

Use of antibiotics in selected tertiary and primary level health care centers of Bangladesh

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Abstract

A cross sectional study was conducted in inpatient department of seven primary level hospitals care centers (PLHCs) and six tertiary level hospitals (TLHs) of the country. Total 2058 hospitalized patients were interviewed over a six month period from October 2012. Most of the patients (85.9% in TLH and 100% in PLH) were prescribed with antibiotics at the time of admission. Only 6.4% patients of TLHs treated with antibiotic had culture proven infection and rest of the patient of TLH and all the patients of PLH were treated with antibiotic empirically. Top prescribed antibiotic was ceftriaxone (39.64% in TLH, 59.64% in PLH). Parenteral route of antibiotic administration was preferred for both at TLHs and PLHCs (63.3% and 76.9%). The results of the present study indicated that antibiotics were widely and inappropriately used without following standard guidelines or based on any rationality. This is an alarming situation, and needs to be addressed by the relevant authority to save the people from growing antibiotic resistance.

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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. Antimicrobial agents are the most frequently prescribed drugs among hospitalized patients. However, irrational drug use is prevalent, especially in the developing countries due to irrational prescribing, dispensing, and administration of medications.¹ Excessive and inappropriate antibiotic use can lead to the emergence of bacterial resistance. Resistance of common hospital-acquired bacteria to antibiotics is a worldwide problem. It can lead to increased morbidity, mortality, length of hospital stay and healthcare expenditures.² Rational use of drugs is based on 'Rule of Right' - 'The right drug given to the right patient at the right time with the right doses'. They should also fulfill safety, affordability, need and efficacy.³ Prevention of

antibiotic misuse is the key for controlling the antibiotic resistance. Approximately, 80 % of antibiotic are used in primary care in India.⁴ Therefore, it is immensely important to review in and outpatient prescribing practice on regular intervals. We therefore, initiated this study to investigate the present status of inpatient prescription pattern of antibiotics in urban and rural healthcare facilities in Bangladesh.

Materials and Methods

This observational type of cross sectional study was conducted under the supervision of microbiology department of Ibrahim Medical College, Dhaka. Six tertiary level hospitals (TLH) and seven primary level health centers (PLHCs) were included in this study. The seven TLH centers were BIRDEM general hospital, Dhaka, Mymensingh, Sher-e-Bangla, Rajshahi

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and Sylhet Osmani medical college hospitals. Seven PLHCs were Upazila (sub-district) health centers of Barisal, Mymensingh, Rajshahi and Sylhet districts. The study was done during the period of October 2012 to March 2013.

Total 2058 admitted patient were included in this study. All relevant information were collected by trained data collectors from the patient's treatment record file and documented in a pre-designed data sheet. These include the features of infection, culture and related investigations, diagnosis, antibiotics given with dose, route, and duration of therapy. Ethical approval was obtained from Institutional review committee of Ibrahim Medical College. Informed consent was obtained from all participants and facilities involved in the study.

Result

Total 2058 patients were included during the six months of study period of which 1612 patients were from TLHs and 446 were from PLHCs. Presenting features of patients prescribed with antibiotics were suspected respiratory tract infection (22.7%), gastro-intestinal tract infection (20.31%) and genitor-urinary tract infection (15.16%). The detail clinical conditions of the patients at PLH and TLH are given in Table-1. All the cases at PLHCs were treated empirically. No culture and sensitivity was done in PLHC prior to or during the antibiotic medication. Culture and sensitivity

Table-1: Presenting clinical conditions of the study population at TLH and PLHCs

Presenting clinical features	TLHs (n=1612)		PLHCs (n=446)		Total 2058	
	No	%	No	%	No	%
RT infection	340	21.1	127	28.5	467	22.7
GIT infection	242	15.0	176	39.5	418	20.3
GUT infection	278	17.2	34	7.6	312	15.2
Symptoms of RS	257	15.9	20	4.5	277	13.5
Skin diseases	177	10.9	37	8.3	214	10.4
Diseases of nervous system	110	6.8	02	0.4	112	5.5
Diseases of MS system	78	4.8	05	1.1	83	4.0
Diseases of CVS	17	1.1	05	0.3	22	1.4
Others	113	7.0	40	8.9	153	7.4

Note: RT= respiratory tract, GIT=gastrointestinal tract, GUT=Genitourinary tract, RS= reproductive system, MS= musculoskeletal, CVS= cardiovascular system

Table-2: Indication and pattern on antibiotic prescription at TLHs & PLHCs

Indication and prescription pattern	TLHs %	PLHCs %
A. Indication of antibiotics		
a. Culture proven cases	6.4	0
b. Empirical	93.6	100
B. Pattern of prescription		
a. Single antibiotic	66.2	82.3
b. Multiple antibiotics	23.9	17.7
c. Parenteral route	63.3	76.9
d. Oral	36.7	23.1
C. Antibiotics prescribed		
a. Ceftriaxone	39.6	59.6
b. amoxicillin+clavulanate	7.8	4.9
c. Ampicillin	2.5	2.3
d. Flucloxacillin	2.4	1.1
e. Cefixim	2.1	3.8
f. Ciprofloxacin	19.3	15.7
g. Cotrimoxazole	11.3	1.0
h. Metronodazole	0	9.0
i. Other	15.0	2.6

Note: others include antibiotics of different classes.

was done only in TLHs in 228 (14.1%) cases and organism was isolated from only 103 (6.4%; 103/1612) cases. Use of single antibiotics was more in PLHCs (82.29%) than that of TLHs (66%). Comparatively, multiple antibiotics were more prescribed in TLHs (23.9%). The pattern of prescription of antibiotics is shown in Table 2. Parenteral route of antibiotic administration was preferred for both at TLHs and PLHCs (63.3% and 76.9%). Top prescribed antibiotic was injection ceftriaxone (39.6% in TLHs, 59.6% in PLHCs) followed by ciprofloxacin (19.2% in TLHs and 15.7% in PLHCs). The pattern of antibiotic prescription at TLHs and PLHCs is shown in Table-2.

Discussion

Antibiotics are the most commonly used drugs. Their irrational use leads to a number of consequences; in term of cost, drug interactions, hospital stay and bacterial resistance.⁵ This study was conducted to explore the current state of rational use of antibiotics in rural and urban health care facilities of Bangladesh.

According to World Health Organization (WHO), 15% to 20% prescriptions are expected with antibiotics in

most of the developing countries where infectious diseases are more prevalent.⁶ In the present study, we have found that more than 85% of admitted patients were treated with antibiotics in TLHs. The rate was high as 100% in PLHCs. Similar trend of frequent antibiotic use had been reported from Pakistan (78%), Nepal (79.9%) and India (80%).⁷⁻⁹ Most common suspected infection was respiratory tract infection followed by gastro-intestinal tract infection. In acute gastro-intestinal and respiratory tract infections antibiotic are often not needed as viruses are the most common cause. WHO guideline for the treatment of diarrhea, clearly mention that antibiotics should not be used routinely. It is not possible to distinguish clinically the episode of diarrhea caused by enterotoxigenic *E. coli* from those caused by rota viruses.¹⁰ This type of practice may be due to over estimation of severity of illness, demand of rapid symptomatic relief by patients and tendency towards empirical therapy rather than personalized therapy.

As per standard procedure, identification of pathogen is necessary for prescribing an antibiotic. But in present study we have found that most of the patients were treated with antibiotics empirically. In PLHCs, laboratory facility was not available for the culture and identification of causative agents. That is why all the patients of PLHCs were prescribed antibiotic empirically. But it is interesting that only 6.2% cases of TLHs given antibiotics are based on culture and sensitivity results. Bacteriological tests were done only in 14.1% cases of THLs.

It was also observed that ceftriaxone was the most frequently (39.64% in TLH, 59.64% in PLH) prescribed antibiotics in admission followed by ciprofloxacin (19.23% in TLH & 15.69% in PLH). The extensive use of third generation parenteral cephalosporins has caused the emergence of extended spectrum beta-lactamases in Gram-negative bacteria worldwide.^{11,12} Third generation cephalosporins are being widely used in hospitals as empirical and prophylactic therapy. This would eventually limit their usefulness in life threatening conditions. Moreover, it appears that there was a tendency to use injectable antibiotics over oral forms. A large proportion of patients were given multiple antibiotics. Such irrational multidrug prescription would lead to increased cost of therapy, more adverse reaction and emergence of resistance.

The results of the study represent the current situation of antibiotic use in rural and urban healthcare facilities of Bangladesh. It is clear that antibiotics are used

irrationally both at urban and rural healthcare facilities. More attention should be given for the improvement of antibiotic prescription and its rational use. Mass awareness campaign should be introduced to address the uses and misuses of antibiotics.

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