

**Summer Training at
Bharat Serums and Vaccines Ltd,
Maharashtra**

**Study on Mucor Mycosis and Liposomal Amphotericine B Prescription in
Treatment**

**By
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**Under the guidance of
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**MBA Pharmaceutical Management
2015-2017**



**The IIHMR University, Jaipur
2016**

CERTIFICATE

This is to certify that **Ms Spardha**, student of MBA Pharmaceutical Management from The IIHMR University, Jaipur has undergone Summer Training Project at **Bharat serum and vaccines. Ltd**, from **1st April to 31st May, 2016**.

The candidate has successfully carried out the study designated to her during summer training and her approach to the study has been sincere, scientific and analytical. This training is in fulfillment of the course requirements.

I wish her success in all the future endeavors.



Col (Dr.) Ashok Kaushik
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To whomsoever it may concern

This is to certify that **Ms. Spardha Sharma**, first year **MBA-Pharmaceutical Management** student from **Institute of Health Management Research, Jaipur, Rajasthan University**, has successfully completed her summer internship program in this organization from **01st April 2016 to 31st May 2016**. The topic of her summer internship was Study on ***"Mucormycosis and Liposomal Amphotericine B Prescription in Treatment"***.

During the duration of the internship, she has worked under my supervision and guidance and has shown a great amount of sincerity, interest and dedication in carrying out the responsibilities assigned to her.

We are satisfied with the output of her work and we wish her all the success in future.

For Bharat Serums and Vaccines Limited

Akhilesh Mishra

Senior Vice President – Human Resources



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Acknowledgement

The satisfaction and euphoria that accompany the successful completion of the project would be incomplete without the mention of the people who made it possible.

First of all, I express my sage sense of gratitude and indebtedness to our Director, Dr. S.D.Gupta, IIHMR University.

I would like extend my sincere and heartfelt thanks to MR. Rakesh Dave, Vice-President, Bharat Serums and Vaccines Ltd. For providing me an opportunity learn and develop professionally.

I would also like to express my deep sense of gratitude to my faculty mentor Big. S.K Puri. I am also thankful to Dr. Sandeep Narula, Associate professor, IIHMR University. I am greatly indebted to both of them for providing their valuable guidance at all stages of the study, their advice, constructive suggestions, positive and supportive attitude and continuous encouragement, without which it would have not been possible to complete the project.

To place on record, I owe a debt of gratitude to all my teachers for grooming me and my classmates for the inspiration needed to work with dedication and motivation throughout as an Intern at Bharat Serum and Vaccines Ltd.

I hope that I can build upon the experience and knowledge that I have gained and make a valuable contribution towards the industry in coming future.

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Executive Summary:

The project assigned was “Study on Mucor Mycosis and Liposomal Amphotericin B Prescription in treatment” with primary objectives being:

- ✓ To study the incidence of Mucor Mycosis in Immunocompromised Patients.
- ✓ To identify the most prescribed Line of treatment in Mucor Mycosis Fungal Infection.
- ✓ To identify choice between Brand/Generic Liposomal Amphotericin B.
- ✓ To identify the Most prescribed Brand.

The project was carried out in 2 stages:

First stage involved meeting the doctors and conducting the survey and second stage involved data analysis and conclusion.

Stage first was carried out among E.N.T doctors, Intensivists, AIDS & Cancer specialists.

After meeting with various doctors following findings were observed:

- ✓ **Incidence of Mucor Mycosis fungal infections in immunocompromised patients.**
 - Approximately 75% of total doctors responded that they handle Mucor Mycosis patient between the ranges of 0-5 patient per month. This clearly shows that Mucor Mycosis is rarely occurring disease.
 - Approximately 9.09% of total doctors responded that they handle 5-10 patients per month followed by 15.90% of total doctors between 10-15 patients per month.
 - Few doctors said that Mucor Mycosis is found majorly in patient suffering from severe diabetes and to combat from Mucor Mycosis one have to control the underlying disease.
 - When asked for less number of patients they said that Mucor mycosis occurs in the late stage in immunocompromised patients and therefore it is rare that patient survive up to that stage.
- ✓ **To identify most prescribed Line of treatment:**
 - Approximately 70.40% of total doctors preferred Liposomal Amphotericin B followed by 7.95% of total doctors responded for Amphotericin B and therefore it is prove that Liposomal Amphotericin B is leading drug for Mucor mycosis as compared with other form of Amphotericin B.
 - Major combination of drugs preferred by doctors was Azoles and Amphotericin B followed by 5.68% of total responded for Azoles and Liposomal Amphotericin B.

- Liposomal Amphotericin B is most preferred due to its least side effects caused during treatment.
 - Amphotericin B is Lag behind due to its side effects like Hepatotoxicity. However it is choice of drug for few doctors due to its low cost. They said that by continuous monitoring Hepatotoxicity is taken care of.
 - Azoles preferred by least number of doctors due to its high cost and recurrence of disease but it is choice of drug in combination with Liposomal Amphotericin B as well as Amphotericin B.
- ✓ **To identify the choice between Brand/Generic Liposomal Amphotericin B.**
- Approximately 30% of total doctors preferred Branded Liposomal Amphotericin B followed by 68% of total for Generic Liposomal Amphotericin B.
 - Approximately 2% of total were those doctors who referred Mucor Mycosis patients to other hospital and therefore they didn't prescribe drug.
 - The main reason of prescribing more Generic than Branded Liposomal Amphotericin B was its equal effectiveness and low cost.
 - Generic Liposomal Amphotericin B was choice of drug in government hospitals as they are part of hospital formulary in government hospitals.
 - Branded drug was least prescribed by doctors due to its high cost. In survey it was found that Mucor mycosis occurs mostly in patient of below poverty line, it becomes difficult for them to afford Branded Liposomal Amphotericin B.
- ✓ **To identify most preferred Brand of Liposomal Amphotericin B.**
- It was found that Ambisome was the most preferred brand of Liposomal Amphotericin B. Approximately 20.45% of total doctors prescribed Ambisome.
 - The second choice of drug was Phosome. Approximately 4.54% of total doctors prescribed Phosome followed by 5.67% of total who prescribed both in combination.
 - The main reason for prescribing Ambisome is due to its least side effects.

Suggestions:

- In the case of Liposomal Amphotericin B every organization works on attributes like Cost and Safety. Therefore for positioning Brand only one technique is left and that is **Emotional relationship with customer**. Thus to position product as **Strong, Favorable and unique** in customers mind, it should have some other characteristics also. These may be:
 1. **Long term Effectiveness.**
 2. **Immunization from Mucor mycosis.**
 3. **Combination with drug that control underlying disease like diabetes.**
- The study also reveals that Posaconazole has drug of choice for long term primary and secondary prophylaxis.
- Voriconazole and Itraconazole are equally potent and are effective in Mucor mycosis. Investing in R&D sector to improve the problem associated with it should prove a growth driver.
- Most of the doctors preferred combination of azoles and liposomal Amphotericin B. Therefore more focus should be given to develop drug which contain both molecules.

Company Profile

Bharat Serums and Vaccines Limited (BSV) is one of the fastest growing biopharmaceuticals companies in India and have been ranked amongst the top Indian Biopharmaceutical companies. With its inception in 1971 by Dr. Gautam and Bharat Daftary, the company has 2 manufacturing units in Ambernath, Maharashtra, 3 independent R&D facilities and a horse farm in outskirts of Maharashtra and over 900 employees.

With its 75% of business coming from domestic markets, its international business is slated to grow exponentially.

Vision

To Be an Innovative, Caring and Trustworthy Partner in Bringing Life To Life

- Mitigating the anguish and suffering of millions.
- Underlying fairness and transparency in dealings with all stakeholders including employees and business partners.
- The Group is driven by an informal culture fostering cohesion and innovation

Presence

Domestic

Products are sold through 6 specialized divisions and have over 25 brands.

- **DIVA:** prime division of BSV, operating in Gynecology and Obstetrics segment
 - Flagship Brand: Rhoclone and Hucog
- **ASPIRE:** A complete solution in AST (Assisted reproductive Technology)
 - Flagship Brand: Foligraf
- **ELITE:** A tender division of BSV, operating in hospital based emergency medicine and casualty
 - Flagship Brand: Tetglob, Equirab and ASVS
- **ALTIUS:** Second largest division of the company and operating in Critical Care segment
 - Flagship Brand: Gamma IV and Albumin
- **ANAGEN:** Offering corner stone therapies in Transplantation and Aplastic Anemia
 - Flagship Brand: Thymogam and Ampholip
- **UROCARE:** Offering corner stone therapies in Urological problems
 - Flagship Brand: Luprodex

International

- With a zest born out of the desire to improve health and quality of life globally, BSV started its international business operations in early 2000. The international business operation got a major boost with the commissioning of the new Ambernath plant in 2003.
- The Company's products are registered in more than 45 countries and its manufacturing facilities are accredited and certified by various regulatory authorities from Asia, Latin America, Middle East, Africa , etc
- The company also has global subsidiaries namely
 - BSV BIOSCIENCES, INC (United States)
 - BSV BIOSCIENCE,GMPH (Germany)

Introduction

Mucor Mycosis

- It is an opportunistic infections caused by “Bread mold fungi” including – Mucor, Rhizopus, Absidia & Cunninghamella. Mucor mycosis is a serious potentially deadly fungal infection that;s infrequently diagnosed.
- Zygomycetes represent the general class of fungi that cause Mucor mycosis. Rhizopus arrhizus species from the Mucoraceae family are the most commonly identified cause of Mucor mycosis in humans
- Many different fungi may cause Mucor mycosis; infections with the Mucoraceae family of fungi predominate as causes; hence, many investigators use the term Mucor mycosis instead of zygomycosis.
- Risk factors include poorly controlled debilitating diseases (including diabetes), immunosuppression and trauma (usually serious injuries), and groups of such patients injured in natural disasters

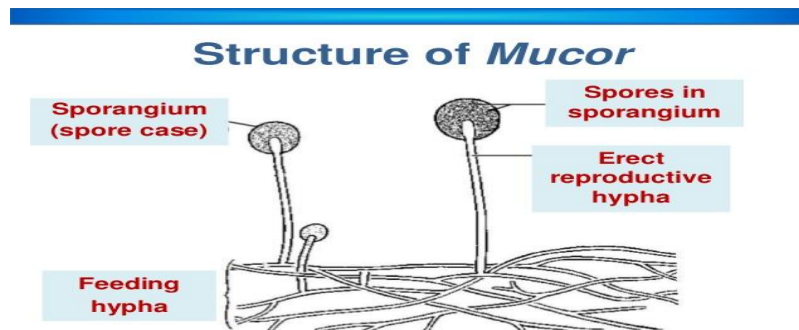
Mucor & Rhizopus species

Disease: Mucormycosis.

Characteristics: Molds with **nonseptate hyphae with right angle branching**. Not dimorphic.

Habitat: is the soil.

Transmission: Inhalation of airborne sporangiospores.



Predisposed Factors:

- Neutropenia
- Diabetes mellitus
- Corticosteroid Use
- Break down of cutaneous barrier as a result of burning, surgical wound and trauma.

Mucormycosis frequently infects the sinuses, brains, or lungs. While infection of the oral cavity or brain are the most common forms of *Mucor* mycosis, the fungus can also infect other areas of the body such as the gastrointestinal tract, skin, and other organ systems.

Sign and Symptoms:



Clinical form	Symptom and clinical manifestations
Rhino-cerebral, Rhino-orbito-cerebral	Facial Pain, Headache, Lethargy, Loss of Vision. Brownish, Blood stained nasal discharge, chemosis, preorbital sinusitis, Ophthalmoplegia, Ptosis, dysfunction of cranial nerve.
Pulmonary	<i>Nonspecific</i> Chest pain, Dysponia, haemoptysis
Cutaneous	Painful lesions resemble ecthyma gangrenosum, cotton like growth- 'Hairy pus', necrotizing fasciitis.
Gastro-intestinal	<i>Depend on site involved, non-specific</i> Abdominal pain, diarrhea, haematemesis, melena.
Disseminated	<i>Most frequent clinical symptoms:</i> Pneumonia, stroke, subarachnoid hemorrhage, brain abscess, cellulites and gangrene.

Complications of Mucor mycosis can be dire: blindness, organ dysfunction, loss of body tissue due to infection and debridement, and death.

Diagnosis:

As swabs of tissue or discharge are generally unreliable, the diagnosis of Mucor mycosis tends to be established with a biopsy specimen of the involved tissue.

Rationale

Mucor Mycosis is most commonly occurs in Immunocompromised patient. Survival rate in immunocompromised patient, those suffering from Mucor Mycosis is very low. Amphotericin B and its type are the only preferred line of treatment. Therefore it is need of hour to know more about Mucor Mycosis and to understand its prescription pattern.

The study has provided insights on:

- ✓ Incidence of Mucor Mycosis in case of Immunocompromised Patients.
- ✓ Stage of detection.
- ✓ Most commonly prescribed Antifungal in case of Mucor Mycosis.
- ✓ Most preferred Brand of Liposomal Amphotericin B given in Mucor Mycosis.
- ✓ Number of patients treated with Liposomal Amphotericin B.
- ✓ Average number of Vials used in treatment of Mucor mycosis disease.

Objectives:

- ✓ To study the incidence of Mucor Mycosis in Immunocompromised patient.
- ✓ To find out the stage of Mucor mycosis detection.
- ✓ To identify the most prescribed Antifungal in Mucor Mycosis
 - Liposomal Amphotericin B
 - Amphotericin B
 - Azoles
- ✓ To find out Number of Patient treated with liposomal Amphotericin B.
- ✓ To identify the most preferred brand.
- ✓ To find Average Number of Vials in treatment of Mucor mycosis.

Methodology

Sample Design:

Descriptive study

Sampling:

Non probability convenience sampling

Sample population:

E.N.T Doctors

AIDS & Cancer specialists

Medical I.C.U

Pulmonologist

Pediatrician

Sample Frame:

Government Doctor

Private Doctors

Medicinal ICU

O.P.D of E.N.T department

Medical Oncology and AIDS departments

Respiratory ICU and OPD

Sample Size:

Respondents: 88

Sample area:

Jaipur

Tool:

Questionnaire to collect primary data

Microsoft Excel to carry out analysis

Data Collection:

Primary- Through questionnaire and meeting with respondents

Secondary- To understand study topic and objectives information from article and journal

Study duration:

Two (2) months

Findings and Interpretation

Objective 1:

Number of patients:

It was found out that approximately 75% of total doctors examined a total between 0-5 patients per month followed by approximately 10% doctor examined between 5-10 patients per month. However 14 doctors, who are approximately 16% of study, responded that they examined a range between 10-15 patients per month, which is also highest.

It was found in study that diabetes and Cancer specialist doctors handle large number of Mucor mycosis patients.

No. of Patients	Doctor response	Response in percentage
0-5	66	75%
5-10	8	9.09%
10-15	14	15.90%

Table 1: Number of patients (per month) Vs Percentage response

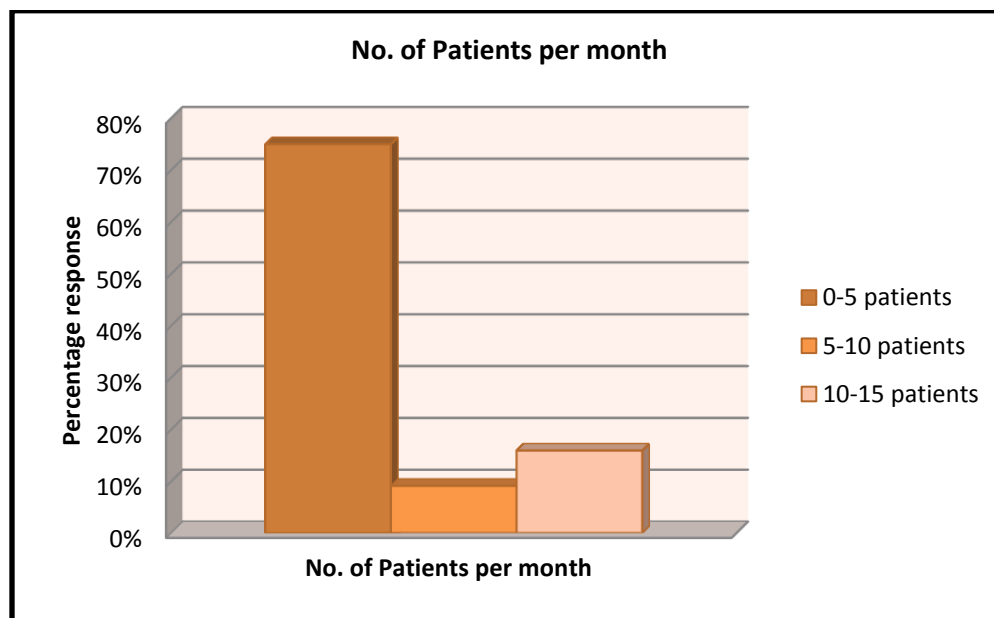


Figure 1: Number of patient Vs percentage response (per month)

Objective 2:

Stage of Mucor Mycosis detection

Approximately 77% of total doctors said that Mucor Mycosis is detected mostly in late stage and approximately 12% of total doctors responded that it is possible to detect this disease in any stage after biopsy and culture followed by 11% of total responded that it was found in early and few said that it was detected when symptom arises.

Mucor Mycosis is detected mainly in late stage as early diagnosis is difficult. Early diagnosis of invasive Mucor mycosis is important for timely therapeutic intervention, improved survival, and reduced morbidity.

Stage of Detection	Doctor Response	Percentage Response
Late Stage	68	77%
After Biopsy	10	12%
Other	10	11%

Table2: Stage of disease detection Vs Percentage response.

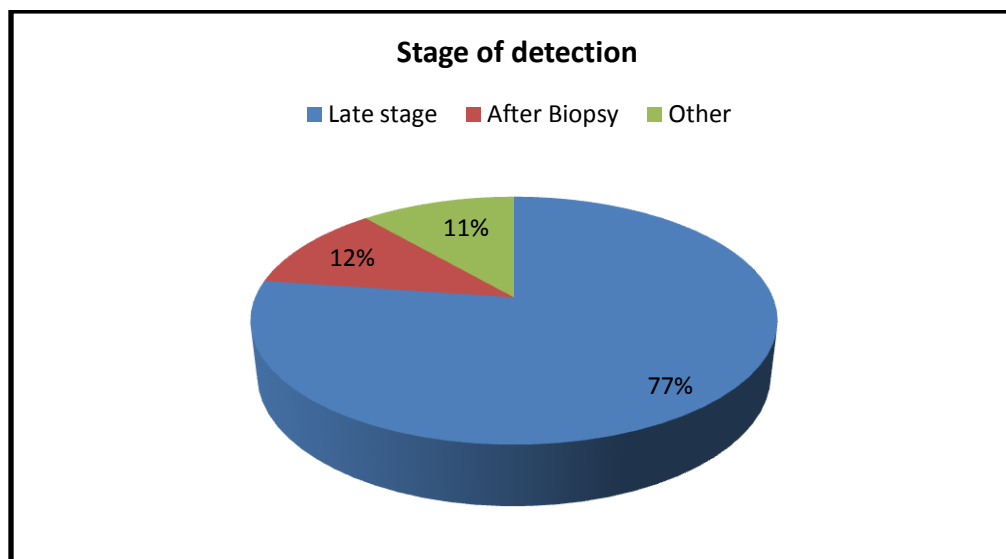


Figure 2: Stage of detection Vs Percentage response.

To find out number of doctor who treat or refer Mucor Mycosis Cases.

It was found that approximately 92.04% of total doctors treated Mucor Mycosis cases in their Hospital, however 7.96% of total doctors referred Mucor Mycosis patient in other hospital depend which part was affected by disease.

Patients with Mucor mycosis should be treated in a tertiary referral center with subspecialty units experienced in the care of the condition and the underlying causes. Correction of the underlying abnormality and prompt institution of liposomal Amphotericin B therapy and surgical resection are critical.

	Response in number	Response in percentage
Treat	81	92.04
Refer	7	7.96

Table 3: Treat/Refer Vs Percentage response

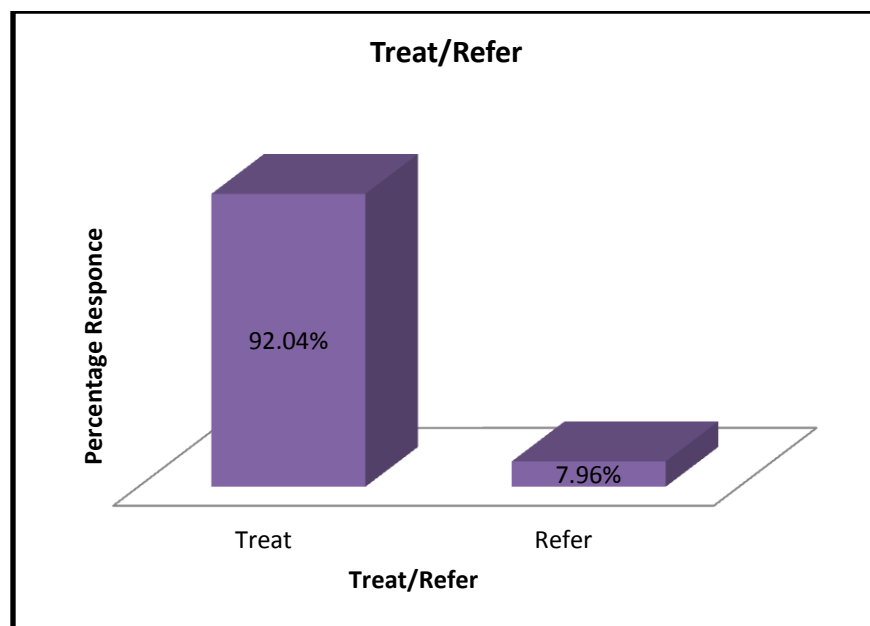


Figure 3: Treat/Refer Vs Percentage responses

Objective 3: Line of Treatment.

Approximately 70.40% of total respondents responded for Liposomal Amphotericin B, followed by 7.95% responded for Amphotericin b and 1.14% for Azoles. Approximately 5.68% of total prescribed combination of Azoles and Liposomal Amphotericin B and few prescribed combination of Azoles and Amphotericin B.

It is clear from study that Liposomal Amphotericin b captured a large market share, and therefore become Market leader in treatment of Mucor mycosis fungal infection.

Line of treatment	Number of response	Percentage of response
Liposomal Amphotericin B	62	70.40%
Amphotericin B	7	7.95%
Azoles	1	1.14%
Azoles & Liposomal Amphotericin B	5	5.68%
Azoles & Amphotericin B	6	6.81%
Liposomal Amphotericin B & Amphotericin B	3	3.14%
All	1	1.13%
None	3	3.40%

Table 4: Line of treatment Vs Percentage response of doctors

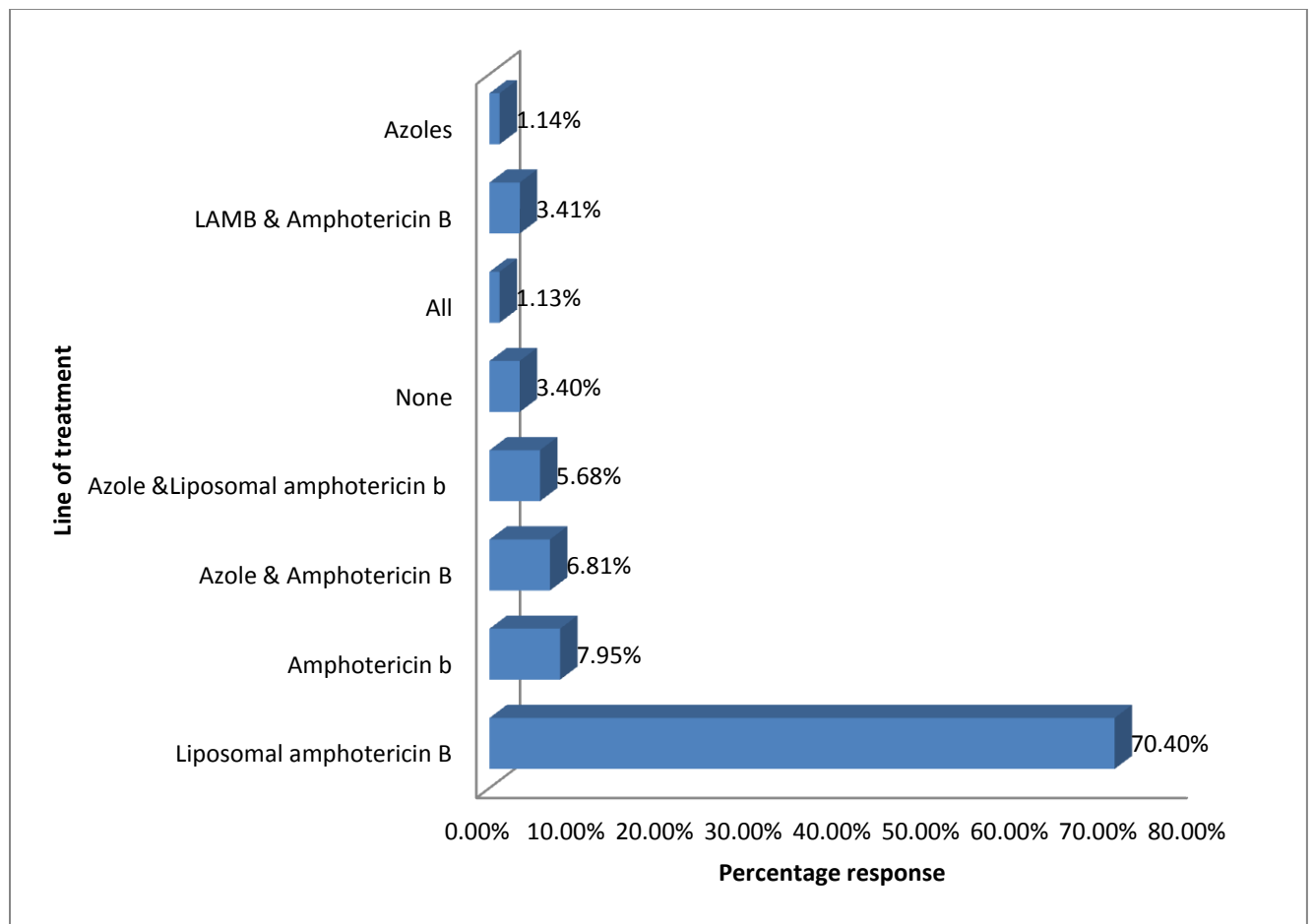


Figure 4: Line of treatment Vs Percentage response

Objective 4: Number of patient treated with Liposomal Amphotericin B.

Figure 5 clearly shows that approximately 63% of total respondent prescribed LA to 0-5 patient per month followed by 15% respondent prescribed Liposomal Amphotericin B to 10-15 patients per month. However 12% of total responded that they prescribe Liposomal Amphotericin B to 5-10 Mucor Mycosis patients per month.

LAMB /Month	Number of response	Percentage
0-5	51	63%
5-10	4	12%
10-15	10	15%
None	16	20%

Table 5: Liposomal Amphotericin B patient Vs percentage response

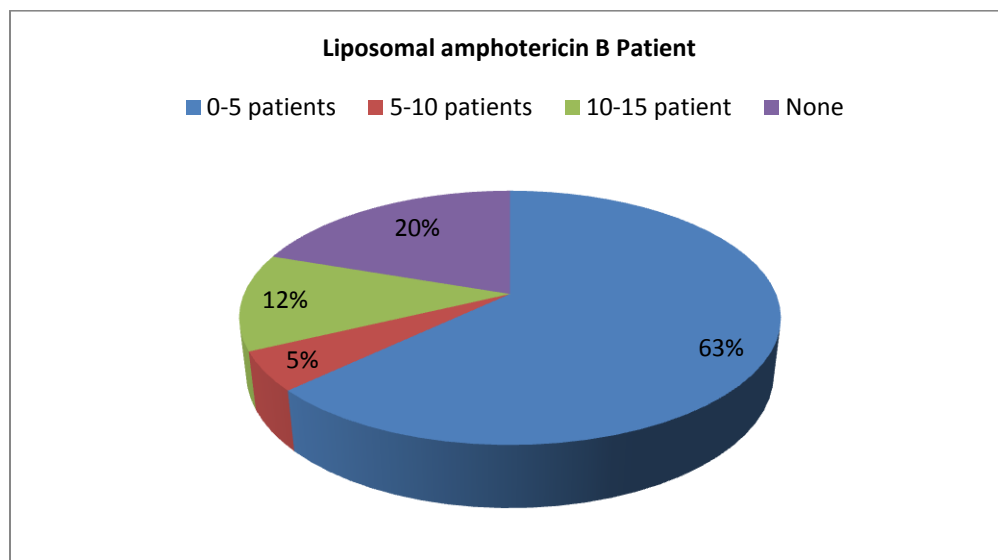


Figure 5: Liposomal Amphotericin B patient Vs Percentage responses

Choice between Branded and Generic Amphotericin B

It was found that approximately 68% of total respondent preferred Generic version of Liposomal Amphotericin B however 30% respondent preferred Branded Liposomal Amphotericin B over Generic. Approximately 2% of total responded that they neither used Branded nor Generic version of Liposomal Amphotericin B.

Choice Brand/Generic	Between	Number of Response	Percentage Response
Brand		24	30%
Generic		55	68%

Table 6: Branded/Generic Vs percentage responses

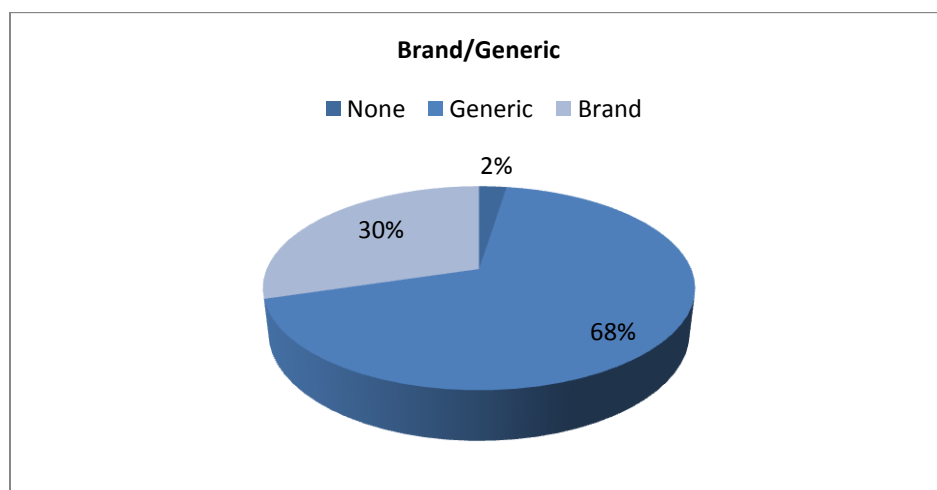


Figure 6: Brand/Generic Vs Percentage response.

Objective 5: To find out most Preferred Brand.

It was found that approximately 20.45% of total respondent preferred Ambisome for Mucor Mycosis fungal infection followed by 4.54% prefer Phosome as preferred brand however 5.68% preferred both as combination for Mucor Mycosis fungal Infection. Approximately 4.54% of total preferred other than these two brands.

Prescription of any brand is depends upon three major driving forces: 1) cost 2) Safety and 3) Effectiveness.

As Branded Liposomal Amphotericin B is very costly it is needed to develop a molecule which is affordable and on the same time it must be effective and causes least side effects.

Brand Name	Response in Number	Response in Percentage
Ambisome	17	20.45%
Phosome	4	4.54%
Both	5	5.68%
None	50	56.81%
Other	4	4.54%

Table 7: Preferred Brand Vs percentage response

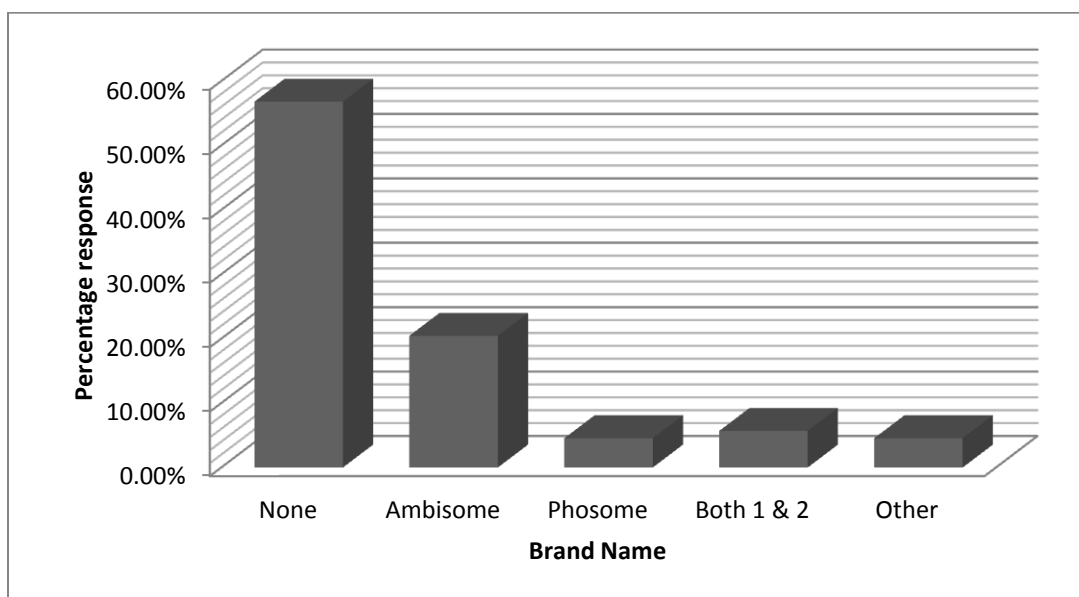


Table 7: Preferred Brand Vs percentage response.

Objective 6: To find out Average number of Vials.

It was found that 50% of total respondent were using 30-50 vials in treatment of Mucor Mycosis fungal infections followed by 27.27% responded that 20-30 vial is enough, however 10.22% of total said that 50-70 vial is required for treatment.

It was found in the study that maximum number of respondent prescribed 30-50 vials in treatment of Mucor mycosis fungal infection and approximately each Vial contains 50 mg of liposomal Amphotericin B. Therefore this study gives an approximate amount of dose prescribed by doctors in treatment.

Average no of Vials	Number of Response	Percentage
20-30	24	27.27%
30-50	44	50%
50-70	9	10.22%
None	4	4.54%

Table 8: Average Number of Vial Vs Percentage responses

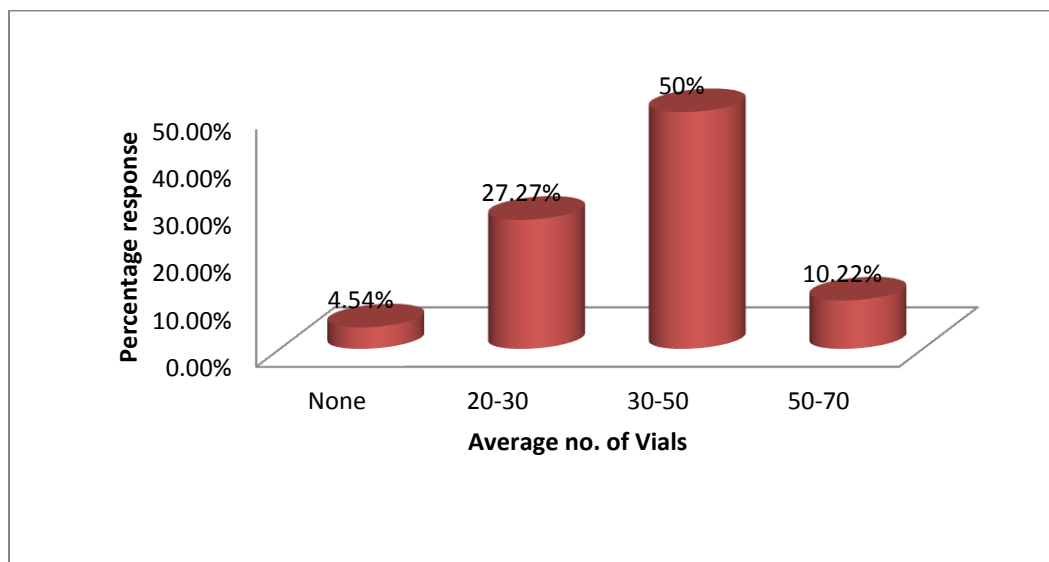


Figure 8: Number of Vial Vs percentage response.

Other finding:

Various other findings of projects are:

- Mucor Mycosis is rarely found. Survival rate is very low, disseminated Mucor mycosis presents with highest mortality rate. Infection to oral cavity or Brain is the most common forms of Mucor mycosis
- Prescribing Antifungal for Mucor Mycosis depends upon economic conditions of patient; therefore cost is the major driving force of prescribing drugs.
- Azoles are least preferred due to its high cost and recurrence of disease, conventional Amphotericin B is least preferred due to side effects caused by it.
- Hepatotoxicity caused by conventional Amphotericin B requires continuous monitoring and in severe cases leads to discontinuation of drugs therefore least referred by doctors.
- In Mucor mycosis disease there is a stage when pus develops in affected area and drug stop working in that case doctor preferred to do surgery. Surgical therapy can be very drastic, and in some cases of disease involving the nasal cavity and the brain, removal of infected brain tissue may be required.
- There is lack of diagnostic tests to detect Mucor mycosis, there is no serological and blood tests that are helpful. Therefore early diagnosis is difficult.

Recommendation:

Place:

- Mucor mycosis is disease caused by fungus of the order Mucorales. Rhizopus species are the most common causative organism. It is often associated with compromised immunity and poor prognosis.
- It was found in study that Farmers constitute the high risk group and peak incidence is observed during monsoon.
- Few doctors in survey said that Mucor Mycosis patients are found in large number in the areas where farming is the major occupation.

Therefore Organization has greater opportunity to introduce their antifungal for Mucormycosis in such areas.

Product:

- For Mucor mycosis treatment drugs should be of **low cost, effective and causes least side effects** and it were found in study that Liposomal Amphotericin B is the market leader.
- Report also provides a way ahead for organization with **Azoles and Liposomal Amphotericin B combinations** being the molecule to venture into due to its effectiveness.
- **Voriconazole, Posaconazole and Itraconazole** are some of the most preferred azoles in combination with liposomal Amphotericin B. Attempt should be done to improve the existing molecule may prove profitable.

Market Strategy:

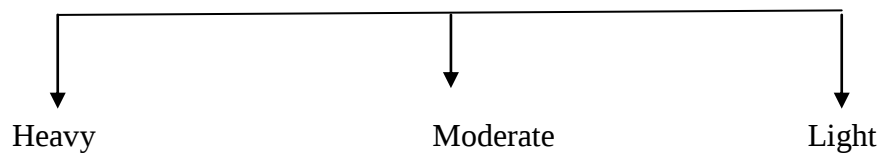
Segmentation:

- a) Product- Based segmentation
- b) Competitor-Based segmentation

a) **Product-related segmentation:** By using this segmentation we can calculate demand frequency:

User Rate:

On the basis of prescription written by different doctors it can be defined into three categories:



It was found that Endocrinologists and AIDS/Cancer specialist handle patients of Mucor Mycosis more than any other specialists.

b) Competition- Based:

Competitor can be classified as:



- a) By studying Hardcore Customer Company can identify its strength.
- b) By studying Split loyal company can pin-point which brand are more competitive.
- c) By looking at customer who is shifting away from its brands, the company can learn about its marketing weakness and correct them.

Targeting:

Diffused Pattern: It was found in study that not only E.N.T specialist but Medical I.C.U specialist, AIDS/Cancer specialists, Pulmonologists also handle Mucor mycosis patients. Thus Target is of Diffused pattern.

Positioning:

In the case of Liposomal Amphotericin B every organization works on attributes like Cost and Safety. Therefore for positioning only one technique is left and that is **Emotional relationship**. Thus to position product as **Strong, Favorable and unique** in customers mind, it should have other characteristics along with Less price and safety. These may be:

- 1) **Long term Effectiveness.**
- 2) **Immunization from Mucor mycosis.**
- 3) **Combination with drug that control underlying disease like diabetes.**

Problems associated with B.S.V:

- 1) Cost of Brand is very high.
- 2) Brand image: it was found in survey that Brand recall in the case of B.S.V is poor.
- 3) Loyalty: during survey it was found that doctors were loyal to particular brand other than Bharat serums.
- 4) Hospital supply/Generic drugs
- 5) Co-Morbid state

To combat from these problems company could follow these strategies of positioning:

- 1) **Competitive pricing**
- 2) **Attractive discount policy.**
- 3) **Institution supply:** Separate field professional to combat from hospital supply. They should highlight safety and other unique factors associated with Brand.
- 4) **Key prescription leader:** To be served more frequently with excellent customer services.
- 5) **Cross promotion:** company can promote their products by making combination therapy with its own or other Brand. But care should be taken that the combination has no interactions. It must be safe and more effective.

Limitations to the study

- More area could have been covered.
- Sample size could have been increased to get more accurate result.
- More time period could have been given.

Reference:

1. Skiada Anna, Lanternier Fanny, Andrew H Groll, Herbercht Rawl (April, 2013); European hematology association, Diagnosis and treatment of Mucor mycosis patient with hematological malignancy; Vol. 98: 492-504.
2. Nancy F crum-cianflone (April, 2015); Medscape, Mucor mycosis.
3. Dimitros p. Kontoyiannis, Russel E. lewis (August, 2011); PMC, Blood; Vol. 118(5), 1216-1224.
4. Ibrahim S. Ashraf; Oxford journal, Medicine & Health, Clinical infectious disease; Vol.54, pp. s16-s22.
5. Hsing-yun sun, singh Nina (April, 2011) Euro Science Open forum Manchester, The lancet infectious disease; Vol.11, P. no. 4.

Annexure:

Questionnaire

Q-1 – How many of Number Mucormycosis patients detected in your practice / month?

1) 0-5 2) 5-10 3) 10-15 4) > 15

Q-2 – At what Stage Mucormycosis disease is detected?

Q-3 - How do you manage these patients?

Refer to other Drs /Hospital treat in your hospital

Q-4 – If you refer – can you please share name of Dr/Hospital?

A: _____

Q-5- What is your line of treatment?

Azoles Amphotericin Liposomal Amphotericin B

Q-6 – What is your preference?

1) Azoles - Preferred Drugs a) _____ b) _____ c) _____
) _____

2) Liposomal Amphotericin B brands – a)

b) _____

c) _____

Q-7- How many patients are treated with Amphotericin B?

0-5 5-10 10-15 > 15

Q-8 - How many patients are treated with Liposomal Amphotericin B?

0-5 5-10 10-15 > 15

Q-9: What is the Duration of Treatment in terms of Dose Rx (No. of Vials?)

20-30 30-50 50-70 >70

Q-10 would like to share any other critical Information Related to Mucormycosis?

A: _____