adequate knowledge on drug use in selected public hospitals in Tigray regional state

Sr. No.	Variable	Category	AOR	P-value	95 % CI
1	Age	-	0.97	0.839	(0.731,1.290)
2	Sex	Female	1		
		Male	0.952	0.86	(0.549, 1.651)
3	Educational level	Illiterate	244	<0.01	(29.41, 2030.6)**
		Elementary	41	<0.01	(5.28, 328.37)
		Secondary	23	0.002	(3.05, 186.55)**
		First degree	1		
4	Marital status	Married	1		
		Single	1.054	0.873	(0.538, 2.067)
		Divorced	0.55	0.563	(0.73, 4.16)
		Widowed	1.497	0.603	(0.32, 6.84)
5	Dispensing time	-	1.226	0.003	(1.073,1.401)**
6	Consultation time	-	0.984	0.889	(0.789, 1.229)

** Variable that shows significant association at P-value<0.005

V. Discussion

This study tried to assess the rational drug use in selected Hospitals of Tigray Regional State. Data was collected from interviewing patients and reviewing prescriptions. Accordingly, the finding of this study showed that irrational prescribing is still a serious problem in the study area. Prescriptions with antibiotics in referral hospitals 66(34.4%); Zonal hospitals 154(48.15%) and district hospitals were 128(49.9%). The percentage of antibiotics per encounter is significantly higher in district hospitals than the referral and zonal hospitals. This is may be due to the reason that in most of the district levels the prescribers were middle level professionals (nurses).

The overall prescriptions with antibiotics were 348(45.3%) and it is higher than what WHO recommended (<32%). Studies conducted in South Africa in public hospitals percentage of antibiotics per encounter were 68.1 %(1). Similar study was conducted in north west Ethiopian hospitals and west Nepal which was 25% and 28% respectively so; there was more

antibiotics usage in the studied area but better than Nigeria and Pakistan, the use of antibiotics was very high i.e. 75% and 78% respectively. This Irrational use of antibiotics contributes to increased antimicrobial resistance (AMR), rendering essential antibiotics ineffective and requiring the use of newer, more expensive antibiotics for the treatment of bacterial illnesses.

In the present study the average number of drugs per prescription were in zonal hospitals (1.65), District hospitals (1.95), Zonal hospitals (1.5), Referral Hospital (1.45). In overall situation the results are similar with the desired standard what the WHO recommended (<2) and better than the studies conducted in Western Nepal (2.5), Niger, (2.95), South Africa (3.2).The most commonly prescribed drugs in over all were antibiotics 348(45.3%), antipyretics 337(43.9%), anti-protozoa 109(14.2%), anti-acid or anti-ulcer 84(10.9%), electrolytes 60(7.8%), minerals and vitamins 57(7.4%), steroids 51(6.6%),antihistamine 29(3.8%), antiemetic 25(3.3%),antispasmodics 25(3.3%), anti-fungal 16 (2.1%), sympatholytic 14(1.8%) antiseptics 14(1.8), TAT 8(1%), diuretics10(1.3%) local anesthesia2(0.3%).

The percentage of drugs prescribed by generic name in referral hospitals 232(83.2%) Zonal hospital 419(77.65%), District hospitals307 (60.3%) And the overall situation was 958(72.4%). in this study prescribed drugs by generic name among the hospitals level decreased from referral to district. Study conducted in North West Ethiopia Gonder hospital (72.6%) Debre tabor hospital (84%) Bahdar hospital (70.5%), South Africa (45.2%). The difference may be due to difference in settings and compositions. According to the WHO recommendation percentage of drugs prescribed by generic name should be 100%. In relation to this in the region there is low of generic use of drugs identified and the factors are needs further investigation. The percentage of drugs prescribed from EDL/FDL referral hospitals 275(98.5%) Zonal hospitals 525(97.3%) District hospital 497(98.2%), this shows there is a similarity among the studied hospitals and better than the study conducted in South Africa (92%) western Nepal (81.4%) Gonder hospital (92.2%), Bahrdar (81.4%), and Debretabor hospital (85%).

The percentage of injections per encounters were in referral hospitals 19(9.9%), zonal hospitals70 (27.1%) district hospital 34(26.6%), and the total number prescription with one or more injections were 123(16.0%). High number of injections was prescribed in zonal and district than referral hospitals. This may be because of the commonly and minimal disease that needs injection for reducing pains were common in district and zonal hospital than in referral. Overall result is greater than the other studies conducted in South Africa (8.3%), and less than the studies conducted in Niger (29.9%).

It was found only 11.7 of drugs were adequately labeled (name of the patient, drug name, dose and quantity). Other study conducted in India the value was 18.5%. Since the pharmacists are actively participating in dispensing of medication, their involvement in providing adequate information to the patient can be judged through this procedure, which was unfortunately found very low. Hence, this low rate of appropriate envelope labeling must be taken as a matter of concern.

In this study Number of patients with adequate knowledge (drug dosage frequency and length of treatment) on drug use was found to be 152(36%). Similar study revealed 52.8% in Chennai, India, 55% in Cambodia, 25.70% in Brazil 21%. At this point it is the duty and responsibility of pharmacist to provide adequate information on proper use of drug. From this study it is evident that the patient had adequate knowledge as compared to the other study. However, this does not assure that the drug will be correctly used by the patient because no follow up study was conducted.

Association between the different factors such as; socio demographic characteristics of clients and consultation time, with adequate knowledge of patients were analyzed. It was revealed that educational status of patients has significant statistical association with knowledge of patients about drugs use P value < 0.01. Those patients who had completed elementary school and secondary school had adequate knowledge 41,23 times less than the first degree and above respectively. However age, sex, marital status and was not significantly associated with knowledge of patients' p value > 0.05. Regarding to the patient care indicators the average dispensing and counseling time was (3.18 min), (2.46 min) respectively. This time is shorter than in India 3.7 and 3.1 minutes respectively and longer than in Nepal which was 52 seconds.

This dispensing time and counseling time is very low led to inadequate information about medication being given to the patients. Patients had little chance to obtain information about their treatment. In addition, most of the drugs dispensed were improperly labeled (11.7%) proper labeling). Dispensing is an essential element of rational drug use, since it is the last point of contact that patients have with their healthcare providers. All efforts and resources involved in patient because a pharmacist can hardly explain about the dosage regimen, any side effect of drug therapy and precautions to be taken along with appropriate labeling of envelope in such a short period of time. Also, as per the WHO recommendation the pharmacist should spend at least 5 minutes in dispensing & 10 min in orienting each patients.

Healthcare providers should be encouraged to comply with the Standard Therapeutic Guidelines in their day-to-day practice. Treatment guidelines have the strongest long-term impact if they are frequently

updated, widely distributed, integrated in the training of prescribers, and used for drug use review. Availability formulary drug list in the study areas were assessed and it was found that there is no published drug formulary list in the hospitals except in one district hospital (Dansha hospital). Standard treatment guide line at OPD level was not available except in two zonal hospitals. There is no drug information center in all the studied areas.

VI. Conclusion and Recommendation

a) Conclusion

In conclusion, the finding of this study shows irrational prescribing and dispensing practice. Generic prescribing was remarkably lower 958 (72.4%), antibiotics 3489 (45.3%) and injections 123(16.0%) prescribed were considerably higher, appropriate labeling of envelope was surprisingly low. Rational Prescribing practice is better in referral hospitals than zonal and district hospitals.

The patient's knowledge on correct dosage was found to be 152(36%). Consultation and dispensing time was far from the desired standard (4.9, 3.1 min) respectively. Availability of formulary drug list in the facility and prescience of national treatment guide line at outpatient department were almost none. There is no a way for updating drug information, in all the study area there is no drug information center. However Number of drug per prescriptions was similar to what recommended by WHO

b) Recommendation

Rational use of medicines depends on the knowledge, attitudes and behaviors of prescribers, dispensers and patients. So, the region should give training in rational pharmacotherapy, linked to STGs and EMLs, & it can help to establish good prescribing habits. Communication skill is very important for dispensers dealing with patients or health care professionals to convey relevant drug information effectively and clearly, which can be done verbally and/or in written form. Therefore the health facility have relevant documents like national treat Treatment guide line and formulary drug list , avail the documents in every service area and they should established drug information center. Drug dispensers must have the ability to explain information clearly by the language particularly the patient or care provider can understand and check whether the information is being understood by them.

Acknowledgments

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