

Prevalent Allergic Diseases in Raipur City with Special Reference to Aeromycoflora of Bus Stand Area

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Abstract: More than 20-30% of the world population is known to suffer from one or other allergic ailments such as allergic fungal sinusitis, allergic rhinitis, bronchial asthma, Eczema and atopic dermatitis etc. Major causative agents are pollen grains fungal spores, dust mites, insect debris and other plant fragments and foods etc. Detailed information on the daily, seasonal and annual variation of different bio-particulates in the atmosphere is prerequisite, for effective diagnosis and therapeutic management of allergic ailments. Aerobiological investigations have been carried out in different parts of country to ascertain aerial concentration and seasonality of pollen and fungal spores. Clinically important fungal allergens are different species of *Aspergillus fumigatus*, *Aspergillus flavus*, *Aspergillus nidulans*, *Alternaria alternata*, *Cladosporium cladosporoides*, *Mucor*, *Fusarium solanii*, *Curvularia lunata*, and others. In present paper an attempt has been made to study the Aeromycoflora of Bus stand area and to identify the important pollen/fungal allergens prevalent in Raipur city in Bus stand area. During our investigation it was observed that 397 fungal colonies, 39 fungal species and 1 sterile type were observed. Out of which 6 species belong to Zygomycotina, 3 Ascomycotina and 30 species belong to Deutromycetes or Anamorphic fungi and 1 sterile type were recorded. In present investigation it was found that maximum percentage contribution was observed for *Aspergillus niger* (110), *Aspergillus flavus* (100), *Cladosporium cladosporoides* (82.50), *Alternaria alternata* (72.50), *Cladosporium oxysporium* (70.00), *Curvularia lunata* (47.50), *Penicillium crysogenum* (45.00), *Fusarium Pallidoroseum* (40.00), *Fusarium monaliformis* (37.50), *Penicillium jensani* (37.50) while minimum percentage contribution was observed for *Rhizopus oryza* (2.50), *Rhizopus nagricans*, *Chaetomium indicum* and *cunnighmella elegans* (5.00). Survey of allergic diseases in 102 patients of Raipur city, showed that 52 patients suffered from Allergic rhinitis and 34 patients from Asthma and 16 patients suffered from Eczema and sinusitis problems. In present survey it was observed that allergic diseases are more common in females than males. Allergic rhinitis and allergic asthma are prevalent allergic disease in Raipur.

Keywords: Aeromycoflora, allergic ailments, fungal spores, Eczema.

1. INTRODUCTION

People are exposed to various types of aeroallergens in different environments, both at indoors and out door places. Fungi are ubiquitous airborne allergens and are important causes of human diseases, especially in the upper and lower respiratory tracts. Allergy is one form of human disease which affects about 40% of the population. Airborne fungal spores have been recognized to cause Asthma, allergic rhinitis, Allergic fungal sinusitis, Atopic dermatitis, Eczema, Aspergillosis etc. The Present out door investigation in Bus stand area of Raipur city has been taken as it is placed in the

heart of the city, and daily thousands of people visit this place. Hence Aeromycoflora of Bus stand area has been taken , which will provide valuable information regarding the composition and concentration of the bioparticles in the air and biopollutants present in Bus stand area of Raipur city. Fungal spores are not equally distributed in the environment their distribution varies according to geographical location and meteorological conditions. During investigation period 40 fungal species have been observed from bus stand area of Raipur city. During investigation period it was also observed that the maximum fungal spores were recorded in winter season, moderate fungal spores in rainy season and less fungal spores in summer season. Similar results were also recorded by earlier workers Majumdar and Barui 2005, Patle,K.D. 2010 and Tiwari et. al 2011. Out of 40 fungal spores recorded from bus stand area maximum fungal spores have been found to be allergenic in nature and cause allergic rhinitis, allergic Asthma, eczema , allergic fungal sinusitis which are found to be prevalent allergic diseases in Raipur city. The results provide helpful information to allergologists and clinician in treatment of fungal related allergic diseases. This research paper aims to update current scientific knowledge concerning the health effects of outdoor exposure to fungi and their role in causing allergic diseases.

2. MATERIAL AND METHODS

In present study, for survey of Aeromycoflora of Bustand area was taken . As these is the places in Raipur city were most of the people visit daily, they start their journey and end their journey from this place. It has been already established that air is never free from micro organisms, specially fungal mycoflora. so we have taken bus stand area which is situated in the heart of the city in pandari. The main objective of the present study is to survey the Aeromycoflora of bus stand area and to find out the fungal spores responsible for allergic diseases. The study was carried out for 1 year i.e from March 2013 to Feb 2014. The gravity plate exposure method was adopted for trapping of Aeromycoflora. PDA potato Dextrose Agar was used as cultural medium. 10 ml of sterilized PDA medium was aseptically poured in Petridish and allowed to solidify. These petridishes were then exposed in triplicates for five to ten minutes above the ground level at the Bus stand area. The study was conducted two times in a month at a regular interval of 15 days period. The exposed petridishes were brought back to the laboratory and incubated for 3 to 5 days at $26 \pm 1^\circ\text{C}$. After incubation period the fungal flora was isolated and identified. The identification was done by preparing microscopic slides with the help of glycerin gel as mounting media and cotton blue stain . The microscopic slides was observed under microscope and identified mainly on the basis of colony characteristics and spore morphology from available literatures (Ellis,1971, Tilak, 1989 and Gregory et al . 1959) and finally identified by authentic authority .The results were recorded separately for different seasons. Microbial ecology was also done by calculating the percentage of frequency and percentage of contribution of fungal species by the following formula

Percentage frequency = (No. of observations in which species appeared/ Total No. of observations) \times 100

Percentage Contribution = (Total number of colonies of a species in all the observations taken together / Total number of colonies in all species) \times 100

For the survey of prevalent allergic diseases in Raipur city. A survey of Fungal allergic diseases was done in 102 patients of Raipur city . Area selected for survey Pandari, Mowa , ShankarNagar, Bayronbazar, Civil line, Modhapara, North part Raipur. In central part of Raipur city area selected for survey was collectrate E.A.C colony , Salem school area, Degree girls college area, etc. South part of Raipur included for survey was Tikrapara, Shailandra nagar New rajendra nagar. And East part of Raipur city selected area for our survey was Vivekanande nagar, State bank colony , Science college area, Raj kumar college area, D.D nagar , Lakhay nagar and Samta colony. In all these area of Raipur city survey of fungal allergic diseases was done during the year 2013 – 2014 and people residing in these area were interviewed with questionnaire containing 8 question related to allergic diseases. In all these major parts of Raipur city, selected Hospitals, Nursing homes and Government hospitals were taken for the survey. Information from 100 doctors and 120 patients of these areas were recorded, with the help of Questionnaire and interview. Medical Representatives of Raipur city were also included to note down the drugs or medicines largely used for allergic diseases. Medical shops of these areas were also visited to record the monthly sale of drugs in treatment process.

3. RESULT AND DISCUSSION

Table 7 Showing Fungal distribution of Aeromycoflora of Bus Stand, Raipur during February 2013 to March 2014

| Name of fungi | SUMMER SEASON | | | | Tot | RAINY SEASON | | | | Tot | WINTER SEASON | | | | Tot | Total no. of fungal colonies | % Frequency | % Contribution |
|------------------------|---------------|-----|-----|-----|-----|--------------|-----|-----|-----|-----|---------------|-----|-----|-----|-----|------------------------------|-------------|----------------|
| | Mar | Apr | May | Jun | | Jul | Aug | Sep | Oct | | Nov | Dec | Jan | Feb | | | | |
| <i>Zygomycotina</i> | | | | | | | | | | | | | | | | | | |
| <i>Absidia spinosa</i> | - | - | - | - | 0 | - | - | 1 | 2 | 3 | - | - | 1 | 1 | 2 | 5 | 33.33 | 12.50 |

In the present study, a total of 397 fungal colonies belonging to 40 fungal species were recorded. Out of which 6 species were from Zygomycotina, 3 species from Ascomycotina, 30 fungal spores from anamorphic fungi or Deutromycetes and 1 sterile type was recorded from Bus stand area of Raipur city. During Summer season a total of 97 colonies and 26 species, in rainy season 135 fungal colonies and 33 species and in winter season 165 fungal colonies and 38 fungal species was recorded. Out of 38 fungal species recorded from deutromycetes *Aspergillus niger*, *Aspergillus flavus*, *Cladosporium cladosporides*, *Alternaria alternate*, *Cladosporium oxysporium*, *Curvularia lunata*, *Penicillium crysogenum*, *Fusarium Pallidoroseum*, *Fusarium monaliformis*, and *Penicillium jensani* were major contributors. Allergic nature of all these fungus have already been established. In present study *Aspergillus niger* and *Aspergillus flavus* was observed as most frequent and dominant species similar result were found by earlier workers Kakde and choudhari (1999), Kakde et. al (1999), Saoji and Chanti (1999) at Nagpur, Nayak and Nanda (2010) at Pondicherry city. Similarly *Cladosporium cladosporides* were predominant and most frequent air spora at different places reported by Tiwari (1999) at Raipur, Dahia and Gupta (2003-2011). Kochar, 2011 at Rohtak. Giri and Sawane (2010) at Nagpur, Khan and Shrivastava (2011) at Bilaspur. Similarly Mangala et. al. 2006 reported *Alternaria alternate* in highest number from Miramar beach area Goa. Similarly *Curvularia* was also frequent species found during this study period. This is in agreement with earlier works carried out by Mishra et al. (1991) at Gaya, Arora and Jain (2003) in Bikaner. Tiwari et al. 2006 at Raipur, Saoji and Bhagyalaxmi 2007 at Pune. Air borne fungal spores are known to be responsible for the diverse human allergic reactions. The common genera reported in present study are *Aspergillus*, *Cladosporium*, *Curvularia*, *Fusarium*, *Penicillium* and *Alternaria* etc. these fungal spores are also known as aero allergens (Karne and Pande, 2007, Mishra, 1995, Sharma 2007).

Survey of allergic disease in 102 patients of the above mentioned area showed that 52 patients suffered from allergic rhinitis and 34 suffered from allergic asthma and 16 patients suffered from Eczema and Sinusitis problems. Hence 50% people were allergic rhinitis patient, 33.33 % were allergic asthma patient and 15% were Eczema and allergic sinusitis patient. In the present study it was found that allergic rhinitis and allergic asthma was prevalent allergic diseases in Raipur city. In present study it was also recorded that out of 102 allergic patients 58 patients were female and 44 patients were male. So it was evident from the above results that allergic diseases in females are more common as compared to males. Survey of allergic diseases from doctors, Medical Representatives and Medical stores of Raipur city showed that allergic rhinitis, allergic asthma, allergic sinusitis and Eczema are frequent allergic diseases in Raipur city. Citrizene, Levocitrizene, Deslor, Mondeslor, Monlevo, was largely sold medicines for allergic diseases. Generally Doctors prescribe Antihistamines and topical steroids for allergic treatments. Decongestants and Nasal spray can be used effectively. Aquamate nasal spray was found to be largely sold nasal spray for rhinitis.

4. CONCLUSION

In the present survey it was observed that Allergic Rhinitis, Allergic Asthma, Allergic sinusitis and Eczema are prevalent allergic diseases in Raipur city. Allergic rhinitis is a risk factor for Asthma other co-morbidities of Allergic Rhinitis include sinusitis, Nasal Polyposis, conjunctivitis, Otitis media with effusion, upper respiratory infections, breathing through the mouth, and sleep disorders. Inhaled corticosteroids are currently the most effective anti inflammatory medications to treat persistent asthma.

5. RECOMMENDATION

The strategy to treat allergic diseases should be implemented through Patient education, environmental control and allergen avoidance, Pharmacotherapy and immunotherapy. Local indoor and outdoor allergens are pollutants which cause and exacerbate allergic diseases should be identified and where possible, mapped and quantified. Appropriate environmental and occupational preventive measures should be implemented where none exist or as necessary. Strategies proven to be effective in disease prevention should also be implemented.

ACKNOWLEDGEMENT

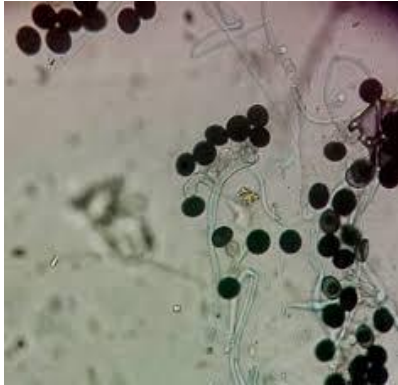
I acknowledge Dr. S.K. Jadhav, Head S .O .S Biotechnology Pt. Ravi Shankar Shukla University Raipur, C.G for providing Laboratory facilities and Dr. V.K Kanungo, Assistant Professor of Govt. N.P.G College of science for their continuous support throughout the work.

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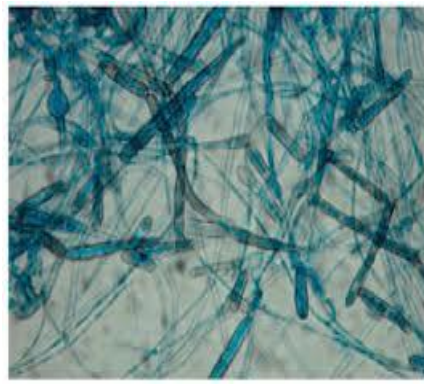
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APPENDIX – A

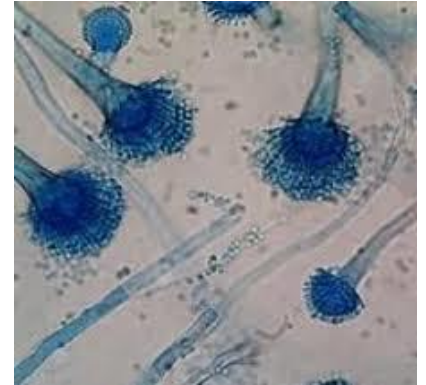
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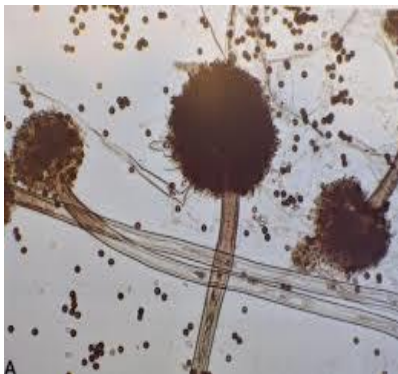
Khuskia oryzae



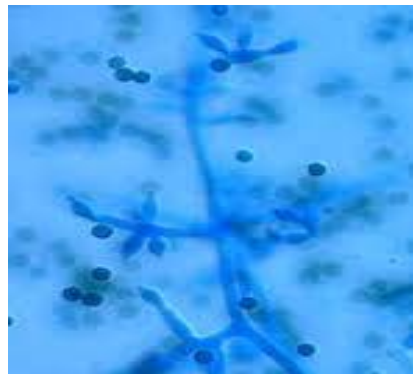
Cornespora sp.



Aspergillus versicolor



Aspergillus niger



Tricoderma viredae



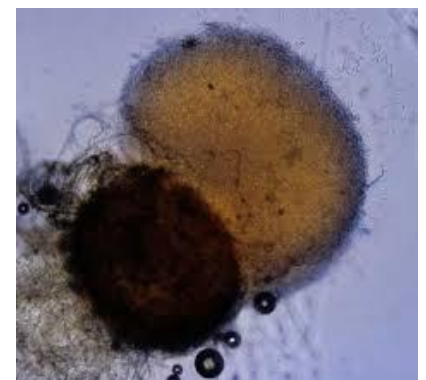
Fusarium monalliformis



Alternaria alternata



Penicillium verrucosum



Phoma sp.