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Assessment of Drug Prescribing Pattern and Cost Analysis for Skin Disease in Dermatological Department of Tertiary Care Hospital: An Interventional Study

Vineeta D*, Sharad P, Ganachari MS, Geetanjali S and Santosh S

KLE University, Belgaum, Karnataka, India

*Corresponding author: Vineeta D, KLE University, Belgaum, Karnataka, India, Tel: 7204345879, E-mail: vaneeta.dhyani@gmail.com

Abstract

Objective: To study and assess the prescribing pattern and cost analysis in dermatology outpatient department (OPD) in a tertiary care hospital.

Methods: Data was collected for three months by reviewing OPD cards and prescription data and rationality and cost were assessed by WHO/DSPRUD Indicators and WHO Recommended clinical guidelines 2013 (Diagnosis and treatment manual). Average per prescription cost was calculated. For cost analysis, we used Cost-Minimization method. Although we only considered total drug treatment cost. All drugs cost were calculated in Indian rupee from the Current Index of Medical Specialties (CIMS). For each drug cost was calculated in as either cost per µg, mg, gm or ml as appropriate. We further divided total drug cost into two parts, first the total cost of drugs which are purchased from Paid pharmacy shops and second, the total cost of drugs which are freely available in Free OPD pharmacy.

Findings: Pre and post interventional data analysis showed that, average no. of drugs prescribed was 2.95/prescription and 2.62/prescription respectively. Before Intervention average cost of drugs per prescription was found to be 376.97 INR and after intervention average cost of drugs per prescription was found to be 299.20 INR. During pre-intervention study period, combination preparations (28.54%) were the most commonly prescribed class of drugs followed by others(Multivitamins, topical Vasodialators, antipyretic, retinoid etc.) (18.86%) and antihistamines (17.69%) while during post-intervention study period, combination preparations (32.37%) were the most commonly prescribed class of drugs followed by antifungals (19.42%) and antihistamines (17.62%).

Conclusion: Clinical pharmacist can conduct such periodic audit to rationalize the prescription, reduce errors and suggest a cost effective management of skin diseases. The programs should conduct into the hospital for Physicians and Post graduate students, to show comparison and benefits of generic versus branded drugs also to improve generic prescribing practice and to make therapy economic to the patients.

Keywords: WHO: World Health Organization; EDL: Essential drugs list; CIMS: Current index of medical specialties; DRPs: Drug related problems; NFI: National Formulary of India; ADR: Adverse drug events

Introduction

Dermatology, the science of the skin and its appendages, its many specialties that evolved from general internal medicine [1]. Very rarely, skin diseases can lead to a manifestation of systemic diseases. Worldwide in general practice, 2% of consultations account for Dermatological conditions [2]. In India, primary and secondary cutaneous complaints are common. Allergy and itches problems are most widely observed in patients. Various combinational drugs generally use in the treatment of skin diseases like proactive antibiotic, antifungal, benzoyl peroxide, steroids, salicylic acid, anti-histaminic, vitamins and minerals, analgesics usually depends upon prescriber's choice [3,1]. Around 3,000 varieties of skin disease have been identified in the clinical literature, most of which are rarely found [4,5]. Treatment is the most important part in both curing the disease as well as in preventing the spread of communicable diseases [4]. The world health organization (WHO)-India program on the rational use of drugs helps to promoting rational prescribing which involves intervention to correct inappropriate drug use, adoption of essential list of drugs, standard treatment guidelines development, irrational prescribing determining and restricting [6]. Drug evaluation is a system of on-going, systematic, criteria-based drug evaluation which is helpful in ensuring the appropriate use of drugs [7]. It was more in developing countries where health budgets are small and approximately. 30–40% of the total health budget is spent on drugs [8]. In these poor countries small amount of funds available for drugs, therefore it is necessary to prescribe drugs rationally for optimal benefit to the patients [9]. The overuse and inappropriate use of antibiotics will affect the quality of life and also Increase number of side effects and that's lead to increase financial burden to the individual, to the society and to the Health care system. antibiotic use and antimicrobial resistance is increasing in India is reported by a "Community based Surveillance of Anti-microbial use and Resistance in the Resource constrained settings" by WHO based on the reports from 5 pilot projects three from India (Delhi, Mumbai, Vellore) and two from South Africa [10]. The World Health Organization (WHO) defined rational use of drugs as patients receiving medications

appropriate to their clinical needs, in doses that meet their own individual requirements, for an adequate period of time and at the lowest cost to them and their community [11]. Irrational drug therapy remains a global phenomenon [12]. Rational use of medicines for all medical conditions is fundamental need to adequate health care, satisfaction of health-related human rights and attainment of health related Millennium Development Goals [13]. The drug use in a community is congruent with drug needs and confers maximum therapeutic benefits and minimal adverse reactions, it is necessary to ensure. To ensure safe and effective medical care with the help of therapeutic audit which required at all levels of the therapeutic chain [14]. In protecting, maintaining and restoring health, drugs plays an important role. Prescription writing conveys the message from the prescriber to the patient; it's a science and an art. The treatment of diseases by the use of essential drugs, prescribed by their generic names, has been emphasized by the WHO and the National Health Policy of India [15]. Generally appropriate prescribing are based on sound knowledge of prescriber, understanding of the pathophysiology of disease to be treated and the knowledge of adverse effects and benefits of the drug use [16]. CDUIs are highly standardized, need not to national adaptation and provide a simple tool for quickly and reliably assessing a few critical aspect of drug use in primary health care setup [17].

There are three types of CDUIs; prescribing indicators, patient care indicators and facility indicators. We are only using prescribing indicators for this study, these are as follows:

1. Average number of drugs per prescription

2. Drugs prescribed by generic name and its percentage

3. Prescription with an antibiotic prescribed and its percentage

4. Prescription with an injection prescribed and its percentage

5. Drugs prescribed from an Essential Drugs List (EDL) and its percentage [18].

To change physician behaviour, a variety of programming techniques and methods of training have been employed. Expectedly, CME seminar workshops that somewhat recreate the one-on-one interactive training experienced during residency by actively involving the physician in simulated decision making situations. And this is more effective in changing attitudes and physician awareness than are traditional didactic CME lectures [19]. The most rapidly growing component of total health care expenditures is prescription drug expenditures. Price and use are the two main factors contributing to rising prescription drug expenditures. Generally clinicians have greater freedom with their prescribing patterns; therefore, use in Medicaid may be different than in the private sector [20]. In the last two decades, a greatly extended range of potent, effective and potentially toxic drugs has become available [21]. The topical corticosteroid is one of the widely used groups of medication in various dermatological conditions. Topical corticosteroids (TC) is choice of dermatologist, have great contribution in effectively treat several difficult dermatoses [22]. Too little steroid can lead to a poor response, and too much can increase the risk of adverse effects because of this fact, the amount of corticosteroid which is prescribed, dispensed and applied should be considered carefully. Topical corticosteroids have adequate anti-inflammatory effects, while reducing both local as well as systemic adverse drug reactions [23,24] The first carbothioate corticosteroid – Fluticasone propionate are classified as a potent anti-inflammatory drug for dermatological use and also for acute and maintenance

treatment of patients with dermatological disorders such as atopic dermatitis, psoriasis and vitiligo, it's available in 0.05% cream and 0.005% ointment formulations [25]. In India, the proportion of insurance in health-care financing is very low. Only about 10% of the population is covered through health financing schemes. Moreover the role of Pharmacoeconomics in India is at starting point at present [26]. In recent years, economic evaluation has become an integral part of health service research and soon it will become more influential. Four main analyses exist for full economic evaluation:

- Cost - Minimization
- Cost - Effectiveness
- Cost - Utility
- Cost – Benefit [27]

Cost-minimization analysis (CMA) is the simplest method from the four evaluation methods. It should be performed and is appropriate when two interventions have been shown to produce the same, or similar, effects. If two therapies are considered clinically equivalent, then only the costs of the interventions need to be considered [28]. Correct diagnosis and early management can mitigate against these costs, reduce morbidity and greatly improve the quality of life of patients. It's the responsibility of dermatologists to provide leadership in the management, prevention, teaching and research of skin diseases and their treatment [2]. The study of prescribing pattern and cost analysis is a component of medical audit which seeks monitoring, economic evaluation and necessary modifications in the prescribing practices of the prescribers to achieve rational and cost effective medical care which will be beneficial to patients.30 The ultimate goal of the dermatological prescription analysis will be a message to the prescriber to achieve rational medical care [24].

Methods and Materials

The Institutional Ethics Committee permission was taken before initiation of the study. The present study was conducted in the Outpatient Department of Dermatology at Tertiary Care Hospital, Belgaum, Karnataka.

Prescriptions of patients attending dermatology OPD of a tertiary care teaching hospital, Belgaum, were collected randomly by twice weekly survey for the duration of 6 months from October 2013 to March 2014. The data collection form was used to collect patient's data. The present study was divided into two parts: Baseline data collection for first three months (pre intervention period) and Post intervention data collection for next three months (Post intervention period). After first three months of the study, Study interventions were adopted and planned. Baseline data was analyzed and discussed with healthcare professionals for initiating the process of rational drug therapy and regarding per prescription cost; also provided the drugs list found in pre intervention data collection and its less costly alternatives to make further prescriptions economic to the patients. This collected prescriptions were analyzed under the sub-heads with respect to drug choice, drug dose/strength (in case of corticosteroids, potency), duration of use, frequency of administration, dosage form and site of application. Obtained information was compiled, scored and analyzed using WHO/DSPRUD Indicators and WHO Recommended clinical guidelines 2013 (Diagnosis and treatment manual). Disease pattern was analyzed for each patient attending dermatology OPD and classified according to dermatologic condition. Average per prescription cost was calculated. For cost analysis, we used Cost-Minimization method. Although we only considered total drug

treatment cost. All drugs cost were calculated in Indian rupee from the Current Index of Medical Specialties (CIMS). For each drug cost was calculated in as either cost per μg, mg, g or ml as appropriate. We further divided total drug cost into two parts, first the total cost of drugs which are purchased from Paid pharmacy shops and second, the total cost of drugs which are freely available in Free OPD pharmacy.

Results

Total 309 patients (including pre and post interventional patients) were included during study period. Overall 309 prescriptions were analyzed amongst 309 patients. Table 1 provide the age distribution of the patients. The number of males were 192 (62.13%) while number of females were 117 (37.86%) with male to female ratio of 1.64. During whole study period, the maximum number of patients were found in the group of adults (18 to 65 years) and minimum numbers of patients were found in the age group of patients were in the age group of infants (1month to 1 year) that visited to the OPD (Table 1).

	No. of Patients (n=309)	% of patients
Infants (1 month - 1 year)	2	0.64%
Children (1 year - 12 year)	25	8.09%
Adolescents (12 year - 18 year)	41	13.26%
Adults (18 year - 65 year)	222	71.84%
Geriatrics (> 65 year)	19	6.14%

Table 1: Age distribution of total study population.

Pre and post interventional data analysis showed that, average no. of drugs prescribed was 2.95/prescription and 2.62/prescription

respectively which includes injectables, topical and oral formulations. Maximum number of drugs prescribed were topicals compared to oral preparations and injectables. During pre-intervention study period, combination preparations (28.54%) were the most commonly prescribed class of drugs followed by others(Multivitamins, topical Vasodialators, antipyretic, retinoid etc.) (18.86%) and antihistamines (17.69%) while during post-intervention study period, combination preparations (32.37%) were the most commonly prescribed class of drugs followed by antifungals (19.42%) and antihistamines (17.62%). Major combinations prescribed were sunscreen preparations and steroids in combination with antibiotics and antifungals. In about 39.83% instances potent steroids were prescribed while steroids with mild potency were least prescribed (8.47%) (Table 2). Total 118 steroids prescribed, most of which were in combination with antibiotics and antifungals (Table 2).

Potency	No. of steroids Prescribed (n=118)	% of steroids
Very potent	33	27.96%
Potent	47	39.83%
Moderate	28	23.72%
Mild	10	8.47%

Table 2: Steroids classification on the basis of potency.

Table 3 shows the disease pattern of patients attending dermatology OPD during the study period. The common skin conditions encountered were of Infections of the skin and subcutaneous tissues (25.62%) followed by 23.43% cases of eczema and dermatitis and 17.18% cases of Disorders of skin appendages.

Types of skin conditions	No. of Diagnosis (n=320)	% of Diagnosis
Infections of the skin and subcutaneous tissues	82	25.62%
Bullous disorders	2	0.62%
Eczema and dermatitis	75	23.43%
Papulosquamous disorders	20	6.25%
Urticaria and Erythema	18	5.62%
Radiation related disorders	20	6.25%
Disorders of skin appendages	55	17.18%
Disorders of pigmentation of skin	18	5.62%
Other disorders	30	9.37%

Table 3: Disease pattern in Dermatology OPD.

After collection of pre-interventional data, intervention were adopted with respect to advised to reduce errors which seen during prescription analysis of pre-interventional data, total 203 prescriptions were analyzed, the findings pertaining to prescription format which shows that all the prescriptions carried the name, date, age, gender, address and OPD number of the patients as they are already printed on the hospital OPD cards. The superscription Rx and Prescriber name

were written in all prescriptions. The Dosage form, course of duration, route of administration, dosing interval, strength of medication were not mentioned in 0.49%, 9.85%, 16.25%, 1.97%, 0.49% prescriptions respectively. While after intervention again the 106 prescriptions (Post-interventional data) were analyzed showed route of administration, dosing interval were not mentioned in 6.60%, 1.88% prescriptions respectively. Also available (in hospital pharmacy) alternative least

costly therapy (Cost-minimization method) were advised to prescribers, regarding 599 drugs found throughout the 203 prescriptions of pre-interventional data (Table 4).

Sr. No.	Indicators	Pre-intervention	Post-intervention
1.	Average number of drugs per encounter	2.95	2.62
2.	Percentage of drugs prescribed by generic name	12.80%	19.18%
3.	Percentage of prescriptions with an antibiotics prescribed	23.15%	15.09%
4.	Percentage of prescriptions with an injections prescribed	3.44%	2.83%
5.	Percentage of drugs prescribed from essential drug list (EDL)	11.51%	13.30%
6.	Percentage of cost according to various class of drugs (Shown in table 5)		

Table 4: Evaluation of prescriptions using WHO/DSPRUD Indicators.

This intervention was adopted to reduce unnecessary cost of prescription, and make it economic to patient. Data analyzed showed that, before Intervention average cost of drugs per prescription was found to be 376.97 INR and after intervention average cost of drugs per prescription was found to be 299.20 INR. Also after intervention post interventional changes observed, in which 47 least costly and free OPD pharmacy medication found in 36 prescriptions. Clinical Guidelines: Diagnosis and Treatment Manual-Feb 2013 [29-32] guide was used to check unnecessary prescribed drug, but none of the prescriptions having harmful unnecessary drugs. Evaluated 309 prescriptions (including both pre-intervention and post-intervention prescriptions) with respect to different parameters using WHO/ DSPRUD Prescribing Indicators (WHO How to investigate drug use in health facilities: Selective drug use indicators.) [18] are as follows:

During Pre-intervention study period, total cost of drugs prescribed was found to be 76,526.49 INR while total Free OPD Pharmacy and Paid OPD Pharmacy costs were 965.01 INR and 75561.48 INR respectively and average cost of drugs per prescription was found to be 376.97 INR. Maximum percentage drug cost were spent on combination preparations (38.63%) followed by others (24.62%) and antibiotics (17.80%) (Table 5). During Post-intervention study period, total cost of drugs prescribed was found to be 31,715.86 INR while total Free OPD Pharmacy and Paid OPD Pharmacy costs were 940.69 INR and 30,775.12 INR respectively and average cost of drugs per prescription was found to be 299.20 INR. Maximum percentage drug cost were spent on combination preparations (43.40%) followed by antifungals (22.20%) and antibiotics (11.34%) (Table 5).

Class of Drugs	Pre-Intervention Total cost incurred in INR and its % Drug cost incurred (c=76,526.49 INR)	Post-Intervention Total cost incurred in INR and its % Drug cost incurred (c=31,715.86 INR)
Antifungals	3619.95 (4.73%)	7,041.9 (22.20%)
Antibiotics	13,626.46 (17.80%)	3,596.88 (11.34%)
Steroids	6,877.56 (8.98%)	2,146.58 (6.76%)
Antihistamines	3,986.56 (5.20%)	1,578.08 (4.97%)
Combination preparations	29,568.64 (38.63%)	13,764.83 (43.40%)
Others	18,847.32 (24.62%)	3,586.59 (11.30%)

Table 5: Percentage cost incurred on drug classes.

Discussion

In this study, Pre and post interventional data analysis showed that, average no. of drugs prescribed was 2.95/prescription and 2.62/ prescription respectively, which correlates with other two studies carried out by Bijoy KP et al. [3] and Narwane SP et al. [31] showed average number of drugs prescribed was 2.39 and 2.7/prescription respectively. A great majority of drugs were prescribed in brand names in our study. This study showed slightly higher average number of drugs/ prescription compared to previous studies.

This study finding showed combination preparations (Mainly Steroid+antifungal topical preparations) as the most commonly prescribed drug class followed by antibiotics which differ from the study carried out by Narwane SP et al. showing antiallergics as the most commonly prescribed drug followed by antifungal and antibiotic [31]. Moreover, our study showed there was a correlation between classes of drug prescribed with the disease encountered. Antifungals and steroids were commonly prescribed as majority of the patients had fungal infections and inflammatory skin condition as a common disorder. In the context of antifungal agents, fluconazole was the drug most commonly prescribed systemic antifungal rather than terbinafine in this study. Also ketoconazole topical preparations used to treat the fungal infections.

Topicals were commonly prescribed compared to the systemic agents. Use of topicals were usually preferred for treating skin diseases as they have site specific action, less systemic absorption resulting in less side effects and convenient for patient use. Majority of topicals were prescribed in combinations followed by antifungals and steroids alone. This finding was comparable with studies by Khan NA et al. [16] that showed steroid and its combinations were most commonly prescribed topically. The most commonly prescribed systemic agents

were antihistamines and Antibiotics followed by antifungals in this study which correlates with the findings of above study. Analysis of data showed that all the antihistaminic agents were prescribed systemically in dermatology because of disease prevalence with related symptoms of itching (associated with fungal infection, scabies, eczema and dermatitis).

This study findings showed most of the dermatological conditions in the OPD were of Infections of the skin and subcutaneous tissues (25.62%) followed by eczema and dermatitis (23.43%) and Disorders of skin appendages (17.18%). The common Eczema and dermatitis found includes Infective eczema, atopic dermatitis, acute and chronic eczema, Irritant contact dermatitis, allergic contact dermatitis, Pruritis, seborrheic dermatitis. The reason responsible for the above finding can be poor hygiene and most of the patients visited to the hospital OPD are from rural area.

Considering the economic burden and high prevalence of the skin diseases, this topic is of interest to study the drug prescribing patterns and cost effectiveness of skin diseases. This study findings showed the average cost of 376.97INR per prescription which was quite higher than Narwane SP et al study and Bijoy KP et al. study which reported the average cost of 135.60 and 196.74INR [31,3]. Unit cost of drugs prescribed per patient is calculated. However actual direct costs and indirect costs were not taken into consideration for cost analysis in this study.

Frequency and duration of administration was specified in some of prescriptions for topical administered drugs which shows quite rational prescribing but dose/strength was not specified in some of prescriptions which shows that the prescribing pattern should be improved to avoid imprecise prescription leading to the prescription errors while dispensing the medication by a pharmacist and there is a need to emphasize on rational and appropriate prescribing pattern to be followed in the OPD for better patient care [32]. Although dose/strength for topical drugs was inadequately mentioned but chances of error were negligible as the brand had availability in single dose/strength in pharmacy.

Conclusion

A majority of drugs were prescribed in brand names due that the per prescription cost of this study is quite higher than other referenced studies because most of the branded drugs are very costly. Though, dose/strength for topical drugs was inadequately mentioned but chances of error were negligible as the brand had availability in single dose/strength in pharmacy. The prescription audit can be an eye opener for the prescribers therefore periodic audit should do by the pharmacist. Clinical pharmacist can conduct such periodic audit to rationalize the prescription, reduce errors and suggest a cost effective management of skin diseases. The hospital administration can look into the issues in the hospital by implementing a formulary into the system so that physicians restrict their prescribing in generic names and provide a cost effective therapy to the patients as essential drugs will be incorporated in hospital pharmacy. The programs should conduct into the hospital for Physicians and Post graduate students, to show comparison and benefits of generic versus branded drugs also to improve generic prescribing practice and to make therapy economic to the patients.

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