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Original Article

Assessment of Prescribing practice pattern in Governmental Health Centers of Bahir Dar Town, Ethiopia

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ABSTRACT

Drug therapy is the most commonly used method of any disease treatment in general practice. However, the patterns of drug prescription are often inappropriate and the need for registration and evaluation of these patterns is essential in an effort to improve prescription standards. Cross sectional prospective study was used. Simple random sampling technique was applied to select 600 patient encounters from six governmental health centers (100 patient encounters for each). Total of 600 prescriptions from six health centers; Abay Mado, Shimbit, Ginbot Haya, Shumabo, Hane and Bahir Dar health centers were analyzed. Average number of drugs per prescription was 1.85. Average percentage of prescription having at least one injection was 14.4%. 100% of prescribed drugs were from essential drug list of Ethiopia. About 41.3% of the patients were prescribed at least one antibiotic. Most of the prescribed drugs (98.3%) were prescribed by their generic name. Percentage of adequately labeled drug packages is very low (24%). Average number of drugs prescribed per prescription is appropriate. Prescribing practices for injections, generic prescribing and prescribing from essential drug list are encouraging. Antibiotic prescribing practices should be improved since the study revealed higher value. Adequate labeling of drug packages (24%) should be improved.

Key Words: Drugs, drug utilization review, essential drugs, prescribing practice

INTRODUCTION

Medicines play an important role in health care delivery and disease prevention. The availability and affordability of good quality drugs along with their rational use is needed for effective health care. Drugs assume a major role in healthcare, both in terms of system management policies and in the practice of the professionals involved, as well as in patients' emotional references. Drugs also play an important role in protecting, maintaining and restoring health. In recent years the contribution of drugs to treatment of medical conditions has increased more rapidly than most non pharmaceutical approaches to disease. However the patterns of drug prescription are often inappropriate and the need for registration of these patterns is essential in an effort to improve prescribing standards [1]. Prescription is an order for medication, therapy, or therapeutic device given by a properly authorized person, which ultimately goes to a person properly authorized to dispense or perform the order. A prescription is usually in written form; can be emailed from a secure encrypted computer system written, phoned, or faxed. Prescription writing is a science and an art, as it conveys the message from the prescriber to the patient. Rational prescribing implies using the right drug for the right patient at the right time in the right dose and manner of administration, at affordable cost and with right information. As accepted by the WHO 'Rational use of drugs requires that patients receive medications appropriate to their clinical needs, in doses that meet their own individual requirements for an adequate period of time, and at the lowest cost to them and their community' [2] . The consequences of excessive and inappropriate prescribing are many; wastage of public and private money, drug resistance, adverse reactions and increase in iatrogenic disease. In the field of antibiotics use, resistance to newer antibiotics has been steadily increasing. The higher level of resistance tends to be found in developing countries with poor capabilities of monitoring of therapies and doses [3]. Drug utilization study, as defined by the WHO, is a structured process which is used to assess the quality of drug therapy by engaging in

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the evaluation of data on drug prescribing, dispensing and patient use in a given health care environment, against predetermined, agreed upon criteria and standards, with special emphasis on the resulting medical, social, and economic consequences [4].

Drug utilization studies seek to monitor, evaluate and suggest modifications in the prescribing practices with the aim of making the medical care rational and cost effective. A study of prescription patterns is an important tool to determine rational drug therapy and maximize utilization of resources. To improve the overall drug use, especially in developing countries, international agencies like the World Health Organization (WHO) and the International Network for the rational use of drugs (INRUD) have applied themselves to evolve standard drug use indicators. These indicators help us to improve our performance from time to time [5, 6].

Worldwide, more than half of all medicines are prescribed, dispensed, or sold improperly and 50% of patients fail to take them correctly. Moreover, about one third of the world's population lacks access to essential medicines [7]. A survey conducted in 8 hospitals in southern Ethiopia that investigated their prescription patterns concluded that irrational prescribing, as evidenced by high average number of drugs prescribed per encounter, high percentage of injections and high percentage of antibiotic use, was prevalent in the studied region [8].

MATERIALS AND METHODS

Study design: A cross sectional prospective study design was conducted

Study area: The study was conducted at six governmental health centers (Abay Mado, Shumabo, Hane, Shimbit, Bahir Dar and Ginbot Haya health centers) in Bahir Dar town, North-West of Ethiopia. They give different health services and act as referring site for about 230, 466 people. These health centers give also give outpatient pharmacy services. The study was conducted in the outpatient pharmacy.

Data collection and analysis: The specific types of data necessary to measure the prescribing indicators were recorded for each patient encounter and entered directly into pre-prepared prescribing indicator form. For this particular study, around 600 encounters were analyzed prospectively from the six health centers. All the data was recorded in the pre-prepared prescribing indicator format and was analyzed using SPSS version 20 software.

Study variables

1. **Prescribing indicators**
   a. The average number of drugs prescribed per encounter was calculated to measure the degree of polypharmacy. It was calculated by dividing the total number of different drug products prescribed by the number of encounters sampled. Fixed dose combination products were counted as one drug.
   b. Percentage of drugs prescribed by generic name was calculated to measure the tendency of prescribing by using generic name. It was calculated by dividing the number of drugs prescribed by generic name to total number of drugs prescribed, multiplied by 100.
   c. Percentage of encounters in which at least one antibiotic was prescribed was calculated to measure the overall use of antibiotics. It was calculated by dividing the number of patient encounters with antibiotic use by the total number of encounters surveyed, multiplied by 100.
   d. Percentage of encounters with an injection prescribed was calculated to measure the overall use of injections. It was calculated by dividing the number of patient encounters with injection use by the total number of encounters surveyed, multiplied by 100.
   e. Percentage of drugs prescribed from an essential drug list was calculated to measure the degree to which practices conform to a national drug policy. Percentage was calculated by dividing number of drugs prescribed which are in essential drug list by the total number of drugs prescribed, multiplied by 100.

2. **Patient care indicators**:
   a. Average dispensing time measures the average time that personnel dispensing drugs spend with patients. It was calculated by dividing the total time for dispensing drugs to a series of patients by the number of encounters.
   b. Percentage of drugs actually dispensed measures the degree to which health facilities are able to provide the drugs, which were prescribed. It was calculated by dividing the number of drugs actually dispensed at health facility by the total number of drugs prescribed, multiplied by 100.
   c. Percentage of drugs adequately labelled measures the degree to which dispenser's record essential information such as name of patient, description of drug, dosage regimen, strength of the drug, precautions and total quantity dispensed on the drug packages they dispense. It was calculated by dividing the number of drug packages containing at least patient name, drug name and when the drug

should be taken by the total number of drug packages dispensed multiplied by 100.

d. Patients' knowledge of correct dosage regimen measures the effectiveness of the information given to patients on the dosage schedule of the drugs they receive. It was calculated by dividing the number of patients who can adequately report the dosage schedule for all drugs by the total number of patients interviewed, multiplied by 100.

3. Health facility indicators

a. Availability of essential drug list of formulary to indicate the extent which copies of the national essential drugs list or local formulary are available at health facilities. It was recorded as "Yes" or "No" for each health facility.

b. Availability of key drugs was measured to see availability at health facilities of key drugs recommended for the treatment of some common health problems. It was calculated by dividing the number of specified products actually in stock by the total number of drugs on the checklist, multiplied by 100

Ethical consideration: Ethical clearance regarding the study protocol was obtained from institutional review board of Bahir Dar University. The University Postgraduate, Research and Community Service Coordinator Office wrote formal letter to each of the health centers and the heads of each health centers gave the permission to perform the study. The data obtained from the patient information cards and from the interviews were used only for the research purpose.

RESULTS

Prescribing indicators: A total of 600 encounters from six health centers were analyzed. A total of 1110 drugs were prescribed of which most are analgesics and antibiotics. The most commonly prescribed analgesics were Paracetamol (176) and Diclofenac (139) while the most commonly prescribed antibiotic was Amoxicillin (162) (Figure 1). The lowest average number of drugs per prescription occurred in Shumabo health center (1.6) while the highest was recorded in Bahir Dar health center (2.1). The overall average drug per prescription was 1.85. Most of the drugs were prescribed by their generic name; Abay Mado (98%), Shimbit (98.5%), Ginbot Haya (97%), Shumabo (99%), Hane (98.6%) and Bahir Dar (98.8%). Encounters containing at least one antibiotic were high for all the six health centers; Abay Mado (43%), Shimbit (40%), Ginbot Haya (39%), Shumabo (48%), Hane (37%) and Bahir Dar (41%). The percentage of patients who received one or more injection during their encounter ranges from a minimum of 13% in Abay Mado and Hane health centers to a maximum of 17% in Shumabo health center, respectively. The overall average of injection encounters was 14.4%. All drugs were prescribed from the essential drug list of Ethiopia in all health centers (Table 1).

Patient care indicators: The study revealed that the average time (in minutes) for dispensing the drugs was; Abay Mado (2), Shimbit (1.5), Ginbot Haya (1.9), Shumabo (2.3), Hane (2.6) and Bahir Dar (3). The overall average of injection encounters was 2.2. Most of the prescribed (88.1% in average) drugs were dispensed from the health centers. Adequate labeling of drug packages is very poor in all the health centers; Abay Mado (19), Shimbit (17), Ginbot Haya (21), Shumabo (24), Hane (30) and Bahir Dar (33). Although adequate labeling was poor, most patients, about 84.4% in average have correct knowledge of the dosage regimen (Table 1).

Facility indicators: All the six health centers have a copy of the national essential drug list. The health centers also have most of the key drugs recommended by WHO essential drug list with overall average value of 94.2% (Table 1).

DISCUSSION

The reference value for average number of drugs in WHO guidelines on rational use of drugs per prescription is 1.6 - 1.8 [9]. The present study revealed that the average number of drugs prescribed per prescription is 1.85 which is acceptable compared with the standard as well as other similar studies done locally and abroad. In similar study done in south west of Ethiopia at Jimma Hospital, the average number of drugs per encounter was 1.59 [10]. However, in a study on prescribing patterns in hospitals in north Ethiopia, the average number of drugs per patient was 1.3 at Gondar Hospital and 2.2 in Debre Tabor Hospital [11]. A national baseline study on drug use indicators in Ethiopia in September 2002 also found the average number of drugs prescribed per encounter to be 1.9 [12]. In the study of drug use patterns in 12 developing countries, the average number of drugs per encounter was high in Nigeria (3.8) Pakistan (4.1), low in Sudan (1.4) and in Zimbabwe (1.3) [13-16]. Among the likely negative effects of prescribing many drugs per prescription, are increased incidences of side effects, drug-drug interactions, confusion where aged patients are involved, non-compliance by patients to the drug regimen as a result of the large number of drugs to be taken at a time and for prolonged periods in most cases. A relationship has

been described between polypharmacy and chronic polypharmacy; the prescription of multiple medicines in itself a predisposing factor to adding further drugs [17]. Studies have also shown a clear relationship between polypharmacy and under prescribing, a situation in which an indicated drug was not prescribed even as no reasons could be found for not prescribing it. The probability of under prescription increases significantly with the number of medicines. This has been shown to result in the so called treatment risk paradox or risk treatment mismatch where patients at highest risk for complications have the lower probability to receive the recommended pharmacological treatment [18].

The WHO recommends a 100% prescription of drugs using their generic name [9]. The average percentage of drugs prescribed by their generic name in this study is 98.3%. Even though it is lower than the expected WHO standard, it is better as compared to other studies. In a study carried out at Jimma Hospital, south west Ethiopia, the percentage of drugs prescribed by generic name was 75.2% [10]. A national baseline study on drug use indicators in Ethiopia in September 2002 also showed the percentage of drugs prescribed by generic name to be 87% [12]. In the study of 12 developing countries, the percentage of generic drugs prescribed was low in Nigeria (58%) and Sudan (63%) but was encouraging in Tanzania (82%) and Zimbabwe (94%) [13-16, 19]. The promoters who promote different brand products of wholesalers do not commonly go and promote their brands to governmental health centers. Rather they promote their brands in hospitals and private health institutions. This might play a role in reducing brand prescribing in health centers.

Low generic prescribing could add confusion of patients who are already faced with the burden of polypharmacy. This could lead to duplication errors where patients may unknowingly take the generic and brand products of same drug simultaneously. Generic prescribing is an indicator of prescribing quality [20]. Moreover, patients who use at the primary health care level to buy drugs, the drugs available are mostly restricted to the essential drugs which are usually written in generic names and supplied by the government. So patients may get problem in searching drugs that are written with brand names [21].

The average percentage of encounters in which antibiotics were prescribed in the health centers is 41.3% which is much higher than the standard (20% - 26.8%) [9] and better than a study done in Hawassa University Hospital which was 58% [22]. A national baseline study on drug use indicators in Ethiopia in September 2002 also showed that the percentage of encounters in which an antibiotic was prescribed to be 58.1% [12]. In the drug use pattern study in 12 developing countries, the percentage of encounters in which an antibiotic was prescribed was high in Sudan (63%), Uganda (56%), and Nigeria (48%) and relatively better in Zimbabwe (29%) [13-16, 19, 23]. Prescribing antibiotics without laboratory validation for its indication promotes development of drug resistant microbes which in turn result in use of highly efficacious antibiotics for otherwise mild bacterial infections. The resistance problem also affects the health condition of the community and will incur extra cost for the government and community to resolve the problem. At such instance these drugs either become unaffordable to most patients and/or encourage poor compliance [21]. Therefore the health care providers should use antibiotics prudently to patients who will exactly benefit from utilizing antibiotic prescription.

The study indicated that the average percentage of encounters in which an injection was prescribed is 14.4%, which is line with the WHO recommendation (13.4% - 24.1%) [9]. A national baseline study on drug use indicators in Ethiopia in September 2002 found the percentage of encounters with an injection to be 23%, which is in the acceptable range [12]. In a study done in Hawassa University Hospital it was 38.1%, which is higher than the standard [22]. In a prescription pattern study in 12 developing countries, the percentage of encounters in which an injection was prescribed was high in Uganda (48%) and Sudan (36%) but very low in Zimbabwe (11%), and in the acceptable range in Indonesia (17%), Ecuador (17%), and Mali (19%) [13-16, 19, 23, 24]. Nowadays, an urgent need arises to reduce injection use in developing countries to prevent infections such as HIV and other blood borne pathogens and also to reduce health care costs due to injection related bacterial infections that took a substantial fee on health care budget.

According to WHO, prescribed drugs should be found in the essential drug list of a country [9]. The present study revealed that 100% of the drugs were prescribed from the essential drug list (EDL) of Ethiopia and each health center has a copy of the EDL. This in general is very encouraging. A study done in Hawassa University Hospital revealed that only 96.6% of prescribed drugs were from the ED [22]. A national baseline study on drug use indicators in Ethiopia in September 2002 showed that the percentage of drugs prescribed from the essential drug list to be 99%, [15]. In a study of prescription patterns from 12 developing countries, the percentage of drugs prescribed from the

essential drug list was 88% in Tanzania and 96% in Nepal [19, 24]. Essential drugs list (EDL) is the list containing drug items essentially used to treat or manage common or readily encountered diseases and/or disorders. Thus the higher the compliance with this list, the more rational the drug prescribing pattern. The EDL of Ethiopia can be accessed from Food, Medicine and Health Care administration and control Authority of Ethiopia (FMHACA) [25]. In this study about 88.1% of the prescribed drugs were dispensed which indicates higher value than a study done in India 10.5% [26], 11.6[27] and 76.9 [28] although it is comparable with other studies in Burkinafaso [29] and Cambodia [30]. The level of appropriate labeling 24% needs improvement as it might lead to medication errors and increased adverse effects. After the completion of the study, the dispensers were asked about the low level of labeling and they reported that shortage of time due to patient workload and poor layout of dispensing room for patient-dispenser interaction are the reasons for poor labeling of drug packages. Similar reasoning was given in another study done in India [28]. Although the labeling of drug packages was low most patients (84.8%) remember the correct dosage regimen. This figure is higher than other findings 80.8% [28], 64.5% [27] and 71.5% [31]. The dispensers after explaining once should ask the patients/caregivers to repeat the drug dosage regimens. This helps to identify those who need further clarification. Availability of key drugs should be ensured in health facilities. The present study prevalence of key drugs 94.2% is higher than other studies 85% [28].

CONCLUSION

Based on the results obtained in this study, it can be concluded that the number of drugs prescribed per encounter, generic prescription, prescribing practices from EDL, availability of key drugs and percentage of actually prescribed drugs are encouraging. Injection prescribing practice is also very good. Antibiotic prescribing patterns are higher and needs improvement initiatives to reduce the use of antibiotics only to those who benefits from utilizing antibiotics. The dispensers should also improve their labeling activity on drug packages. The presence of a copy of EDL in each health center is also very encouraging.

Competing Interests: I declare that there are no competing interests on this work

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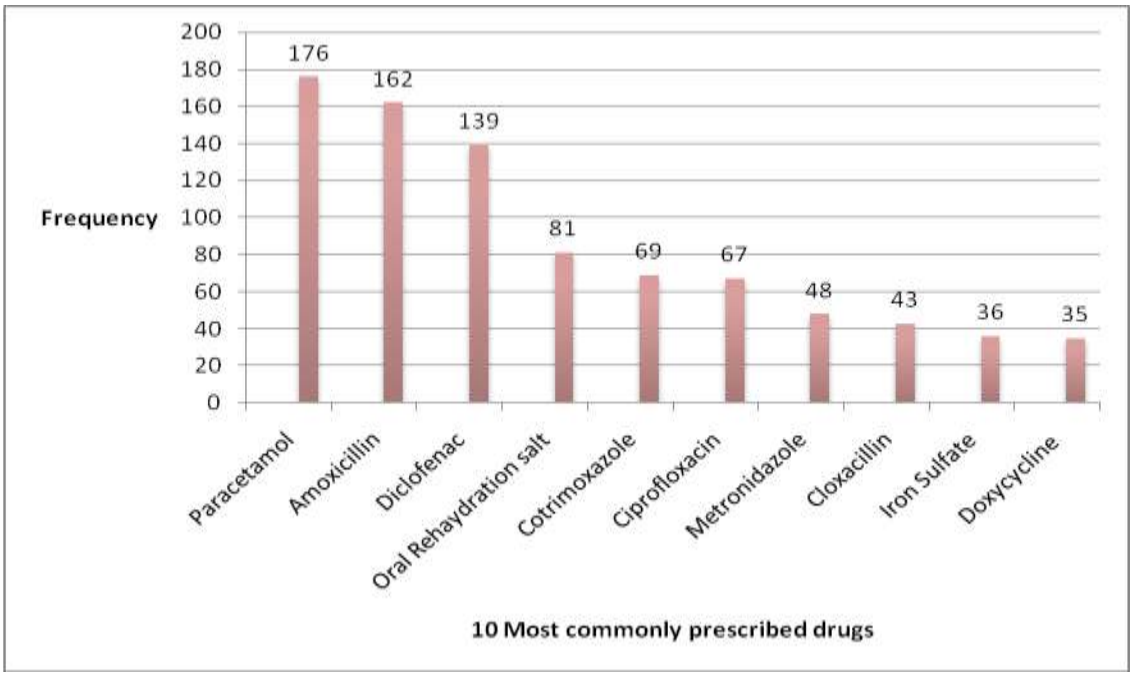

Figure 1: The top 10 most commonly prescribed drugs in the six governmental health centers

Table 1: Prescribing practices in governmental health centers in Bahir Dar town using WHO prescribing indicators

Prescribing indicator	Abay Mado health center	Shimbit Health center	Ginbot Haya health center	Shumabo health center	Hane health center	Bahir Dar health center	Overall average values
Average number of drugs prescribed	1.8	1.7	1.9	1.6	2	2.1	1.85
Percent of encounter with generic name	98	98.5	97	99	98.6	98.8	98.3
Percent of encounters with antibiotics	43	40	39	48	37	41	41.3
Percent of encounters with injections	13	15	14	17	13	14.5	14.4
Percent of drugs prescribed from EDL	100	100	100	100	100	100	100
Average dispensing time (in Minutes)	2	1.5	1.9	2.3	2.6	3	2.2
Percent of actually dispensed drugs	88	90	84	86	92	89	88.1
Percent of adequately labeled packages	19	17	21	24	30	33	24
Percent of patients with correct knowledge of dosage regimen	84	85	79	88	82.7	90	84.8
Availability of essential drug list	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Percent availability of key drugs	90	96	94	98	92	95	94.2

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