

Assessment of the Prescription Completeness and Drug Use Pattern in Public Versus Private Hospital, North West Ethiopia

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Abstract

Introduction: About one-third of the world's population lack access to essential medicines. Many of those who have access use them irrationally. Inappropriate prescribing is one of the manifestations of irrational medicine use.

Objective: The aim of the study is to assess prescription completeness and drug use pattern in public and private hospitals using the World Health Organization core drug use indicators.

Methods: 1200 prescriptions were collected retrospectively from prescriptions written for 1 year from outpatient pharmacies of the two hospitals. Exit interview was conducted to assess patient care indicators and health facility indicators were assessed through observation. Data were analyzed using SPSS version 20.

Results: All prescriptions contain treatment information (Drug name, Drug strength, Drug dose, Frequency and Duration) except Dosage form which was 12.8% in public hospitals. While only drug name and dose were stated in all prescriptions in private hospitals. The average number of drugs per prescription was higher in public (2.92) than private (2.26) hospital. Percentage of encounter with antibiotic was higher in private hospital 99.8% than public hospital 77.7%. However, the percentage of encounter with injection was higher in public hospital (41.5%) than private hospital (25.5%). The mean consultation time and dispensing time were 4.86 and 1.84 minutes, in public hospitals and 3.94 and 1.96 in private hospitals respectively. The percentage of drugs actually dispensed was 92.7% in private and 81.5% in public hospital, but only less than 12% of dispensed drugs were adequately labelled. A copy of essential Drug List was available in both hospitals.

Conclusion: Almost all prescriptions were not complete in both hospitals. All drug use indicators were out of the WHO recommendation. Therefore, effective intervention program such as sensitization for practitioners on rational medicine prescription is recommended.

Keywords: Prescription completeness • Drug use Pattern • Bahir Dar

Introduction

Essential medicines are one of the vital tools needed to improve and maintain health. Despite this fact, an estimated one-third of the world's population and more than half of developing countries lack regular access to essential drugs. Many of those who do have access are using them irrationally [1]. Rational medicine use (RMU) is well recognized as an important part of health policy. It requires that taking appropriate medication by patients to the right clinical needs, in right doses that meet their own individual requirements, for an adequate period of time and at an affordable price [2-4].

Irrational medicine use is becoming a global problem. Globally, more than 50% of all medicines are used inappropriately, either dispensed or prescribed incorrectly [4]. Irrational medicine use occurs with polypharmacy (when more than one medicine is used unnecessarily), with the use of wrong or ineffective medicine, or with under use or incorrect use of effective medicine. These actions negatively affect the quality of drug therapy and medical care [2,4]. Inappropriate prescribing is also a manifestation of irrational medicine use that occurs when medicines are not prescribed in accordance with the guideline. And also all the necessary information in the prescription should be completed by the prescribers, since incomplete information could lead to poor outcome and be harmful to the patient [1-5].

Drug utilization study as defined by the WHO, is a structured process

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which is used to assess the quality of drug therapy by engaging in the evaluation of data on drug prescribing, dispensing, and patient use in a society with special emphasis on the resulting medical, social, and economic consequences. These studies seek to monitor, evaluate, and suggest modifications in the prescribing practices with the aim of making the medical care rational and cost-effective [6].

Drug utilization research with the WHO drug use indicators is becoming increasingly necessary to promote rational medicine use and to identify problems related to medicine use especially in developing countries, like Ethiopia [2-4]. Conducting periodic studies of pattern of drug use in various hospital settings or patient populations is essential to identify specific medicine use problems, sensitize practitioners on rational medicine prescription and to critically analyze the current hospital drug policies and to make recommendations based on various guidelines to improve upon the current drug usage pattern [4-6]. The current study was designed to identify the major problems in prescription completeness and rational use of drugs in public and private hospital, by using the WHO indicators. The result of this study helps to prioritize the main intervention areas regarding rational use of medicines. It will also provide baseline information for researchers who are interested to conduct further studies to determine factors for drug use pattern in these facilities.

Methods

Study design

Institutional based cross-sectional study design was used to collect the quantitative data from prescription papers dispensed to outpatient pharmacies between April 1, 2019 and April 1, 2020 (1Year). Prescriptions which contained only drugs, and drugs and medical supplies and dispensed to outpatients were included in this study. However, the investigation excluded inpatient prescriptions, prescriptions with only medical supplies, fluids and/or parenteral nutrition. According to the WHO guide, at least

600 encounters should be included in a cross-sectional survey to describe the current prescribing practices, with a greater number if possible [7]. Therefore, Prescribing indicators were assessed retrospectively using a total of 1200 prescriptions from the two hospitals (600 prescriptions from each) were selected randomly among prescriptions filled between April 1, 2019 and April 1, 2020. Exit interview with 100 patients (50 patients from each hospital) and observation to all activities of the pharmacy department staff were conducted to gather necessary information to assess patient care indicators at the outpatient pharmacy of public and private hospital in May, 2020. Health facility indicators were assessed through observation of health facilities for the availability of drug formulary and key medicines at the facility during study period. The Federal Ministry of Health tracer Medicines list were used for the assessment of key drug availability in the hospitals [8]

Patients included for patient care indicator study were those who attend in outpatient pharmacy and willing to participate. Those who were severely ill, unable to talk and who were not willing to participate were excluded from this study. All the three groups of indicators were assessed based on the WHO/International Networks for Rational Use of Medicines (INRUD) guidelines [9].

Data collection and analysis

Statistical Packages for Social Sciences (SPSS) version 20 was employed for entry, and analysis of the quantitative data. In the statistical analysis, frequencies and percentages were obtained. The findings were interpreted according to standard values of WHO prescribing indicators.

Results

Prescription completeness

Prescriptions designate a specific medication and dosage to be administered to a particular patient at a specified time. Thus, all the necessary information in the prescription should be completed by the prescribers, since incomplete information could lead to poor outcome and be harmful to the patient [2, 5].

For the purpose of study, parts of a prescription are described as, patient related, treatment related, prescriber related and dispenser related information. The current study revealed that with regard to treatment information, all prescriptions contain treatment information except dosage form (12.8%) in public hospital. While in the private hospital only drug name and dose fully stated in all prescription. On the other hand, from the patient information, patient weight was filled only in 5.5% and 2.2% of prescriptions in public and private hospital respectively. In addition, diagnosis of the patient was poorly recorded in private hospital (4%) than public hospital (97.5%). In general in public hospital only 4(0.7%) prescriptions had complete information but in private hospital, there is no completed prescription (Tables 1 & 2).

Prescribing indicators

1200 prescriptions (600 prescriptions from each hospital) were analyzed, and a total of 1750 and 1357 prescribed drug products were obtained in public and private hospitals respectively. The average number of drugs per prescription was 2.92 + 1.6 for public hospital and 2.26+1.1 for private hospital. The total drugs prescribed by generic names accounted for 96.8 % at public and 70% at private hospital (Table 3).

Out of 1750 drugs prescribed in public hospital, 558 (31.8%) were antibiotics. The three most commonly prescribed antibiotics were Amoxicillin 150(26.9), ceftriaxone 84 (15.1%), and Ciprofloxacin 69(12.4%). In addition, 334(19.1%) of prescribed drugs were injections and the first three most commonly prescribed injections were ceftriaxone 86 (25.7%), metronidazole 72(21.6%) and frusemide 35(10.5%). In the private hospital, of the total drugs prescribed, 708 (52.2%) were antibiotics and the first three most commonly prescribed antibiotics were Amoxicillin 141(19.9%), Azithromycin 118(16.7%) and ceftriaxone 70 (9.9%). Injection also

Table 1: Prescription completeness assessment at public hospital from April 1, 2019 and April 1, 2020 (n = 600).

S/N	Patient information		Treatment information		Professional information			
	Parameters	%	Parameters	%	Prescribers		Dispensers	
					Parameters	%	Parameters	%
1	Full name	100	Drug name	100	Full name	99	Full name	97.8
2	Sex	100	Drug strength	100	Qualification	99	Qualification	97.8
3	Age	98.5	Drug dose	100	Date	97.7	Date	95.3
4	Weight	5.5	Frequency	100	Signature	99	Signature	98.5
5	Card #	99.7	Duration	100				
6	Diagnosis	97.5	Dosage form	12.8				
7	Address	37.7						

Table 2: Prescription completeness assessment at Private hospital from April 1, 2019 and April 1, 2020 (n = 600).

S/N	Patient information		Treatment information		Professional information			
	Parameters	%	Parameters	%	Prescribers		Dispensers	
					Parameters	%	Parameters	%
1	Full name	100	Drug name	100	Full name	77.3	Full name	0%
2	Sex	93	Drug strength	96.8	Qualification	67.3	Qualification	15.3
3	Age	93.7	Drug dose	100	Date	38.2	Date	0%
4	Weight	2.2	Frequency	97.8	Signature	73.8	Signature	31.5
5	Card #	94.2	Duration	97.7				
6	Diagnosis	4	Dosage form	41.3				
7	Address	10.2						

Table 3: Drug prescribing indicators at public and private hospital from April 1, 2019 and April 1, 2020 (n = 1200)

Prescribing indicators	Public Hospital		Private Hospital		WHO standard
	Number	Average/ Percentage	Number	Average/ Percentage	Average/ Percentage
Average number of drugs per encounter	1750	2.92	1357	2.26	1.6-1.8
Percentage of drugs prescribed by generic	1694	96.80%	950	70%	100%
Percentage of encounter with antibiotics	466	77.7	599	99.80%	20.0-26.8%
Percentage of encounter with injections	291	41.5	153	25.50%	13.4-24.1%
Percentage for drugs from essential drug list	1750	100%	1312	96.70%	100%

accounts 21.8% of the total prescribed drugs and ceftriaxone 70 (23.6%), metronidazole 57 (19.3%) and Frusemide 42(14.2%) were the three most commonly prescribed injections (Tables 4 & 5).

Facility specific indicators

In both hospitals a copy of Essential Drug Lists was available in the

hospital pharmacy. However, it doesn't distribute to staffs. There are 43 drugs which are considered as key drugs. During the study period, 88% and 72% of them were available in private and public hospitals (Table 7).

Patient care indicators

Average consultation time, Average dispensing time, Drugs actually dispensed, Drugs adequately labeled and Knowledge of correct dosage were evaluated. And we found that an average of 4.86 minutes and 3.94 minutes were taken to consult the patient in public and private hospital respectively. An average dispensing time for the prescribed drugs to the

Table 4: Most commonly prescribed antibiotics at the Public versus Private Hospital from April 1, 2019 and April 1, 2020 (n = 1200)

Antibiotics	Public Hospital		Private Hospital	
	Frequency	Percent	Frequency	Percent
Amoxicillin	150	26.9	141	19.9
Ciprofloxacin	68	12.2	88	12.4
Doxycycline	44	7.9	46	6.5
Cefixem	20	3.6	38	5.4
Azithromycin	66	11.8	118	16.7
TTC eye ointment	82	14.7	80	11.3
Gentamicin	17	3	41	5.8
Cloxacillin	34	6.1	34	4.8
Ampicillin	26	4.7	40	5.6
Crystalline penicillin	15	2.7	7	1
Augmentin	36	6.5	75	10.6
Total	558	100%	708	100%

Table 5: Most commonly prescribed injection at Public Versus Private Hospital from April 1, 2019 and April 1, 2020 (n = 1200)

Injections	Public Hospital		private Hospital	
	Frequency	Percent	Frequency	Percent
Ceftriaxone	86	25.7	70	23.6
Metronidazole	72	21.6	57	19.3
Furosemide	35	10.5	42	14.2
Diclofenac	31	9.3	25	8.4
Tramadol	17	5.1	38	12.8
Ampicillin	26	7.8	25	8.4
Gentamicin	17	5.1	20	6.8
Dexamethasone	24	7.2	11	3.7
diazepam	11	3.3	4	1.4
Crystalline penicillin	15	4.5	4	1.4
Total	334	100%	239	100%

Table 6: Summary of patient care indicators result obtained at public Hospital and private Hospital, May 2020 (N=100)

Patient care indicators	Public Hospital Average/percent	Private Hospital Average/percent	WHO standard
Average consultation time	4.86 min (SD=2.1)	3.94 (SD=1.9)	>10 Min
Average dispensing time	1.84min (SD=.88)	1.96 (SD=.92)	>90 Min
% drugs actually dispensed	75(81.5%)	101(92.7%)	100%
% of drugs adequately labeled	12%	8%	100%
% patients knowledge with correct duration of their treatment	30(60%)	44(88%)	100%
% patients knowledge with correct frequency	44(88%)	40(80%)	100%
% patients knowledge with correct route	50(100%)	50(100%)	100%
% patients knowledge with correct storage	5(10%)	11(22%)	100%

Table 7: Facility specific indicators at public and private hospital May, 2020

Facility specific indicators	Availability in public hospital	Availability in private hospital	Distributed to the staff (Y/N)
Availability of copy of EDL or formulary	Available	Available	No
% availability of key drugs in the stock	72%	88%	No

patient was 1.84 minutes for public hospital and 1.96 minutes for private hospital. Private hospital had better drug availability than public hospital. Since from the total 109 prescribed drugs, 101(92.7%) were dispensed. While in public hospital, out of the 92 prescribed drugs, only 75(81.5%) were actually dispensed.

Index of drugs adequately labeled was calculated as percentage of drug packages labeled with at least drug name, dose, strength, frequency and duration. The present study showed that only 12% and 8% of the drugs was adequately labeled in public and private hospitals respectively. Of the patients interviewed to assess their knowledge on prescribed drugs, all patients had knowledge on the correct route of drug administration in both hospitals. While only 5(10%) and 11(22%) of them had knowledge on how to store their medication in Public and Private Hospital respectively (Table 6).

Discussion

Prescription completeness

A prescription is an order for medication issued by a physician, Dentist, or other properly licensed medical practitioner. It is an important transaction between the physician and the patient. Thus, it has to be written legibly, accurately and completely in order to minimize errors in the dispensing and administration of medications. However, the present study showed that almost all the assessed prescriptions was incomplete, which contained at least one or more unfilled parameters. Patient full name and address are necessary on the prescription for identification purposes. In the current study, patient address was written in 37.7% and 10.2% of prescriptions in public and private hospital respectively. However, patient full name was completely filled in all prescriptions of the two hospitals. This result was higher than a study conducted in Addis Ababa university hospital (94.5%) and Gondar university hospital (67.93%) [4-10]. On the treatment information side, drug dosage form was least recorded (12.8%) in public and (41.3%) in private hospital. The other treatment related information's were filled in all prescriptions of public hospital and 96% and above of the prescription papers in private hospital. This indicates public hospital had better recording practice than the private one. These findings were also higher as compared to study conducted elsewhere [4-11].

If we look at the professionals' information, prescribers' information's were well recorded relative to the dispensers' information's in both hospitals. While in private hospital, no one wrote his/her name and the date, when they are received and filled in the pharmacy. All prescribers and dispensers should write their name and signature to respond any drug related problems. In general, the result of this study revealed the presence of relatively better practice in the hospitals in almost all prescription information parameters.

Prescribing indicators

In this study, the average number of drugs per encounter for private and public hospital was 2.26 and 2.92 respectively, which is not within the recommended limit by the WHO [7]. The result of the present study was better as compared to other studies conducted in Asia, like India (3.45), Pakistan (3.4), eastern Nepal (4.68) and in Africa, Nigeria (3.04), Kenya (2.9) [16] and Ghana 4.8 [13-17]. Comparable results were obtained from those studies conducted in different parts of Ethiopia, Blue Hora hospital (2.33) Ayder hospital (2.61) and Debremarkos hospital (2.4) [18-20]. Results in the recommended limit were also obtained in other studies done in Ethiopia, like, Jimma university hospital (1.84), Felegehiwot hospital

(1.46) [21,11]. Addis Ababa university hospital,(1.89) and five national regional states (Tigray, Amhara, Oromia, SNNPR, Benishangul - Gummuz) and Addis Ababa (1.99) [14,22]. The lesser the number of drugs prescribed; it is a positive sign of good prescribing practice. Therefore, the presented study showed that prescribing practice regarding the number of drugs per prescription was not good.

Prescribing by generic name helps the hospital pharmacy to have a better availability of pharmaceuticals. It can also reduce the confusion among the pharmacists while dispensing. They are often more economic than the branded ones. In the current study, law generic prescribing practice is observed in private hospital than the public hospital. From the total 1357 prescribed drug, only 950 (70 %) of them were prescribed with their generic name. While on public hospital, better generic prescribing practice were observed (96.8%). This value is still lower than that of the WHO recommendation (100%) [7]. Similar result was observed on a study conducted in Indonesia public and private primary health care facility 93.3% and 62.0% respectively [23]. This finding is less than that of Gondar university of Hospital (99.16%) [10]. Hawassa University Hospital 98.7%, Felege Hiwot Referral Hospital 97.4%, India 96.88% and UAE 100% [24-27]. On the other hand, lower values were obtained from studies conducted in Debremarkos Hospital 77.7% and some studies conducted abroad such as in Kenya 27.7 %, Nigeria 42.7%, Pakistan 71.6%, Nepal 59.02% [13-20].

Over use of antibiotics is not recommended, since it is one of the causes of anti- microbial resistance [28]. WHO set that as percentage of prescriptions with antibiotics should not be greater than 26.8% in health care facilities [7]. In the current study, almost all prescriptions in private hospital contain one or more anti-biotics 599(99.8%) and from the total prescriptions, 100(16.7%) of them contain two or more antibiotics. In addition, in public hospital, out of 600 prescriptions analyzed, 466(77.7%) of them had antibiotics. Higher values were also found in studies conducted at Debremarkos Hospital (71.36%), Hawassa University Hospital (58.1%) and Felege Hiwot hospital (42.02%) [24, 11]. Nigeria (43.8%) [10-15]. As compared to this study, lower values were seen in Gondar university hospital (29.14%) and Ayder hospital 32% [19]. Studies done Africa such as in Kenya, Ghana, and Nigeria had resulted values of 84.8%, 60%, and 43.8%, respectively [16-15]. These indicate that antibiotics prescribing needs to be regulated and setting prescribing limit to antibiotics may help to decrease over prescribing of antibiotics. And also conducting regular drug use evaluation is important to evaluate the status of antibiotics consumption. Excessive and unnecessary use of injections is expensive in terms of health care cost and they are the means for transmission of very serious blood-borne infections [9, 29]. The result of this study showed that, injections were prescribed in 291 (41.5%) and 153(25.7%) of the total prescriptions in public hospital and private hospitals respectively. The private hospital result was close to, but a bit higher than the WHO recommendation (13.4-24.1) [7]. While public hospital finding was not in WHO recommendation limit. Higher results were observed in a study conducted it different areas, such as in Debremarkos hospital 48.36%, Mekelle Hospital 42.2%, and in Hawassa University hospital 38.1% prescriptions had injectable [24-29].

The concept of essential medicines has been worldwide accepted as a powerful tool to promote health equity and its impact is remarkable for applying rational drug use [7-30]. In our study, all drugs prescribed from the public hospital were from the essential drug list (EDL) of the hospital, like other study reports from different health facilities in Ethiopia, such as Felege Hiwot hospital and Ayder hospital which adhered 100% with EML [11-19]. On the other hand in the private hospital, out of the total prescribed drugs, 96.7% of drugs were listed in the Hospital's essential drug list. This result is less than from the recommended value by WHO (100%). Similar to the studies done in Debremarkos hospital and Hawassa hospital, the results were 98.24% and 96.6%, respectively [20-24].

Patient Care Indicators

Average consultation time was (4.86 minutes) in public and (3.94

minute) in private hospitals, which is below WHO recommended value (>10 minutes) [7]. This duration is longer than that reported in Bule hora hospital (1.22min), Pakistan (2.2min) and Nepal (2.02min) [13-14]. The current study result was also had shorter duration as compared with other studies in Ethiopia, four hospitals in Western Ethiopia 18.20 mins, selected health facilities Eastern Ethiopia 5.6min [31,32]. This does not necessarily mean that patients receive better care, since a number of factors may influence the results of this indicator.

WHO recommends that pharmacists spend at least 3 minutes in orienting each patient [7]. Therefore, the duration of dispensation of 1.84 in public hospital and 1.96 in private hospital found in the present study is inadequate for proper pharmaceutical orientation. Such inadequacy was also reported in the literature in studies done in selected public hospitals in eastern Ethiopia (61.12sec) and Jimma university hospital (22.5sec) [21-33].

Even though diagnosis and prescription are successful, the patient may still not reach therapeutic success due to unavailability of medicines. In the present study, 81.5% and 92.7% of all drugs prescribed were provided in public and private hospitals respectively. This value is less than what ideally recommended (i.e., 100%). Private hospital has better availability of medicines than public one. This might be ease of procurement processes and adequate budget. The results of the present study were higher than a study conducted in Addis Abeba university hospital (70%) and in a selected public hospitals in Eastern Ethiopia (64.0%) [4-33].

To be a treatment effective, it is essential that the user receive information on different issues, including:

- a) potential side effects
- b) Interaction with other medications and foods
- c) Frequency and route of administration
- d) Storage conditions of medicines.

The current study result showed that, 10%, 60%, 88% and 100% of patients in public hospital were aware of the correct storage conditions, duration, frequency and route of administration for the medications received respectively. Comparable results were obtained in private hospital, 22%, 88%, 80% and 100%. However the result of the current study was lower than WHO recommendation (100%).

The levels of the dispensers' record essential information on the drug packages during dispensing were also studied. And it was found that, only 12% and 22% of dispensed products were adequately labeled in public and private hospitals respectively. Comparable result were obtained in studies conducted in Gondar hospital (8.47%) and Kenya (22.6%) [10-16]. The present result may not correspond to the reality of the healthcare services. Certain factors may have contributed to an underestimation of the actual level of dispensation, including lack of packaging materials.

Facility Specific Indicators

The availability of Essential Drug Lists and formularies are vital for health professionals' for continuous professional improvement. The current study revealed that, the two hospitals had a copy of EDL/formulary which is in agreement with the proposed norms (100%). The problem here was those materials were not distributed to staffs. Similar result was obtained in study conducted at Addis Ababa university Hospital [4]. The percentage of key drugs in the stock was also assessed in the two hospitals and 72% and 88% was obtained in public and private hospitals respectively (optimal value 100%). This value was better than a finding from selected public hospitals in eastern Ethiopia (66.7%) [34]. Limited availability of key drugs might be associated with budgetary constraints, inadequate drug supply system or poor inventory control system [13].

Conclusion

Almost all prescriptions were not complete and most of the WHO core drug use indicators were not met by the hospitals, except availability of copy of EDL. Therefore, we suggest the following measures:

- a) stimulating the development of therapeutic guides.
- b) Developing continued education programs that encourage prescribers towards more rational prescription and dispensers towards better orientation.
- c) Compliance with generic drug regulations
- d) Familiarizing the labeling of the medication dispensed, for the promotion of rational drug use practice in the hospitals.

Data Availability

The author confirms that data used to support the findings of this study are available from the corresponding author upon request.

Conflicts of Interest

The author declares that there is no conflict of interest regarding the publication of this article.

Funding Statement

The research did not receive specific funding but was performed as part of the employment of the author in Bahir Dar University.

Ethical Statement

The ethical approval was obtained from the Research and Ethical Review Committee and Institutional Review Board of Bahir Dar University, College of Medicine and Health Sciences. Then permission was taken from Pharmacy Service Directorate of the two hospitals. Participation was completely voluntary and participants were informed that they had the right to refuse or participate in the study. Study participants with inadequate knowledge were advised how to take their medicine properly after the interview.

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