RA Journal of Applied Research
||Volume||2||Issue||02||Pages-416-423||Feb-2016|| ISSN (e): 2394-6709
www.rajournals.in

# Prescription Pattern and the Cost Analysis of Tinea and Acne Patients in the Dermatology Department of a Tertiary Care Teaching Hospital

***Dr Siddharth A.Kamerkar***
301 A, Gauri Society, Vishnu Nagar, Naupada, Thane, Maharashtra - 400602
Email: *kamerkarsiddharth@gmail.com*

***Abstract:***
***Dermatophytes are fungi that invade and multiply within keratinized tissues causing infection called dermatophytosis or Tinea or ringworm. Acne is a disease of the pilosebaceous unit and affects more than 80% of the general population in their lifetime. This study was undertaken to monitor the current prescribing pattern of anti-acne and anti-tinea drugs in dermatology outpatient department in a tertiary care teaching hospital. It was undertaken for 30 days in the month of June 2009. The current study was designed as a unicentric observational study. All patient attending the dermatology OPD with acne and tinea infections with or without any concomitant disease were included in the study. The parameters included were demography, diagnosis, Average number of drugs per prescription, Specific trade preparations used, Dosage forms preferred and cost of prescription. Result - Total 1790 prescription were audited and only the prescription for acne and tinea infections were considered. A total of 55 (3.07%) patients were suffering from tinea and a total of 64 (3.57%) patients were suffering from acne. The average number of drugs per prescription prescribed for tinea infection was 3.17. The average number of drugs per prescription prescribed for acne infection was 3.04. This was a pilot study and the drugs commonly used in tinea and acne cases were studied along with the cost analysis. More studies with greater duration and greater sample size need to be carried out for a better understanding of economic influencers.***
***Keywords – Drug utilization, Tinea, Acne. Prescription***

## INTRODUCTION:

Pharmacoepidemiology is the study of the use and effects/side effects of drugs in a large number of people with the purpose of supporting the rational and cost-effective use of drugs in the population, thereby, improving health outcomes. Drug utilization research is an essential part of Pharmacoepidemiology. Monitoring the use of medications and knowledge of prescription habits are some of the strategies recommended for containing and controlling medication cost and its effect on the national budget. This information also helps us develop strategies to change inappropriate medicine use behaviour.

Dermatophytes are fungi that invade and multiply within keratinized tissues causing infection called dermatophytosis or Tinea or ringworm. They include members of the genera Trichophyton, Microsporum, and Epidermophyton. Typical infections have an annular appearance. Deep inflammatory nodules or granulomas occur in some infections. Dermatophytosis contributes to a large extent in any skin clinic in India. [1]

Acne is a disease of the pilosebaceous unit and affects more than 80% of the general population in their lifetime [2].

Clinically, acne presents as comedones (pathognomonic lesion), inflammatory papules, pustules, nodules and cysts. It affects the sebaceous gland bearing areas of the skin viz. face, neck, chest, back and upper arms. There may be complications like post inflammatory hyperpigmentation and scarring. [3] [4]. The various treatment options available aim to reduce the non-inflammatory lesions, the existing inflammation, and bacterial colonization and minimize complications.[5]

This study was undertaken to monitor the current prescribing pattern of anti-acne and anti-tinea drugs in dermatology outpatient department in a tertiary care teaching hospital.

## MATERIALS AND METHODS

The study was conducted in dermatology outpatient department in Padmashree Dr. D.Y. Patil Hospital and Research Centre Navi Mumbai. It was undertaken for 30 days in the month of June 2009. The current study was designed as a unicentric observational study. The subjects were enrolled on the basis of inclusion and exclusion criteria. All patient attending the dermatology OPD with acne and tinea infections with or without any concomitant disease were included in the study. Prescriptions were

RA Journal of Applied Research
||Volume||2||Issue||02||Pages-416-423||Feb-2016|| ISSN (e): 2394-6709
www.rajournals.in

collected from these patients. The data of these patients was collected in case record forms. The parameters included were demography, diagnosis, Average number of drugs per prescription, Specific trade preparations used, Dosage forms preferred and cost of prescription. Cost of the individual prescriptions were worked from prices as given in Indian Drug Review June 2009 and hospital pharmacy.

OBSERVATIONS AND RESULTS:

Total 1790 prescription were audited and only the prescription for acne and tinea infections were considered. A total of 55 (3.07%) patients were suffering from tinea and a total of 64 (3.57%) patients were suffering from acne [Table 1]. Out of a total of 55 patients with tinea, 20 (36.3 %) were females and 35 (63.6 %) were males [Table 2], which shows greater prevalence of tinea in males. Out of a total of 64 patients with acne, 30 (46.9 %) were females and 34 (53.1%) were males [Table 2], which shows almost equal prevalence of acne in both sexes.

Table 1 - PERCENTAGE OF PATIENTS

| | |
|---|---|
| TOTAL NUMBEROF PATIENTS | 1790 |
| TINEA PATIENTS | 55 (3.07%) |
| ACNE PATIENTS | 64 (3.57%) |

Table 2 - SEX DISTRIBUTION

| DISEASE | MALE | FEMALE | TOTAL |
|---|---|---|---|
| TINEA | 35 | 20 | 55 |
| ACNE | 34 | 30 | 64 |

The average number of drugs per prescription prescribed for tinea infection was 3.17. The average number of drugs per prescription prescribed for acne infection was 3.04. (Table 3)

Table 3 - AVERAGE NUMBER OF DRUGS PER PRESCRIPTION

| DISEASE | AVERAGE NUMBER OF |
|---|---|
| TINEA | 3.18 |
| ACNE | 3.04 |

In case of tinea, the route of administration of drugs were oral and topical. 102 drugs were given orally and 73 drugs were given topically. In case of acne, the route of administration of drugs were oral, topical and parenteral. 66 drugs were given orally, 127 drugs were given topically and 2 drugs were given parentally (Table 4). Thus in tinea oral formulations were given commonly. This was probably due to the fact that most tinea cases were moderate to severe in intensity. In acne topical formulations were given commonly since it is standard practice to give topical therapy first and to give systemic therapy if topical therapy fails and symptoms persist.

Table 4 -Route of administration of drugs

| DISEASE | ROUTEOFADMINISTRATION | NUMBER OF DRUGS |
|---|---|---|
| TINEA | ORAL | 102 |
| | TOPICAL | 73 |
| ACNE | ORAL | 66 |
| | TOPICAL | 127 |
| | PARENTERAL | 2 |

Drugs Prescribed -

In tinea cases, the drugs prescribed were as follows

In tinea, oral fluconazole was the most common drug prescribed amongst the oral formulations whereas topical clotrimazole was the most common drug prescribed amongst the topical formulations.

RA Journal of Applied Research
||Volume||2||Issue||02||Pages-416-423||Feb-2016|| ISSN (e): 2394-6709
www.rajournals.in

Table 5 – Oral drugs in Tinea Patients

| Drug | Group | Number of patients | Brand name (cost in Rs.)* |
|---|---|---|---|
| Terbinafine | Antifungal | 21 | Zimig(20),Terbest (20),Terfaze(20) |
| Fluconazole | Antifungal | 27 | Flucos(28),Faze(10),AF(9.8),Nufor ce(7.99),Fusys(7.5) |
| Hydroxyzine | Antihistaminic | 19 | Atarax(0.7),Prugo(0.9) |
| Levocetrizine | Antihistaminic | 15 | Levocet(4),Ievosiz(1.94) |
| Cefadroxil | Cephalosporin | 3 | Cefadur(7),Cefadrox(3.78) |
| Vitamin, mineral, antioxidant | Vitamin, mineral, antioxidant | 5 | Keragloforte (8.9),Neurobion forte(5.55),Antoxid (3.8),Oxidan(3.8) |
| Amoxicillin- clavulanic acid | Penicillins antibiotic | 1 | Moxikind-cv(18.9) |
| Ketoconazole | Antifungal | 2 | Nizral (20.5) |
| Cetrizine | Antihistaminics | 9 | Setri(2.2) |
| Hydroxychloroquine | Immunosu ppresants | 1 | HCQS(6.6) |

Table 6 – Topical drugs in Tinea Patients

| Drug | Group | Number of patients | Brand name (cost in Rs.)* |
|---|---|---|---|
| Clotrimazole | Antifungal | 31 | Candid (33),Absorb(37.40) , Canestan(37.50) |
| Miconazole | Antifungal | 9 | DK(78) |
| Fusidic acid | Oxazolidinone antibiotic | 4 | Fucidin(35),Fudic(84.95),Futop b (35) |
| Terbinafine | Antifungal | 9 | Sebifin(57),Daskil(49),Zimig(62.75) |
| Sertaconazole | Antifungal | 2 | Onabet(80) |

RA Journal of Applied Research
||Volume||2||Issue||02||Pages-416-423||Feb-2016|| ISSN (e): 2394-6709
www.rajournals.in

| | | | |
|---|---|---|---|
| Ketoconazole | Antifungal | 2 | Kz(142.50),Triatop(179),Nizral(65) |
| Halobetasol | Corticosteroid | 3 | Halovate(96) |
| Fluticasone | Corticosteroid | 1 | Flutivate(90) |
| Permethrin | Ectoparasiticides | 1 | Nedax(55) |
| Ciclopirox | Antifungal | 1 | 8x(117) |
| PABA | Chemical sunscreen | 1 | Suncross(219.30) |
| Aloevera | Adsorbant and protective | 1 | Dermadew soap(79.95) |
| Calamine | Adsorbant and protective | 1 | Lactocalamine(29) |
| White paraffin | Emollients | 1 | Cutisoft(45) |
| Arbutin | Demelanizing agent | 1 | Ban-a-tan(180) |
| Fluconazole | Antifungal | 1 | Flucos(41.16) |
| Adapalene | Drugs for acne vulgaris | 1 | Admark(90) |

In acne cases the drugs used were as follows

In acne, oral azithromycin was the most common drug prescribed amongst the oral formulations whereas topical clindamycin was the most common drug prescribed amongst the topical formulations.

Table 7 – Oral drugs in Acne Patients

| Drug | Group | Number of patients | Brand name (cost in Rs.)* |
|---|---|---|---|
| Azithromycin | Macrolide antibiotics | 40 | Aziwok (13), Azifast (23), Azibact(23) |
| Isotretinoin | Drugs for acne vulgaris | 8 | Isotroin(18) , sotret(15) |
| Vitamin,mineral, antioxidant | Vitamin, mineral, antioxidant | 7 | Crotec EC (4.8), Keragloforte(8.9),Vit c(1.24),Limcee(1.48),Vit a(0.68) ,Antoxid(7.4) Avitin7(6) |

RA Journal of Applied Research
||Volume||2||Issue||02||Pages-416-423||Feb-2016|| ISSN (e): 2394-6709
www.rajournals.in

| | | | |
|---|---|---|---|
| Fluconazole | Antifungal | 3 | AF(22.5) |
| Cetrizine | Antihistaminic | 1 | Setri(2.2) |
| Hydroxyzine | Antihistaminic | 2 | Atarax(0.7) |
| Doxycycline | Tetracyclines antibiotics | 1 | Doxy(5) |
| Dapsone | Antileprotic drugs | 1 | Dapsone(0.11) |
| Levocetrizine | Antihistaminic | 1 | Levosiz(1.94) |

Table 8 – Topical drugs in Acne Patients

| Drug | Group | Number ofpatient | Brand name (cost in Rs.)* |
|---|---|---|---|
| Clindamycin | Lincosamide antibiotic | 31 | Clin3(50),Clin ad (100) ,Clindac A(100) |
| Adapalene | Drugs for acne vulgaris | 17 | Adacin(170),Adaferin(90) , Admark (170),Clin ad (100), Deriva(99.9) ,Clindac A(100) , Erytop A(26.85) |
| Salicylic acid | Keratolytic | 10 | Saltrix(48),Klonyl-s(60),Saslic DS(180), Speelac(78.80) |
| Aloevera | Adsorbants and | 4 | Venusia(108),Fash(149) |
| Benzoyl peroxide | Drugs for acne vulgaris | 4 | Brevoxyl(100) , Perobar (70), Benzac AC (66) |
| Calamine | Adsorbants and | 4 | Caladew(29) , caladryl(30.63), calak(19.4) |
| Arbutin | Demelanizing agent | 1 | Niltan(167) |
| Mepyramine | Antihistaminic | 5 | Anthical(32) |
| Nadifloxacin | Fluoroquinol one antibiotic | 1 | Nadoxin(44.50) |
| Vaseline | Emollient | 1 | Vaseline(5) |
| Erythromycin | Macrolide antibiotics | 10 | Erytop A(26.85) |

RA Journal of Applied Research
||Volume||2||Issue||02||Pages-416-423||Feb-2016|| ISSN (e): 2394-6709
www.rajournals.in

| | | | |
|---|---|---|---|
| Tretinoin | Drugs for acne vulgaris | 11 | Supratrel(180),Retino A(52.90), Nextret(48), Melalong(75) |
| Ketoconazole | Antifungal | 3 | KZ,Scalpe(105) |
| Tazarotene | Drugs for psoriasis | 1 | Tazaret(140.50) |
| Hydroquinone | Demelanizing agent | 1 | Melalong(75) |
| Azelaic acid | Drugs for acne | 1 | Aziderm(90) |
| Ciclopirox | Antifungal | 5 | 8x(117.70) |
| Betamethasone | Corticosteroid | 1 | Klonyl-s(60) |
| Triclosan | Antibacterial | 2 | Dermadew acne soap(79.95) |
| PABA | Chemical sunscreen | 3 | Suncross gel(219.30) |
| Kojic acid | Demelanizing agent | 1 | Niltan(167) |

Table 9 – Parenteral drugs in Acne Patients

| Drug | Group | Number of patients | Brand name (cost in Rs.)* |
|---|---|---|---|
| Vitamin A | Vitamin | 1 | Inj vita |
| Triamcinolone | Corticosteroid | 1 | Tricort(19.9 |

*For oral formulation, the cost is given per tablet/capsule. For topical formulation, the cost is given per tube.For parenteral preparation, the cost is given per ampoule.

Hence, In case of tinea disease, the average cost per prescription was 153.57 Rs. The minimum cost was 72.24 Rs. and maximum cost was 368.14 Rs.In case of acne disease, the average cost per prescription was 292 Rs. The minimum cost was 179.35 Rs. and maximum cost was 626.86 Rs.This cost includes cost of drugs for the disease as well as the cost of drugs for associated condition if any.

Out of the total number of 55 cases, the number of cases with tinea disease only was 36 whereas number of cases presenting with tinea along with associated condition was 19. Out of the total number of 64 cases, number of cases of acne disease only was 40 whereas number of cases presenting with Acne along with associated condition was 24.

Hence if cost of drugs for tinea and acne diseases only are to be considered without considering the drugs for the associated condition then the cost ranged from 54 Rs. to 102 Rs. (average 78 Rs.) in case of tinea and from 113 Rs. to 243 Rs.(average 165 Rs.) in case of acne.

RA Journal of Applied Research
||Volume||2||Issue||02||Pages-416-423||Feb-2016|| ISSN (e): 2394-6709
www.rajournals.in

Table- 10– Cost of Prescription

| DISEASE | AVERAGE COST OFPRESCRIPTION | MINIMUMTOMAXIMUM COST |
|---|---|---|
| TINEA | 153.57 Rs. | 72.24 Rs. — |
| ACNE | 292 RS. | 179.35 Rs. — |

DISCUSSION -

The total number of cases of Tinea and Acne infections were 119 out of which tinea were 55 cases (3.07%) out of which 20 were female and 35 was male. and acne were 64 cases (3.57%) out of which 34 were female and 30 were male.Thus males were mostly affected in case of Tinea while both sexes were almost equally affected in cases of Acne vulgaris. In a study conducted in Odisha on acne patients it was seen that total male to female ratio found was 1:1.29 [5].In a study done in primary care setting, it was seen that the ratio of male to female patients with acne was 1:1.02. [10]These studies confirmed the findings of our study. In a study it was seen that a total of 845 patients were seen in the adolescent age group and 365 patients in the adult age group[5]. In another study it was seen that the male to female ratio in the adult age group was found to be 1:2.35 [6–9]. However we did not differentiate the sample population on basis of age groups

In case of tinea, the route of administration of drugs were oral and topical. 102 drugs were given orally and 73 drugs were given topically. In case of acne, the route of administration of drugs were oral, topical and parenteral. 66 drugs were given orally, 127 drugs were given topically and 2 drugs were given parenterally.Thus in tinea oral formulations were given commonly .This was probably due to the fact that most tinea cases were moderate to severe in intensity. It was seen that in acne topical formulations were given commonly since it is standard practice to give topical therapy first and to give systemic therapy if topical therapy fails and symptoms increase.In a study done in tertiary care teaching hospital in Odisha in acne patients, it was seen that 47.44 % of drugs given were oral whereas 52.56% of drugs given were topical [5].

In tinea, oral fluconazole was the most common drug prescribed amongst the oral formulations whereas topical clotrimazole was the most common drug prescribed amongst the topical formulations. Prescription Studies done in tinea cases are rare. In acne, oral azithromycin was the most common drug prescribed amongst the oral formulations whereas topical clindamycin was the most common drug prescribed amongst the topical formulations. In a study on acne it was found that out of total 3634 drugs prescribed, 1174 (32.31%) prescriptions were for isotretinoin alone, which is almost one-third of the total number of drugs [5]. Another study concluded that use of topical retinoids was preferred in combination with other treatments rather than as monotherapy. Oral antibiotics were widely prescribed. [12] in a survey it was shown that Diagnosis of acne vulgaris was the strongest predictor of getting a retinoid prescription [13]. In a drug utilisation study done on acne patients from 1984 to 2003 it was seen that Thirty-five percent of patients had an isotretinoin treatment [14] Similarly a survey showed that Topical retinoids were prescribed for acne in 77.1% of the cases.[15]. In our study isotretinoin was the second most common drug prescribed after azithromycin for acne.

In tinea,majority of prescriptions were for combination of three agents consisting of oral and topical formulation. It consisted mainly of oral terbinafine/fluconazole, topical clotrimazole and oral antihistamine cetrizine/levo cetrizine/hydroxyzine. Results indicated that three drug combination containing oral antifungal terbinafine (terbest/terfaze/zimig 20 Rs.), oral antihistaminic hydroxyzine (0.7 Rs.) and topical antifungal clotrimazole (candid 33 Rs.) (Total 54 Rs.) proved cheaper than prescription containing any brand of oral terbinafine (20 Rs.) and oral antihistaminic levocetrizine (4 Rs.) and topical antifungal miconazole (DK 78 Rs.) (Total 102 Rs.). It was also seen that combination therapy of fluconazole (fusys 7.5 Rs.), clotrimazole (candid 33 Rs.) and hydroxyzine (atarax 0.7 Rs.) (Total 41.2 Rs.) was cheaper than therapy containing terbinafine.

In acne majority of prescriptions were for a combination of four agents of oral and topical formulation .It consisted mainly of azithromycin, clindamycin, and adapalene. Results indicated that combination containing oral azithromycin (aziwok 13 Rs.) and fixed combination of clindamycin and adapalene (clin ad/clindac A 100 Rs.) (Total 113 Rs.) proved cheaper than prescriptions containing oral azithromycin (azibact or azifast 23 Rs.) and topical clindamycin (clin3 50 Rs.) and topical adapalene (admark 170 Rs) (total 243 Rs.).In case of tinea, the average cost per prescription was 153.57 Rs. The minimum cost was 72.24 Rs. and maximum cost was 368.14 Rs.In case of acne, the

RA Journal of Applied Research
||Volume||2||Issue||02||Pages-416-423||Feb-2016|| ISSN (e): 2394-6709
www.rajournals.in

average cost per prescription was 292 Rs. The minimum cost was 179.35 Rs. and maximum cost was 626.86 Rs.This cost includes cost of drugs for the disease as well as the cost of drugs for associated condition if any.If drugs for tinea and acne only are to be considered without considering the associated condition then the cost ranged from 54 Rs. To 102 Rs. (average 78 Rs.) in case of tinea and from 113 Rs. to 243 Rs.(average 165 Rs.) in case of acne. In a study it was seen that Polypharmacy was seen in 1135 (93.80%) prescriptions as compared to 75 (6.20%) prescriptions with monotherapy [5]. Another study showed that topical erythromycin or clindamycin were the sole medication prescribed in 0.81% of the visits recorded, with 60% of these prescriptions arising from dermatologists and 40% from non-dermatologists[11].

Conclusion-Drug utilization studies of this kind highlight the fact that selection of particular brand can significantly influence the cost of therapy.This was a pilot study and the study should be done with a larger sample size. More studies with greater duration and greater sample size need to be carried out for a better understanding of economic influencers.

REFERENCES

[1] Bai Kirubha M H. Prescription auditing of griseofulvin in a tertiary care teaching hospital. Indian J Dermatol Venereol Leprol 2009; 75: 588-92

[2] 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.].

[3] Purdy S, de Berker D. Acne. BMJ. 2006 Nov 4; 333(7575):949-53

[4] Na JI, Suh DH. Red light phototherapy alone is effective for acne vulgaris: randomized, single-blinded clinical trial.Dermatol Surg. 2007 Oct; 33(10):1228-33; discussion 1233

[5] Nibedita Patro, Monalisa Jena, Maitreyee Panda, Mrutyunjay Dash J. A Study on the Prescribing Pattern of Drugs for Acne in a Tertiary Care Teaching Hospital in Odisha Clin Diagn Res. 2015 Mar; 9(3): WC04–WC06

[6] Goulden V, Clark S, Cunliffe W. Post adolescent acne: A review of clinical features. Br J Dermatol. 1997;136(1):66–70.

[7] Williams C, Layton AM. Persistent acne in women. Implications for the patient and for therapy. Am J Clin Dermatol.2006; 7 (5):281–90.

[8] Goulden V, Stables GI, Cunliffe WJ. Prevalence of facial acne in adults. J Am Acad Dermatol. 1999;41(4):577–80. [PubMed]

[9] Shaw JC, White LE. Persistent acne in adult women. Arch Dermatol. 2001;137(9):1252–53.

[10] Br J Gen Pract. 2003 Jul;53(492):525-9. Presentation and management of acne in primary care: a retrospective cohort study. Purdy S1, Langston J, Tait L.

[11] Hoover WD, Davis SA, Fleischer AB, Feldman SR. Topical antibiotic monotherapy prescribing practices in acne vulgaris. J Dermatolog Treat. 2014 Apr;25(2):97-9.

[12] Patel P, Lin HC, Feldman SR, Fleischer AB Jr, Nahata MC, Balkrishnan R. Medication choice and associated health care outcomes and costs for patients with acne and acne-related conditions in the United States. J Drugs Dermatol. 2011 Jul;10(7): 766-71.

[13] Balkrishnan R, Bhosle MJ, Camacho F, Fleischer AB, Feldman SR. Prescribing patterns for topical retinoids: analyses of 15 years of data from the national ambulatory medical care survey. J Dermatolog Treat. 2010 May;21(3):193-200.

[14] Azoulay L, Oraichi D, Bérard A. Patterns and utilization of isotretinoin for acne from 1984 to 2003: is there need for concern? Eur J Clin Pharmacol. 2006 Aug;62(8):667-74.

[15] Balkrishnan R, Sansbury JC, Shenolikar RA, Fleischer AB Jr, Feldman SR. Prescribing patterns for topical retinoids within NAMCS data. J Drugs Dermatol. 2005 Mar-Apr;4(2):172-9.