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Study on prescription pattern of antibiotics in Dermatology OPD of a tertiary care teaching hospital of tribal region of India

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Abstract

Objectives: To assess the prescription pattern of Antibiotics in Dermatology OPD of a tertiary care teaching hospital of Bastar district, a tribal region of Chhattisgarh state at central-south India.

Methods: All the prescriptions issued to the patients attending the dermatology OPD from January 2015 to March 2015 were recorded and assessed as per WHO guidelines for Drug Utilization Studies.

Results: The total number of drugs prescribed in the 3650 prescriptions was 10,002 and average number of drugs per prescription being 2.74. For 12.96% patients, ≥ 4 drugs were prescribed on a single prescription. Antibiotics were prescribed in 18.68% of total prescriptions. Antibiotics were most commonly prescribed for *Acne vulgaris* (8.16% of total prescriptions). Most preferred route for Antibiotics administration was oral (66.51%). Majority of the Antibiotics were given by the combination therapy of oral and topical route (79.57%). Injectable Antibiotics were prescribed in 0.69% of total Antibiotics use. The most commonly used antibiotic was Doxycycline (33.87% of total prescriptions containing antibiotics) followed by Amoxicillin 24.34% and Azithromycin 13.34%. Large numbers of the Antibiotics (81.96%) were prescribed by generic names.

Conclusions: *Acne vulgaris* was most common indication for antibiotics in the studied dermatology OPD. We found good prescribing habit in our study but adequate information was not written in some records with regards to the quantity of the topical antibiotics and prescribing by generic name. Systemically Beta-Lactam antibiotics and topically Mupirocin were the two most commonly prescribed agents. Prescribing combination of oral antibiotics with topical antibiotics was found to be high.

Keywords: Antibiotics, Prescription, Audit, Dermatology, Tribal.

1. Introduction

Skin is the largest and most exposed organ of human body, thus prone to various kinds of injuries, infections and infestations. Many systemic diseases also have their dermatological manifestations. Skin is the 18th leading cause of health burden worldwide [1]. Dermatological conditions account for up to 2% of consultations in general practice worldwide [2].

Infections responsible for skin diseases were mainly caused by bacteria, virus and fungi. Bacterial infections of the skin are common among the infections. Most of them are caused by gram-positive bacteria *Staphylococcus aureus*, *Streptococcus pyogenes* and *Propioni bacterium* acnes. Very few cutaneous infections are caused by gram-negative bacteria e.g. *Pseudomonas*

aeruginosa, *Pasteurella multocida*, *Capnocytophaga canimorsus*, *Bartonella* sp., *Klebsiella rhinoscleromatis*, and *Vibrio vulnicus* [3].

Problem of emergence of resistant organisms is alarmingly high globally. Irrational and inappropriate antibiotic prescription is the major contributing factor for developing drug resistance in addition to poor patient compliance. According to a report from the Centre for Disease Control and Prevention in 2013, an estimated two million illnesses and 23,000 deaths developed from infections with resistant bacteria [4].

Based on pharmaceutical industry monitoring data, Dermatologists in the United States account for almost 5% of antibiotic prescriptions and that too for prolonged duration, thus dermatologists may potentially contribute to the antibiotic resistance [5].

Periodic prescription audit is a way to control irrational prescribing. It minimize overuse and misuse of drugs, enhance the therapeutic efficacy, minimize the adverse effect, plan essential drug selection, optimize the cost of the therapy, provide useful feedback to the clinician and estimate the drug need of the community, thus have a favourable impact on the standards of treatment [6]. Rational use of antibiotics means that right antibiotics should be prescribed for the right patient in adequate dose for the sufficient duration. So inappropriate or bad prescribing habits represents a potential hazard to patients such as toxicities, development of microbial resistance and adverse economic impacts due to the high cost [7].

The aim of this study is to analyse various aspects of prescription pattern and rational use of antibiotics by dermatologists to generate the base line data and thus to help the dermatology prescriber in achieving rational and affordable treatment to their patients.

2. Materials and methods

This prospective observational study was carried out in Late B.R.K.M. Govt. Medical College, a tertiary care teaching centre situated at Jagdalpur city of Bastar district, a tribal region of Chhattisgarh state of India for duration of three months from January 2015 to March 2015 after taking permission from the Institutional Ethics Committee. All the prescriptions issued to the patients attending the dermatology outpatient department following the consultation were entered in the case record forms as per WHO guidelines (1993) for Drug Utilization Studies.

The data collected included age, gender, symptoms, diagnosis, number and class of drugs, name of antibiotics with the dose, duration, strength, quantity to be applied and frequency of administration. For the ease of calculation, some commonly used non antibiotic antibacterial agents e.g. sulphonamides were also included with the antibiotics.

3. Results

3.1 Patient demographics

This study included 3650 prescriptions collected from various age groups comprising of around 51.48% male and 48.52% female patients. The patient's name, age and sex were mentioned on 100% of the prescriptions. A maximum of around 32.63% prescriptions were collected from age group of 21-30 year followed by 23.64% from the age group of 11-20 year.

Table 1: Socio-demographic characteristics of patients

	Characteristics	Frequency (n=3650)	Percentage
Gender	Male	1879	51.48
	Female	1771	48.52
Age	0-10	395	10.82
	11-20	863	23.64
	21-30	1191	32.63
	31-40	539	14.77
	41-50	331	9.07
	51-60	186	5.10
	>60	145	3.97

3.2 Disease distribution

A total of 124 different dermatological disorders were observed in the current study during analysis of 3650 prescriptions. Most common cases reported were scabies (9.51%), *Acne Vulgaris* (8.16%) and *Allergic Contact* Dermatitis (5.42%). Diagnosis was written in 89.31% of the prescriptions.

Table 2: Distribution of common skin conditions as per diagnosis

Diseases/Conditions	Total cases (n=3650)	Percentage of total prescription
Scabies	347	9.51
Acne Vulgaris	298	8.16
Allergic Contact Dermatitis	198	5.42
Tinea Carporis	157	4.30
Furuncle/Carbuncle	153	4.19
Melasma	138	3.78
Urticaria	121	3.32
Tinea Cruris	93	2.55
Post Inflammatory Hyperpigmentation	85	2.33
Pityriasis alba	82	2.25
Rest diseases/conditions	1978	54.19

3.3 Drug utilization pattern

The total number of drugs prescribed in the 3650 prescriptions was 10002 with the average number of drugs per prescription being 2.74. The maximum number of drugs on a single prescription was seven and the minimum was one. For 473 patients (12.96%), ≥ 4 drugs were prescribed on a single prescription. Injections were minimally prescribed to the patients. No drugs prescribed in 4.15% cases and were treated by Laser, minor surgical procedure or reassurance. Fixed dose combinations were given in 1.38% cases. Total 8% of the prescriptions carried instructions or special instructions to patient, rest all patients were given verbal instructions.

Of the 10002 drugs, the most commonly prescribed class of drugs was Antiallergics (23.35%) followed by Antacids (17.52%) whereas Antibiotics were 13.02% of total drugs prescribed.

Table 3: Main therapeutic categories of drugs

Category	Total Number of Drugs (n = 10002)	Percentage
Analgesics	343	3.43
Antacids	1752	17.52
Antiallergics	2336	23.35
Antibiotics	1302	13.02
Antiemetics	71	0.71
Antifungals	1468	14.68
Corticosteroids	1030	10.30
Scabicides	921	9.21
Miscellaneous	779	7.79
Total	10002	100

3.4 Prescription Pattern of Antibiotics

Antibiotics were prescribed in 682 prescriptions (18.68% of total prescriptions). The total number of Antibiotics prescribed in the 3650 prescriptions was 1302 (13.02% of total drugs prescribed). Antibiotics are most commonly prescribed for *Acne vulgaris* (298 patients, 8.16% of total prescriptions) followed by Furuncle/Carbuncle (153 patients, 4.19% of total prescriptions) and Hansen's disease (50 patients, 1.37% of total prescriptions).

Table 4: Common indications for Antibiotics in current study

Diagnosis	No. of Prescriptions	Percentage of total prescription (n=3650)
Acne Vulgaris	298	8.16
Furuncle/Carbuncle	153	4.19
Hansen's Disease (Leprosy)	50	1.37
Impetigo	41	1.12
Infective Eczematous Dermatitis (IED)	36	0.99
Genital Ulcer	16	0.44
Trophic Ulcer	14	0.38
Acneiform Eruption	12	0.33
Recurrent Furunculosis	11	0.30
Syphilis	10	0.27
Others	41	1.12
Total	682	18.68

Most preferred route for administration of Antibiotics was oral (866 out of 1302, 66.51%). Majority of the Antibiotics were given by the combination therapy of oral and topical route (1036 out of 1302, 79.57%) while very few Antibiotics (0.15%) were given by topical only route. Injectable Antibiotics were prescribed only in 0.69% of total Antibiotics use.

Table 5: Routes of administration of antibiotics

Routes of administration		Frequency (n = 1302)	Percentage
Topical		2	0.15
Systemic	Oral	255	19.59
	Injection	9	0.69
Topical + Oral (425 + 611)		1036	79.57
Total		1302	100

Among the all systemically used antibiotics (excluding antibiotics in Kit), most commonly used antibiotic was Doxycycline, used in 33.87% of total prescriptions containing antibiotics (231 out of 682) followed by Amoxicillin 24.34% and Azithromycin 13.34%. Antibiotics in kit form were most commonly used for Hansen's disease (9.38%). Injectable antibiotics were only prescribed in 1.32% of total prescriptions containing antibiotics.

Table 6: Prescription pattern of systemic antibiotics

Route	Class/Group	Drug	Frequency (n= 682)	Percentage	Conditions/Diseases
Oral	Penicillins	Amoxicillin	166	24.34	Folliculitis, Furuncle, Infective Eczematous Dermatitis, Trophic Ulcer, Chronic Burn Ulcer, Diabetic foot
		Amoxicillin-Clavulenic acid	46	6.74	Folliculitis, Furuncle, Carbuncle
		Cloxacillin	6	0.88	Macrolides
	Cephalosporins	Cefadroxil	9	1.32	Folliculitis
		Cefixime	29	4.25	Folliculitis, Gonorrhoea, Infected scabies
		Cephalexin	2	0.29	Oral Ulcer
		Azithromycin	91	13.34	Acne vulgaris, Genital Ulcer, Gonorrhoea
		Erythromycin	30	4.4	Impetigo, Pityriasis Lichenoid Chronica, Pityriasis Rosea
	Fluoroquinolones	Ciprofloxacin	36	5.28	Folliculitis, Furuncle
		Ofloxacin	41	6.01	Folliculitis, Furuncle
	Sulfonamides	Cotrimoxazole	11	1.61	Recurrent furunculosis
	Tetracycline	Doxycycline	231	33.87	Acne vulgaris, Genital Ulcer, Acneiform eruption, Syphilis
	Rifamycins	Rifampicin	11	1.61	Recurrent furunculosis
	Oxazolidinones	Linezolid	7	1.03	Trophic ulcer
Oral-(Kits)	MDT (PB)	Rifampicin, Dapsone	64	9.38	Hansen's disease (Leprosy)
	MDT (MB)	Rifampicin, Dapsone, Clofazimine			
	DOTS (Cat-I)	Isoniazid, Rifampicin, Pyrazinamide, Ethambutol	17	2.49	Lupus vulgaris, Scrofuloderma
	Kit-1(NACO)	Azithromycin, Cefixime	3	0.44	Urethral discharge, Cervical discharge
	Kit-6	Cefixime, Doxycycline, Metronidazole	16	2.35	Lower abdominal pain syndrome, Genital ulcer disease
Injections	Penicillins	Benzathine Penicillin	9	1.32	Syphilis

Among the all topically used antibiotics, most commonly used antibiotic was Mupirocin, used in 31.82% of total prescriptions containing antibiotics followed by Clindamycin (26.1%) and Erythromycin (17.6%). Least common topically used antibiotic was Retapamulin (0.29%).

Table 7: Prescription pattern of topical antibiotics

Drug	Frequency (n= 682)	Percentage	Conditions/Diseases
Clindamycin	178	26.1	Acne vulgaris
Erythromycin	120	17.6	Acne vulgaris
Fusidic acid 2%	47	6.89	Diabetic foot, Folliculitis, Impetigo
Metronidazole	3	0.44	Rosacea, Bacterial vaginosis
Mupirocin 2%	217	31.82	Folliculitis, Furuncle, Carbuncle, Erysipelos, Infective Eczematous Dermatitis, Trophic Ulcer, Recurrent furunculosis
Retapamulin	2	0.29	Impetigo
Silver sulphadiazine 1%	3	0.44	Chronic burn ulcer

Large numbers of the Antibiotics (81.96%) were prescribed by generic names. Other prescribing data were specified in majority of prescriptions in our study (Dose/strength in 95.75%, frequency in 100% and duration of treatment in 91.05% of total prescriptions). Quantity of the topical Antibiotics to be applied was not mentioned in any of the prescriptions. Antacids and related drugs were most commonly drugs co-prescribed along with Antibiotics.

Table 8: Details of information of prescriptions for Antibiotics

Parameters	Specified in	
	Frequency (n = 682)	Percentage
Generic names	559	81.96
Dose/Strength	653	95.75
Frequency of administration	682	100
Duration of treatment	621	91.05
Quantity of topical antibiotics	0	0

4. Discussion

Analysis of the patient data revealed that majority of patients are of age group of 21-30 years, followed by 11-20 years. Gender-wise distribution shows that proportion of male patients (51.48%) was more than female patients 48.52%. This is similar to studies by Bijoy *et al* [8], Narwane *et al* [9] and Sarkar *et al* [10]. This is different to the study done by Das *et al* [11] where female patients predominate. In the current study, the average number of drugs per prescription was found to be 2.74 which are slight higher than recommended by Narwane *et al* [9].

Disease distribution pattern in current study shows that most common diagnosis was Scabies (9.51%), which dictates the importance of hygiene and health education to prevent this infestation. This finding is different from other studies done by Symvoulakis *et al* [12], Baur *et al* [13] and Rao *et al* [14] in which, noninfectious diseases were most common. Next common condition was Acne vulgaris (8.16%), an important skin disease where Antibiotics were used and that too for prolonged period. Prolonged use of antibiotics is one of the factors which provoke the emergence of resistant organisms. This finding is somewhat similar to study done by Sajith *et al* [15] and Anuj Kumar Pathak *et al* [16]. Major conditions where Antibiotics prescribed were Acne vulgaris (8.16%), Furuncle/Carbuncle (4.19%) and Hansen's disease/Leprosy (1.37%).

In the present study, Use of Antibiotics accounted for the 13.02% of total drug used, which is somewhat similar to study done by Anuj Kumar Pathak *et al* [16]. Majority of antibiotics were given by combination of oral and topical therapy. Overall most preferred route for Antibiotics was Oral (66.51%) and least preferred route was injection. These findings were comparable with studies by Bahelah *et al* [17], Khan *et al* [18], and Kayode *et al* [19], but different than the study done by Anuj Kumar Pathak *et al* [16], where most preferred route was topical.

In the current study, most common systemically used antibiotic was Doxycycline (33.87%) followed by Amoxicillin (24.34%) and Azithromycin (13.34%). Overall Beta-lactam antibiotics including Penicillins & Cephalosporins were found to be most commonly used antibiotics in our study. This finding was comparable with studies by Sunderkotter *et al* [20], Stevens *et al* [21] and Moon KT [22]. This may be because of higher safety, efficacy and affordability of Beta-lactam antibiotics. Injectable antibiotics were least prescribed (1.32%), which supports the rationality. Most common topically used antibiotic was Mupirocin (31.82%) followed by Clindamycin (26.1%). Similar findings were seen in study done by Khan *et al* [18].

Majority of Antibiotics (81.96%) were prescribed by generic names. Other drugs are prescribed by brand name; it may be due to non availability of all the required drugs in hospital formulary as well as local chemist. Other prescribing data like dose/strength, frequency and duration of treatment were specified in majority (90-100%) of prescriptions in our study. Also majority of prescriptions were complete with respect to patient and doctor related data. These findings denote the rational prescribing practices in our place of study. In our study, many antibiotics are prescribed for durations of 3-7 days with exception of certain diseases where prolonged treatment is necessary like Acne vulgaris [23], Leprosy and Cutaneous tuberculosis, thus further supporting good prescribing habit. Quantity of the topical Antibiotics to be applied was not mentioned in any of the prescriptions.

Irrational, inappropriate prescribing and misuse of antimicrobials is a widespread problem which may lead to emergence of resistance. Physician as well as higher authorities will have to take measure to follow the WHO guidelines regarding the rational prescribing practices. Standard treatment guidelines and hospital based formulary should be developed as per local need to minimize the irrational prescribing. Periodic screening of drug utilization pattern should to be done on regular basis to verify suitable modification in the prescription of drugs to increase the clinical benefit and decrease the adverse drug reactions. It is also observed in our study that self-medication of antibiotics and quackery are other causes of irrational use of antibiotics. This matter should be confirmed by further studies and addressed by strict policies and regulations.

5. Conclusions

At the studied dermatology OPD, Acne vulgaris is most common among the skin diseases where the antibiotics are indicated. Although we found good prescribing habit in our study but adequate information was not written in some of the records with regards to the quantity of the topical antibiotics and prescribing by generic name. It was also found that systemically Beta-Lactams antibiotics and topically Mupirocin were the two most commonly prescribed agents. Prescribing combination of oral antibiotics with topical antibiotics was found to be high.

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