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Prescribing Antibiotics Among Post-operative Patients in Obstetrics and Gynecology Department of Two Tertiary Care Hospitals of Bangladesh

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Abstract

Background:
Antibiotics are important in obstetrics and gynecology for preventing and treating infections, inappropriate use contributes to antimicrobial resistance.

Objective:
To evaluate the prescribing pattern of the antibiotics in postoperative patients admitted in gynaecology and obstetrics at Dhaka Medical College Hospital (DMCH) and Rangpur Medical College Hospital (RpMCH).

Methods:
This cross-sectional observational study was carried out among the post-operative patients admitted in Obstetrics and Gynecology Departments of Dhaka Medical College Hospital & Rangpur Medical College Hospital from July 2017 to June, 2018. A total of 500 sample; 250 from Dhaka center (DMCH) and 250 from Rangpur center (RpMCH), was enrolled through purposive sampling. Sociodemographic data of the participants, diagnosis, number of prescriptions containing antibiotic, numberof antibiotic per prescription, name of drugs in generic or in trade name were recorded.

Results:
Among 500 subjects, 250 were from gynaecological cases and 250 from obstetrical cases. The average age was29.88±11.29 years (range: 18-70 years), with most participants (56.6%) from rural areas. Among 3978 prescribed drugs, average number of drugs per prescription was 7.91±1.49 with 28.43 % being antibiotics. 34.23% drugs were prescribed by generic names and hospital supplied drugs were 39.64%. After surgery, 72.6% of patients received two injectable antibiotics, with higher rates in Dhaka (77.2%) compared to Rangpur (68%). The average number of injectable antibiotics was similar in both centers (2.17±0.48), but oral antibiotics were more common in Dhaka (2.22±0.48 vs 2.03±0.8). Most used injectable antibiotic was ceftriaxone (Dhaka center vs Rangpur center, 88.8%, vs 82.4%) and metronidazole (Dhaka center vs Rangpur center 95.2% vs 55.6%), while cefixime(Dhaka center vs Rangpur center 64% vs 44.4%) and metronidazole (Dhaka center vs Rangpur center 82.8% vs 22.8%) were the most common oral antibiotics at discharge.

Conclusion:
Ceftriaxone and Metronidazole were frequently administered to postoperative patients. This indicates a trend of polypharmacy that could be reduced by selecting broad-spectrum antibiotics after culture and sensitivity.

Keywords: Antibiotics, Gynecology, Obstetric, Rangpur, Dhaka, Bangladesh

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Introduction:

Antibiotics in obstetrics and gynecology are used both to treat infections and to prevent postoperative wound infections, a major cause of morbidity and mortality after surgery.[1] Despite careful procedures, infections can still occur. Antimicrobial resistance (AMR) is a growing global health problem,[2] particularly severe in Southeast Asia due to weak regulations and poor control of antibiotics.[3] In Bangladesh, antibiotics are accessible without prescriptions, leading to irrational use by unqualified providers.[4] The issue is aggravated by aggressive marketing and insufficient government oversight, [5] with many doctors relying on clinical judgment for antibiotic prescriptions.[1] Multiple antibiotics are often prescribed simultaneously, especially in hospitals where diagnostic facilities are inadequate facilities.[6,7] In many patients, the use of systemic antibiotics is often unnecessary or inappropriate regarding the drug or dosage. Studies in Europe and the United States show that 23 to 38% of inpatients receive systemic antibiotics. In Turkey, antibiotics are the most used drug, making up 20% of the market. In India, they represent over 50% of drug sales, and one study found that 75% of prescriptions include antimicrobials, though their necessity is uncertain.[8] Studies conducted in Bangladesh during last decade revealed that there is polypharmacy, high use of antimicrobials and injectables in hospitals and very low generic name prescribing.[9] Studies indicate that Ceftriaxone (62.9%), Metronidazole (17.2%), and Ciprofloxacin (9.5%) are the most used antibiotics, often in combination therapies (23.3%).[10] Ceftriaxone is frequently prescribed after caesarean sections to reduce maternal infections.[11] Third-generation cephalosporins are widely used for their broad-spectrum coverage. [12] Brand-name antibiotics are prescribed more than 80% of the time, with low rates of generic prescribing.[8,13] Most antibiotics are given through injections (48%), orally (26.9%), or topically (24.7%). [14,15] The study aims to evaluate antibiotic use patterns among postoperative patients in Obstetrics and Gynaecology at Dhaka and Rangpur Medical college.

Methodology:

This cross-sectional observational study was conducted on post-operative patients in the Obstetrics and Gynecology Departments at Dhaka Medical College Hospital (DMCH) and Rangpur Medical College Hospital (RpMCH) from July 2017 to June 2018 after the approval of Ethical review Committee (ERC) of Dhaka Medical College. A total of 500 patients were enrolled by purposive sampling. Participants were informed about the study's aims, procedures, and benefits before giving their written consent. They were told there would be no financial benefits and that they could withdraw at any time without affecting their treatment. Data was collected through face-to-face interviews using structured questionnaires that gathered socio-demographic details and information on medication used after surgery, including antibiotics. Besides these, data regarding diagnosis, number of prescriptions containing antibiotic, number of antibiotic per prescription, name of drugs in generic or in trade name, number of drugs written in each prescription were also recorded. The generic names and the pharmacological class of each drug prescribed to patients were identified by a drug data base published every year in Bangladesh. Moreover, snapshots of prescription or photocopy of the discharge sheet were collected. All the prescribers were blinded to reduce biases. Patients who withdrew or provided incomplete information were excluded from the study. All relevant information was collected using a prescription checklist and analyzed with SPSS version 19.0. Each question was given a code, and different responses were recorded for statistical analysis. Descriptive statistics were generated to ensure data homogeneity, with demographic variables shown as percentages. Age was reported as means ± standard deviations. The study estimated the number of drugs per sheet and presented results in tables, charts, or diagrams, highlighting key findings as needed.

Results:

Among 500 participants, 250 were from Dhaka Medical College Hospital and 250 from Rangpur Medical College Hospital. The study involved equal numbers of gynecological and obstetric surgeries. The average age was around 30 years, with most patients aged 21 to 30. A majority were married, had low education levels, and were housewives (Table-I).

Among the surgeries lower uterine caesarian section was the most common surgery performed in this study 50% (250) in both the centers followed by Laparotomy with salphingo-oophorectomy (33.6%) and hysterectomy (12.8%) in DMCH. But in Rangpur Medical College Hospital dilatation and curettage (19.6%) was the most common Gynecological operation conducted (Table-II).

Among 3978 prescribed drugs, average number of drugs per prescription was 7.91±1.49 with 28.43 % drugs was antibiotics. 34.23% drugs were prescribed by generic names and hospital supplied drugs were 39.64% (Table-III).

Majority (72.6%) of the patients were given 2 injectable antibiotics after surgery, in Dhaka center 77.2% and in Rangpur center 68%. Average

Table-I: Socio-demographic characteristics of the participants (N=500)

Socio-demographics	DMCH (n=250) no. (%)	RpMCH (n=250) no. (%)	Total (n=500) no. (%)
Mean age (years)	29.80±10.99	30.00±11.03	29.88±11.29
Major age group			
21 to 30 years	132(52.8)	131(52.4)	263(52.6)
Residence			
Urban	92(36.8)	125(50)	217(43.4)
Rural	158(63.2)	125(50)	283(56.6)
Educational status			
Illiterate	22(8.8)	15(6.0)	37(7.4)
Below SSC	135(62.4)	160(64)	295(63.2)
SSC	36(14.4)	26(10.4)	62(12.4)
HSC	15(6.0)	30(12)	45(9)
Graduate and above	21(8.4)	19(7.6)	40(8)
Occupation			
Housewives	220(88.0)	230(92.0)	450(90)
NGO service	10(4.0)	9(3.6)	19(3.8)
Government Service	9(3.6)	9(3.6)	18(3.6)
Business	8(3.2)	2(0.8)	10(2)
Unemployed	3(1.2)	0(0)	3(0.6)

Table-II: Details of the surgeries of the participants (N=500)

Type of surgery	DMCH (n=250) no. (%)	RpMCH (n=250) no. (%)	Total (n=500) no. (%)
LUCS	125(50)	125(50)	250 (50)
Laparotomy with salphingectomy	42(16.8)	3(1.2)	58(11.6)
Hysterectomy	32(12.8)	14(35)	67(13.4)
TAH	16(6.4)	3(1.2)	19(3.8)
TAH with BSO	1(0.4)	21(8.4)	22(4.4)
VH	15(6)	11(4.4)	26(5.2)
D & C	22(8.8)	49(19.6)	71(14.2)
Cystectomy	2(0.8)	6(2.4)	10(02)
Exploratory laparoscopy	12(4.8)	10(4)	22(4.4)
Myomectomy	7(2.8)	2(0.8)	9(1.8)
Posterior colpoperineorrhaphy	5(2)	3(1.2)	8(1.6)
Uterus repair	3(1.2)	4(1.6)	7(1.4)

number of injectable antibiotics given were similar both centers. At the time of discharge 53.8% of the patients were given 2 oral antibiotics (Table-IV).
Most used injectable antibiotic was ceftriaxone (Dhaka vs Rangpur center, 88.8%, vs 82.4%) and metronidazole (Dhaka vs Rangpur center 95.2% vs 55.6%). On the other hand, cefixime (Dhaka vs Rangpur center 64% vs 44.4%) and metronidazole was the most commonly used oral antibiotic used at discharge (Dhaka vs Rangpur center 82.8% vs 22.8%) (Figure-1 & 2).
The most common antibiotic combination used was ceftriaxone and metronidazole followed by ceftriaxone combined with gentamicin or amikacin (Table-V).

Table-III: WHO drug use prescribing indicators (N=500)

WHO prescribing indicator	DMCH (n=250)	RpMCH (n=250)	Total (n=500)
Total number of drugs prescribed	2023	1955	3978
Average number of drugs per prescription (Mean±SD)	8.0±1.42	7.82±1.55	7.91±1.49
% of drugs prescribed by generic name	40.6%	27.7%	34.23%
% of injections prescribed	61.9%	63.0%	62.45%
% of drugs prescribed from hospital supply	41.8%	37.4%	39.64%
% of antibiotics prescribed	27.76%	28.52%	28.43%
% of drugs prescribed from essential drug list- 2017	74.24%	73.20%	73.73%

Table-IV: Details of the antibiotic use after surgery (N=500)

Antibiotic used	DMCH (n=250) no. (%)	RpMCH (n=250) no. (%)	Total (n=500)
Number of injectable antibiotics used after surgery			
1	8(3.2)	21(8.4)	29(5.8)
2	193(77.2)	170(68)	363(72.6)
3	46(18.4)	55(22)	101(20.2)
4	3(1.2)	4(1.6)	7(1.4)
5	5(2)	6(2.4)	11(2.2)
Mean±SD	2.17±0.48	2.16±0.58	2.17±0.53
Number of oral antibiotics used at discharge			
1	33(13.2)	89(35.6)	122(24.4)
2	147(58.8)	122(48.8)	269(53.8)
3	53(21.2)	31(12.4)	84(16.8)
4	15(6.0)	6(2.4)	21(4.2)
5	2(0.8)	2(0.8)	4(0.8)
Mean±SD	2.22±0.48	1.84±0.79	2.03±0.80

Table-V: Pattern of commonly usedcombined injectable antibiotics according to types of surgery

Type of surgery	Ceftriaxone + Metronidazole		Ceftriaxone+ Metro+ Gentamicin/amikacin		Ciprofloxacin+ Metronidazole		Meropenem+ Metronidazole	
	DMCH no. (%)	RpMCH no. (%)	DMCH no. (%)	RpMCH no. (%)	DMCH no. (%)	RpMCH no. (%)	DMCH no. (%)	RpMCH no. (%)
LUCS	10 (40)	70 (28)	25 (10)	40 (16)	-	-	-	15 (6)
Laparotomy with salphingectomy	50 (20	20 (8)	4 (1.6)	6 (2.4)	-	-	-	-
Hysterectomy	20 (8)	15 (6)	10 (4)	10 (4)	-	-	2 (0.8)	10 (4)
Other surgeries	10 (4)	9 (3.6)	5 (2)	-	2 (0.8)	40 (16)	-	-
D & C	8 (3.2)	10 (4)	-	3 (1.2)	12 (4.8)	2 (0.8)	-	-

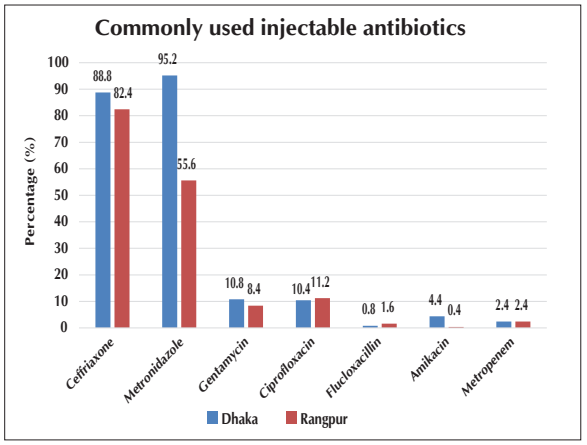

Figure-1: Commonly used injectable antibiotics (N=500)

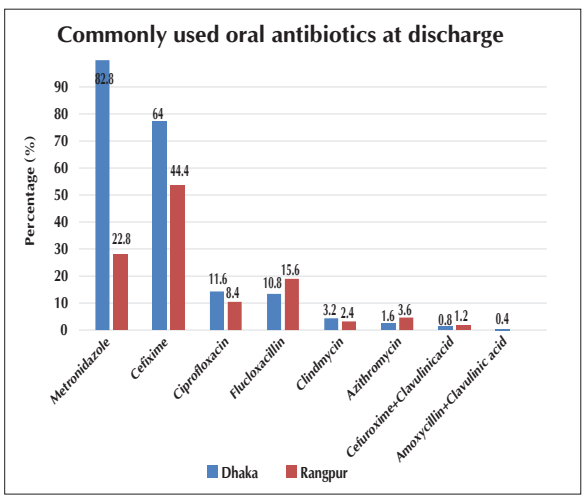

Figure-2: Most commonly used oral antibiotic at discharge (N=500)

Discussion:

The tertiary level hospitals have been chosen because the prescribing patterns of the postoperative department of tertiary level hospitals are often copied by community practitioners. Mean age of all study subjects were 29.88±11.29 years with majority in the age group of 21-30 years. As both Gynecological and Obstetric surgical cases were included in this study, the mean age differed from other studies. In a study on 1807 patients, maximum number of patients were in age group of 18 to 30 yrs (980; 54.2%).[8] Jowarder RJ reported the majority aged 31–45 years (48.9%; mean age 38.5±9.3 years).[16] These findings are consistent with previous studies where 54.2% of patients were aged 18–30 years in one series of 1807 cases, Sharma et al,[17] reported a mean age of 37.86±15.51 years, Latha et al,[18] observed 86% in the 20–30-year group, and Balla et al,[19] found a mean age of 28.88±9.32 years.

The types of surgeries differed based on study design and sampling. In this study, lower uterine caesarian sections (LUCS) were most common at 50%. Other studies reported higher rates of LUCS by 56.5%,[20] 127 cases[17] and 93.7%[21] while Divyashree et al[22] focused only on gynecological cases and found hysterectomy was most common (87%).

In the study, average number of drugs per prescription was 7.91±1.49 with 28.43 % being antibiotics, which exceeds the WHO recommendation of 2.0 drugs per prescription.[23] Other studies noted averages of 9.8 and 12 drugs per visit.[21,24] The Dhaka center had more prescribed drugs than the Rangpur center, likely due to complex cases and drug availability. Keeping the number of prescribed drugs low is crucial to avoid drug interactions, prevent bacterial resistance, and reduce hospital costs. The average number of injectable antibiotics was 2.17±0.53 and oral antibiotics at discharge was 2.03±0.80. Previous studies indicated an average of 2.3 antibiotics per prescription. [8,13] Sawhney N et al found that most patients received medications in injectable forms (48%) and 26.9% as oral preparations.[8] Devi et al had similar findings, with 63.01% of antibiotics given parenterally and 29.14% orally.[14]

The predominant antibiotic combination used was ceftriaxone and metronidazole, with some patients also receiving ceftriaxone in combination with gentamicin or amikacin. At discharge, ceftriaxone was frequently replaced by oral cefixime, particularly in Dhaka, where more oral antibiotics were prescribed compared to Rangpur, where metronidazole was administered injectably for 2 to 3 days without transitioning to oral forms. Neither center adhered to the BSMMU guidelines or the Standard Clinical Management Protocols from the Directorate General of Health regarding antibiotic usage. Jowarder RJ et al highlighted that metronidazole (55.7%) and ceftriaxone (45.6%) were the most prescribed antibiotics, followed by gentamicin (13.7%), cefuroxime (14.1%), ciprofloxacin (11.9%), and flucloxacillin (5.7%).[16]

Sawhney et al also reported Cefuroxime (17.3%) and Framycetin (24.7%) being common, [8] and a study in Bangladesh reported Ceftriaxone (30.19%), Cefixime (18.87%), and Amoxicillin (16.98%) as the most used agents.[25] additionally, Gor et al, found Amoxicillin+Clavulanic acid (6.59%) to be the most common fixed-dose combination.[26] Ceftriaxone-based regimens remained prevalent post-caesarean section, aligning with WHO guidelines for antibiotic prophylaxis against maternal infections.[18] A recent survey indicated that 55.57% of Bangladeshi physicians prescribed antibiotics empirically, favoring cephalosporins (26.9%).[10]

In Bangladesh, the practice of prescribing drugs by generic name is quite low,[20] with an average of three drugs prescribed by generic name, especially in Dhaka. Drug availability in government hospitals may affect this rate. Brand-name prescribing was notably high (>80%), while generic prescribing remained low (37.71%) in other studies.[8,13,16]

Conclusion:

Ceftriaxone and Metronidazole were frequently administered to postoperative patients. The use of 2 to 3 antibiotics indicates a trend of polypharmacy that could be reduced by selecting broad-spectrum antibiotics after culture sensitivity testing. A nationwide study is advised to accurately assess the situation across the country.

Limitations:

The antibiotics utilization pattern was limited to express two tertiary care center and therefore not representative of generalized countrywide and rationality of prescriptions was not checked.

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