Original article

Drug prescribing patterns for outpatients in three hospitals in north-west Ethiopia

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Abstract

Background: Information about drug utilization at the out patient departments of the Hospitals in Ethiopia is scanty although a large segment of the patients are being served at the outpatient departments.

Objective: To evaluate and compare patterns of drug prescribing practiced in the outpatient departments of three hospitals.

Methods: Case notes of outpatients attending the Gondar teaching hospital (n=2023), Bahir Dar regional hospital (n=2597) and Debre Tabor rural hospital (n=1808) were reviewed retrospectively over one year period.

Results: The leading diagnoses in the three hospitals were similar and include disease of the respiratory system, gastrointestinal tract, sexually transmitted and skin. The average number of drugs per patient was 0.98 in Gondar, 1.8 in Bahir Dar and 2.2 in Debre Tabor hospitals. Antibacterials including anti-TB drugs (40-51%) and analgesics (11-49%) were the most frequently prescribed drugs in the three hospitals.

Conclusion: The average number of drugs prescribed per patent was within the acceptable range. Deviation of prescribing pattern among the outpatients possibly reflects the availability of drugs, attitude (habit) of the prescriber and diagnostic profiles and facilities. Much remains to be done to promote rational selection and use of drugs in hospitals. [*Ethiop.J.Health Dev.* 2002;16(2):183-189]

Introduction

Appropriate drug utilization studies are important tools to evaluate whether drugs are properly utilized in terms of efficacy, safety, convenience and economic aspects at all levels in the chain of drug use (1). Regardless of considerable improvements in the availability and control of drugs in hospitals, rational drug use is still a world wide concern (2).

The overall use of drugs at hospitals in many countries, at least from the point of view of consumption, is relatively small compared to the national drug budgets (3). But this is not the case in Ethiopia where hospitals consume about 50% of the total drug budget (4). The spectrum of the therapeutic classes of drugs employed in hospitals is also wider than in other types of health facilities (5). Moreover, physicians may also have an influence on drugs prescription outside hospitals.

In some studies conducted in north west Ethiopia, the over use of antibiotics and injections in primary health care facilities (6), misuse of antibiotics in inpatients (7), low adherence of prescribers to the basic principles of prescription writing and over consumption of anti-infectives (8), 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 outpatients (9), in dispensaries (10), for specific classes of drugs (7,11,13), and in paediatric inpatients (14).

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Most of these studies are neither patients nor diagnosis linked.

Drug prescribing for outpatients is done by various types of health professionals, and out patient clinics deliver therapeutic service to a large segments 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. The objective of the present study was to evaluate and compare patterns of drug prescribing practiced in district, regional and tertiary hospitals in north west Ethiopia.

Methods

The patterns of drug prescribing were investigated in Gondar hospital (GH), Bahirdar hospital (BDH) and Debretabor hospital (DTH), all located in north-west Ethiopia and representing different types of care and different geographical set-ups. According to the Ethiopian general health service classification (4), the selected hospitals represent central referral, regional and rural hospital respectively.

Before the beginning of the actual survey, detailed characteristics and systems of care delivery were reviewed and discussed with the respective medical directors and administrators, and adequate cooperation was secured. The protocols for the outpatient survey were prepared and pre-tested.

The protocols contained questions for relevant socio-demographic, and disease and drug related information. Representative samples were drawn from each outpatient unit retrospectively based on the actual patient attendance within a year period. Data were collected by the investigators or a trained physician (and in certain cases by nurses under supervision).

The total number of out-patients attending the respective hospitals per year was calculated from the out-patient registry books of the respective hospitals. Samples of 2023,2597 and 1808 from GH, BDH and DTH, respectively, were then drawn and reviewed by sequentially selecting every 10^{th} out-patient case note of patients attending the out-patient clinics between September 1994 and August 1995.

Patient characteristics such as name, age, sex, living area, past drug history and diagnosis as well as drug details (name, dosage form, frequency, route and duration of administration) were recorded. The basis of prescription (especially for antibiotics empirical/ laboratory) was initially sought to be included, but it was later left out because of incomplete documentation.

Data were entered on computer using EPI version 6.0 statistical package. Patient characteristics, leading diagnosis, number of diagnosis per patient, the extent to which patients were exposed to drugs before attending the outpatient clinic and the extent of omission of certain essential information in the case notes reviewed, were computed. The total number of drugs prescribed in kind, the total frequency of prescription, percent patient exposure to certain groups of drugs, frequency of most commonly prescribed individual and class of drugs, number of drugs prescribed per patient, prescribing by generic names and from the essential drug list of Ethiopia (5) were calculated.

Results

The main patient characteristics attending the outpatient clinics of the three hospitals are shown in Table 1. The mean age was 29. 4, 27.1 and 31.8 years in GH, BDH and DTH respectively. Male to female ratio was more than 1.3, indicating male predominance. The average number of diagnoses per patient ranged between 1.2 in BDH and 1.4 in GH; and previous drug history was higher in BDH (24.5%) than in GH (6.4%) and DTH (1.1%).

The most frequently encountered diagnoses are listed in Table 2, and correspond well to the annual morbidity statistics of the hospitals surveyed. Diagnoses were classified, irrespective of the etiology, according to the major organ/systems, and the main individual

Table 1: **Characteristics of outpatients attending the GH (n=2023)=BDH (n=2598) and DTH (n=1808) in north west Ethiopia, 2001**

Characteristics	GH N (%)	BDH N (%)	DTH N (%)
1. Age (Mean ± SD Years)	29.4±17.3	27.1±15.7	31.8±15.5
Range:	0 - 97	0 - 88	1.8 - 90
<5	158 (7.8)	226 (8.7)	7 (0.4)
5-14	192 (9.5)	270 (10.4)	154 (8.5)
15-30	897 (44.4)	1256 (48.3)	903 (49.9)
31-44	382 (18.9)	456 917.60	360 (19.9)
45-64	303 (15.0)	325 (12.5)	309 (17.1)
Over 64	90 (4.5)	65 (2.5)	75 (4.1)
2. M/F ratio	1.5	1.3	1.3
3. Urban/Rural ratio	1.1	2.2	0.98
4. Drug Taking history (previous drug Exposure)	130 (6.4)	636 (22.5)	20 (1.1)
5. diagnosis/patient	1.4	1.2	1.3

Table 2: **Diagnostic patterns of outpatients in GH (n=2768), BDH (n=3108) and DTH (n=2319), north west Ethiopia, 2001**

Diagnosis	GH n	GH %	BDH n	BDH %	DTH n	DTH %
1. Respiratory D.	621	22.4	754	24.3	668	28.8
* tuberculosis	297	10.7	422	13.6	193	8.3
* bronchitis	90	3.3	117	3.8	198	3.5
* pneumonia	115	4.2	76	2.4	137	5.9
2. GIT diseases (D)	712	25.7	562	18.1	556	24.0
* Intestinal pares	375	13.5	205	6.6	271	11.7
* PUD/gastr/esoph	141	5.1	90	2.6	191	8.2
* Diarrhoeal D.	86	3.1	114	3.7	36	1.6
3. STD & Skin D.	209	7.6	294	9.5	289	12.5
4. Gyn & Obs D.	176	6.4	204	6.6	75	3.2
5. Musculoskeletal D.	132	4.7	207	7.5	145	6.3
6. Ophthalmic D.	173	6.3	233	7.5	69	3.0
* Trachoma & conjunctivitis	87	3.1	112	3.6	54	2.3
7. Kidney & UTID.	185	6.7	162	5.2	156	6.7
8. ENT D.	124	4.5	135	4.3	86	3.7
9. nervous system D.	87	3.1	133	4.3	42	1.8
10. Febrile D.	91	3.3	118	3.8	86	3.7
* Malaria	58	2.1	46	1.5	24	1.0
11. Cardiovascular D.	54	2.0	45	1.4	33	1.4
12. Endocrine & Metab. D.	55	2.0	40	1.3	19	0.8
13. Haematologic D	44	1.6	17	0.5	16	0.7
* Anaemia	38	1.4	14	0.5	15	0.6
14. Lymph-node glandular D.	36	1.3	92	3.0	63	2.7
* HIV/AIDS	33	1.2	106	3.4	21	0.9
15. Others	44	1.6	16	0.7	..	..

(specific) diagnoses were indicated with asterix for some classifications. The total % values of specific diagnoses were indicated with asterix.

Diseases of the respiratory and gastrointestinal system were the top-two most frequently recorded causes of morbidity. Although the general diagnosis pattern was consistently similar, some differences were observed regarding individual patterns of diseases among the hospitals surveyed.

In Table 3, the frequency (exposure) of drug combinations is shown. The average number of drugs per patients was 0.98, 1.8 and 2.2 in GH, BDH and DTH respectively. Patients receiving no drugs were higher in GH (34.4%) than in BDH (12.4%) and DTH (3.2%). Patients who were prescribed 5 or more drugs

Table 3: **Number of drugs prescribed to out patients per visit. GH (n=2023) BDH (n=2598) and DTH (n=1808), north west Ethiopia, 2001**

Case notes with	GH N (%)	BDH N (%)	DTH N (%)
No drug	695 (34.4)	322 (12.4)	59 (3.3)
One drug	803 (39.8)	694 (26.7)	340 (18.8)
Two drugs	384 (19)	827 (31.8)	716 (39.6)
Three drugs	112 (5.6)	571 (22.0)	597 (33.0)
Four drugs	20 (1.9)	158 (6.1)	86 (4.8)
Five drugs	3 (0.1)	20 (0.8)	8 (0.4)
Six drugs	-	6 (0.2)	1 (0.06)
Seven drugs	-	-	1 (0.96)
# of drugs/patient	0.98	1.8	2.2

during a single visit to the outpatient clinics were less than 1%.

The most frequently prescribed individual drugs to outpatients are shown in Table 4. The top two most frequently prescribed drugs in GH were antibacterials, (ampicillin and Co-trimoxazole). In BDH, anti-TB drugs (INH and Vit B_6) whereas in DTH an analgesic (paracetamol) and multivitamins were the top-two most frequently prescribed drugs. Ampicillin was however, a widely used antibacterial drug in the three hospitals. Very low prescribing frequency of anti-TB drugs was observed in GH. Although the prescribing Frequency of individual drug was variable in the three hospitals, the prescribing frequency of a certain therapeutic class (group) was almost similar. For example, anti-infectives followed by analgesics were the most frequently prescribed therapeutic classes of drugs in all the three hospitals. The percentage of patients who received some selected group of drug is shown in Table 5. As it can be seen from the table, the percentage of patients who received antibiotics was 36.9, 41.9 and 64.1 in GH, BDH and DTH, respectively. Almost half of the patients who were attending the DTH out-patient clinic received analgesics.

Table 4: **The most frequently prescribed individual drugs to outpatients in GH (frequency = 2013), BDH (frequency = 4823) and DTH (frequency = 3602), north west Ethiopia, 2001.**

GH		BDH		DTH	
Drugs	n (%)	Drugs	n (%)	Drugs	n (%)
Ampicillin	233 (11.6)	INH + TB450	498 (10.3)	Paracetamol	481 (13.4)
Cotrimoxazole	195 (9.3)	Vitamin B_6	376 (7.8)	Multivitamins	350 (9.4)
Mebendazole	146 (7.3)	Ampicillin	354 (7.3)	Ampicillin	250 (6.9)
TTC oint. + caps	145 (7.2)	Dipyrone	277 (5.7)	Cotrimoxazole	218 (6.1)
Paracetamol	96 (4.8)	TTC oint. + caps	254 (5.3)	Penicillin G	215 (6.0)
Penicillin G	83 (4.1)	Cotrimoxazole	218 (4.5)	Tetracycline	204 (5.7)
Multivitamins	81 (4.0)	Streptomycin	163 (3.4)	Streptomycin	179 (5.0)
Metronidazole	81 (4.0)	Ethambutol	157 (3.3)	Dipyrone	17 (4.9)
Chloramphenicol	58 (2.9)	Aspirin	127 (2.6)	TB450	166 (4.6)
Maalox	39 (1.9)	Chloramphenicol	124 (2.6)	Mebendazole	166 (44.6)
Aspirin	38 (1.9)	Paracetamol	124 (2.6)	Vitamin B6	122 (3.4)
Librax	29 (1.4)	Mebendazole	121 (2.5)	Chloramphenicol	99 (2.7)
Al (OH) 3	25 (1.2)	Penicillin G	116 (2.4)	Aspirin	95 (2.7)
$FeSO_4$	25 (1.2)	Berantine	107 (2.2)	Metronidazole	85 (2.4)
Levamisole	24 (1.2)	Metronidazole	98 (2.0)	Hyocine	83 (2.3)
Chloroquine	24 (1.2)	ORS	80 (1.7)	Mgtricilicate	76 (2.1)
Others	680 (34.0)	Others	131 (23.5)	Others	655 (18.2)

TTC = tetracycline, ORS = Oral rehydration salt

Table 5: **Prescription of selected groups of drugs in GH (n=2023), BDH (n=2598) and (n=1808), north-west Ethiopia, 2001**

Exposure to	GH		BDH		DTH	
	n	%	n	%	n	%
1. Anti infectives	989	(49.2)	1784	(68.1)	1282	(76.4)
* Antibiotics	743	(36.9)	1088	(41.9)	1158	(64.1)
* Anti TB	35	(1.7)	506	(19.5)	195	(10.8)
2. Analgesics	224	(11.1)	555	(21.4)	888	(49.1)
3. Antacids	123	(6.1)	188	(7.3)	194	(10.7)
4. Antiasthma	28	(1.4)	86	(3.3)	42	(2.3)

The percentage of patients who received injections was higher in DTH (24.5%) than in GH (5.2%) and BDH (13.9%). Prescribing by generic names was more or less uniform among the hospitals (GH, 72.6%; BDH, 70.5%; and DTH, 84.1%). The number of drugs prescribed from the essential drug list of Ethiopia was 92.2%, 81.4%, and 85% in GH, BDH and DTH, respectively. The number of drugs prescribed in kind seem small in DTH (54) compared to GH (119) and BDH (133).

Discussions

Patients exposure to drugs before attending the outpatient clinics was low in our study as compared to the report from Sweden, Sir Lanka and Zimbabwe (15-18). This could be because of lack of time of physicians to take history of drug exposure, lack of physician's appreciation of its importance or due to the uncooperativeness of patients to deliver such information. It therefore emphasizes the need to develop previous drug history reporting (recording) system to permit the completeness of patient history, the diagnosis of adverse drug reactions and drug interactions, and to initiate a correct treatment.

The average number of drugs prescribed in the three hospitals surveyed, although the figure was relatively lower in Gondar hospital, is in agreement with other reports (6,19,20).

The low average number of drugs per patients seen in GH may be related to large number of case notes (34.4%) which did not contain drug information. Although, non-drug therapy is one of the option in therapeutics, it is difficult to accept that 34.4% of patients actually received no medication in spite of the relatively higher average number of diagnoses per patient in GH. Because prescription and case notes have medico-legal values, due attention should be given for the completeness of the prescription writing principles and procedures. The incompleteness of drug related information (dose, frequency, route and duration of administration) has been observed in the present study and in the previous study (8).

The prescription of more than 3 drugs for a considerable percentage of patients in BDH (7.1%) and DTH (5.2%) could atleast partly be explained by the necessity of the combination of drugs for the treatment of some diseases such as tuberculosis. The reason given by the physicians in GH that TB patients were referred to the nearby clinics to collect their drugs may support the above explanation since the prescription of more than 3 drugs is relatively low in GH (1.1%). Important to mention is that the number of diagnoses in an individual patient may also determine the number of drugs to be prescribed.

Drugs prescribed within an institution might reflect the disease prevalence in the population, the availability of different drugs and the attitude of the prescriber. While the former may explain the agreement between drug prescribing and diagnosis in several cases (eg. Antacids, anthelmintics, antiasthmatics), the lowest exposure for anti-TB drugs in GH does not correspond with the epidemiological differences among the three hospital settings. This may be due to the referral of TB-patients to the near by clinics for collection of anti-TB drugs leading to a poor recording in the charts (personal discussion with prescribing physicians).

Exposure of patients to antibiotics (range 36.9-64%) was very high compared to other reports

from similar outpatients in Ethiopia (9-11) and other countries (20). Obviously, bacterial infections are prevalent in the study region. The obtained results are however, too high to justify epidemiological trends. A similar notion that antibiotics might be over (irrationally) used has also been reported (7,8). Moreover, the choice of antibiotics is limited, even for hospitalized patients (21), giving chance to selection of drug resistant strains. Resistance for ampicilln and co-trimoxazole, the two most commonly used antimicrobials, was found to be high in GH (21), and possibly in other hospitals indicating that judicious use of antibiotics is necessary. The indiscriminate use of antibiotics that may result in the emergence of drug resistant bacteria makes the treatment of a patient more expensive, more risky and less rewarding. The low use of sulfonamides, tetracyclines and chloramphenicol in our study could probably be due to issues related to safety and the development of resistance associated with wide use of them (21,22), and is rational in that sense.

Analgesics hold the second position after antibacterials and this is consistent with reports from other hospitals in the country (11) and from primary health care centers in the region (6). The therapeutic value of a rational use of analgesics may not be questionable. However, excessive exposure to analgesics poses potential adverse effects and also consumes considerable amount of drug budget (11). The wide use of dipyrone in BDH and DTH (this study) and elsewhere in the country (9-11) must be discouraged as it causes potentially fatal bone marrow toxicity that has led to its withdrawal from the markets in many countries (23).

The number of outpatients exposed to injections seems to be low and rational when compared to primary health facilities (6). Generally, the use of injections declined with increasing level of medical care. The relatively high exposure for injections in BDH and DTH compared to GH could be due to the higher frequency of streptomycin prescription in these hospitals. The reasons for the lower number of drugs (in kind) in our study, adherence to generic prescribing and essential drug list of Ethiopia seem to be due to the greater role of the government in distributing limited number of drugs, usually by their generic names and according to the essential drug list of Ethiopia (5).

In conclusion, we presented the drug-prescribing pattern in rural, regional and central referral (teaching hospitals). Drug therapy corresponded with diagnoses in most cases although the study was not designed to assess the rationality of each treatment regimen. The average number of drugs prescribed in the hospitals surveyed are within the acceptable range. Antibiotics and analgesics seem to be over used as there are indications where their prescribing frequency does not fully agree with morbidity data. The choice of individual drugs varied among hospitals and may partly reflect the physician's prescribing habit, availability of drugs and diagnostic facilities and profiles.

A decreasing tendency of prescribing injections and an increasing habit of prescribing by generic names reflect improvements in prescription writing that need be encouraged.

However, some important patient-and drug-related information are not recorded on the medical records that should be given due attention. Increasing the availability of drugs both in kind and quality and the establishment of treatment guidelines and antibiotic policy based on periodic assessment of the microbial sensitivity pattern are recommended to improve the rational use of drugs.

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