Evaluation of drug use using WHO prescribing indicators in private clinics of WolaitaSodoCity, Southern Ethiopia

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Abstract
Introduction: *Drug use evaluation is a method of obtaining information to identify problems related to drug use and if properly developed, it also provides a means of correcting the problem and thereby contributes to rational drug therapy. The aim of this study wasto evaluate drug use based on WHO prescribing indicators in private clinics WoliataSodocity, Southern Ethiopia.*
Methods: *A cross sectional study was carried out inWolaitaSodo City private clinics from March 1 – May 30, 2017. Patients' medical records from March 2016 to Feb2017were reviewed for evaluation of WHO prescribing indicators. Total of 720 patient medical records were reviewed. Systematic random sampling was used after clustering health facility for patient load.Statistical Package for Social Sciences (SPSS) version-24 software was used for data management.*
Results:*Total of 720 records was reviewed. The male to female ratio was 0.79 with median age of participants 25(IQR 2-29). Among 720 patients 680 had drug prescription recorded.Total number of drugs prescribed was 2067. The average number of drugs per prescription was 3±1.5. Percent of encounters with antibiotics was 515(77%) and Percent of encounters with injection was 335(49.3%).Percentage of drugs prescribed from essential drug list/Formulary was 1650(79.8%) and the percentage of generic prescription was 1757(85%).*
Conclusion: *In this study all five prescription indicators at private health care settings in WolaitaSodo showed deviation from recommended WHO standard. Strict implementation and review of hindering factors for non-adherence for standard is recommended.*
Key words:*Drug use evaluation, private Clinic, Sodo.*

I.   Introduction

Drug use evaluation (DUE) is a method of obtaining information to identify problems related to drug use and if properly developed, it also provides a means of correcting the problem and thereby contributes to rational drug therapy (WHO 2003; Richard O, 2016).

WHO developed and tested standardized indicators of general outpatients care to ensure consistent, valid and reliable identification of drug use problems. Among these WHO indicators drug prescribing indicators which includes average number of medicines prescribed per patient encounter, percentage of medicines prescribed by generic name, percentage of encounters with antibiotic prescribed, percentage of encounters with injection prescribed, and percentage of medicines prescribed from an essential medicines list of formulary (Richard O, 2016; WHO 1993). Theseindicators are used to describe current treatment practices, compare health facilities and prescribers and allow for identification of potential drug use problems that may affect patient care. According to the opinion of the INRUD Research Team members that the prescribing indicator values for the numbers of drugs per encounter <2, prescribing by generics 100%, antibiotics <30%, injection 20%, and drug prescribing from the essential drug list 100 % (Richard O, 2016; WHO 1993;WHO2009).

According to World Health Organization (WHO) rational drug use requires that patients receive medications appropriate to their clinical needs, in doses that meet their individual requirements, for an adequate period of time, and at an affordable cost (HollandR et al., 2007). Unfortunately, more than 50% of all medicines are prescribed, dispensed, or sold inappropriately on a global basis and 50% of allpatients fail to take their medicines correctly (WHO2009).

Frequent use of injectable medicines is associated with serious adverse effects and risk of contamination where non-sterileinjections contributetothetransmissionofhepatitis, HIV/AIDSandblood-bornediseases (Desta Z et al., 2002; FMHACA 2012).Polypharmacy, theconcurrent use of multiple drugs, is

associated with the highest risk of drug interactions. It may cause an undesirable drug interaction that may result in either a therapeutic failure or toxicity. As the number of medications being taken by a given patient increases, the risk of DIs in that patient also increases (PeterLet al., 2003). Overuse of antimicrobials exerts pressure to increase rates of antimicrobial resistance and harmful in terms of economic cost and avoidable adverse reactions.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 (Desta Z et al., 2002).

There are studies in different areas of the world and Ethiopia reveal different irrational drug use including over use, frequent use of injections, over use of antimicrobials, use of prescriptions written in brand name prescriptions which are not in accordance to standard treatment guidelines or out of the essential drug list (EDL) are some of the concerns of drug utilization researches (WHO, 2011). Average medicines per encounter were reported as 2.36 and 3.1 ± 1.6 in the studies done in Western China (Lifang D et al, 2011) and Lucknow District India respectively (Kumari R et al., 2008). A study conducted in Pakistan had showed average number of drugs per encounter 4.5, percent of encounter with antibiotic 39.6%, 54.5% prescription from EDL and 23.3% generic prescription (Muhammad Aet al., 2018)

A study conducted in Kenya Private Health Facilities showed an average 3.10 drugs per encounter and 62.44% encounter with antibiotics prescribed (Kisengi M, 2013). Ten years data African region a systematic analysis (1995–2015) study revealed; in average 3.1 drugs per encounter, 46.8% encounters with antibiotics, 25% encounters with injections, 88% prescription from EDL and 68% generic prescription (Richard et al., 2016). A recent study in Senegal reveled; in average 2.52 drugs prescribed per encounter, 40% encounters with antibiotics, 32% prescription from EDL and 7% generic prescription (Bassoum O, et al., 2018).

Studies in public health settings of Ethiopia still showing deviation of indicators from recommended WHO standards. A study at health centers in Addis Ababa showed an average 2.03 drugs per prescription and 67.36% encounter with antibiotics (Jabo SA et al., 2018); in public hospital of Northeast Ethiopia 2.5 average numbers of drugs per encounter, 34.64% encounters with antibiotics, 83% prescribed from EDL and 90.53% generic prescription (Desalegn B et al., 2020). In Eastern Ethiopia a study showed 2.34 average numbers of drugs per encounter, 57.87% encounters with antibiotics and 90.61% generic prescription (Mekonnen S et al., 2017)

However, study in private clinics in Ethiopia is very rare. Therefore, the aim of this study was to evaluate the drug utilization in private clinics inWolaitaSodocity, Southern Ethiopia based on the WHO prescribing indicators.

II. Methods

A cross sectional study was conducted in sixprivate mediumclinics in Sodo city, Woliata Zone, Southern Ethiopia from March 1 to May 30, 2017.One year patients' medical records maintained from March 2016 to Feb 2017 was reviewed. This information was used to evaluate the drug prescribing pattern according to the WHO rational prescribing indicators: average number of drugs per prescription, percentage of medicines prescribed by generic name, percentage of encounters with antibiotic prescribed, percentage of encounters with an injection prescribed, and percentage of medicines prescribed from an essential drug list or formulary. According to WHO International Network of Rational Use of Drug (INRUD) recommendation, a total of at least 600 patient records are required for reliable drug prescribing indicators assessment among health facilities. With 20% allowance for unclean data total of 720 patient medical records were reviewed. Taking patient load in each clinic as a basis of clustering, the data was collected by systematic random sampling method in each clinic.The data was collected by the pharmacists who have at least two years of experience in dispensingand given appropriate orientation. Data was collected by format data collection format. Statistical Package for Social Sciences (SPSS) version-24.0 software was used for data management and descriptive statistics were performed for prescribing indicators.The study was approved and ethically cleared by WolaitaSodo University, College of Health Sciences & Medicine Research and Ethics committee. Cooperation letter was written bySodo city administrationhealth department to private clinics. Informed consent was taken from owners of clinics. The confidentiality of data collected was maintained.

III. Results

Total of 720 records were reviewed. The male clients were slightly lower than females with ratio of 0.79 (318/402). The median age of participants were 25 with inter quartile range of (IQR 2, 29). More than half age groups were between 15-30 years old (table 1)

From 720 patients cards reviewed in 112 cards there was no diagnosis recorded except history and in 608 patient cards there was diagnosis recorded. The top three diagnoses were malaria followed by respiratory system diseases and typhoid or typhus (table 2).Among 720 patients 680 had drug prescription recorded and the remaining 40 have no drug prescription documented. The total number of drugs prescribed was 2067 for 680

patients. The most frequent poly pharmacy was 3 drugs followed by 2 drugs (table 3). The average number of drugs per prescription was 3 ±1.5 (table 4). The most commonly prescribed therapeutics class were antibiotics727 (35.20%) followed by non-steroidal ant-inflammatory drugs (NSAID) 246 (11.9%) and Gastrointestinal drugs 200(9.67%) (Table 5).

Total of 515 (77%) of prescription contains at least one antibiotic per prescription. The most commonly prescribed antibiotics were amoxicillin followed by cephalexin and ciprofloxacin. Almost half of prescription 335(49.3%) contains at least one injectable with the most frequent injection of diclofenac.From total of 2067 drugs prescribed to 680 patients 1650(79.8%) were prescribed from essential drug list/Formulary of Ethiopia and the number of generic prescription were 1757/2067(85%) (Table 4).

Table 1: Scio-demographic profile of participants at WolaitaSodo private clinics, 2017(n=720)

Variables	Frequency	Percent
Age groups		
<1	15	2.08
1-14	199	27.64
15-30	375	52.08
31-64	102	14.17
≥65	29	4.03
Total	720	100
Sex		
Male	318	44.16
Female	402	55.84
Total	720	100

Table 2: Commonly diagnosed diseases at Wolaitasodo private clinics, 2017(n=720)

No	Diagnosis	Frequency	Percent
1.	Malaria	129	16.73
2.	Respiratory System diseases	123	15.95
3.	Typhoid/typhus	97	12.58
4.	Acute Febrile Illness	89	11.54
5.	Skin disease	45	5.84
6.	Diarrheal diseases	41	5.32
7.	Ameba/giardia	37	4.80
8.	Peptic ulcer diseases	23	2.98
9.	Urinary Tract Infection	19	2.46
10.	Others (multiple)	56	7.26
11.	Not documented	112	14.53
	Total	771	100

Table 3: Number of drugs in a prescription at Wolaitasodo private clinics, 2017(n=720)

Number of drugs in a prescription	Frequency	Percent
0	40	5.6
1	88	12.2
2	183	25.4
3	191	26.5
4	98	13.6
5	72	10.0
6	48	6.7
Total	720	100.0

Table 4: WHO recommended prescribing indicators assessed in Wolaitasodo private clinics, 2017(n=720)

No	WHO Indicators	Total drugs/encounters	Average/percent	WHO Standard	Deviation
1.	Number of drugs per prescription	2068 (n=680)	3±1.5	<2	0-2.5
2.	Percent of encounter with antibiotics	515 (n=680)	77	<30	47
3.	Percent of encounter with Injection	335(n=680)	49.3	<20	29.3
4.	Percent of Generic prescription	1757	85	100	15
5.	Percent of drugs from EDL*	1650	79.8	100	20.2

EDL= essential drug list

Table 5: Therapeutic/pharmacologic class of drugs prescribed atWolaitasodo private clinics, 2017(n=720)

therapeutic class	frequency	percent
Antibiotics	727	35.20
Non-steroidal ant-inflammatory drugs	246	11.90
Gastrointestinal drugs	200	9.67
Anti-malarial drugs	149	7.21
Fluids and electrolytes	111	5.37
Nutrition supplements	108	5.22
Anthelmintic	89	4.30
Respiratory system Drugs	79	3.82
anti-Ameba/giardiasis therapy	73	3.53
Topical steroids	66	3.19
Antifungal agents	63	3.05
Central Nervous System drugs	46	2.22
Antihistamines	34	1.64
Narcotics analgesics	31	1.50
Drugs for medical abortion	16	0.77
Cardiovascular system drugs	12	0.58
Endocrine therapy	9	0.44
Hematologic agents	8	0.39
Total	**2067**	**100.00**

Discussion

This study revealed generally deviation of prescription practice at wolaitasodo private medium clinics from WHO recommendation for prescription.

Level of Poly pharmacy

In these study settings the average number of drugs per prescription was 3±1.5 with about 82% of patients had taken ≥2 drugs. This is higher than different studies conducted at public health settings in Ethiopia; i.e. Bole health center (2.03) (Jabo SA et al., 2018), North East Ethiopia (2.5) (Desalegn B et al., 2020), and Eastern Ethiopia (2.34) (Mekonnen S et al., 2017). This difference might occur due to public settings have both diagnostic and pharmacy setting and so regulated due to government budget for pharmaceutical supply. This study showed similar poly pharmacy with African regions review result of ten years practice (Richard et al., 2016). However, the poly pharmacy at this study setting is better than study conducted at public sector of Ghana (Baba S et al., 2019), and private sector at Pakistan (Muhammad A et al., 2018).

Percent of encounter with antibiotics

Frequent use of antibiotic may lead to drug resistance which in turn may affect community health in all settings. However, this study showed very high deviation of antibiotic encounter from WHO recommendation. The percent of encounter with antibiotics was 77% with about 35.20% of all prescriptions were antibiotics. This is higher than available data from studies at public health settings in Ethiopia(Jabo SA et al., 2018; Desalegn B et al., 2020;Mekonnen S et al., 2017). It was also higher than African region review study (Richard et al., 2016) and private settings in Senegal (Bassoum O, et al., 2018) and Pakistan (Muhammad Aet al., 2018). This high

utilization of antibiotics in private settings may account for empiric prescription due to lack appropriate diagnosis and fear of patient feedback in community if therapeutic failures may happen.

Percent of encounter with Injection

Percent of encounter with Injection in this study was 49.3%. Generally injection prescription recommended only when patient cannot take other route of administration or if injection has superior bioavailability and efficacy than other alternatives. However, injection utilization in this study settings was more than twice the WHO recommended range (<20%) and quite higher than study findings in public health settings of Ethiopia (Jabo SA et al., 2018; Desalegn B et al., 2020;Mekonnen S et al., 2017)and African region review (Richard et al., 2016). It had still big variation from private settings in Pakistan (Muhammad Aet al., 2018) and Senegal (Bassoum O, et al., 2018). This very high utilization may be due to patient expectation of injection and fear of clinicians that patients may not revisit to clinic if no injection given. Therefore, the community may be high risk adverse effect, infection and higher cost with very high utilization of injection.

Percentage of medicines prescribed by generic name

The percentage of generic attained at settings of this study (85%) was lower than WHO recommendation (100%). still it is slightly lower than some studies at public health care settings in Ethiopia(Jabo SA et al., 2018; Desalegn B et al., 2020;Mekonnen S et al., 2017). However, since the data was collected from patient document at clinic but not prescription paper there is possibility of brand prescription for patient while documented by generic at patient card. When this finding is compared to African region review result which was 68% (Richard et al., 2016) it is better and much better when compared to recent African studies; Ghana 53%(Baba S et al., 2019), Senegal 7% (Bassoum O, et al., 2018).

Percentage of medicines prescribed from an essential medicines list or formulary

Attainment of Drugs prescribed from an essential medicines list or formulary was 79.8% that is lower than recommended standard (100%) and still lowers than some recent studies in Ethiopia(Jabo SA et al., 2018; Desalegn B et al., 2020;Mekonnen S et al., 2017) and African review 88%(Richard et al., 2016) and Ghana 96%(Baba S et al., 2019). When it compared to a private setting study at Wolkite town, Ethiopia (98%), rather than showing improvement it showed decrement (Bayew T et al., 2012). However, it is much better than recent studies in private settings of Senegal 32% (Bassoum O, et al., 2018) and Pakistan 54.5% (Muhammad Aet al., 2018).

Limitation of Study

Since the patient record document is reviewed, the completeness of documentation and similarity of documentation and prescription given to patient by prescription paper is uncertain. Further prescription paper analysis is recommended.

IV. Conclusion

In this study the attainment of all five prescription indicators at private health care settings in WolaitaSodoshowed deviation from recommended WHO standard. Hence it needs further large data analysis in wider settings. Government shall consider strict implementation and review of hindering factors for non-adherence for standard.

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