

Doctor Perception towards Itraconazole in the Market

By

Aditya Delu

*Dissertation submitted for the partial fulfillment of the
MBA Pharmaceutical Management
Academic year, 2015-2017*



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TO WHOMSOEVER MAY CONCERN

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The Candidate has effectively completed the investigation assigned to him amid entry level position preparing and his way to deal with the examination has been true, logical and systematic.

The Dissertation is in satisfaction of the course prerequisites.

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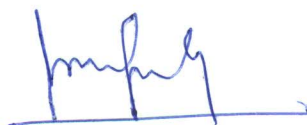
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Col. Dr. Ashok Kaushik

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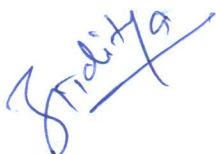
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Original Literary Work Declaration

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This is to certify that all ethical issues have been considered while collecting data for my dissertation titled **“Doctor Perception towards Itraconazole in the Market”**.



ADITYA DELU

Signature of student

ACKNOWLEDGEMENT

This internship/dissertation would have been an insurmountable task without the support, guidance and encouragement that I have been fortunate enough to receive from many people.

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Finally, I would like to thank IIHMR University for providing me with an amazing opportunity and for making it an experience worth cherishing for a lifetime.

Thank you.

ADITYA DELU

ABSTRACT:

Objectives:

Studies have been established to find out the various strategies for repositioning of Itraconazole and doctors opinion about Itraconazole tablet. This study also included objective that is doctor opinion about itraconazole molecule and which parameter should be more focused to increase market share of Itraconazole. Study is focused on evaluation of suggestions given by doctors for ideal formulation of Itraconazole tablet.

Research design:

Primary data was collected from 100 doctors and 50 Chemists in the Jaipur city. Convenience sampling method is used to collect data from doctor and chemist.

Methods:

Data was collected through structured questionnaire and filled in the excel format. Analysis was performed using **MS Excel** as analytical tool.

Results:

Majority of respondents preferred Itraconazole as the main molecule in treatment of fungus in the patients followed by luliconazole and ketoconazole respectively. Majority of patient are of fungal infection than vaginal vulgaris so that doctors prescribing itraconazole in the fungal infections.

Patient Compliance (40%) is the major factor behind preferred brand prescribing by doctor. Followed by availability (25%) and clinical evidences (20%). For any ideal antifungal molecule efficacy and safety is necessary in the formulations as per majority of responses because resistance from antifungal is major challenge in the mean while time. 86% Doctors prescribe alone itraconazole therapy whereas 14% prefer itraconazole in combination therapy with the other antifungal molecules.

The main brands which are leaders in the market of itraconazole in Jaipur are Candiforce (Mankind) followed by Itzya (Abbott) and Itraspore (Systopic) respectively. The ideal therapy

for itraconazole is 14 days which is approved by USFDA and mostly followed by all the doctors.

Conclusion:

Study shows that majority of respondents (Doctors) are mostly prescribing Itraconazole due to its higher potency towards the fungus and quick relief and better safety profile.

Itraconazole is effective in the pallet form hence all the company brands are available in the pallet form

Due to the resistance of Itraconazole seen in the market doctor need that more effective formulation comes to the market for better patient compliances.

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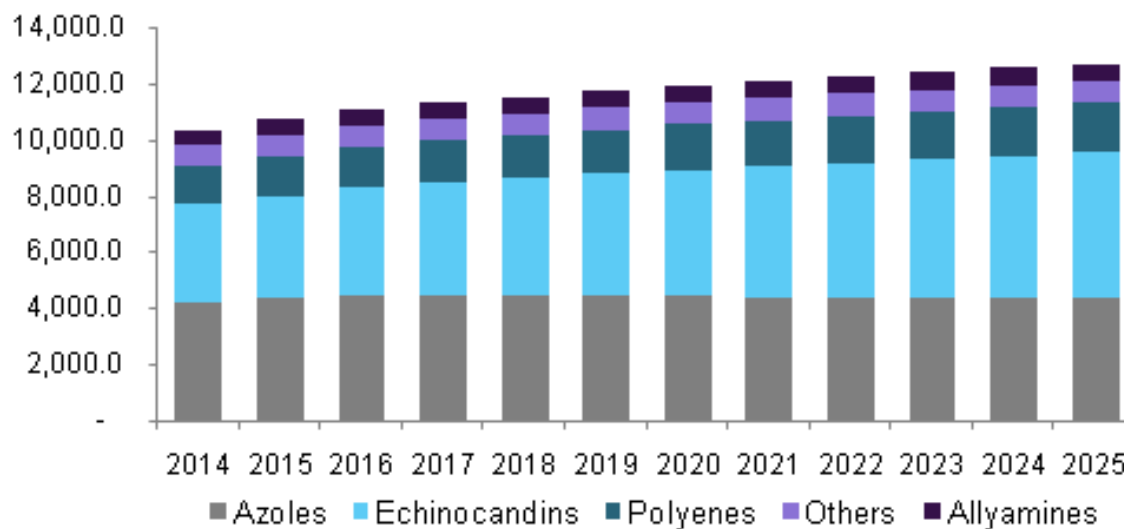
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INTRODUCTION

In 2015 the global drugs market size of antifungal was valued at USD 10.7 billion and is expected to positive growth due to the rising incidence or cases of fungal infections in the persons including as candidiasis and pergillosis. These infections may lead to the death in patients with a compromised immune system, such as in the individual's afflicted with (AIDS) acquired immune deficiency syndrome, leukemia, and are hence coined as opportunistic infections. The increasing prevalence of the hospital-acquired infections and infectious diseases is expected to fuel the demand for therapeutics over the forecast period or time.

Fungal infection is found to attack both systemic and superficial parts of the body in the skin, mouth, eye, and vagina, leading to diseases, such as ringworm, fungal meningitis and athlete's foot which are treated using antifungal product. A huge range of fungi static or fungi cidal preparations, such as sprays, creams, injections and tablets are available in the market. Increasing demand or consumption of these products is predicted to drive the demand over the next 1 decay.

“Global Antifungal Drugs Market Revenue by Drug Class, 2014 -2025” (USD Million Dollar)



Competitive Insights

Some of the key players in this industry are Pfizer, Novartis AG, Sanofi-Aventis, Inc., Merck & Co., Inc., Enzon Pharmaceuticals, Inc., Astellas Pharma, Inc., Bayer AG, GlaxoSmithKline plc, Sigma-Aldrich and Abbott. The participants are adopting competitive strategies such as new product development and collaborative agreements so to capture a greater share.

Fungal Infection is mostly associated with the use of broad spectrum corticosteroids, antibiotics, anticancer or immunosuppressant drugs and emergence of AIDS.

Classification

1. Antibiotics Amphotericin B, Nystatin, Gresofulvine
2. Azole Clotrimazole, Ketaconazole, Fluconazole, Itraconazole, Luliconazole

Itraconazole

“Itraconazole was invented in 1984, is a triazole antifungal molecule/agent for fungal infections.” The route of administration for this drug is may be given by orally or intravenously.

It is on the (WHO) “World Health Organization's list of essential Medicines”. The most important medications given in the basic health system of society.

Itraconazole atom has a more extensive viability or range of action than fluconazole (however not as wide as posaconazole or voriconazole). Specifically it is dynamic against *Aspergillus* species, which fluconazole isn't. Itraconazole is likewise authorized for use in onychomycosis, "sporotrichosis, histoplasmosis, and blastomycosis". Itraconazole is having more than 99% protein-bound and has for all intents and purposes no infiltration into the cerebrospinal liquid. Accordingly, it ought to never be utilized to treat focal sensory system contaminations or meningitis."

Conventional itraconazole has relatively, low bioavailability after oral administration or especially when given in the capsule form on an empty stomach. The fast-dissolving polymer targets the supersaturated solution of itraconazole, from which enhanced absorption can be expected, recently itraconazole was found to be contribute to the formation of nanofibers in certain simulated intestinal fluids. These nanofibers have a uniform width of 11-12 nm and a length up to several micrometers. The capsule form is a molecular dispersion of itraconazole in amorphous HPMC polymer.

Mechanism of action (MOA)

The mechanism of action of itraconazole is the same as the other azole antifungals have: it inhibits the fungal-mediated synthesis of ergosterol via inhibiting the lanosterol 14 α -demethylase because of its ability to inhibiting cytochrome P450 3A4 CC-3, caution should be used when considering the interactions with other medications.

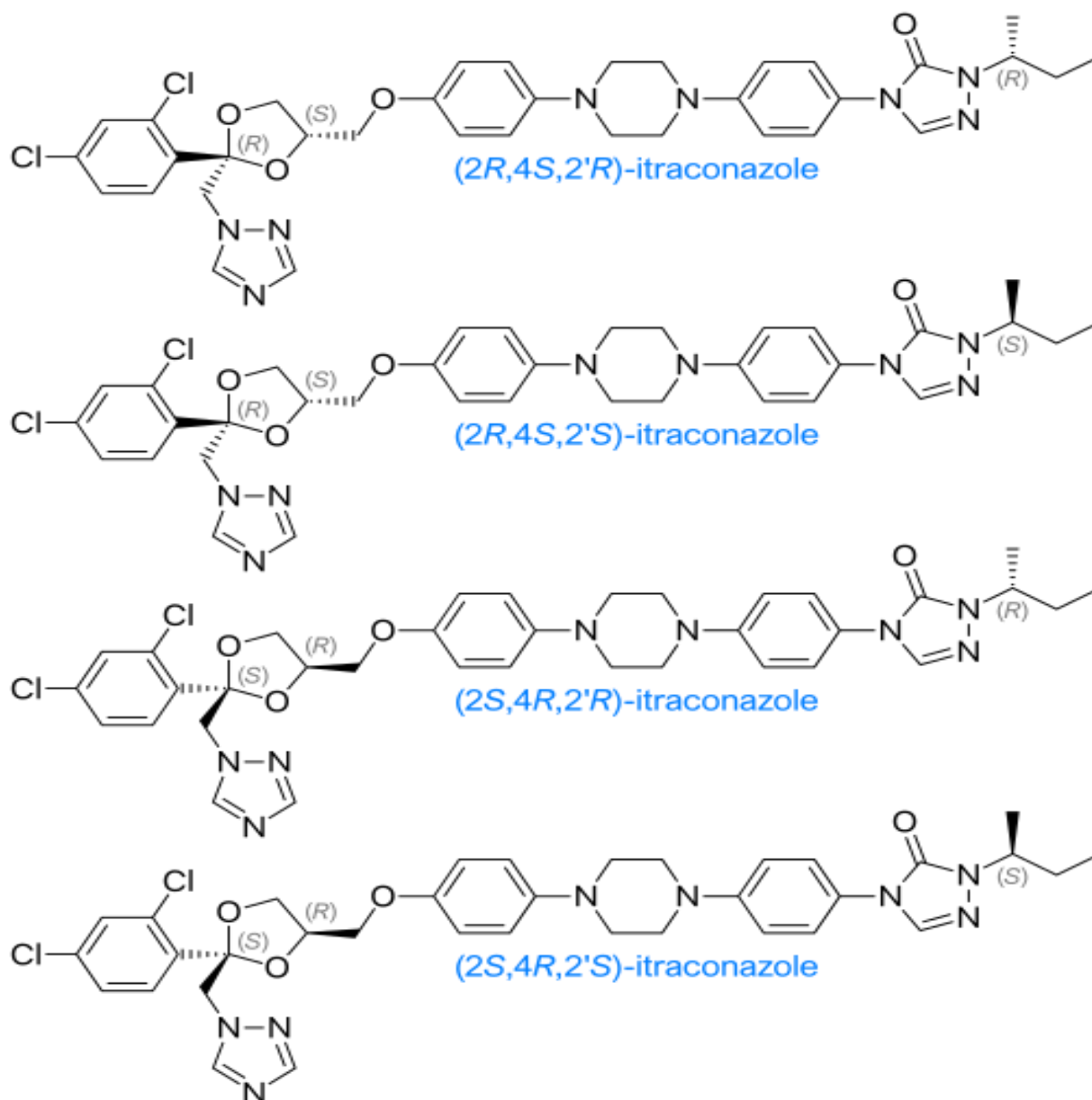
Pharmacokinetics

Itraconazole like, quinidine clarithromycin, and cyclosporine can inhibit P-glycoproteins causing drug-drug interactions by reducing the elimination and increasing absorption of organic cation drug. With conventional Itraconazole preparations serum level can be vary greatly between patients and often resulting in serum concentrations lower than the therapeutic index. It has therefore been conventionally advised that patients take Itraconazole drug after a fatty meal rather than prior to eating.

Chemistry

Itraconazole molecule has three chiral carbons in its structure. The two chiral centers present in the dioxolane ring are fixed in relation to one another and the triazolomethylene, aryloxymethylene. The clinical formulation is a 1:1:1:1 mixture of four stereoisomers.

Dioxolane-ring substituents are always cis to each other.



Itraconazole Side Effects

Itraconazole may have some reaction that ought to be accounted for by social insurance experts or specialists.

- breathing issues
- allergic responses like skin rash, tingling or hives, swelling of the face, lips, or tongue
- changes in hearing
- dark pee

- cough up bodily fluid
- fast, sporadic pulse
- general sick feeling or influenza like manifestations
- loss of craving
- nausea, retching
- light-hued stools
- pain, shivering, deadness in the hands or feet
- redness, rankling, peeling or slackening of the skin, including inside the mouth
- sudden weight pick up
- swelling in feet, lower legs, or legs
- right upper midsection torment
- unusually powerless or tired
- yellowing of the eyes or skin

There are some symptoms that for the most part don't require restorative consideration some of them are specified underneath:

- diarrhea
- blurred/twofold vision
- dizziness
- stomach irritate or swelling
- headache

There are a few meds which patient ought not to bring with any of the accompanying drugs:

- alprazolam
- alfuzosin
- certain drugs for cholesterol like cerivastatin, lovastatin, simvastatin, lomitapide
- certain drugs for circulatory strain like felodipine, nisoldipine
- cisapride

- certain drugs for the heart like disopyramide, dofetilide, dronedarone, eplerenone, quinidine, ranolazine
- colchicine (in the event that you have liver or kidney issues)
- conivaptan
- ibrutinib
- ergot alkaloids like dihydroergotamine, ergonovine, ergotamine, methylergonovine
- irinotecan
- lurasidone
- midazolam
- methadone
- nevirapine
- other solutions that draw out the QT interim (cause an unusual heart musicality)
- pimozide
- sirolimus
- red yeast rice
- ziprasidone
- thioridazine
- triazolam

Itraconazole particle may likewise interface with the accompanying medicines:

- antacids
- aliskiren
- amlodipine
- antiviral prescriptions for HIV or AIDS
- aprepitant
- buprenorphine
- atorvastatin
- certain prescriptions for bladder issues like fesoterodine, solifenacin, tolterodine
- certain anti-microbials like ciprofloxacin, clarithromycin, erythromycin

- certain medications for sadness, uneasiness, or insane unsettling influences like diazepam, aripiprazole, buspirone, haloperidol, perospirone, quetiapine, risperidone
- certain medications for erectile brokenness like sildenafil, vardenafil, tadalafil
- certain meds for growth like docetaxel, erlotinib, bortezomib, dasatanib, ixabepilone, lapatinib, nilotinib, trimetrexate, busulfan ,vinca alkaloids
- certain drugs for torment like alfentanil, fentanyl, oxycodone, sufentanil
- certain drugs that treat or avert blood clusters like warfarin, dabigatran, rivaroxaban
- certain solutions for stomach issues like cimetidine, famotidine, omeprazole, lansoprazole
- certain solutions for seizures like carbamazepine, phenytoin
- certain solutions for tuberculosis like isoniazid, INH, rifabutin, rifampin, rifapentine
- cinacalcet
- cilostazol
- cyclosporine
- digoxin
- everolimus
- eletriptan
- halofantrine
- meloxicam
- isradipine
- nadolol
- nifedipine
- other pharmaceuticals for contagious diseases
- praziquantel
- ramelteon
- saxagliptin
- repaglinide
- salmeterol
- steroid pharmaceuticals like budesonide, ciclesonide, dexamethasone, fluticasone, methylprednisolone
- tamsulosin
- tacrolimus

- tolvaptan
- verapamil

Literature Review

1. Itraconazole is especially alluring in the parasitic prophylaxis for malignancy patients because of its expansive range, including candida and aspergillus. It is generally well tolerated. However its efficacy in preventing invasive aspergillosis couldn't be demonstrated. A 3 year old boy diagnosed with acute lymphoblastic leukemia, received induction chemotherapy. On day 14 itraconazole solution with a dose of 5mg/kg was begun. Ten days, after itraconazole was started he developed neurogenic bladder, paralytic ileus, mild left ptosis, and absence of deep reflexes with severe paralysis of the lower extremities and the mild weakness of upper extremities. Itraconazole withdrawal was followed by rapid improvement and with neurologic examination returning to normal within the 6 weeks. 19 cases of unusual enhanced vincristine neurotoxicity, related to itraconazole have been reported in children's. Although the manifestations are the same as those usually associated with use of the vincristine in these cases severity appears remarkable. The author's suggest that in the absence of any proven benefit of itraconazole prophylaxis and given the interaction of this drug with vincristine, leading to severe and even potentially fatal toxicities. The combination use of these drugs should be avoided.
2. Onychomycosis may be caused by dermatophytes Candida species and nondermatophyte molds. To evaluate the safety and efficacy of itraconazole and terbinafine in the treatment of some nondermatophyte molds, that cause toe onychomycosis. To review the literature on the treatment of nondermatophyte mold toe onychomycosis, using the oral antifungal agents. Patients with nondermatophyte mold, toe onychomycosis were treated in an open prospective manner with either terbinafine or itraconazole (pulse) therapy. In each instance light microscopic examination, was consistent with the diagnosis of a nondermatophyte mold, for each patient mycological evaluation of the target nail resulted in three or more successive culture's yielding growth of the mold alone. Every one of the fifteen patients had onychomycosis of the toes, which was of the distal and sidelong sort. The patients were treated with the itraconazole particle given as the standard three heartbeats with extra heartbeats regulated, contingent on the reaction showed by the toe onychomycosis, in the patient. Essentially terbinafine was given for twelve

weeks with extra treatment managed, as directed by the reaction. Efficacy parameters were clinical cure (CC) and mycological cure (MC). Mycological cure was negative, light microscopic examination (KOH) and culture. Clinical cure was the appearance of completely normal looking nail. At month twelve from the start of treatment, the response was as follows- *Scopulariopsis brevicaulis*- terbinafine (MC 0/1, CC 0/1) and itraconazole (MC 4/4, CC 2/4), *Fusarium* species- terbinafine (MC 0/1, CC 0/1), and itraconazole (MC 1/1, CC 1/1). *Alternaria alternata*- itraconazole (MC 0/1, CC 0/1), *Aspergillus* species- itraconazole (MC 5/6, CC 3/6), and *Onychocola canadensis*- itraconazole (MC 1/1, CC 0/1). There were no significant laboratory adverse effect or clinical adverse effects. In the present series, itraconazole demonstrated efficacy against onychomycosis of the toenails caused by the 5-*brevicaulis* and *Aspergillus* species. A review of the literature confirms that our experience with itraconazole and further suggests that terbinafine may also demonstrate efficacy against the cases of *S. brevicaulis* and *Aspergillus* toe onychomycosis. Additionally reports in the literature, suggest that pedal onychomycosis caused by *Fusarium* species may also show response to terbinafine and itraconazole.

3. Patients with aspergilloma, can be safely managed with supportive therapy in absence of massive haemoptysis. We hypothesised that (CCPA) chronic cavitary pulmonary aspergillosis could also be managed on similar grounds. The aim of this prospective randomized controlled trial was to evaluate the safety and efficacy of itraconazole in CCPA. Consecutive patients of chronic cavitary pulmonary aspergillosis with presence of chronic pulmonary/systemic symptoms, and pulmonary cavities, and presence of *Aspergillus* (microbiological or immunological) were randomized, to receive either supportive treatment alone or itraconazole 400 mg daily for six months plus supportive therapy. Response was assessed clinically radiologically and overall after six months therapy. A total of 31 patients (mean age- 37 years) were randomized to itraconazole, ($n = 17$) or the control ($n = 14$) group. The number of patients showing overall response, was significantly higher in the itraconazole group (76.5%) vs. the control (35.7%) group ($P = 0.02$). The number of patients demonstrating the clinical or radiological response were also significantly higher in the itraconazole group, ($P = 0.016$ and 0.01 respectively). Adverse events were noted in 8 patients in the itraconazole group however, none was serious or led to discontinuation, of the study drug (itraconazole). Itraconazole was found to be superior to standard supportive treatment alone in the stabilising cases of CCPA.

4. "Candidiasis or oral candidosis is a standout amongst the most widely recognized, human astute parasitic contaminations of the oral depression. This pathology had a wide assortment of treatment which has been contemplated until nowadays. The present examination offer's a writing survey on the treatment of candidiasis (oral), with the motivation behind build up which treatment is the most reasonable, for each "situation. Searching the twenty four latest articles about treatment of candidiasis it concluded, that the incidence depends upon the types of the candidiasis and the virulence/severity of the infection. Although nystatin and amphotericin b were the most drugs used locally and fluconazole oral suspension is proving to be a very effective drug in the treatment of candidiasis. Fluconazole was found to be the drug of choice as a systemic treatment of candidiasis (oral). Due to its high adaptability, good antifungal properties of the patient and its effectiveness or safety compared with other antifungal drugs. But this drug is not always effective, hence we need to evaluate and distinguish others like ketoconazole or itraconazole, in that cases when Candida strains resist to fluconazole.
5. Itraconazole and fluconazole are two investigational triazole antifungal agents, which are currently undergoing clinical trials in the United States. Both are active orally and have favorable pharmacokinetics (i.e., good bioavailability, low plasma protein binding, long half-life,) and possess activity against several systemic fungal pathogens . In addition preliminary information suggests, that these agents are substantially less toxic than the currently available azole compounds. Fluconazole and Itraconazole to a lesser degree, itraconazole have been shown to be the highly effective for the treatment of cryptococcal meningitis. The potential for mediate collaborations is especially lower with these operators contrasted with medications, for example, ketoconazole
6. Amphotericin B has been the treatment of choice, for disseminated histoplasmosis in patient with acquired immunodeficiency syndrome (AIDS). Oral antifungal agents could be welcome alternatives to standard treatment of disseminated histoplasmosis, in less severe cases. The purpose of this study was to assess the safety and efficacy of itraconazole therapy in patients with AIDS (acquired immunodeficiency syndrome) and disseminated histoplasmosis.
 - Patients and methods
 - This was a multicenter open-label, nonrandomized prospective trial, conducted in university hospitals of the AIDS Clinical Trial Group

- Of fifty nine evaluable patients, fifty (85%) responded to therapy. Five patients withdrew because of progressive infection and one died of a presumed pulmonary embolus within the first week of therapy without improvement, two withdrew because of toxicity, and one was lost to follow-up after second week of therapy.
- Itraconazole is effective and safe induction therapy for mild disseminated histoplasmosis, in patients with AIDS, offering an alternative to amphotericin B in such other cases. Patients with moderately severe or severe histoplasmosis, should first be treated with the amphotericin B and then may be, switched to itraconazole after achieving clinical improvement.

7. There were one hundred sixty eight cases of tinea capitis in infants from 0-2 years of age. The majority was reported by Al-Fouzan, and was part of a larger cohort of children. Of this cohort 121 patients were children ages are between 0-12 months, but specific patient data were not included. In this group, of primarily Middle Eastern children, *M canis* was the common dermatophyte, followed by *T violaceum*. The 121 patients are between 0-2 years of age with tinea capitis were treated with griseofulvin for four to ten weeks. A subset was treated, with a combination of oral and topical agents and show improved therapeutic results at four to six weeks but showed no difference when compared with oral therapy alone by 8-10 weeks.

Most patients were treated with griseofulvin, 19% of children were treated with itraconazole, 9% with terbinafine, and 4% with the fluconazole. All patients reportedly were cured without any of the side effects. Two patients initially treated with griseofulvin were retreated with terbinafine, one was treated with griseofulvin 10 mg/kg/day dose and subsequently treated with terbinafine 62.5 mg daily dose with complete cure. We report 1 patient who did not tolerate griseofulvin, and was then retreated with terbinafine. Dosing regimens for griseofulvin varied between 10 and 20 mg/kg/day. Romano et al¹⁶ used a standard 125 mg/day dose for patients treated with griseofulvin. Itraconazole was used in the doses of 5 mg/kg/ day. In two reports, itraconazole was used in pulsed dosing. Terbinafine was used in doses of 62.5 mg or 125 mg daily. Fluconazole was used in the doses of 5 or 6 mg/kg/day. Treatment duration will be averaged 5.5 weeks. Cost is variable for these agents. Terbinafine tablets are the cheapest opinion or option as it has been added to many insurance plans. Fluconazole ranges, from \$10 to \$55 depending on

the formulation. Griseofulvin micro solution, and tablets cost about \$42 and \$102 respectively. and griseofulvin ultramicrosize, averages about \$0.93/mg. whereas Itraconazole is the most expensive at \$310 for solution and \$147 for tablets

Need for study:

The pharmaceutical market is challenging. The brand which is most fitted into market condition will survive. Derma market is now shifted more towards Itraconazole from Terbinafine or Griseofulvin. There is minute difference between different brands of derma vitamins, antifungal to gain the advantage of some specific vitamins, antifungals which is not provided by other brands in market. Company can do this only by collecting the thorough information of competitors brand and doctors view about derma products.

Henceforth following examination is led to distinguish the different properties on which organization needs to center while repositioning of the Itraconazole tablet mark.

RESEARCH METHEDODOLOGY

OBJECTIVES:

1. To assess the Doctor perception towards Itraconazole
2. To assess the top brands in itraconazole by the doctor point of view

RESEARCH DESIGN

- Sample territory: Jaipur, India
- Study outline: Descriptive examination
- Study sort: Analytical examination
- Sampling: Non-Probability Sampling
- Sample measure: 100 Doctors and 50 Chemists in Jaipur city.

MATERIAL AND METHOD

- Information sort: Primary information
- Apparatus utilized for information accumulation: Structured Questionnaire
- Medium of information collection: "Survey through organized survey.

Information was gathered through Structured Questionnaire by specifically drawing closer to specialist's chamber and scientist counter. Add up to 100 specialists and 50 scientific experts were reviewed."

Information gathering Tool: "Information was gathered through poll and filled in an exceed expectations design which additionally broke down by exceed expectations instruments."

DATA ANALYSIS PLANE

Data filled in the excel format was analyzed by using tool pivot table. From the pivot table total responses given by doctors and chemist were calculated as there any multiple response option given to single question in questionnaire.

After counting the individual options response it compared with total response and percent response for each option were calculated by considering total count of response as 100% for multiple option question and for normal question total no. of respondents is considered as 100%. Graph prepared for the percent responses given by doctor and chemist.

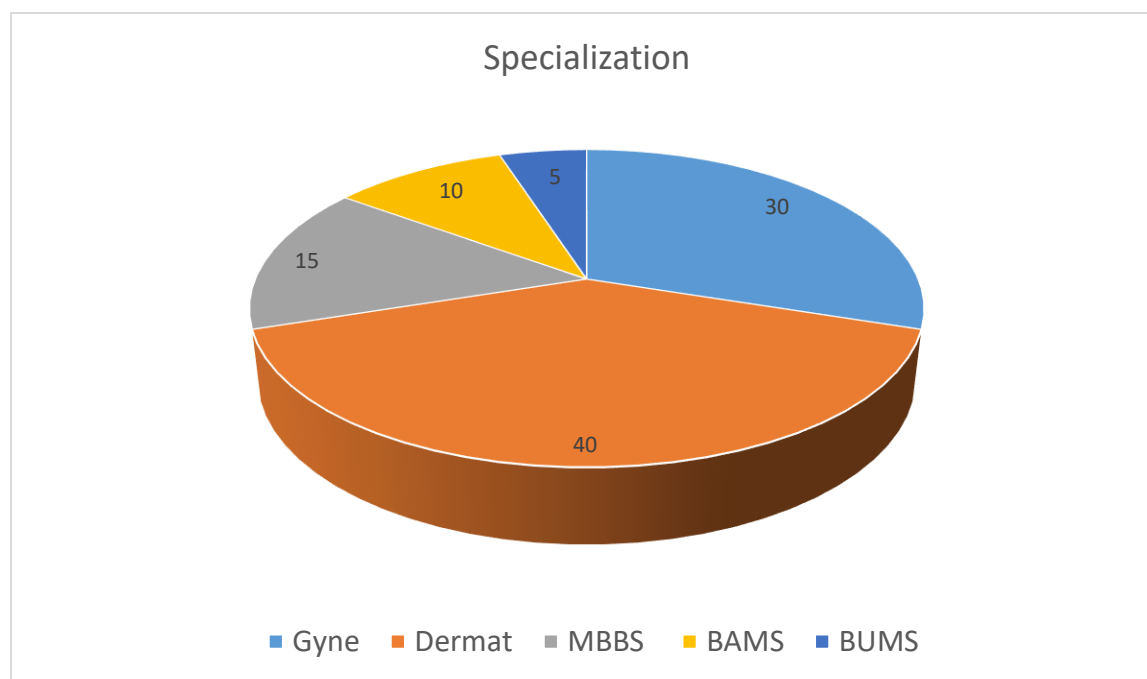
Inclusion Criteria: Doctors and chemist present in Wall City, VDN, Raja Park, Sasthri nagar, Bani Park, Jalupura, Murlipura, Jothwara, NIIMS, MGH area of Jaipur.

Exclusion criteria: Different regions of Jaipur was exclude in the examination on account of hard to get to.

FINDINGS

Table no. 1 Specialization of Doctor.

S. No.	Specialization	Frequency
1	Gyne	30
2	Dermat	40
3	MBBS	15
4	BAMS	10
5	BUMS	5

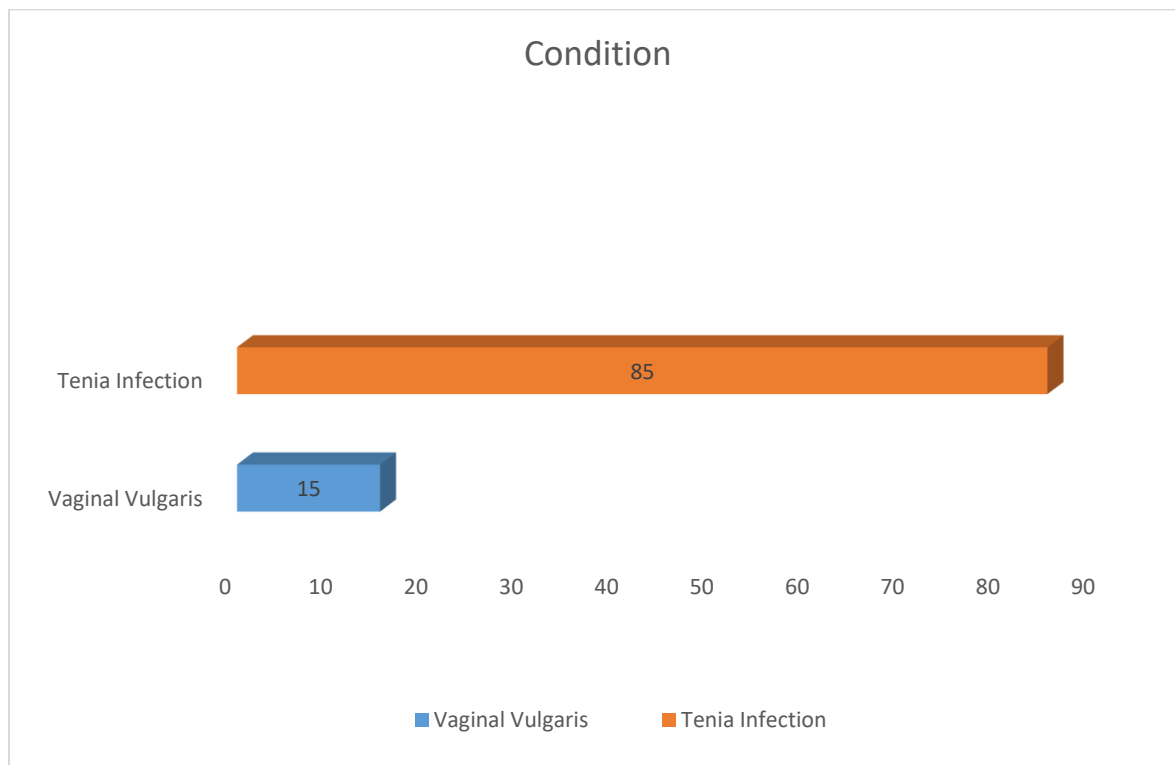


Interpretation:

- 40% of Doctor are dermatologist in the study
- Followed by the 30% Gyne
- 15% of total respondents are MBBS Doctor, rest 10% and 5% are BAMS and BUMS respectively in the study.

Table No.2 Case in which prescribe Itraconazole

S.No.	Disease	Frequency
1	Vaginal Vulgaris	15
2	Tenia Infection	85

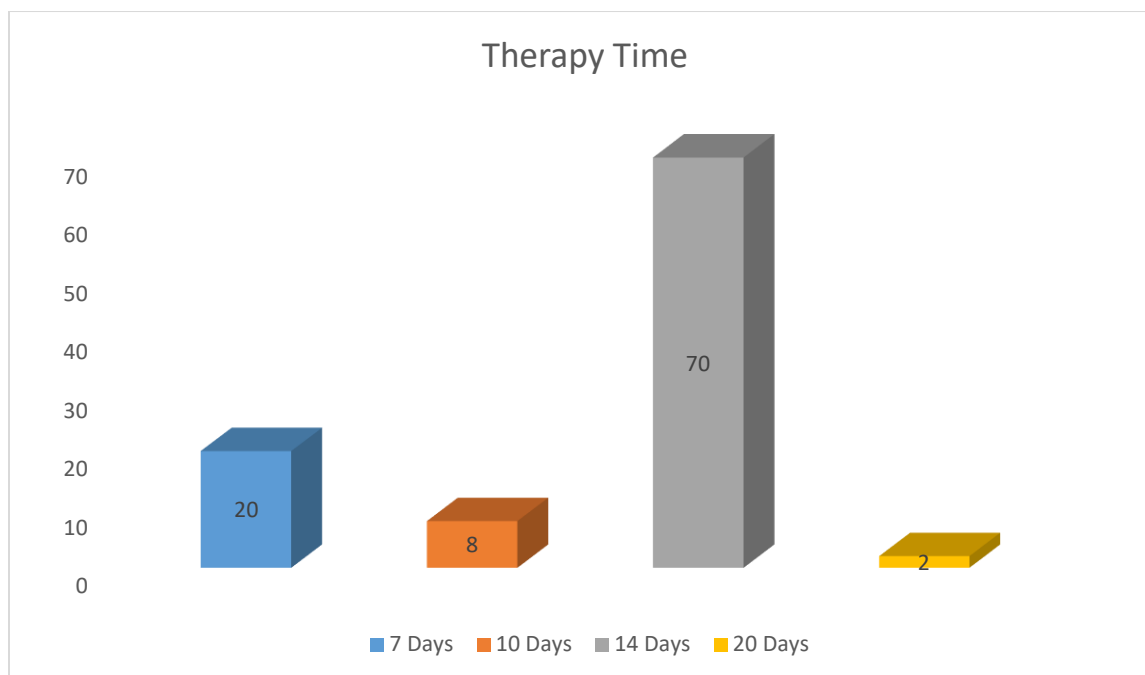


Interpretation:

- 85% of Itraconazole is prescribed in the case of Tinea Infection include Tinea Corporis, Tinea Cruris, Tinea Pedis and Onychomycosis.
- 15% of Itraconazole is used in the case of Vaginal Vulgaris.

Table No. 3 Average therapy dose prescribe to patient by doctor

S.No.	No. of Days	Frequency
1	7	20
2	10	8
3	14	70
4	20	2



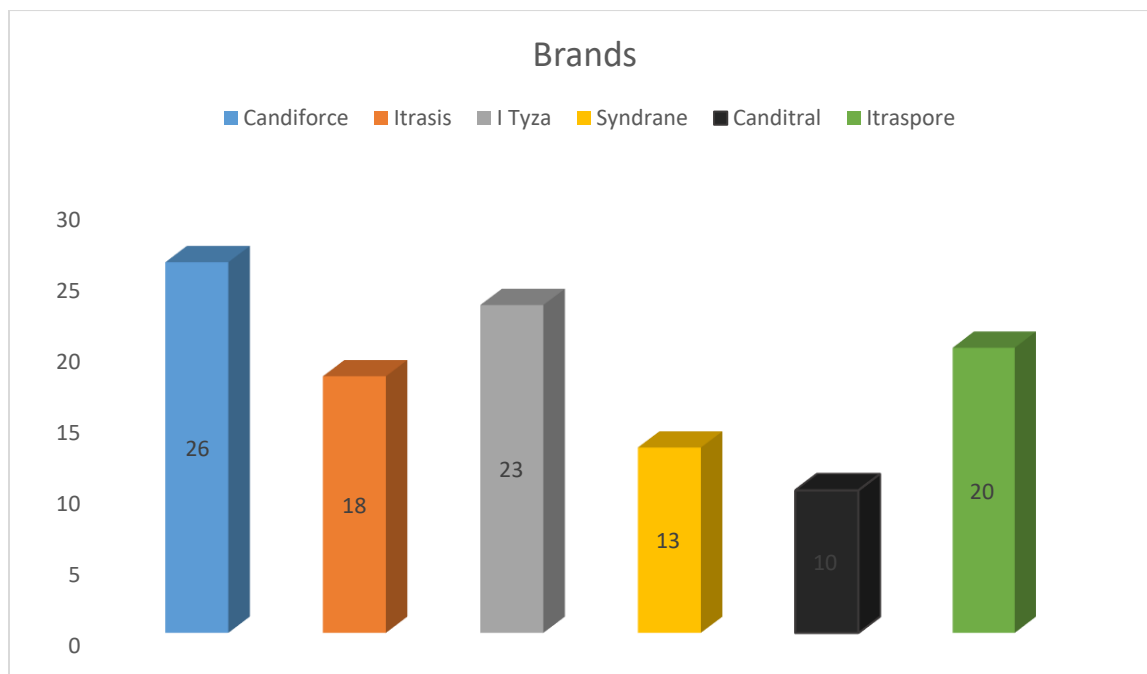
Interpretation:

Average therapy of Itraconazole which is prescribed by doctors are:

- 20% of respondent prescribe Itraconazole for 7 days
- 8% of respondent prescribe Itraconazole for 10 days
- 70% of respondent prescribe Itraconazole therapy for 14 days to patient
- 2% of respondent prescribe Itraconazole therapy for 20 days or more
- Mostly respondent prescribe Itraconazole for 14 days to the patient

Table No. 4 Most prescribed Itraconazole brand by the Doctor.

S. No.	Brands	Frequency
1	Candiforce	26
2	Itrasis	18
3	I Tyza	23
4	Syndrane	13
5	Canditral	10
6	Itraspore	20



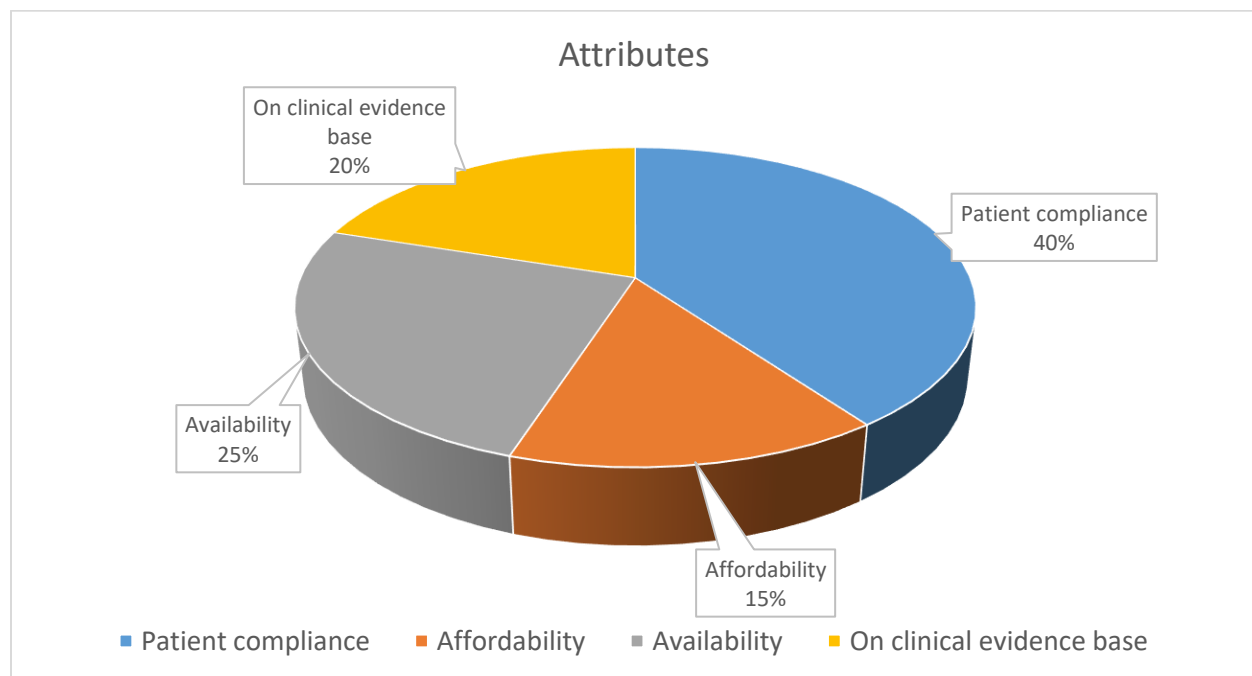
Interpretation:

Leading Brands of Itraconazole in the Jaipur are

- 26 respondents are preferring Candiforce as majority of preferred brand in Itraconazole
- Candiforce is followed by I tyza which is prescribed by 23 respondents
- 20 respondent prefer Itraspore as preferred brand
- Itrasis is 4 leading prescribed brand of Itraconazole in Jaipur prefer by 18 respondent
- 13, 10 respondent prefer syndrane, canditral as prefer brand in Itraconazole

Table No. 5 Attributes suitable to prescribe particular brand

S.No.	Attributes	Frequency
1	Patient compliance	40
2	Affordability	15
3	Availability	25
4	On clinical evidence base	20



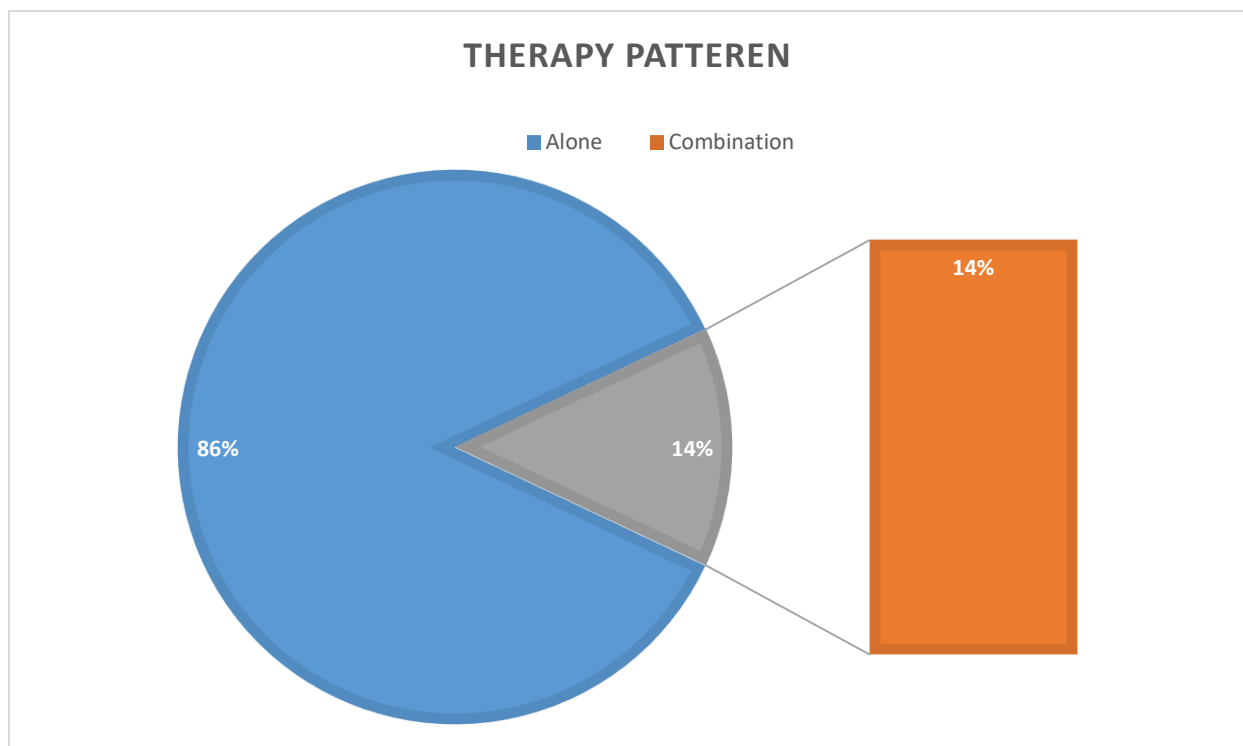
Interpretation:

Doctors are prescribing the prefer brands of Itraconazole to the patient due to the following factors:

- 40% prefer due to Patient Compliance.
- 25% prefer due to availability of brand in market
- 20% prefer due to on clinic evidence based study of brand
- 15% prefer due to the affordability of brand for the patient

Table No.6 In case of fungal infection prescription pattern of Itraconazole.

S.No.	Attributes	Frequency
1	Alone Itraconazole	86
2	Combination Therapy	14

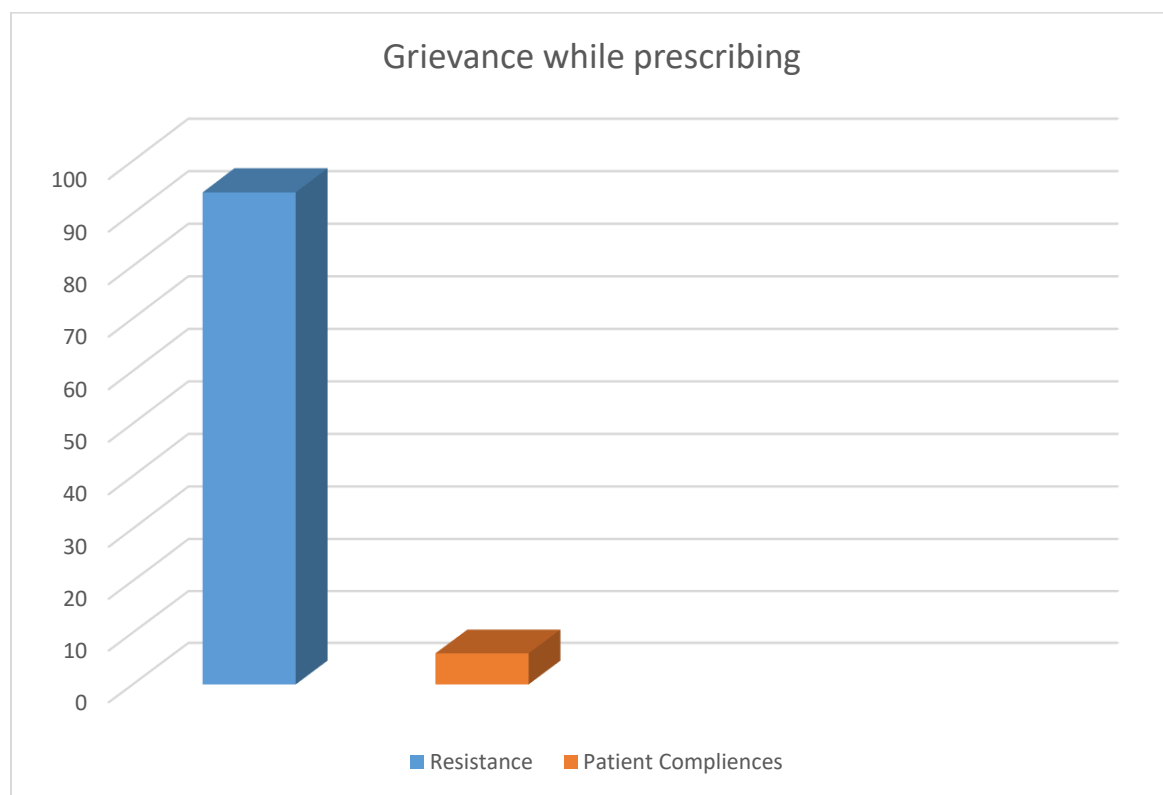


Interpretation:

- 86% of doctor may prescribe Itraconazole alone to the patient
- 14% of doctor prefer Itraconazole with in the combination therapy (Itraconazole with Terbinafine or Luliconazole majorly)
- Sometime prescription pattern depends upon the severity of the patient

Table No. 7 Grievance while prescribing Itraconazole to patient.

S. No.	Attributes	Frequency
1	Resistance	94
2	Patient Compliances	6



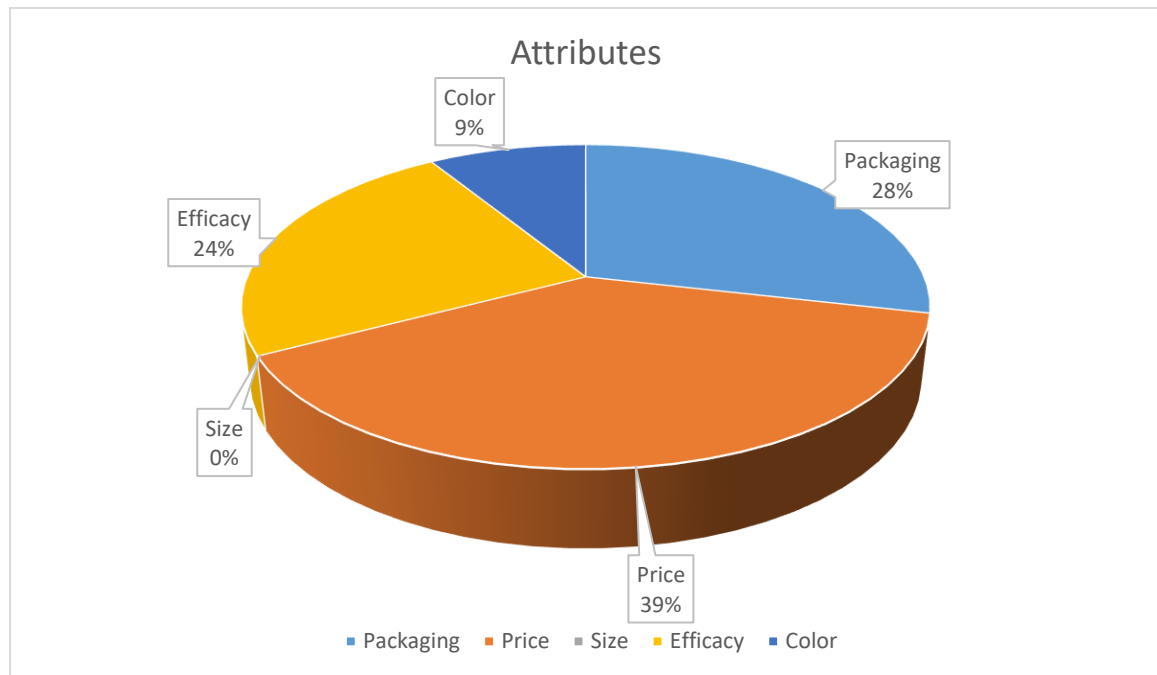
Interpretation:

Grievances which is majorly influence in the prescription pattern of doctor for Itraconazole are

- Resistance of Antifungal molecules in the market consist the major concern of doctor
- While few doctor have concern about the patient compliance

Table No. 8 Attribute in the brand which you ideally prescribe can be improved.

S. No.	Attribute	Frequency
1	Packaging	42
2	Price	57
3	Efficacy	35
4	Size of capsule	00
5	Color of capsule	13



Interpretation:

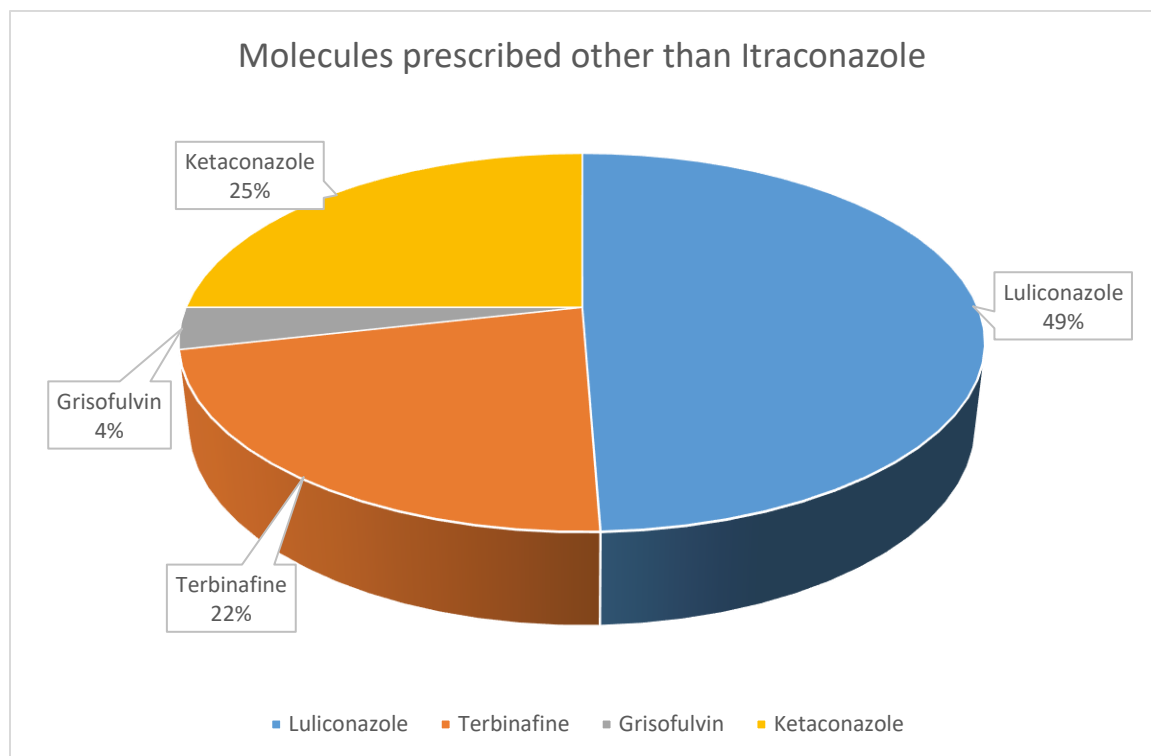
There are many attribute in the brand which doctor ideally prescribe want to improve further in that brand are:

- 39% of doctor have opinion about price of brand should be further decrease as they have in market so that it should be in reach of every patient.
- 28% of doctor want to improve the packaging of the brand with the advance technology than the existing technology.
- 9% of doctor have opinion to improve the color of capsule or pallet of Itraconazole used in particular brand they use.

- 24% of doctor think to improve the efficacy of Itraconazole brand by the advance technology or high dose due to highly resistance occur in patient.
- Some doctor prescribing Itraconazole 400 mg to patient which is not approved by USFDA due to the resistance occur in patient.
- No one have any issue regarding the size of capsule it is ideal which they use in practice.

Table No. 9 Prescribe other molecule rather than itraconazole

S. No.	Attributes	Frequency
1	Luliconazole	83
2	Terbinafine	37
3	Grisofulvin	6
4	Other (Ketaconazole)	42

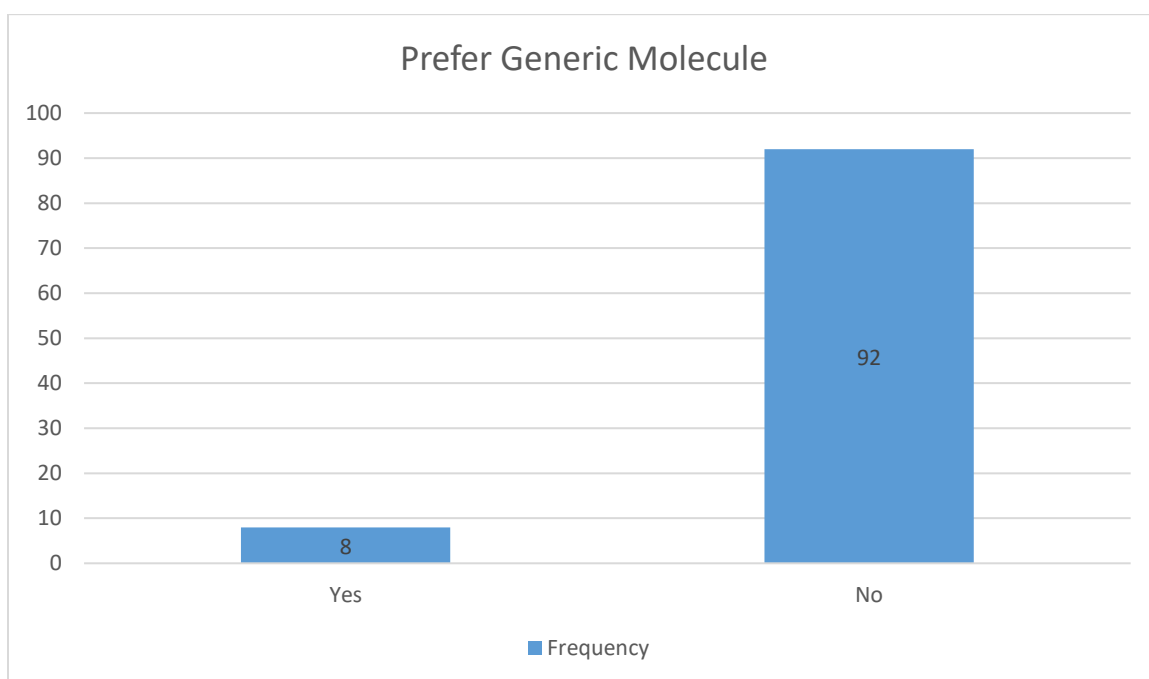


Interpretation:

- In the market there are many antifungal molecule available for the doctors which will be there preference
- Nearly half of the respondent prefer Luliconazole molecule (49%) in antifungal their choice other than the Itraconazole.
- 25% of respondent prefer Ketoconazole as prefer molecule after Luliconazole as preferred molecule.
- 22% of respondent still prefer Terbinafine as their choice of molecule rather than Itraconazole
- 4% of respondent prefer Grisofulvin as prefer molecule with the Itraconazole molecule.

Table No. 10 Dr. prefer itraconazole generic formulation or not

S. No.	Attributes	Frequency
1	Yes	8
2	No	92



Interpretation:

- 8% of respondent prescribe the generic Itraconazole
- 92% of doctors prescribe branded Itraconazole to the patient
- So majorly in the Itraconazole molecule market is captured by the brands rather than generic formulations.

Result

- 40% of Doctor are dermatologist followed by the 30% Gyne in the study
- 15% of total respondents are MBBS Doctor, rest 10% and 5% are BAMS and BUMS respectively in the study.
- 85% of Itraconazole is prescribed in the case of Tinea Infection include Tinea Corporis, Tinea Cruris, Tinea Pedis and Onychomycosis.
- 15% of Itraconazole is used in the case of Vaginal Vulgaris
- 20% of respondent prescribe Itraconazole for 7 days
- 8% of respondent prescribe Itraconazole for 10 days
- 70% of respondent prescribe Itraconazole therapy for 14 days to patient
- 2% of respondent prescribe Itraconazole therapy for 20 days or more
- Mostly respondent prescribe Itraconazole for 14 days to the patient

Leading Brands of Itraconazole in the Jaipur are

- 26 respondents are preferring Candiforce as majority of preferred brand in Itraconazole
- Candiforce is followed by I tyza which is prescribed by 23 respondents
- 20 respondent prefer Itraspor as preferred brand
- Itrasis is 4 leading prescribed brand of Itraconazole in Jaipur prefer by 18 respondent
- 13, 10 respondent prefer syndrane, candital as prefer brand in Itraconazole

Doctors are prescribing the prefer brands of Itraconazole to the patient due to the following factors:

- 40% prefer due to Patient Compliance.
- 25% prefer due to availability of brand in market
- 20% prefer due to on clinic evidence based study of brand
- 15% prefer due to the affordability of brand for the patient

- 86% of doctor may prescribe Itraconazole alone to the patient whereas 14% of doctor prefer Itraconazole with in the combination therapy (Itraconazole with Terbinafine or Luliconazole majorly)
- Sometime prescription pattern depends upon the severity of the patient
Grievances which is majorly influence in the prescription pattern of doctor for Itraconazole are
- Resistance of Antifungal molecules in the market consist the major concern of doctor while few doctor have concern about the patient compliance

There are many attribute in the brand which doctor ideally prescribe want to improve further in that brand are:

- 39% of doctor have opinion about price of brand should be further decrease as they have in market so that it should be in reach of every patient.
- 28% of doctor want to improve the packaging of the brand with the advance technology than the existing technology.
- 9% of doctor have opinion to improve the color of capsule or pallet of Itraconazole used in particular brand they use.
- 24% of doctor think to improve the efficacy of Itraconazole brand by the advance technology or high dose due to highly resistance occur in patient.
- Some doctor prescribing Itraconazole 400 mg to patient which is not approved by USFDA due to the resistance occur in patient.
- No one have any issue regarding the size of capsule it is ideal which they use in practice.
- In the market there are many antifungal molecule available for the doctors which will be there preference
- Nearly half of the respondent prefer Luliconazole molecule (49%) in antifungal their choice other than the Itraconazole.
- 25% of respondent prefer Ketoconazole as prefer molecule after Luliconazole as preferred molecule.
- 22% of respondent still prefer Terbinafine as their choice of molecule rather than Itraconazole whereas 4% of respondent prefer Grisofulvin as prefer molecule with the Itraconazole molecule.

- 8% of respondent prescribe the generic Itraconazole
- 92% of doctors prescribe branded Itraconazole to the patient
- So majorly in the Itraconazole molecule market is captured by the brands rather than generic formulations.

CONCLUSION

Doctors are mostly prescribing Itraconazole due to its higher potency towards the fungus and quick relief and better safety profile.

Itraconazole is effective in the pallet form hence all the company brands are available in the pallet form

Due to the resistance of Itraconazole seen in the market doctor need that more effective formulation comes to the market for better patient compliances.

Doctor also focused to reduce the therapy cost of itraconazole in market by the companies so that it should be in reach of every patient.

Doctors are prescribing other molecule (Luliconazole, Ketaconazole) instead of itraconazole due to resistance seen in market or quality, efficacy of certain products.

Average dose therapy given by doctors to his patient is 14 days in case of Tinea infection and in case of onychomycosis its duration is 14-21 days in pulse therapy.

Doctors are basically focus towards the quality and efficacy of itraconazole.

Some of the doctors also focused towards the qualitical products with in economic range for the patients.

Whereas certain doctors think the efficacy/Bioavailability of the itraconazole is increased due to the resistance seen in market towards the existing molecule or dose.

More patient prone to fungal infections are from the slum area or poor people due to unhygienic conditions.

Doctors prescribing the terbinafine due to its cidal MOA than static of itraconazole and has currently no resistance problem seen in market. Luliconazole is newly introduced molecule for the dermatologists compare to other molecules and yet no resistance seen of luliconazole in market and its efficacy is also relevant for doctors.

REFERENCES

1. Ogawa Haruhiko, Fujimura Masaki, Takeuchi Yasuo, Makimura Koichi: Efficacy of itraconazole in the treatment of patients with chronic cough yield basidiomycetous fungi, Journal of Asthma 2009 volume 46 issue 4
2. Gilabate Y, Rezusta A, Gil J, Saenz-Santamaria MC, Coscojuela C, Navarro M, et al. Tinea capitis in infants in their first year of life. Br J Dermatology 2004;15J:866-90
3. Schwartz RA, Janusz CA, Janniger CK. "Seborrheic dermatitis: an overview". American Family Physician 2006 July ; 74 (1): 125–30.
4. Binder B, Richting E, Weger W, Ginter-Hanselmayer G. Tinea capitis in early infancy treated with itraconazole; a pilot study. J Eur Acad Dermatol Venereol 2009;23:1161-3
5. Elish D, Silverberg NB. Infantile seborrheic dermatitis. May 2006; 77(5): 297- 300. [Medline]
6. Menon T¹, Umamaheswari K, Kumarasamy N, Solomon S, Thyagarajan SP: Efficacy of itraconazole and fluconazole in the treatment of oral candidiasis in HIV patients, Pubmed 2001 Oct 22;80(2):151-4.
7. Freedberg IM, Eisen AZ, Wolff K, Austen KF, Goldsmith LA and Katz SI. Fitzpatrick's Dermatology in General Medicine. 6 th edition. The McGraw- Hill Companies; 2003:1198-1204.
8. James WD, Berger TG and Elston D. Andrews' Diseases of the skin- Clinical Dermatology. 10th edition. Saunders Elsevier; 2006:191-192.
9. Larralde M, Gomar B, Boggio P, Abad ME, Pagotto B. Neonatal Kerion Celsi: reports of three cases, Pediatr Dermatol 2010;27:361-3.
10. Gupta AK and Bluhm R. Seborrheic dermatitis. Journal of European Academy of Dermatology and Venereology 2004; 18: 13-26.
11. Khondker L , Choudhury AM , Wahab MA , Khan MSI, Efficacy of Oral Itraconazole in the Treatment of Seborrheic Dermatitis, Journal of Bangladesh College of Physicians and Surgeons Vol. 29, No. 4, October 2011
12. Sil A, Kanti Das N, Ghosh P, Kanti Dutta P, Choudhury NI, Tripathi SK. Study to evaluate price control of antifungal medicines and its practical applicability, Indian Journal of Pharmacology,2012,44(6):704-709.

APPENDIX

Questionnaire

DOCTOR ATTITUDE TOWARDS THE EFFICACY OF ITRACONAZOLE IN THE MARKET

Dissertation project, Indian Institute of Health Management Research,
Jaipur (Rajasthan)

Name

Age

District

Sex

1. Kindly share your specialization?

.....

2. In which condition you prefer itraconazole?

.....

3. For what duration you prefer itraconazole to patient?

1. 7 capsule

3. 14 capsule

2. 10 capsule

4. More than 14 capsule

4. Which brand of Itraconazole you prescribe most?

1. Candiforce

2. I Tyza

3. It Mac

4. Syndrane

5. Other (.....)

5. What product attribute you prefer for prescribing itraconazole brand (Rank it in sequence)

1. Patient compliance

2. Affordability

3. Availability
4. On clinical evidence base
6. In case of fungal infection what is your prescription pattern of itraconazole?
 1. Alone Itraconazole
 2. Combination therapy (.....)
7. If you are prescribing itraconazole to patient what grievance says when you prescribing itraconazole to patient?
 1. Resistance
 2. Patient compliance
 3. Other
8. What do you think in the brand which you ideally prescribe can be improved by?
 1. Color of capsule
 2. Size of capsule
 3. Efficacy of capsule
 4. Packaging
 5. Price of brand
9. If you prescribe other molecule rather than itraconazole than which molecule?
 1. Luliconazol
 2. Terbinafine
 3. Grisofulvine
 4. Other (.....)
10. Do you prefer itraconazole generic formulation?Why?
 1. Yes
 2. No

.....

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