Indications and Patterns of Antibiotic Prescription in the Buea Regional Hospital of Cameroon

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ABSTRACT

BACKGROUND: Irrational drug use has been a global problem over the time and has a serious repercussion on the patient and even the prescriber. With the discovery of many drugs especially antibiotics in the last century, many prescribers have had the tendency of either under or over prescribing these drugs to patients, a habit which may negatively affect the patient.

OBJECTIVES: The main aim of this study was to describe pattern of antibiotic prescription in the Buea Regional Hospital (BRH), over a one year period (June 2012 and June 2013).

METHODS: It was a cross-sectional and retrospective descriptive study using prescription sheets of both inpatients and outpatients. Data obtained were analysed using Epi Info statistical software.

RESULTS: There were 1,576 prescribed drugs from 425 prescriptions with at least an antibiotic, with the mean number of drug per prescription being 3.7±1.3drugs and a mode of 3 drugs per prescription (38.8%, 95% C.I). As much as 47.5% had more than 4 drugs per encounter. More so, 637 antibiotics were prescribed giving a proportion of antibiotics per encounter of 40.4% with a mean of 1.5±0.7drugs, and the most commonly prescribed antibiotics was ceftriaxone, 191(30.0%) and metronidazole, 119(18.7%). The cephalosporins (30.0%) and penicillins (25.8%) were the most common class of antibiotics. 43.8% of the antibiotics were prescribed by brand names and 50.1% were administered via parenteral routes. The mean duration of antibiotic therapy was 5.5±4.5days. The most frequent indications of antibiotic prescription were gastrointestinal tract infections (22.6%) and respiratory tract infections (15.3%). There were 14.6% of the prescriptions with no indication clearly written and 6.4% had no information relating to the prescriber.

CONCLUSION: Antibiotic prescription in the BRH was inappropriate with main reason being lack of clearly defined working diagnosis. Polypharmacy is a big problem in this health facility. Ceftriaxone was the most frequently prescribed antibiotic with gastrointestinal tract infection being the most indication.

KEYWORDS: prescription, antibiotics, rational drug use, polypharmacy.

RÉSUMÉ

CONTEXTE : L'usage irrationnel des médicaments est devenu un problème mondial au fil du temps et a de graves répercussions sur le patient et le prescripteur. Avec la découverte de nombreux médicaments particulièrement des antibiotiques au cours du siècle dernier, de nombreux prescripteurs ont une tendance soit vers la sous soit vers la sur prescription de ces médicaments, une habitude qui peut avoir des répercussions négatives sur le patient.

OBJECTIFS : L'objectif principal de cette étude était de décrire les habitudes de prescription des antibiotiques au sein de l'Hôpital Régional de Buea (BRH), sur une période d'un an (juin 2012 et juin 2013).

MÉTHODES : Il s'agit d'une étude transversale, rétrospective et descriptive basée sur l'exploitation des feuilles de prescription des patients hospitalisés et non hospitalisés. Les données obtenues ont été analysées en utilisant le logiciel Epi Info.

RÉSULTATS: Il y a eu 1 576 médicaments prescrits, et 425 ordonnances avaient au moins un antibiotique. Le nombre moyen de médicaments par ordonnance était 3,7 ± 1,3 et le mode était de 3 médicaments par ordonnance (38,8 %, 95% C. I).

47,5 % des ordonnances avaient plus de 4 médicaments par consultation. 637 antibiotiques ont été prescrits donnant une proportion d'antibiotiques par rencontre de 40,4 % avec une moyenne de 1,5 ± 0,7 antibiotiques, et les antibiotiques les plus couramment prescrits était la ceftriaxone, 191 (30,0 %) et le métronidazole, 119(18,7 %). Les céphalosporines (30.0 %) et les pénicillines (25,8 %) ont été les classes d'antibiotiques les plus fréquentes. 43,8 % des antibiotiques étaient des médicaments de spécialités (marques) et 50,1 % ont été administrés par voie parentérale. La durée moyenne de l'antibiothérapie était de 5,5 ± 4,5 jours. Les indications plus fréquentes de prescription des antibiotiques étaient les infections du tractus gastro-intestinal (22,6 %) et les infections des voies respiratoires (15,3 %). Pour 14,6 % des prescriptions, aucune indication n'était clairement écrite et 6,4 % n'avaient aucune information concernant le prescripteur.

CONCLUSION: La prescription des antibiotiques est largement inappropriée à l'Hôpital Régional de Buéa et la raison principale est le manque de définition claire du diagnostic. La polymédication est un gros problème dans cet établissement de santé. La ceftriaxone est l'antibiotique le plus fréquemment prescrit, les infections du tractus gastro-intestinal étant l'indication la plus fréquente.

MOTS-CLÉS : Prescription, antibiotiques, utilisation rationnelle des médicaments, polymédication.

INTRODUCTION

Most patients desperately seek for remedies no matter what it takes to acquire it. They totally depend on healthcare providers to offer the best they can. Prescription patterns have great impact on the outcome of the patient's condition [1]. . Inappropriate prescriptions result in financial wastage and harm to patients and pharmaceutical industries [2,3]. Inappropriate prescriptions in our hospitals and irrational drug use by patients have become the norm in our society although it is a worldwide phenomenon. W.H.O. has issued guidelines on prescription of antibiotics but in its conference titled "The World Medicines Situation 2011" in Geneva 2011, it revealed that over half of all medicines are prescribed and dispensed inappropriately. In developing countries, less than 40% and 60% of patients in public and private sectors respectively are treated under W.H.O guidelines [2]. Furthermore, it is worth noting that only very few countries have regulatory boards to ensure rational and appropriate drug use. Cameroon has such an organ in the Ministry of Health but it is very ineffective. Antibiotic-use has been quite successful in treating bacterial infections. Their widespread use, misuse and or overuse have led to serious consequences on the morbidity and mortality rates. It can partly be due to rapidly increasing antibiotics resistance and spread of blood-borne like HIV, hepatitis B and C from use of unsterilized instrument. W.H.O report of 2011 stated that antibiotics overused and misused are worldwide and that in Europe some countries use more than double the number of antibiotics per head of the population compared to others with a similar disease profile. Inappropriate antibiotic prescription may have devastating consequences. Many antibiotics in Cameroon are sold over the counter or open markets with or without prescriptions for the sole interest of profit.

The primary goal of this research was to describe the patterns and indications of antibiotic prescription in the Buea Regional Hospital (BRH) and relate them to the indications for which they were prescribed.

MATERIALS AND METHODS

Ethical clearance was obtained from the Institutional Review Board of the Faculty of Health Sciences and authorizations given by the Regional Delegation of Health and the Management of Buea Regional Hospital. Informed consent was waived because it was a retrospective study. The study was conducted in the Buea Regional Hospital (BRH) - a secondary healthcare centre found in the South West Regional capital of Buea. It serves as the main hospital in the Buea Health District; with 7 health areas which have about 25 health facilities (public and private). It has a population of 131,325 inhabitants (65,714 men and 65,611 women) [8]. The hospital acts as a University Teaching Hospital and is one of the two Regional Hospitals in the South West Region of Cameroon.

This was a cross-sectional, retrospective and descriptive study covering the period from June 2012 to June 2013. Prescription records of both in-patients and out-patients consulted during this period were considered. Patients under routine antibiotic therapy such as HIV patients on cotrimoxazole prophylaxis against toxoplasmosis and also those on antituberculosis regimen were excluded. Factors relating to antibiotic prescription such as average number of drugs and the proportion of antibiotics per prescription; the most frequently prescribed antibiotics; the type of drug name (generic or trade) used; pharmaceutical formulations (oral, topical or parenteral); the indications and duration of therapy. The prescribed antibiotics indications were grouped based on the pathological conditions: respiratory tract, gastrointestinal infection, genitourinary tract (including gynecological related pathologies), skin, nervous system (including the CNS), musculoskeletal system, haematological and parasitic infections and obstetrical conditions (pregnancies, puerperium and childbirth).

The data obtained were stored and analyzed using the EPI Info statistical software. The analyzed results were presented as frequencies and proportions (percentages) in the form of tables and figures.

RESULTS

A total of 610 prescriptions were recorded of which 425 (70%) contained at least an antibiotic. All selected prescriptions had the name, age, address and sex of the patient. There were 342 (80.5%) and 83 (19.5%) inpatients and outpatients respectively. The mean age was 25.8 ± 19.7 years and patients prescribed at least an antibiotic were aged between 1 day and 60 years. A hundred and five (105 (24.7%) and 102 (24.0%) prescriptions had patients aged 21-30 years and 1 day-10 years respectively. Sex distribution and marital status showed 237 (55.8%) females and 232 (54.6%) unmarried whereas 241 (56.7%) prescriptions did not have the educational status of the patients. There were 1,576 drugs identified on prescriptions giving an average of 3.7 ± 1.3 drugs per prescription. The number of medications prescribed per encounter ranged from 1-8 drugs. Three (165 (38.8%) and four (102 (24.0%) medications per encounter were the most common while a single encounter had 8 (0.2%) medications (**Table I).**

Table 1: Table showing number of drugs prescribed per patient encounter.

Number of Drugs Prescribed per Encounter	Number of Prescriptions (%)
1	1 (0.2)
2	57(13.4)
3	165(38.8)
4	102(24.0)
5	58 (13.7)
6	27 (6.4)
7	14 (3.3)
8	1 (0.2)
Mean±SD	**3.7±1.3 drugs**

Antibiotics prescribed were 637 (40.4%) out of 1,576 medications giving an average of 1.5±0.7, with 259 (58.6%) prescriptions having one antibiotic and a lone prescription having up to 5 antibiotics. Eighteen (18) different antibiotics were recorded with ceftriaxone, 191, 30.0%) followed by metronidazole 119 (18.7%), ciprofloxacin 74 (11.6%), amoxicillin 60 (9.4%), amoxicillin-clavulanic acid 53 (8.3% and tetracycline (15 (0.2%) being the least prescribed (**Figure 1**).
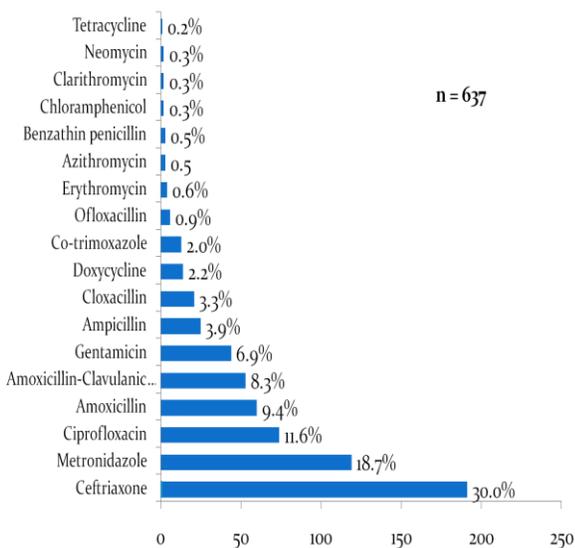

Figure 1: Most commonly prescribed antibiotics

These antibiotics appeared in 9 different classes with cephalosporins (191, 30.0%) occupying the first position due to ceftriaxone use (**Table 2**) followed by penicillins (164, 25.8%), nitroimidazole (metronidazole) (119, 18.7%) and phenicols (2 (0.3%) was the least prescribed. The prescribers used mainly generic names (358 (56.2%) and administered 319 (50.1%) of the antibiotics via parenteral routes.

Table 2: Class of prescribed antibiotics

Class	Frequency (%)
Cephalosporins	191 (30.0)
Penicillins	164 (25.8)
Nitroimidazole (Metronidazole)	119 (18.7)
Quinolones	80(12.6)
Aminoglycosides	45 (7.1)
Tetracyclines	15 (2.4)
Sulfonamides/Trimethoprime	13 (2.0)
Macrolides	8 (1.3)
Phenicols	2 (0.3)

The duration of treatment ranged from 1 – 15 days giving an average of 5.5 ±4.5 days. Seven (146, 22.9%) and ten (104, 16.3%) days were the most prescribed durations (**Table 3**).

Table 3: Duration of antibiotic treatment

Duration of Antibiotic treatment in days	Number of Antibiotics Prescribed (%)
1	59(9.3)
2	90(14.1)
3	78(12.2)
4	22(3.5)
5	98(15.4)
6	22(3.5)
7	146(22.9)
8	3(0.5)
9	2(0.3)
10	104(16.3)
12	1(0.2)
14	10(0.6)
15	2(0.3)
Mean±SD	**5.5±4.5 days**

The antibiotics were indicated for gastrointestinal tract (96, 22.6%), surgical procedures (62, 14.6%) respiratory tract (65, 15.3%), genitourinary tract infections (40, 9.6%), obstetric procedures excluding caesarean sections (33, 7.8%) skin (23, 5.4%) and 62 (14.6%) prescriptions had no clear indications (**Table 4**).

Table 4: Common indications for antibiotic prescription in BRH.

Indications	Number of Prescriptions N (%)
Gastrointestinal tract infection (including gastroenteritis, peptic ulcer disease, enterocolitis, cholescystitis etc)	96(22.6
Respiratory tract infection (including ENT infections)	65(15.3)
Surgical interventions including caesarean sections, I&Ds, laparotomies, wounds etc.	62(14.6)
Genitourinary tract infection	40(9.4)
Obstetric procedures (excluding caesarean sections)	33(7.8)
Skin	23(5.4)
Parasitic infection mainly malaria	19(4.5)
Neonatal infection	10(2.4)
Other diseases	15(3.5)
No Indications	62(14.6)

Note: Other diseases include diseases of the cardiovascular system, endocrine system Nervous system, diseases of musculoskeletal system which required no surgical intervention,

The gastrointestinal tract infections treated were salmonellosis (33.4%), gastroenteritis (22.9%) enterocolitis (22.9%), peptic ulcer disease (13.5%) and dental caries (1.0%) was the least (**Figure 2**).
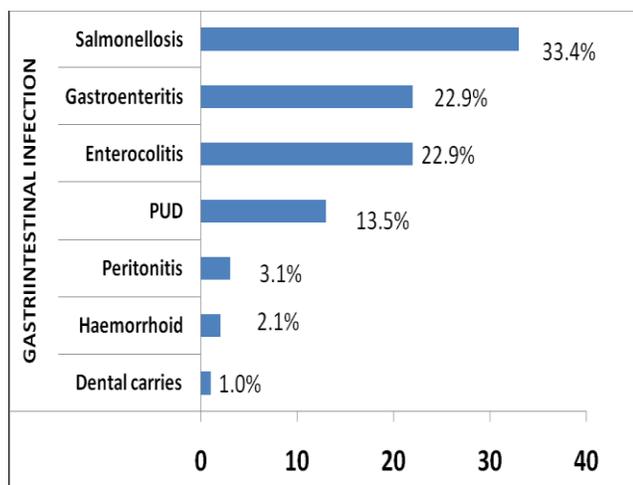

Figure 2: Distribution of gastrointestinal tract diseases indicated for antibiotics

Medical practitioners (377 (88.9%) signed most of the prescriptions with their names fully written followed by nurses (14, 3.3%), students (7, 1.6%) and 27 (6.4%) prescriptions had no information relating to the prescriber (**Figure 3**).
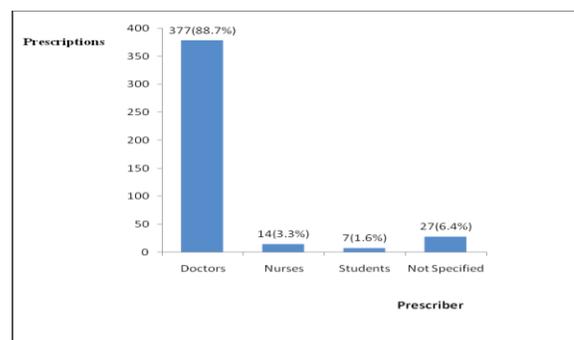

Figure 3: Distribution of prescribers in Buea Regional Hospital

DISCUSSION

The issue of incomplete information on prescription forms is not associated to only Buea Regional Hospital (BRH) in Cameroon. All prescriptions in this study had names of patients but that was not the case with Dessie Referral Hospital, Ethiopia (99.86%) [9] and Asir, Saudi Arabia (94.6%) [10]. In BRH, all (100%) prescriptions contained sex, age and addresses of the patients but not in 3 Bahraini health facilities where 0.5%, 3.5% and 3.8% prescriptions had no such information [13] and in Dessie, Ethiopia where 41.57%, 12.29% and 69.93% had no information on sex, age and addresses respectively [9]. In a study carried out in Saudi Arabia, 49.7% and 22.7% had no information on sex and age of the patients respectively and no prescription had patient's address [9]. All the prescriptions were dated in this study similar to findings obtained in Dessie in Ethiopia and Asir in Saudi Arabia [9, 10]. These countries have religious conservative societies which might have affected the prescription pattern.

Patients to which antibiotics were prescribed had ages cutting across the different age groups though ages between 1-30 years were dominant. The presence of more females and unmarried patients could not be proven to have influenced the use of antibiotics since most of the diseases treated were neither gender sensitive nor marital status oriented.

A total of 1,576 medications were prescribed ranging from 1 to 8 per encounter with an average of 3.7± 1.3 medications per encounter. This average was similar to that reported (3.99 drugs per encounter) in Ilorin University Teaching Hospital, Nigeria [4] and less compared to 2.7 medications per encounter in Egypt [13]. However, these values were above the W.H.O recommended reference value of 1.6-1.8 drugs per encounter [13]. This shows that polypharmacy is pervasive in our health facilities. Most of the prescriptions had 3 medications per encounter and as

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much as 8 medications were observed in a prescription. A total of 202 (47.5%) prescriptions had at least 4 medications comparable to studies in Abuja, Nigeria [13], 43.2% in Benin City, Nigeria [5] and a far smaller proportion (14.1%) in the Ilorin University Teaching Hospital [5].

Out of the 1,576 medications prescribed, 637 (40.4%) were antibiotics, prescribed as one antibiotic (58.6%) and a maximum of 5 antibiotics per encounter. This proportion of antibiotics was doubled compared to the W.H.O standard of 20.0-25.4% [13], results of studies from Dessie in Ethiopia, 24.37% [58], Yemen (23.8%) [15] and almost tripled the Pakistani finding of 14.6% [1]. Another study in Debre-Tabor, Ethiopia revealed a high proportion of antibiotic prescribed (64.1%) [16]. The differences in the proportion of antibiotic prescribed might be due to their availability in the hospital, differences in infectious diseases, training background, qualification and experience of prescribers since nurses and students were found to issue out prescriptions as well.

We had a total of 18 different antibiotics prescribed during the study with almost a third of the prescription being ceftriaxone. Ceftriaxone was the only cephalosporin used in the hospital followed by metronidazole 119 (18.7%) which is active against anaerobic bacteria. Other antibiotics used were ciprofloxacin 74 (11.6%), amoxicillin 60 (9.4%) and amoxicillin-clavulanic acid 53 (8.3%). This finding was different from studies conducted in other developing countries. In Dessie Referral Hospital, Ethiopia, amoxicillin (19.05%), chloramphenicol (14.02%) ampicillin (13.00%) and ceftriaxone (11.38%) were the most commonly prescribed antibiotics [9]. In a secondary health facility in Abuja, Nigeria, amoxicillin was also the most commonly prescribed antibiotic (31.79%), followed by metronidazole 27.37%, amoxicillin-clavulanic acid (14.04%) and ciprofloxacin (8.39%) [14]. Reasons for this disparity are similar to those cited above.

In terms of classes of antibiotics, a cephalosporins (30.0%) was the most commonly prescribed class of antibiotics during this study period followed by the penicillins (25(.8%), nitroimidazoles (metronidazoles), (18.7%), quinolones (12.6%) then aminoglycosides (7.1%) and others such as chloramphenicol, clrithromycin, neomycin and tetracycline were the least prescribed (0.3%, 0.3%, 0.3% and 0.2%). This was different with other studies [7, 9, 14] where penicillins were the most commonly prescribed class of antibiotics. In Sokoto which is located in the North West of Nigeria, quinolones were the most frequently prescribed class followed by the penicillins and metronidazoles [6].

Prescribers used generic names as opposed to trade/brand names (43.8%). WHO upholds a 100% prescription using generic names [13], therefore, the 56.2% use of generic names was low for a centre engaged in the training of medical students and nurses. With the advent of the essential drug concept and development of the Essential drug List adopted by most countries (Cameroon inclusive) [16], prescription by generic names will greatly reduce the cost incurred by patients when looking for brand names. This low prescription using generic name appears to be consistent with findings in Nigeria, 42.7% and 45.6% [5,7]. Higher values of 75.0% and 99.8% were found in Banglandesh and Cambodia respectively [18]. Generic prescribing should actually be advocated as it curbs incidences of drug duplication. Here, patients unknowing buy and administer the same drug because the different prescribers used a generic name and brand/trade name or two brand names of the same medication. This may increase incidences of adverse effects. One of the factors influencing the use of brand names rather than generic names is the intense lobbying (including gifts) by medical representatives of pharmaceutical companies.

The medications were administered either orally (309, 48.5%) or parenterally (319, 50.1%) at almost equal rates. In-patients, who constituted the majority of the participants, were usually treated with urgency and so most of their medications were administered via infusions or injection. This accounts for the high injectable forms recorded. Patients who were recuperating received orally administered medications as well as out-patients attending the hospitals. W.H.O allows 10.1—17.0% of the medications to be given parenterally. This high proportion of parenteral antibiotic use may be due to severity of the infectious disease conditions at the time and also to the fact that we had more inpatients (80.5%) during the study. There is a need for decrease parenteral drug use especially with the increase incidences of diseases such as HIV/AIDS, hepatitis B and C and others associated with increase parenteral drug use [5].

Antibiotic prescription must consider the microorganism concern, the right dose, frequency and how long to treat. The duration of treatment must be short to avoid the development of resistance. The W.H.O. recommends treatment of not more than 5 days. However, this study witnessed duration ranging from 1 to 15 days with an average duration of 5.5±4.5days. A majority of antibiotics was prescribed for 3 to 10days with mode of 7 days (22.9%).

Indications justifying the prescription of these antibiotics included gastrointestinal tract infections: gastroenteritis, peptic ulcer disease, enteric fever, enterocolitis, cholecystitis and others; respiratory tract infections: pneumonia, productive cough and bronchitis. Surgical

procedures included caesarean sections, incision and drainage of abscesses, wounds, laparotomies; diseases of the genitourinary tract such as gonorrhoea, syphilis and septicemia. Prescriptions with unknown indications present the shallow nature of history taking and diagnoses of the diseases. As high as 14.6% cases was recorded. It promotes unnecessary expenditure on the part of the patient, promotes antibiotic resistance in the long run and causes havoc if an unauthorized modification is done on a patient's treatment program. Although most of the prescriptions were done by medical practitioners, nurses were noted to have prescribed. This might be acceptable in the case of experience nurses but not by students. Some of these cases occurred when students are on call and there are no superiors to report the cases to for proper guidance. BRH which is modeled to be a University Teaching Hospital of the best standard needs to show good practices so that students do not copy unacceptable habits in medical practice.

CONCLUSION
Antibiotic prescription in the BRH was inappropriate and irrational because there was lack of clearly defined working diagnostic tools. Polypharmacy was a big problem in this health facility and it outstripped the standard set by the World Health Organisation. Prescriptions by trade/brand names (43.8%) were high and were mainly parenteral and oral formulations. The duration of

administration was more than the 5 days as stipulated by W.H.O with ceftriaxone and metronidazole being the most prescribed antibiotics for the management of gastrointestinal tract, respiratory tract and surgical and genitourinary tract infections. The authority of BRH should ensure that a proper guideline on rational use of drugs is instilled in the prescription pattern and management of patients in the hospital.

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AUTHORSHIP
All the authors found in this article contributed in the conception and design, acquisition, analysis and interpretation of data and the write up of this article.

DISCLOSURE OF CONFLICTS OF INTEREST
There is no conflict of interest at the time of submitting this article for review and subsequent publication.

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