ORIGINAL RESEARCH PAPER

Pharmaceutical Science

AN ANALYSIS OF DRUG UTILIZATION PATTERN IN ACNE VULGARIS, TINEA INFECTIONS AND ECZEMA PATIENTS VISITING AN OUT PATIENT DEPARTMENT OF DERMATOLOGY IN A TERTIARY CARE TEACHING HOSPITAL: AN OBSERVATIONAL STUDY.

KEY WORDS: Acne Vulgaris, Tinea infections, Eczema, Rationality of prescription,Per prescription cost.

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ABSTRACT

Background Skin is the largest and the most exposed organ of human body .The prevalence of Dermatophytosis ,Acne and Eczema is more in general population. This study was planned to evaluate the utilization pattern of drugs in Acne vulgaris, Tinea infections and Eczema and find out the cost of drug per prescription that the health care system spends for disease conditions under study. **Methods** This study was an Observational study carried out in patients attending the Dermatology OPD. The data was collected from the prescriptions of patients after getting approval from Institutional Ethics Committee for a continuous period of one year. **Results-** In present study, the average number of drugs prescribed per prescription in patients with Tinea infections, Acne Vulgaris and Eczema were 1.87, 1.43 and 2.4. The percentage of generic drugs prescribed were 100%.No any Fixed Drug Combinations, Multivitamins or Injectable drugs were used. The drugs prescribed from Essential Drug List were 100% for Tinea and Acne while 75% for eczema patients. The mean cost of drug per prescription for treatment of Tinea infection, Eczema and Acne vulgaris was Rs.6.86, Rs.7.96 and Rs.15.21 respectively. **Conclusion-** This study suggests the prescribers to consider factors as polypharmacy, rationality of prescription and per prescription cost benefit before writing any prescriptions. There was a significant cost difference with respect to the previous study; with the current study finding cheaper alternatives for per prescription cost for treatment of said conditions.

INTRODUCTION

Skin is the largest and the most exposed organ of human body thus making it more susceptible to attack by biological agents and micro organisms(1,2).Skin diseases in developing countries have a serious impact on people's quality of life, it is more so in India where climate, socio-economic status, religions and customs are widely varied in different parts of the country(3,4,). Occasionally skin diseases can be a manifestation of systemic diseases(5,6,7).

Dermatophytosis contributes to a large extent in any skin clinic in India(8). Acne is a disease of the pilosebaceous unit and affects more than 80% of the general population in their lifetime (9). Eczema is a type of skin inflammation. It presents with pruritis, erythematous lesions, soles and crusts, excoriation, lichenification.

Periodic audit of prescriptions in the form of drug utilization studies are an important tool to enhance the therapeutic efficacy, to minimize the adverse effects, to optimize the cost of the treatment and to provide useful feedback to the clinician(10,11)

This study was planned to evaluate the utilization pattern of drugs in Acne vulgaris,Tinea infections and Eczema. The current study also finds out the cost of drug per prescription that the health care system spends on the disease conditions under study.

AIM AND OBJECTIVES

Aim

To assess the drug utilization pattern in Acne vulgaris,Tinea infections and Eczema patients visiting dermatological OPD of a tertiary care hospital.

Primary objective

To evaluate the prescription using "WHO drug use indicators"

Secondary objectives

To find out the cost of drug per prescription for the said skin conditions by best lowest price for the prescribed drugs.

Study design:

This study was an Observational study carried out in patients attending the Dermatology Out Patient Department ..The data was collected from the prescriptions of patients after getting approval from Institutional Ethics Committee for a continuous period of one year between January 2019 to December 2019.

SELECTION OF CASES

Inclusion criteria

a) All patients between 12-60 years of age and of either gender attending Dermatology Out Patient Department with chief complaints suggesting of Acne Vulgaris,Tinea infection and Eczema were screened for inclusion in the study.

b) The patients with confirmed diagnosis of said conditions by dermatologist and not suffering from any other co-morbid condition were recruited for the study after obtaining written informed consent from patient.

c) All newly diagnosed patients purely suffering from above mentioned conditions were selected for study.

Exclusion Criteria:

a) Patients <12 years and >60 years of age.
b) Patient taking any other medicine which will provoke or aggravate the conditions under consideration
c) Patients not willing to give written informed consent.

Sample size:

As per prevalence of Acne vulgaris(80%),Tinea infections (78%) and Eczema(28%),the sample size was calculated and found out to be a total of 400(Acne 150, Tinea 140,Eczema 110).The sample size being calculated as follows.

n=z2pq/d2[where n=sample size,z=confidence interval(for 95%,z=1.96),p=prevalence of disease and d=standard error]

1)For Acne p=80,z2=4,q(100-p)=20,d2=49(d=7)
n=3.84*80*20/49
n=125

2)For Tinea p=78,z2=4,q(100-p)=22,d2=49(d=7)
n=3.84*78*22/49
n=134

3)For Eczema p=28,z2=4,q(100-p)=72,d2=81(d=9)

n=3.84*28*72/81
n=95.5

Collection of data:
The data was collected from the Dermatology OPD. The prescriptions of all the newly diagnosed patients attending the Dermatology OPD were included. Patients were informed and explained about the study, Written informed consent had been taken prior as per attached proforma. The Case Record Form (CRF) was filled and the data obtained was compiled in tabular form and analyzed according to WHO prescribing indicators(12).

Detailed Research Plan
- Patients were selected randomly.
- The diagnosis written on the prescription was noted.
- Patients once selected were not re-included in subsequent visits.
- Total number of male and female patients were calculated.
- Drugs were categorized according to the class they belong to.
- Number of patients receiving mono and poly therapy were calculated.
- Prescriptions were further assessed using WHO drug use indicators(12).
- Drugs prescribed were assessed for consistency with WHO list of essential medicines

Per prescription cost was calculated for cost analysis. As all the drugs prescribed were from hospital pharmacy, the drug cost was calculated in Indian Rupee from the rate present in the hospital Rate Contract(RC) .For each drug, cost was calculated in analyzed prescriptions. The cost per prescription was calculated by summing up costs of all the drugs in the prescription given for the prescribed duration and frequency.

Average cost per prescription was calculated by using the formula

Average cost per prescription= Sum of Costs of all prescriptions for individual
disease Condition/Total number of prescriptions for individual disease condition.

Data Analysis
Data analysis includes following steps
Step1
All responses were tabulated by the investigator using Microsoft -Excel 2007 Software. Graphical representations were made wherever necessary.

Step2
Data was analyzed using Microsoft-Excel 2007 and R programming. Descriptive statistics like proportions, mean and median were used to analyze the data. Categorical characteristics of the participants were analyzed by using proportion. The continuous skewed data was analyzed using median and IQR. Whereas continuous non-skewed data was analyzed by using mean. Fischer exact test was used to compare categorical data and Kruskal Wallis test was used to compare continuous skewed variables. Statistical significance was evaluated at 0.05 alpha level.

RESULTS
This study was carried out on prescriptions of newly diagnosed patients of Tinea infections, Eczema and Acne vulgaris visiting Dermatology OPD of a tertiary care hospital of western Maharashtra from January 2019 to December 2019. A total of 400 prescriptions which included 150 prescriptions of Acne vulgaris, 140 of Tinea infections and 110 of Eczema patients were enrolled in the study. Data of prescriptions of these patients was collected and analyzed. The drugs were categorized according to the class they belong to. Prescribing indicators were evaluated as per WHO indicators. The results are as follows:

1) Demographic profile of study participant

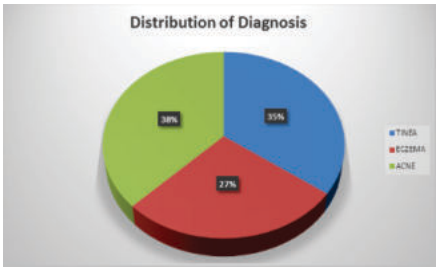

Figure 1: Distribution of Diagnosis

Table1: Demographic Characteristics

Characteristics	Total	TINEA	ECZEMA	ACNE	p-value
Number of prescriptions (%)	400	140 (35%)	110 (27%)	150 (38%)	-
Age, Years Median (IQR)	31 (27 – 39)	30 (25 – 42)	38 (29 – 48)	22 (19 – 25)	0.0001
Sex Number (%) Male Female	235 (59%) 165 (41%)	94 (67%) 46 (33%)	69 (63%) 41 (37%)	72 (48%) 78 (52%)	0.003

Kruskal Wallis test was used to check the median of age among Tinea infections, Eczema and acne vulgaris.

The median age of presentation of patients for the whole study population was 31 years IQR(27-39), while median ages of those presenting with Tinea infections, Eczema and Acne vulgaris were 30years IQR(25-42), 38years IQR(29-48) and 22 years IQR(19-25) respectively.

There was a statistically significant difference among the median age of patients presenting with Tinea infections, Eczema and Acne vulgaris (i.e p=0.0001). Acne vulgaris patients were presenting more at younger age groups. There was a statistically significant difference in the distribution of sex among the Tinea infection, Eczema and Acne vulgaris patients (i.e p=0.003). Acne vulgaris presenting more in female patients.

2.Drug use indicators
A total number of 2365 doses of medications were prescribed in 400 prescriptions which were distributed as 923 in Tinea infections, 885 in Eczema and 557 in Acne vulgaris prescriptions.

WHO prescribing indicators:
A) Average number of drugs per prescription

Table 2: Average number of drugs per prescription

Disease conditions	TINEA	ECZEMA	ACNE
Total number of prescriptions/encounters	140 (35%)	110 (28%)	150 (38%)
Total number of drug products	263	279	215
Average number of drugs per prescription	1.87	2.54	1.43

The collected data after analysis for average number of drugs prescribed per prescription showed the following results.

The Average number of drugs prescribed per prescription in patients with Tinea infections were 1.87, while those for

Eczema and Acne Vulgaris patients were found to 2.54 and 1.43 respectively.

B)Percentage of encounter with antimicrobials

Percentage of encounters with antimicrobials prescribed in Tinea infections

G = F/A x 100 where

F is the number of patient encounters with one or more antimicrobial/s prescribed

A is the total number of encounters surveyed

G=263/263x100=100%

Percentage of encounters with antimicrobials prescribed in Acne vulgaris

G = F/A x 100 where

F is the number of patient encounters with one or more antimicrobial/s prescribed

A is the total number of encounters surveyed

G=215/215x100=100%

No antimicrobial was prescribed in treating Eczema conditions in this study.

Table 3 :Percentage distribution of antimicrobials in treatment of Tinea infections and Acne vulgaris

Drugs	TINEA	ACNE
Clotrimazole Miconazole Clotrimazole + Miconazole	62 (44%) 91 (65%) 14 (10%)	- - -
Benzoyl peroxide Doxycycline Azithromycin	- - -	150 (100%) 37 (25%) 6 (4%)

C)Percentage of Drugs prescribed by generic names

The data after analysis for the percentage of drugs prescribed by generic names showed that the percentage of generic drugs prescribed for treatment of all three conditions i.e Tinea infections, Eczema and Acne vulgaris was 100%.

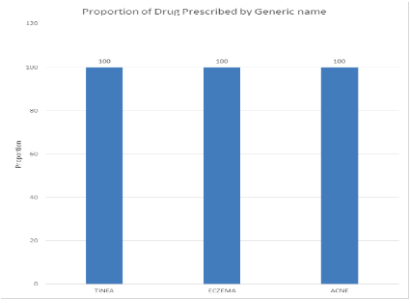

Figure 2: Proportion of drugs prescribed by generic name

D)Percentage of drugs prescribed from WHO essential drug list

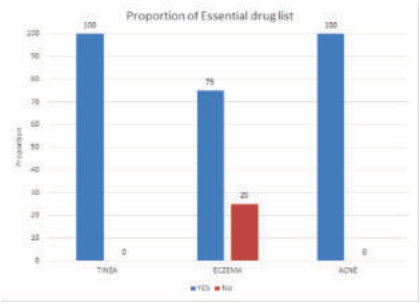

Figure 3: Proportion of drugs prescribed from WHO essential drug list

While 100% of the drugs prescribed for the treatment of Tinea infections and Acne vulgaris were from WHO Essential Medicines List, around 75% of the drugs prescribed for eczema were from WHO Essential Medicine List.

Table 4:Results of the WHO prescribing indicators

SR	Prescribing Indicators	TINEA	ECZEMA	ACNE
1	Average number of drugs per encounter	1.87	2.54	1.43
2	Percentage of drugs prescribed by generic name	100%	100%	100%
3	Percentage of encounters with an antimicrobial prescribed	100%	0%	100%
4	Percentage of drug prescribed from WHO essential drug list	100%	75%	100%
5	Percentage of fixed drug combination	0	0	0
6	Percentage of encounters with an injection prescribed	0	0	0
7	Percentage of drugs prescribed from hospital formulary	100%	100%	100%

3.Cost of Drugs per prescription

Table 5: Cost of drugs per prescription

Cost per prescription	TINEA	ECZEMA	ACNE
Total	959.81	875.37	2282.4
Mean	6.86	7.96	15.21

Average cost per prescription= Sum of Costs of all prescriptions for individual disease Condition/Total number of prescriptions for individual disease condition.

Average cost per prescription for Tinea = 959.81/140 =6.86.

Average cost per prescription for Eczema = 875.37/110 =7.95

Average cost per prescription for Acne vulgaris = 2282.4/150 =15.21.

We used mean as the central tendency to describe the data..The mean cost of drug per prescription for treatment of Tinea infection was Rs.6.86, while that for treating Eczema and Acne vulgaris was Rs.7.96 and Rs.15.21 respectively.

DISCUSSION

Drug prescribing is not necessarily based on patient needs and all patient needs are not necessarily met with drug therapy. This inappropriate prescribing like under prescribing or over prescribing is a matter of concern. To overcome this problem, drug utilization studies are important research area to study drug prescribing and usage in a scientific way. Drug utilization study is an important part of pharmacoepidemiology since it describes the prescribing style, extent and exposure of drug. Increase in the marketing of new drug, wide variation in the drug prescribing pattern, rising concern about the adverse effects and cost of drugs, these factors indicate the significance of DUS.

Acne vulgaris, Tinea infections and Eczema remain the most commonest condition being reported at Dermatological OPD. Drug utilization study helps in minimizing polypharmacy, cost of therapy and adverse drug reactions and improves rational drug use.

1.1 Patient related data

This study showed that, the median age of presentation of patients for the whole study population was 31 years (27-39), while median ages of those presenting with Tinea infections, Eczema and Acne vulgaris were 30years(25-42), 38years(29-48) and 22 years(19-25) respectively. Tinea infections(67%)

and Eczema(63%) were seen occurring more predominantly in male patients whereas Acne vulgaris was common in female patients(72%).

1.2 WHO Prescribing Indicators

In this study, most of the prescriptions were as per the standard format.

1.2.1 Number of drugs per prescription

It has been recommended that the limit of number of drugs prescribed per prescription should be 2 because of the increased risk of drug interactions. According to WHO, average number of drugs prescribed per patient should be less than 2. In present study, the average number of drugs prescribed per prescription in patients with Tinea infections, Acne Vulgaris and Eczema patients were found to be 1.87, 1.43 and 2.54 respectively .In contrast to present study, average number of drugs per prescription was 2.7 for the study done by Narwane.SP et al(13); indicating polypharmacy which may increase the incidence of ADRs and economic burden on patient or health care system. In the present study; polypharmacy was noted only in Eczema with 2.54 drugs per prescription.

1.2.2 Drugs prescribed by generic names

Percentage of drugs prescribed by generic name should be close to 100% according to WHO. There is a substantial price variation between brands and on prescribing by generic name; the pharmacist can dispense a cheaper brand reducing the cost of treatment.In this study 100% of the drugs were prescribed by generic names

1.2.3 Encounter with an antimicrobial prescribed

The antimicrobial use should be done judiciously which is necessary to prevent the emergence of antimicrobial resistance, arising due to uncontrolled use of antimicrobial. Also the controlled use will reduce the cost of treatment and risk of resistance. In this study, the use of antimicrobial agent was 100% for Tinea infections and Acne vulgaris probably because of their infective etiologies, however no antimicrobial usage was seen in treating different eczema conditions under study.

1.2.4 Drugs prescribed from WHO essential medicine list

According to WHO, 100% drugs should be prescribed from essential drug list. Purpose of this indicator is to measure the degree to which practices conform to WHO essential drug list policy. Drugs included in WHO essential medicine list are well established, already tested in practice and have lower cost as compared to newer drugs. In this study 100% of the drugs prescribed for the treatment of Tinea infections and Acne vulgaris were from WHO Essential Medicines List, which shows that the study was in accordance with WHO essential drug list prescribing policy. Of the total drugs prescribed for Eczema, 75% of the drugs were from WHO Essential Drug List. Whereas 25% of drugs prescribed in Eczema were not from WHO Essential Drug List .

These prescriptions however had White petroleum jelly being prescribed, probably because of the dry and irritant lesions as clinical presentation of the disease. However White petroleum jelly was present in Hospital list of Essential Medicines.

1.2.5 Percentage of prescriptions with an injection prescribed

Percentage of prescriptions with an injection prescribed should be less than 10% according to WHO. This Indicator measures overall level of use of this commonly overused and expensive form of drug therapy. In this study however no Injectable drugs were prescribed to treat either of the conditions under study. All the conditions in present study were mostly treated with topical(maximum)and oral formulations.

1.2.6 Percentage of fixed drug combination from WHO essential drug list

The use of Fixed drug combinations further indicates unnecessary adverse drug reactions and financial burden to the patients. In this study no fixed drug combinations were prescribed to treat any disease condition under consideration.

1.2.7 Percentage of prescription with multivitamins prescribed

Unwanted use of multivitamins in a prescription signifies polypharmacy and may invite significant drug interactions with other medications prescribed. It may further increase the burden on cost of prescription.

In this study neither of the conditions under study were prescribed with multivitamins. This study is thus free of polypharmacy which may have occurred on addition of multivitamins to the prescription and may have also raised the cost.

1.3 Cost of drug per prescription for the said skin conditions

This study was however restricted to find out the cost of drugs per prescription for the said conditions. Also all the drugs which were prescribed for the said skin conditions were available from the hospital pharmacy itself. No out of hospital pharmacy drugs were prescribed. Hence this study gives an advantage of finding out the cost per prescription that the hospital spends on the treatment of the said conditions.

The average cost per prescription that the hospital spends on treatment of Tinea infections, Eczema and Acne vulgaris was found out to be Rs.6.86, Rs.7.96, Rs.15.21 respectively. This was lower than the cost of prescription found in study done by Narwane.SP et al(13) where average cost per prescription for drugs prescribed from hospital pharmacy was Rs 19.4; and only 16.6% of all drugs prescribed were generic. In present study the cost per prescription was low as all the drugs were prescribed from hospital pharmacy, all prescribed drugs were generic and from WHO Essential Drug List(except White petroleum jelly) and also no any Injectable drugs or multivitamins were prescribed.

Summary

Drug utilization study is an effective tool to promote rational and cost-effective drug prescribing.

This study has clearly defined the skin diseases under consideration i.e Tinea infections, Eczema and Acne vulgaris among the patients attending Dermatology OPD of a tertiary care teaching hospital.

The study depicts the occurrence of Tinea infections (67%) and Eczema(69%) more in male patients, whereas Acne vulgaris(72%) was more commonly occurring in female patients. The average number of drugs prescribed per prescription for Tinea infections, Eczema and Acne vulgaris were 1.87, 2.54 and 1.43 respectively.

The drug prescription by generic names was 100% for all the 3 disease conditions under study, signifying the cost effectiveness of the study. Also drugs prescribed from WHO Essential Drug List was 100% for Tinea infections and Acne vulgaris, whereas that for Eczema was 75%; signifying that the hospital was bound to follow WHO list of essential medicine which prescribing drugs to patients.

Antimicrobials were prescribed in 100% of prescriptions of Tinea infections and Acne vulgaris probably due to their infective etiologies, whereas no antimicrobials were seen prescribed to treat Eczema types.

No any Injectable ,Fixed Drug Combinations or Multivitamins

were prescribed in treatment of any of the 3 said conditions. This further helped in reducing the costs on the treatment of said conditions and preventing unnecessary adverse drug reactions.

CONCLUSION

This study suggests the prescribers to consider factors as polypharmacy, rationality of prescription and cost benefit analysis before writing any prescriptions. There was a significant cost difference with respect to the previous study; with the current study finding cheaper alternatives for treatment of said conditions.

Limitations.

The present study is however not without limitations. It was a single centre study hence findings cannot be generalized. Larger prescribing pattern surveys involving more tertiary care hospitals should be conducted which will further throw light on drug utilization trends and magnitude of irrationalities in prescribing. Education of prescriber is cornerstone of any successful treatment survey and adherence to guidelines by physicians will aid in improving prescribing behaviour to larger extent.

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Conflict of Interest-Nil

REFERENCES

1) Gallo R L, Huttner K M. Antimicrobial Peptides: An Emerging Concept in Cutaneous Biology. The journal of investigative dermatology. 1998; 739-743.
2) Chiller K, Selkin BA, Murakawa GJ. Skin microflora and bacterial infections of the skin. J Investig Dermatol Symp Proc. 2001;6(3):170-174.
3) Hay R, Sandra E, Bendeck, Chen S, Estrada R, Haddix A. Skin diseases. Disease control priorities in developing countries [Internet]. 2006; Ch. 37, skin diseases. [cited 2016 May 10]. Available from: https://www.ncbi. nlm.nih. gov/books/NBK11733/
4) WHO. Epidemiology and Management of Common Skin Diseases in Children in Developing Countries. Department of Child and Adolescent Health and Development. WHO/FCH/CAH/05.12. Geneva [Internet]. 2005 [cited 2016 July 12]; 1-62. Available from:http://apps. who.int/iris/bitstream/ 10665/69229/1/WHO FCH CAH 05.12 eng.pdf.
5) Zamania A, Mahjum H. Prevalence of skin diseases in Hamedan, Iran in 2002. Indian J Dermatol. 2005; 50(4):208-211.
6) Antony J, Celine T.M. A study on pattern of diseases of skin and subcutaneous tissue. African Journal of Medical and Health Sciences. 2014; 13(1):34-38.
7) Devi TB, Zamzachin G. Pattern of skin diseases in Imphal. Indian J.Dermatol.2006; 51(2):149-150.
8) Bai Kirubha M H. Prescription auditing of griseofulvi in a tertiary care teaching hospital. Indian J Dermatol Venereol Leprol 2009; 75: 588-92.
9) Jones-Caballero M, Chren MM, Soler B, Pedrosa E, Peñas PF. Quality of life in mild to moderate acne: relationship to clinical severity and factors influencing change with treatment. J Eur Acad Dermatol Venereol. 2007 Feb; 21(2):219-26.].
10) Sweileh WM. Audit of prescribing practices of topical corticosteroids in outpatient dermatology clinics in north Palestine. Eastern Mediterr Health J. 2006; 12(1/2):161-69.
11) Chakrawarty R, Jaiswal MK, Sharma S. Study on prescription pattern of antibiotics in Dermatology OPD of a tertiary care teaching hospital of tribal region of India. International Jornal of Biomedical Research. 2017; 08(08):491496.
12) World Health Organisation. How to investigate drug use in health facilities: selected drug indicator. Geneva, World Health Organisation 1993. WHO/DAP/93.1.
13) Narwane.SP,Patel.TC,Shetty.YC,Chikhalkar.SB.Drug Utilization and Cost Analysis for Common Skin Diseases in Dermatology OPD of an Indian Tertiary Care Hospital-A Prescription Survey. BJPR. 2011 1(1):9-18.