TO PERFORM PRESCRIPTION ANALYSIS AND PHARMACOECONOMIC ANALYSIS OF THE DRUGS PRESCRIBED FOR SKIN DISORDER

Mohini Rajput[1], Hemakshi Chaudhari[1], Savita Patil[1], Shivkumar Yadav[1], Jagruti Marathe[1], Harshada Patil[1], Aishwarya Dhole[1], Imtiyaz Ansari[2*]

Abstract

Background: The therapeutic efficacy of using many medications simultaneously is frequently increased, although some combinations might cause undesirable drug-drug interactions (DDIs). Due to the lack of new clinical signs and symptoms and the frequent worsening of previously present illnesses, most interactions are missed by doctors. To stop the harmful effects of interactions, it is essential to quantify the frequency of probable DDIs.

Objectives: To assess the prevalence and risk factors for patients' potential drug-drug interactions (pDDIs). To assess the variation in cash costs of the most commonly recommended generic drugs in dermatology and analyze the expense and prescription trends in the outpatient dermatology section. (OPD)

Material and Method: A cross-sectional, descriptive, observational study was used in the investigation. The research was conduct from September 2022 to March 2023, and all data will be gathered by the end of March 2023. A total of 500 prescriptions were gathered. The data covered every patient who had a skin condition. Software called Lexicomp was used to assess DDI. All of the patients had skin diseases, either by itself or in combination with other co-morbid illnesses.

Result: Out of the 500 prescriptions that were gathered, we found that 202 had DDI in patients with skin diseases, and 28 interactions were seen in comorbid conditions. The interactions are shown in Type A 19 (9%), Type B 64 (32%), Type C 79(39%), Type D 24(12%), and Type X 16(8%) in patients with skin diseases. Type B 8 (29%), Type C 12(43%), Type D 6(21%), Type X 2(7%) in comorbid condition. Levocetirizine (212), clindamycin (141), ketoconazole (110), clobetasol (104), and benzoyl peroxide (67) were the drugs that were prescribed the most frequently to treat skin conditions.

Conclusion: The study's conclusions demonstrated that patients had a significant prevalence of probable DDIs. Drug combinations that might cause major adverse drug reactions (DDIs) should not be recommended to patients by doctors without proper investigation.

Keywords: DDI- Drug-Drug Interactions, Skin Diseases or Disorders, Lexicomp, Pharmacoeconomic analysis, Prescription analysis, comorbid condition.

[1]Department of Pharmacy Practice, R. C. Patel Institute of Pharmaceutical education and Research, Shirpur, Dist: Dhule, Maharashtra 425405

[2*]Department of Pharmacology, R. C. Patel Institute of Pharmaceutical education and Research, Shirpur, Dist: Dhule, Maharashtra 425405

*Corresponding Author: Imtiyaz Ansari,

Assistant Professor, Department of Pharmacology, R. C. Patel Institute of Pharmaceutical education and Research, Shirpur, Dist: Dhule, Maharashtra 425405, Imtiyaz.rcpiper@gmail.com, +91 79772 21955

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INTRODUCTION

• The largest organ in the body, the skin, serves a variety of purposes. It acts as the main defence against radiation, dangerous substances, and microbial diseases. The skin may occasionally be impacted by a number of diseases. **(Shrestha and Shrestha)** Clinical conditions that dermatologists regularly face, skin disease patterns differ between and among areas of the same nation. The quality of people's lives is significantly influenced by skin conditions. The two symptoms that are most usually cited as being bothersome in developing nations are allergies and itching. To reduce the burden of skin diseases and to enhance people's quality of life, especially in developing countries, there has to be a higher public awareness of personal cleanliness and healthy living. Diseases are categorised internationally. More than 1,000 disorders connected to the skin or the skin itself are listed in the 10 categorizations of human disease, with a pattern dominated by a few pathologies that account for the majority of the burden of skin diseases. However, even though this significant impact, the discussion of national or international health continues to pay relatively little attention to skin diseases. **(Roderick J. Hay)** In order to analyse the prevalence of skin diseases, the following frequent subcategories of skin problems were chosen: eczema, psoriasis, acne vulgaris, and pruritus (itching without a known cause). Dermatomycosis prevalence data may advise and enhance the actions needed to reduce morbidity and the economic effect on people afflicted. This observational research contrasts how prevalent fungal skin illness is in connection to socioeconomic position. **(Katelyn Urban)** Most skin problems demand expensive, long-term treatment. Treatment compliance and treatment seeking are negatively impacted in underdeveloped nations like India by a poor healthcare delivery system and excessive out-of-pocket costs. **(Rochit Rajesh Singhal)** According to **(Lamichhane)**, drug utilisation studies are helpful for learning more about drug use trends and identifying high-cost medications. Such analysis helps to identify issues with drug use such as polypharmacy, drug-drug interactions, and adverse drug reactions in addition to increasing the standard for medical care at all levels of the healthcare system **(Michael et al., 2003; Sweileh et al., 2006; Chester, 2002).** Data on medication consumption trends in dermatology in India are very rare. These data informed the design of the current study, which aimed to describe the distribution patterns of medications for treating common skin disorders, as well as the costs associated with each prescription.

Over the past few decades, skin conditions have become more common, and they now place a heavy load on global healthcare systems. The majority of information on the epidemiology of skin diseases in India comes from tiny case series or surveys conducted in hospitals or villages, which does not accurately depict the disease burden throughout the nation. **(J. S. Thakur)** As well as due to vast number of prescriptions and the numerous potential sources of error associated with the prescription, there is no reliable data on the quality of such prescriptions, nor on potential sources of error in the tribal area**. (Akshay Khandeparkar)** Therefore, the goal of the current study is to identify drugs errors in prescriptions given to patients with skin illnesses and to conduct pharmacoeconomic analyses for individuals who live in tribal areas.

METHODOLOGY

A cross-sectional, descriptive, observational, single centre study was conducted at Dermatology OPD of Suyash Hospital, Shirpur from October 2022 to January 2023 and a total of 500 prescriptions were collected during the study period. The data was collected by random sampling technique. The study included both sexes suffering from various skin diseases. During the dermatologists' consultations, the information relevant to the study, such as the types of skin illnesses, the patient's OPD card was used to collect the patient's demographic information and fill out a predesigned proforma with the prescription ordered, dose type, frequency, mode of administration, and treatment duration. An approval from the Institutional Review Committee of K.V.T.R Ayurveda College, Boradi, institutional ethics committee was consulted, Medical College. The collected data was kept in Microsoft Office Excel.

DATA ANALYSIS

Using the Lexicomp mobile application, potential drug-drug interactions (pDDIs) were evaluated and categorised based on inter-action risk rating, severity, and reliability rating. One of the most effective DDI screening programmes is Lexi-Interact. Numerous earlier research evaluated Lexi-effectiveness interacts as DDI screening software. In the majority of these studies, Lexi-Interact was rated as highly sensitive (87-100%) and specific (80-90%) software. For smartphones and tablets, Lexicomp is simply accessible and downloadable. Drug-drug interactions (pDDIs) are those that theoretically could happen while taking two or more medications at the same time. The final step was to identify the drugs that may have had

possible drug interactions. The simultaneous use of five or more medications by a single patient for one or more illnesses is referred to as polypharmacy. When a drug is taken with another drug, the effects on the body of each drug change, which is known as a drug-drug interaction.
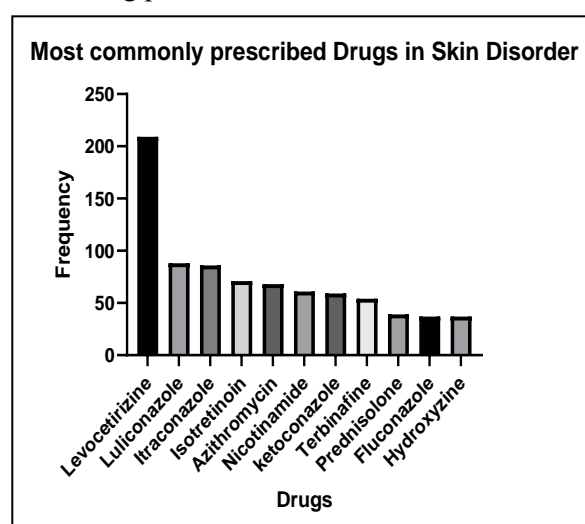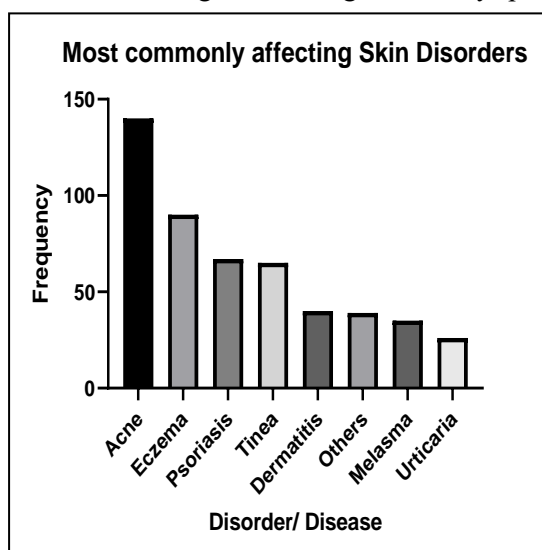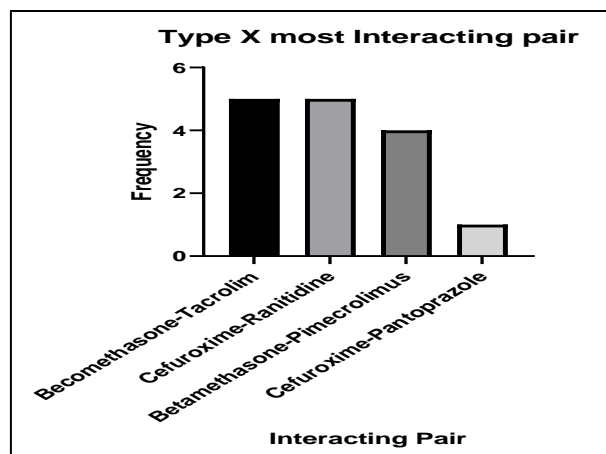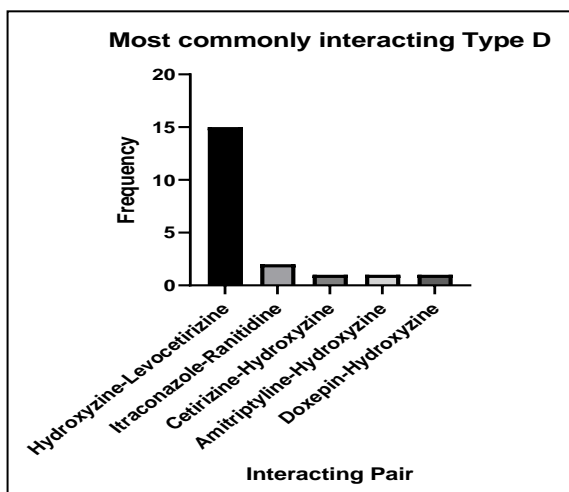
STATISTICAL ANALYSIS
RESULT

A total of 500 prescriptions in all were collected from dermatological departments and analysed during study period. The majority of patients from all of the cases were female, then followed the majority of male patients. Accordingly, 50% of the patients belonged to the 18–30 age range. Acne (28%), eczema (18%), and psoriasis (13%) were the three most prevalent illnesses seen in figure
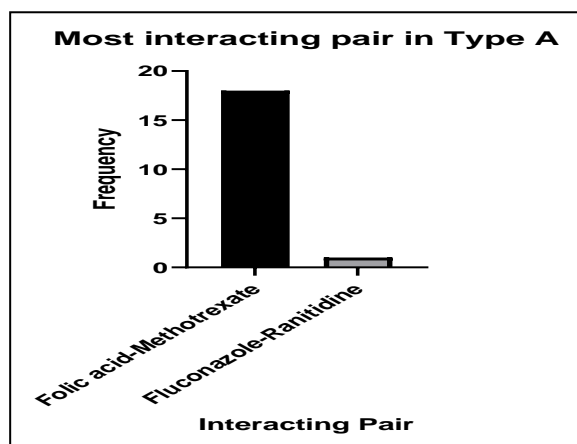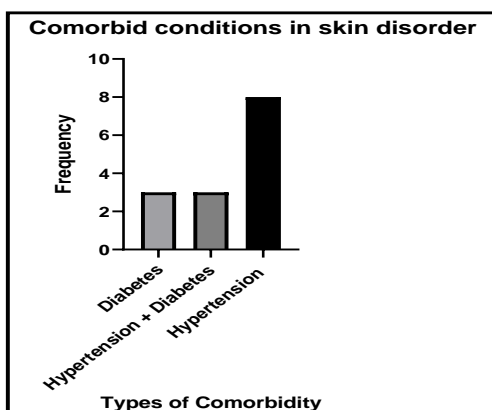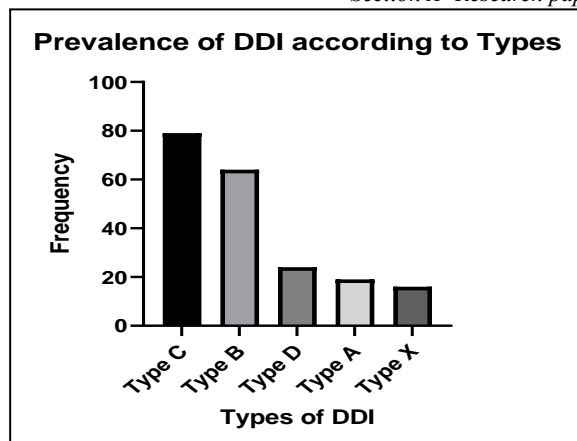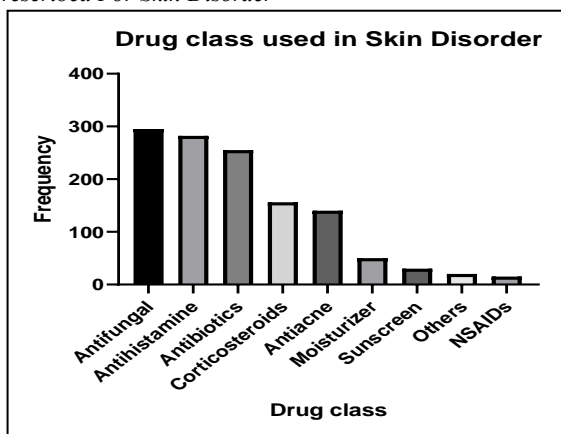
A detailed pattern of skin diseases was seen in the study. The most frequently prescribed medicine class included antifungals (24%), antihistamines (23%) and antibiotics (20%), as well as corticosteroids (13%). The most often prescribed antifungals were miconazole (8%) and ketoconazole (35%) as well as itraconazole (92%) and terbinafine (55%) and fluconazole (55%) and sertaconazole (12%), While levocetirizine 212 (75%) was the most often prescribed antihistaminic medication, hydroxyzine 37 (13%), ranitidine 30 (11%), and fexofenadine 3 (1%), were also frequently used. 500 people received a total of 2008 prescriptions for drugs. Each patient might have a maximum of 7 concurrent medications, with a minimum of 2. Levocetirizine was the most often recommended medication for skin illness (209 patients), followed by luliconazole (88 patients), itraconazole (86 patients), and isotretinoin (71 patients). The most common 15 medications that study participants received prescriptions for are shown in the figure. During the study period,

prescriptions that were gathered from Suyash Hospital in Shirpur were examined. The total number of prescriptions analysed 202 (40.4%) drug-drug interactions, with 19 (9%) drug-drug interactions in type A, 64 (32%) in type B, 79 (39%) in type C, 24 (12%) in type D, and 16 (8%) in type X showing. where frequency of administration was taken into account and where clinically significant DDI was determined. A total of 15 co-morbid illnesses in all 500 patient records, with diabetes and hypertension being the disorders that affected the greatest number of patients. Diabetes (3), hypertension (8), and both diabetes and hypertension (3). The drugs are examined to look for interactions using Lexicomp software. In type A, fluconazole interacts with ranitidine in a sum of one interaction while methotrexate interacts with folic acid in a sum of eighteen interactions; in type B, methotrexate interacts with salicylic acid in a sum of eleven interactions and hydroxyzine and azithromycin interact with itraconazole in a sum of eight and five interactions, there are twelve interactions of type C between itraconazole and fluconazole as well as eight interactions between itraconazole and ketoconazole. Tacrolimus interacts with prednisolone, with a total of three interactions. Bilastine has a total of seven and five interactions with levocetirizine and fexofenadine. Additionally, there are two interactions between itraconazole and ranitidine in type D as well as fifteen interactions between hydroxyzine and levocetirizine. Cetirizine, amitriptyline, and doxepin are the three medicines that interact with hydroxyzine the most. In type X, betamethasone interacts with tacrolimus and pimecrolimus, showing a sum of five and one interactions, whereas cefuroxime interacts with ranitidine and pantoprazole, showing a sum of five and one interactions. These findings suggest that most interacting pairs.

Most commonly affecting Skin Disorders

Most commonly prescribed Drugs in Skin Disorder

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Drug class used in Skin Disorder

Prevalence of DDI according to Types

Comorbid conditions in skin disorder

Most interacting pair in Type A

Most interacting pair in Type B

Most interacting pair in Type C

Most commonly interacting Type D

Type X most Interacting pair

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DISCUSSION

The present work is conducted at Suyash Hospital Shirpur, Dhule 425405. This study was carried for rural and urban peoples from October 2022 to March 2023 and data was gathered. The economic growth in India has an impact on the prevalence of skin disorders. It has been demonstrated that very simple skin issues frequently result in greater suffering than more significant medical conditions. The importance of skin disorders from a public health perspective is based on their high incidence rate and moderate morbidity. Low socioeconomic position, overcrowding, and inadequate hygienic practises are variables linked to a high occurrence of skin disorders. The findings of research study, which are similar to those of Abdel et al. but different from those of Surabhi et al. and Shrestha et al. revealed a majority of females for dermatological conditions.(Shrestha & Shrestha, 2020)(Gupta et al., 2016)Participants attending the Suyash Hospital dermatology OPD most frequently presented with tinea (13%), followed by acne (28%), eczema (18%), psoriasis (13%), and dermatitis (8%), melasma (7%). The present research findings vary from the studies carried out by Surabhi Gupta et al. who identified eczema (23.10%), pyoderma (14.29%), fungal infection (14.24%), and psoriasis (5.77%) as the leading skin disorders, as well as scabies (11%), eczema (8%), tinea (5.5%), and dermatitis (7.5%) as the most prevalent skin diseases and disorders. (Gupta et al, 2016) The majority of the dosage forms given (58%) were topical and were in the form of creams, lotions, shampoos, and ointments. This data supports the use of topical preparations for the treatment of skin conditions since they feature patient-friendly application methods, site-specific effects, and low systemic absorption rates that lead to fewer adverse effects. Oral formulations in the form of pills, capsules, and syrups were next (42%) in popularity. This was comparable to the other research conducted by Surabhi et al. where oral dosage forms were administered in 47.8% of cases, followed by topical dose forms in 51.2% of cases. (Gupta et al, 2016) Antifungals are the most often prescribed class of medication, representing 24% of all prescriptions. They are typically administered orally or topically. Ketoconazole was the antifungal that was most frequently administered. This result differs with research by Zelalem et al. in which ceftriaxone was the most often employed antibiotic. Apart from this, it has been observed that multiple drug therapy was prescribe by the dermatologist for the complete cure but polypharmacy is associated with occurrence of drug-drug interactions.(Tesfaye & Nedi, 2017) DDIs are a significant public health issue that can complicate clinical patient treatment, particularly for polypharmacy patients with several comorbidities. In this study, adult polypharmacy outpatients were examined for the prevalence and severity of pDDIs. This study provides crucial details on the prevalence of probable DDIs, their kinds according to the interaction mechanism, and their degree of severity similar to the study by Mohammad et al, Rogero-Blanco et al, Akshay et al, these all studies also conducted assessment of the prevalence of pDDIs due to polypharmacy in several patients from different places. Studies have revealed a strong correlation between the quantity of prescription drugs and pDDIs.(Nusair et al., 2020),(Rogero-Blanco et al., 2021)(Khandeparkar & Rataboli, 2017)We observed, the majority of pDDIs reported in this study had a risk rating of "C," whereas 10% of all pDDIs had a risk rating of "D" or "X." These results are comparable to other research' reports of pDDI risk ratings. In the study we conducted the data we collected showed that type C and type D interactions were more prevalent. Type D displays 32%, whereas Type C shows 39%. as well as in type X 8%. Similar to previous authors, this According to a study by Akshay et al. at the Goa Medical College, 48% of prescriptions contained three to four medications. Only 0.14% of interactions in their sample were of type X, with type C interactions being the majority 66% of interactions. (Khandeparkar & Rataboli, 2017) A prospective, observational research conducted by the cardiology division of a hospital in South India found that the incidence of probable DDIs was 30.67%. Few short-term research in Brazil reported on possible connections between certain patient categories. According to these data, 22% of psychiatric patients and 32% of paediatric patients experienced DDIs. In compared to the current study, the dermatology department found a 40.4% incidence of probable DDIs. According to these studies, the rate of DDI was 39% in type c, 32% in type b, 12% in type d, as well as type a and type x at 9% and 8% respectively. (Khandeparkar & Rataboli, 2017) Compared to the prevalence 64.1% recorded by Rogero-Blanco et al., the prevalence of 40.4% found in the current study is lower. Less research has been done on DdI. The fact that 90.5% of their patients were taking NSAIDs may be the cause of this discrepancy. 4.9% of patients had DdI associated with renal failure, as compared with 2.9% in the Doubova et al. study. This could be probable because, in contrast to us, those authors only discussed DdI between the use of NSAIDs and renal failure. (Rogero-Blanco et al., 2021) Levocetirizine, amitriptyline, doxepin, and cetirizine were among the medicines that interacted

with hydroxyzine the most frequently (18, 15, 2, and 2 respectively). The greatest number of interactions in the sample size of 500 was discovered to be 202, of which 19 interactions belonged to the type A group, 64 to the type b group, 79 to the type c group, 24 to the type d group, and 16 to the type x group. Lorazepam, phenytoin, and prazosin were shown to have the highest rates of medication interactions in another study conducted by Akshay et al. (Khandeparkar & Rataboli, 2017) In present study, adult polypharmacy outpatients were examined for the prevalence and severity of pDDIs. This study provides crucial details on the prevalence of probable DDIs, their kinds according to the interaction mechanism, and their degree of severity similar to the study by Mohammad et al, Rogero-Blanco et al, Akshay et al, these all studies also conducted assessment of the prevalence of pDDIs due to polypharmacy in several patients from different places. Studies have revealed a strong correlation between the quantity of prescription drugs and pDDIs. (Nusair et al., 2020),(Rogero-Blanco et al., 2021)(Khandeparkar & Rataboli, 2017)

CONCLUSION

The current study assessed potential DDIs in prescriptions from community and hospital pharmacies. The majority of interactions will be handled by dosage modifications, patient monitoring for toxicity signs and symptoms, and a long-term requirement for patient follow-up for clinically significant drug interactions (DDI), according to the research's conclusions. The probability of developing DDI, which can result in serious health issues, rises when the number of medications per prescription rises, whether due to co-morbidity or severity.

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