

# **RISK Factors and Clinical Profile of Fungal Infections as a Post Covid Complication**

Dr VENNA VENKATA RADHA GOPAL (*Post graduate*)

Dr VANA BHASKARA RAO (*Post graduate*)

Dr C.S.S SARMA M.D *Professor &HOD dept of general medicine*  
*Institute: Rangaraya Medical College & Government General Hospital, Kakinada.*

---

Date of Submission: 20-01-2022

Date of Acceptance: 03-02-2022

---

## **I. Introduction:**

The incidence of fungal infections has risen recently.

opportunistic infections have increased in frequency as a consequence of intentional immunosuppression as in organ and stem cell transplantation and other disorders, cancer chemotherapy, liberal use of anti bacterial agents, uncontrollable diabetes, use of monoclonal antibodies and primary and secondary immunodeficiency disorders. Awareness of fungal co-infection is essential to reduce delays in diagnosis and treatment in order to help prevent severe illness and death from these infections.

The fungal infections become the one of most common post covid complications, this study attempts to report the risk factors and clinical features of various fungal infections as a post covid complication in a single institute Government general hospital kakinada.

### **AIMS & OBJECTIVES**

TO STUDY THE RISK FACTORS AND CLINICAL PROFILE OF FUNGAL INFECTIONS AS A POST COVID COMPLICATION IN PATIENTS ADMITTED TO GOVERNMENT GENERAL HOSPITAL KAKINADA, EAST GODAVARI, ANDHRA PRADESH.

### **INCLUSION CRITERIA**

PATIENTS WITH SYMPTOMS AND SIGNS OF FUNGAL INFECTIONS WHO ARE ADMITTED IN GOVERNMENT GENERAL HOSPITAL KAKINADA AS A POST COVID SEQUAE.  
PATIENTS WHO GAVE THE INFORMED VALID CONSENT.

### **EXCLUSION CRITERIA**

PATIENTS WITH SYMPTOMS AND SIGNS OF FUNGAL INFECTION BUT DOES HAVE COVID 19 POSITIVE HISTORY.  
PEOPLE WHO DID NOT GIVE CONSENT FOR STUDY.

## **II. Methodology**

This is a hospital based prospective observational study that used data from in hospital admissions to GGH KAKINADA.

of the total cases admitted in GGH kakinada with symptoms and signs of fungal infections as a post covid sequelae who are fulfilling the inclusion criteria were included in the study group.

after taking informed consent, thorough history was elicited from patient or 1st degree relative.name, age, sex, occupation, history of present illness, symptoms and signs pertaining to fungal infections.

Enquired about how many days after covid 19, these symptoms started.

Recent past history regarding COVID 19, by which the disease is confirmed, severity of disease, drugs used by patients during covid, glycemic status during covid 19 disease, oxygen requirement during covid 19 disease, self hygiene status, steam inhalation and exposure to a mucormycosis case.

other comorbidities suffered by the patient like diabetes mellitus, hypertension, malignancy, chronic kidney disease and chronic liver disease and history of blood transfusions and usage of iron chelating agents.

routine blood investigations and special investigations like KOH mount of nasal swab, MRI paranasal sinus and Brain.

Ethics approval obtained from Institutional ethics committee.

### III. Results

Of the total 100 patients included in the study, 78 patients are male patients and 22 are females patients.

Chart 1

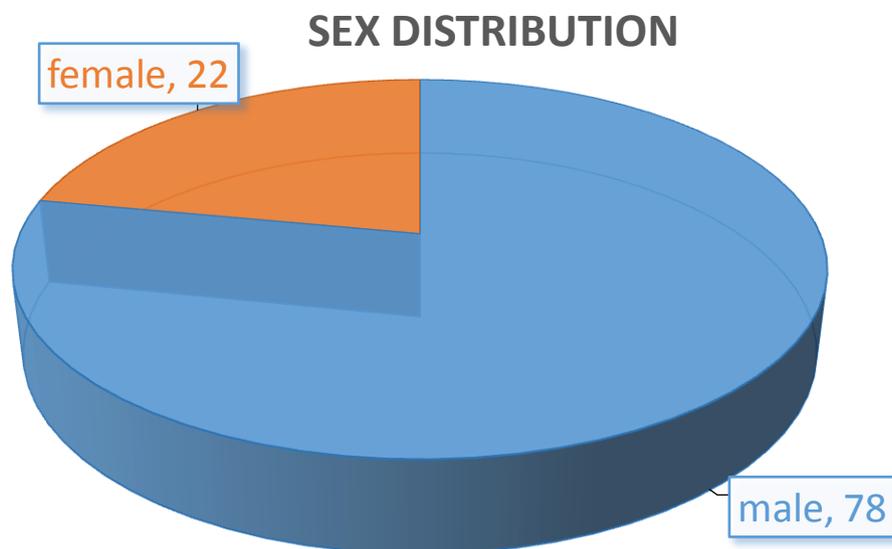
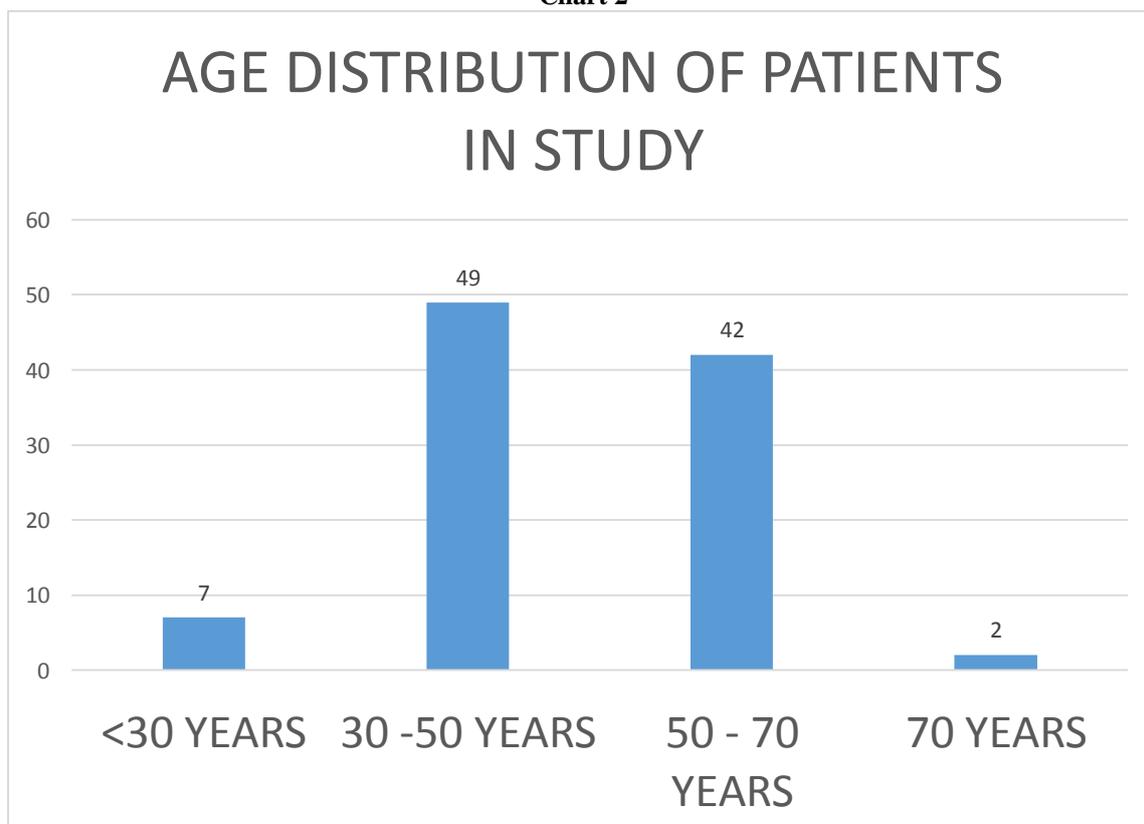
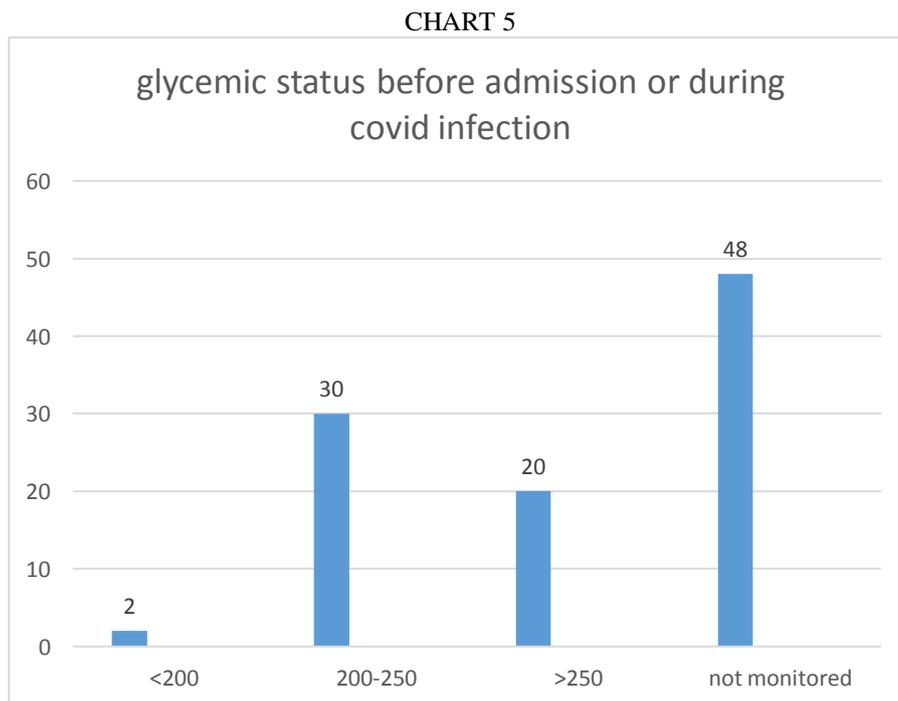
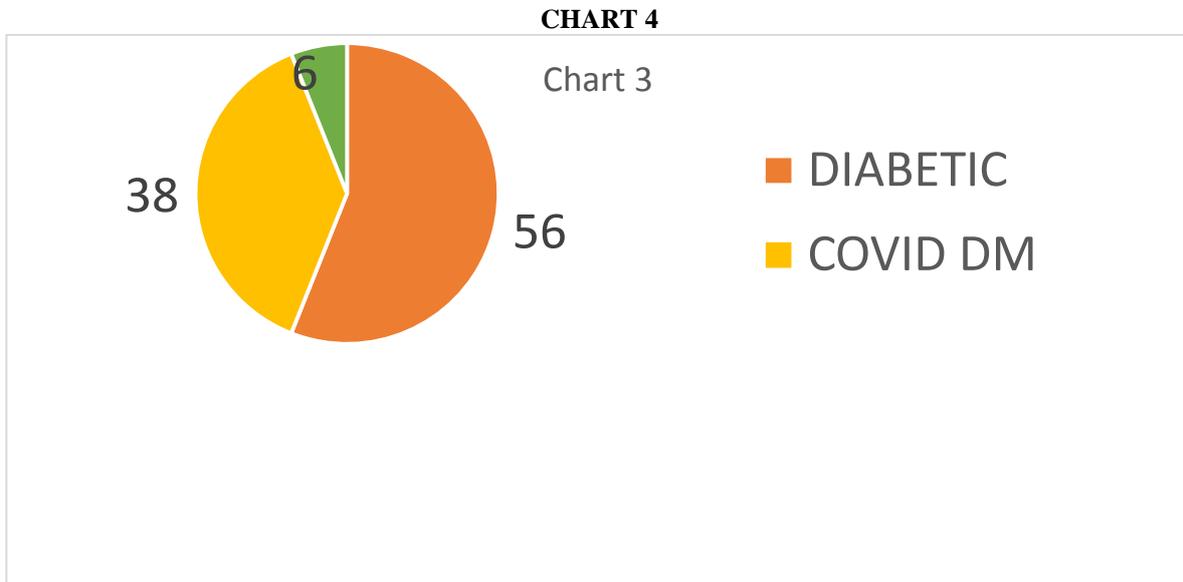


Chart 2

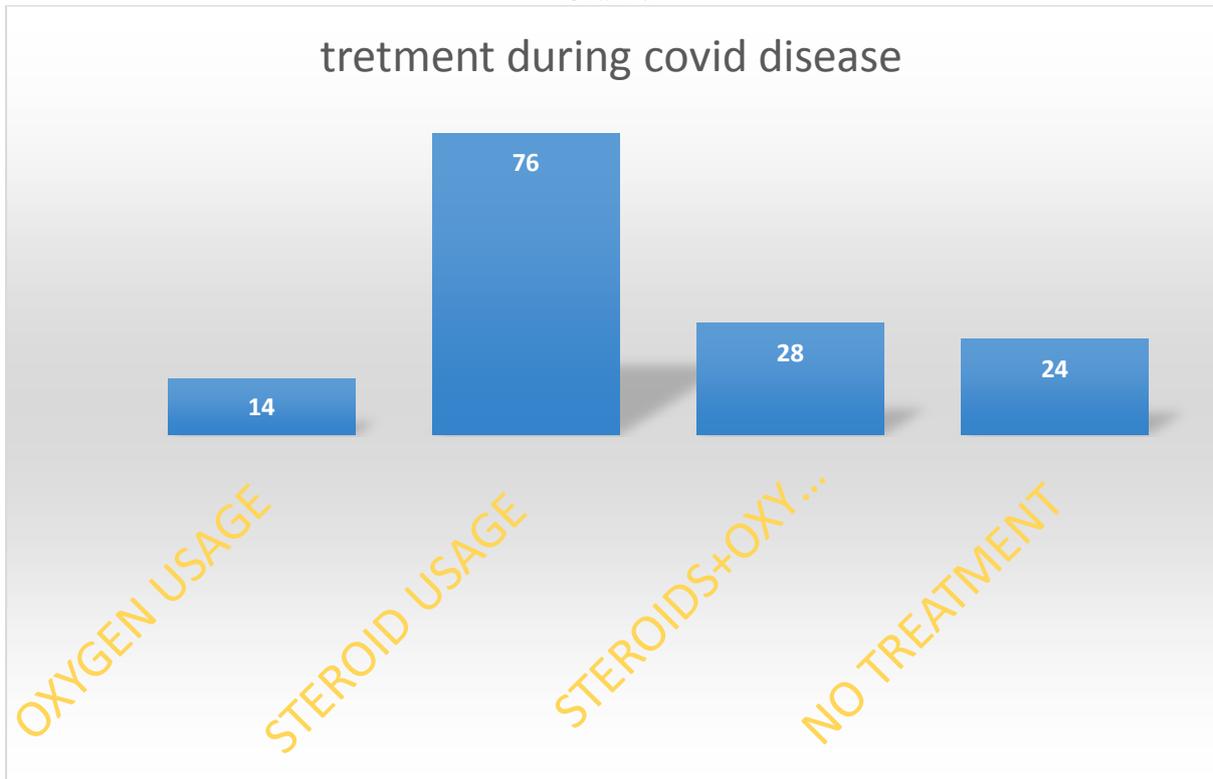


The below chart 3 depicts the diabetic patterns of the patients involved in the study. Of the 100 patients included in the study 56 were known diabetics and 38 were found with diabetes at presentation and 6 patients were non diabetics



The CHART 5 depicts the glycemic status of the patients before admission or during covid infection, of which 2 patients have glucose levels <200, 30 patients between 200-250, 20 patients >250 mg/dl and 48 patients did not monitor glucose levels during covid infection.

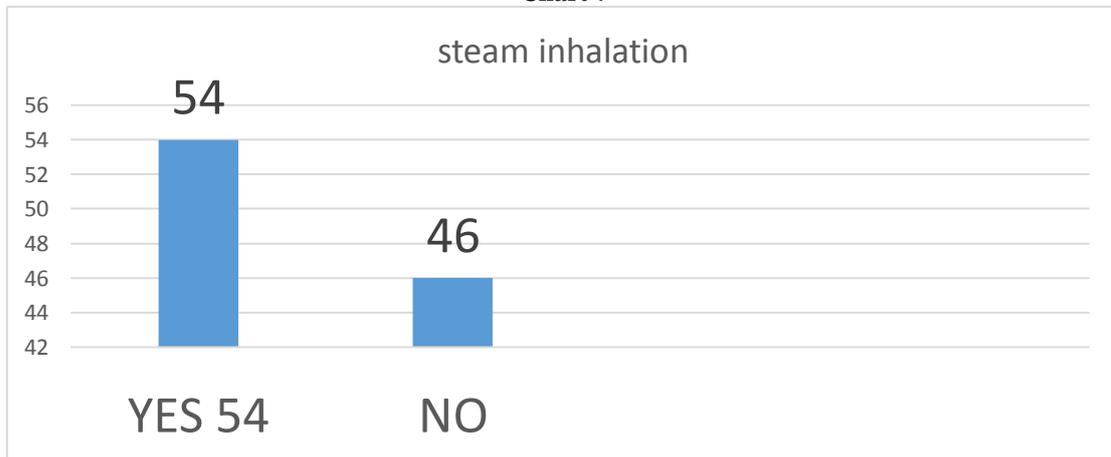
Chart 6



of the 100 patients included in the study 24% patients did not use any medication, 14 % used oxygen, 76% patients used steroid, 28% used steroid and oxygen.

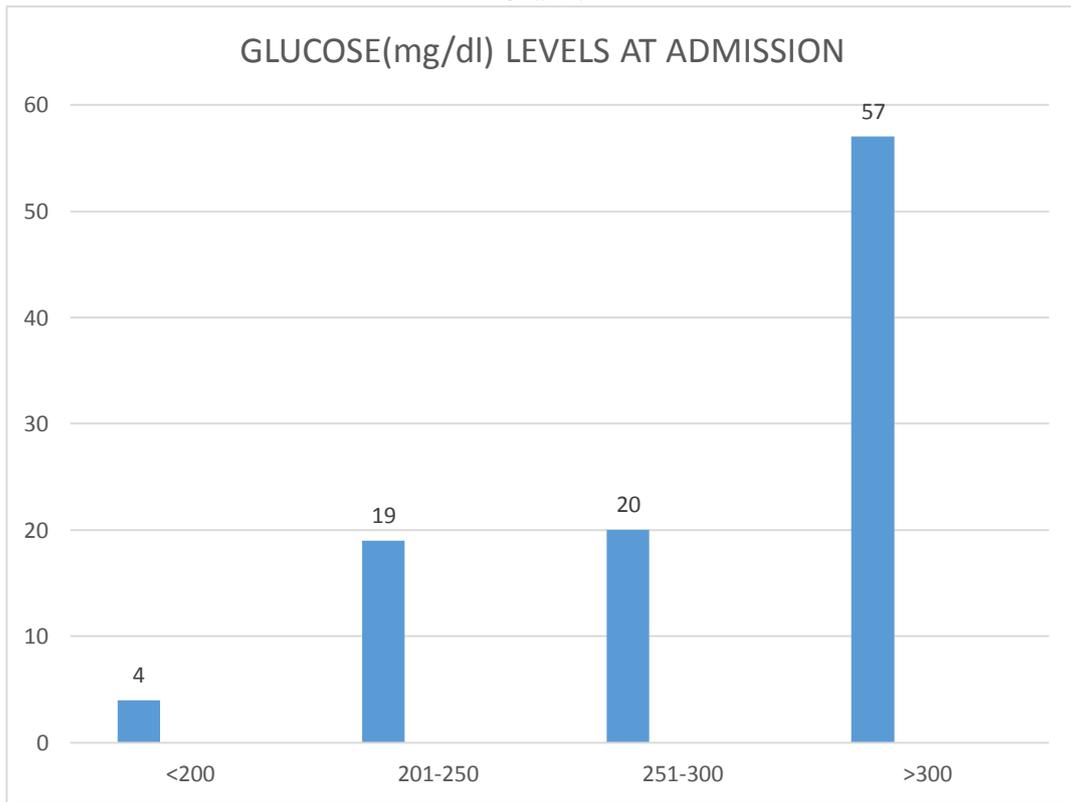
Of the 100 patient in the study 56 patients used steam inhalation as a part of treatment during medication

Chart 7



Measuring Glycemic levels at admission found that 4 patients are having sugars <200mg/dl, 19 patients are having between 200-250mg/dl, 20 patients between 251- 300mg/dl and 57 patients are having rbs >300mg/dl

Chart 8



Site of infection in patients admitted

Chart 9

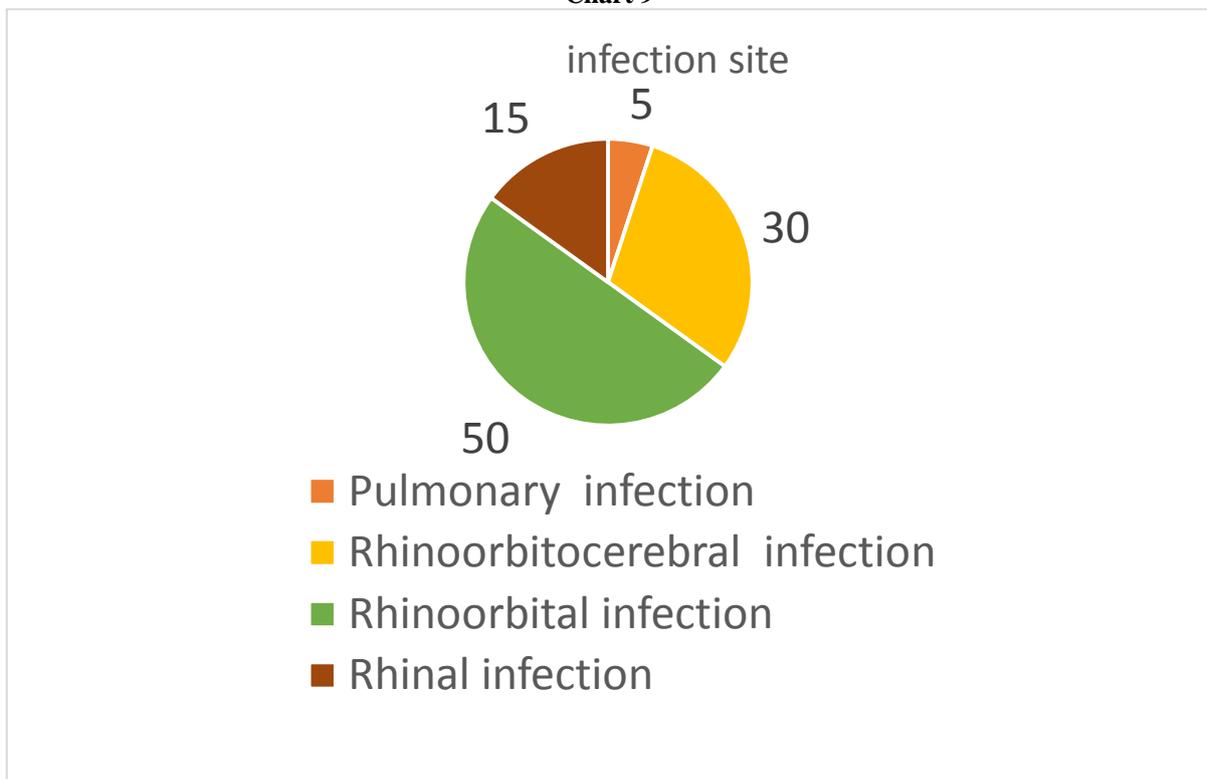
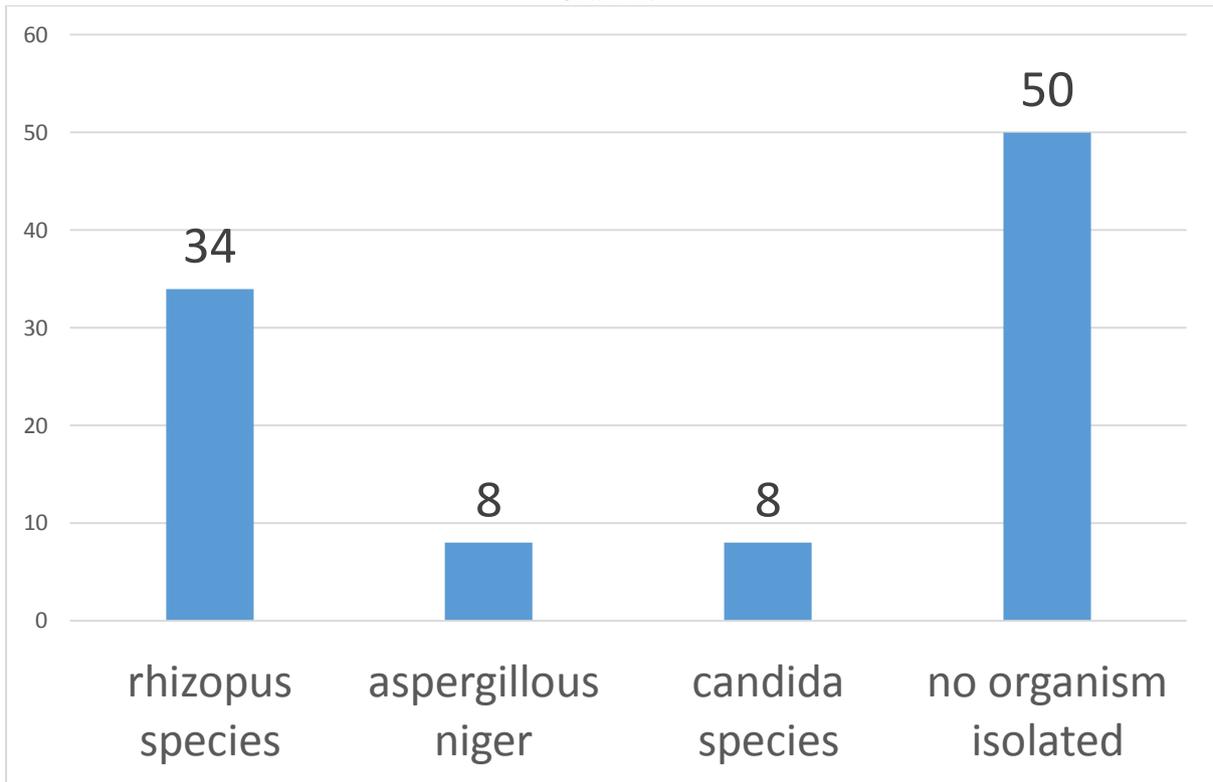
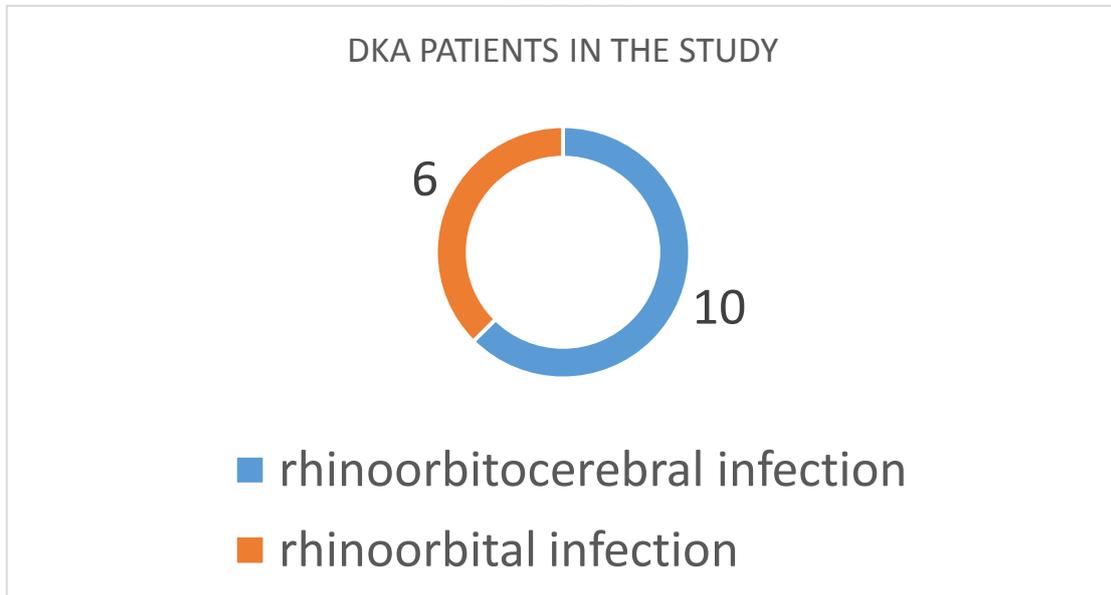


Chart 10



16 patients presented with diabetic ketoacidosis at admission, ie RBS >250mg/dl, ph <7.35 and ketones positive

CHART 11



#### IV. Discussion:

Covid 19 is associated with significant incidence of secondary infections both bacterial and fungal infections probably due to immune dysregulation.

Covid 19 infected dead tissue in upper respiratory tract can provide a nidus for fungal growth which can be supplemented by hyperglycemia

Widespread use of steroids, monoclonal antibodies like tocilizumab may lead to exacerbation of fungal infections.

There appears to be number of triggers that may precipitate fungal infection in people with covid 19 like

- 1) presence of diabetes mellitus with or without dka
- 2) Uncontrolled hyperglycemia and precipitation of DKA due to steroid use.
- 3) Covid 19 often causes endothelitis, thrombosis, lymphopenia and reduction of CD4 and CD8 T Cells.
- 4) Hyperglycemia causing glycosylation of transferrin, ferritin, and reduce iron binding capacity and increase free iron levels
- 5) High glucose, low pH, free iron and ketones enhance growth of fungus.

So all efforts should be made to maintain optimal glycemic status and judicious use of steroids in covid 19 is recommended to reduce burden of fatal fungal infections.

An indian study done on mucormycosis by vishal rao et.al identified diabetes(96%) as the major comorbidity and uncontrolled diabetes mellitus was found in 68% patients

Steroid usage is identified in 13% patients

Oxygen was used in 17% patients

Half of the patients were identified with rhino orbital mucormycosis.

In our study major risk factors are diabetes mellitus(56%) and steroid usage (76%).

We have identified 54% patients used steam inhalation as covid treatment.

Major site of infection is rhino orbital(60%) followed by rhinoorbital cerebral (30%), rhinal (15%) and pulmonary (5%)

In our study we could not find any cutaneous fungal infection which could be a limitation of our study.

## V. Conclusion

Newer manifestations of covid are appearing over time.

the association of corona virus and fungal infection must be given a serious consideration as a post covid complication.

uncontrolled diabetes mellitus and overzealous use of steroids and steam inhalation are commonly associated with post covid fungal infection in our study.

covid 19 is associated with significant incidence of secondary infections both bacterial and fungal infections probably due to immune dysregulation.

## References

- [1]. Hoeningl M. Invasive fungal disease complicating covid 19, clinical infecti Dis. 2020 sep 5
- [2]. Garcia-Vidal C, Sanjuan G, Moreno-gracia E et.al. Incidence of co infections and superinfections in hospitalized patients with covid 19, a retrospective cohort study
- [3]. Lansbury L, Lim B, Baskaran V, Lim WS. coinfections in people with covid 19: a systematic review and analysis. J infect 2020 may 27
- [4]. Gangneux JP, Bounoux ME, Dannaoui E, Cornet M, Zahar JR. Invasive fungal disease during COVID19: we should be prepared.
- [5]. Mucormycosis in COVID-19: A systematic review of cases reported worldwide and in India. Awadhesh Kumar Singh, Ritu Singh, a Shashank R. Joshi, b and Anoop Misra, d
- [6]. Coronavirus Disease (Covid-19) Associated Mucormycosis (CAM): Case Report and Systematic Review of Literature. Deepak Garg, Valliappan Muthu, Inderpaul Singh Sehgal, Raja Ramachandran, Harsimran Kaur, Ashish Bhalla, Goverdhan D Puri, Arunaloke Chakrabarti, Ritesh Agarwal
- [7]. Song G, Liang G, Liu W. Fungal co infections associated with global covid 19 pandemic: a clinical and diagnostic perspective from china. mycopathologia. 2020 July 31.
- [8]. Koehler P, Cornely OA, Bottiger BW, Duse F, Eichenauer DA, Fuchs F et al. covid 19 associated aspergillosis. mycoses 2020 may 15
- [9]. Beer KD, Jackson BR, Chiller T, Verweij PE, Van de Veerdonk FL, Wauters J. Does pulmonary aspergillosis complicate covid 19 critical care exp 2020 sep 18
- [10]. Vishal rao, Gururaj Arakeri, Gaurav madikeri, Ashwin shah, Rachel S Oppen, Peter A Brennan. Post covid mucormycosis: in India: A formidable challenge. 19 JUNE 2021
- [11]. Jameson, Fauci, Kasper, Hauser, Longo, Harrison's principles of internal medicine 20th edition mucormycosis.

Dr VENNA VENKATA RADHA GOPAL, et. al. "RISK Factors and Clinical Profile of Fungal Infections as a Post Covid Complication." *IOSR Journal of Dental and Medical Sciences (IOSR-JDMS)*, 21(02), 2022, pp. 44-50.