



# Geo-Environmental Etiology of Allergic Disorders and its Impact on Human Health in Sopore J&K, State, India

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## ABSTRACT

The present study aims to comprehend the causes responsible for the occurrence of allergic disorders and access their impact on human health in peculiar climatic conditions of Sopore tehsil district Baramulla, J&K, State, India.

**Objective:** To understand the dissemination phenomenon of known allergenic pollen types causing allergic disorders among the people of the selected sample area in Jammu and Kashmir State, India.

**Methodology:** An effort is being carried out to study airborne pollen and assess their impact on human health in a peculiar climatic condition of Sopore tehsil of district Baramulla in the north region of Kashmir valley of Jammu and Kashmir state by using both primary as well as secondary source of data in order to envisage the relation of environmental factors on the allergic disorders with their impact on the human health.

**Results:** In the present study 1413 cases of allergic disorders were recorded in the district hospital, sub-district hospital and primary health centers from the year 2010-2015, out of which 57.18 percent were constitutes males. Cases like rhinitis (35.52 percent), conjunctivitis (28.09 percent), dermatitis (15.28 percent) and bronchial asthma (21.08 percent) were recorded in the study area.

**Key Words:** Temperature variability, wind velocity, pollens, Allergens, Pulmonary disorders

## INTRODUCTION

The prevalence rate of respiratory and allergic diseases such as asthma and rhinitis have increased dramatically to epidemic proportions worldwide. The World Allergy Organization (WAO) raises concern of this health hazard and highlights the role of climate-related health impacts on mortality and acute morbidity of respiratory disorders due to extreme meteorological events. Pollens are by and large considered as causative agents of respiratory allergy disorders in any geographic area<sup>1</sup>. It has been established that the frequency and incidence of allergic pollen is high in areas of low relative humidity, modest temperatures and maximum rainfall<sup>2</sup>. Pollen dispersal is facilitated by dry weather with low relative humidity as the pollen particles being light and dry disperse in the air with less constraint. Wind velocity and wind direction plays an important role in pollen release and in its trans-

portation during flowering phase<sup>5</sup>. It has also been observed in Kashmir (India) that besides high temperature and low relative humidity the pollen dispersion from the exotic Australian populous tree enhances the liberation and distribution of pollen resembling light cotton flakes in the atmosphere and are capable to trap the allergen elements (pollen) which unwillingly enters into the human organs through inhaling organs thus irritates the eyes. Air borne allergen pollen flora are widely distributed all over the India with no exception to Jammu and Kashmir which enjoys frequent weather changes thus plays a major role in the dispersal of allergen pollens inhaled by human when exposed to open environment<sup>7</sup>.

## Study Area

The study has been carried out in Sopore tehsil, a second order administrative unit of Baramulla district of Jammu and Kashmir State (India). Sopore known as *Suyyapur* in antiq-

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uity is a prosperous geographic region in the state Jammu & Kashmir. It is located at 34°30'N latitude, 74°47'E longitude, constitutes an area of 320sq.kilometers and is known as "Apple town of Asia"; because of its horticultural produce. The area offers opportunity to the larger people of district to earn livelihood in horticulture/agricultural related activities. Therefore it represents the geographic region of north Kashmir in terms of population composition and its characteristics.

### Data base and Methodology

The data was collected from district hospital, sub- district hospital and primary health centers located in the study area. The climatic data was collected from meteorological department Srinagar. Mean monthly temperature, average annual rainfall and average wind velocity from year 2010-2015 were taken into consideration to check seasonal trend. The other factors interlinked with allergic disorders were also taken into consideration such as flora of the region, occupation structure etc. After disseminating the meteorological data with medical records the impact of allergic disorders on the human health with seasonality were seen on both genders as well as on different age groups in the study area.

### RESULTS

Different parameters such as meteorological factors (Temperature, rainfall, wind velocity) from year 2010-2015, occupational structure, and flora were interlinked with various allergen antigens and their impact was seen on the human health in the study area. The results are shown in separate tables listed.

### DISCUSSION

In this study it was found that allergen pollen along with various meteorological parameters (Temperature, Rainfall and Wind velocity), flora and flowering period time, occupational structure have a strong bearing on the human health. In the study area about 1413 cases of allergic disorders were recorded in the district hospital, sub-district hospital and primary health centers from 2010-2015, out of which 57.42 percent of the cases of allergic disorders were related to men of all age group. The higher percentage of males was mainly attributed to nature of work and exposure to open environment in agricultural fields. About 46 percent such cases with rhinitis, conjunctivitis, dermatitis and bronchial asthma were recorded in the month of March- June during. 2010-2015(half decade). 66.38 percent the case were in the age group of 21-50 years being the more potent labour class and is peak season of as agricultural activities in Kashmir valley. The previous nearly six months remains dormant for such

activities due harsh winter and inclement weather conditions in the valley. Due to the onset of spring from 21<sup>st</sup> March in the state people start their work in the fields (Agricultural, Horticulture etc.) in order to generate their daily livelihoods. All the factors favors the allergic disorders such as temperature for the blooming of allergenic pollen flower, wind and moisture require transporting these allergen pollen spores from lower layer of atmosphere to hitting targets mainly (human population).

### CONCLUSION

The study highlights the impact of allergic pollens along with different meteorological factors on human health. Clear evidences are traced from the study area which shows a relationship of allergen pollens and human health. Diseases such as Rhinitis, Conjunctivitis, Dermatitis, and Bronchial asthma were recorded in both field as well as from medical records witnessed during different seasons in the study area of all ages irrespective of gender. The study revealed that local factors especially presence of allergen flora, nature of work mainly contributed to etiology of allergic disorders.

### Suggestions

Avoidance is the best treatment, but it is very difficult to follow as it is not possible to avoid pollen completely as majority of the life dependence is with agriculture economic activities. General masses can be advised to use air masks thereby reducing the inhaling of allergens. Another method is immunotherapy where extract of a particular antigen or mixed antigen to which patients are allergic is given in very low concentrations initially and then the concentration is increased slowly. As a result, a patient develops antibodies against the specific antigens. More importantly government must to take necessary measurements before introducing any new exotic flora species so to be eco-friendly in nature.

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**Table 1: Occupational structure**

Tehsils	Cultivators	Agricultural laborers	Household industry workers	Others
Sopore	23,682	5,010	2,901	30,730

Source: Census department India

Table 1 shows the occupational structure, the main occupation of district Baramulla in general and Sopore tehsil in particular comprises of agricultural cultivators. Both male and females spend most of their time in their field. The peak season of agriculture starts from month of March and it continue till October-November. From month of March the flowering of trees emerge which continues till the month of June. Therefore during pollination various pollens disseminate with the help of wind.

**Table 2: Mean monthly meteorological data of Kashmir valley (average 2010-2015)**

Months	Temperature ocelcius		Average. Rainfall (millimeters)	Wind velocity Km/hour
	Maximum	Minimum		
January	7.3	-3.2	98.1	2.2
February	8.8	-0.2	188.9	2.1
March	17.0	3.4	114.1	3.4
April	20.0	7.8	171.6	3.4
May	23.6	10.1	114.8	3.0
June	27.9	13.8	47.6	2.5
July	30.9	17.0	64.5	2.3
August	30.3	17.5	77.8	2.3
September	27.1	13.2	102.9	2.5
October	22.7	5.6	59.9	2.1
November	18.0	1.3	22.3	2.1
December	10.3	-1.8	66.7	2.2

Source: IMD Center, Srinagar (J&K State)




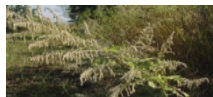




Table 2, depicts that favorable months for the dispersal of pollen allergen from month of March-June as all conditions required for the dispersal is suitable during these months along with the wind direction North-Westwards. Incidentally these months are the peak agricultural working time in the whole Kashmir valley which makes people more susceptible to allergic disorders such as rhinitis, conjunctivitis, dermatitis and bronchial asthma.



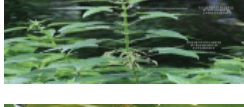
**Table 3: Geographical occurrence of Vegetation**

S. No	Vegetation	Vernacular Name	Occurrence (Geographical Spread)
1	Bermuda Grass (cynodon dactylon)	Dramun	Very Common
2	Corn ( Zea Mayus)	Makai	Frequent
3	Wheat (Triticum Sativum)	Khenuk	Rare
4	Mugwort (Artemisia Vulgaris)	Tetwain	Frequent
5	Lambs quarter (Chenopodium Album)	Kun	Common
6	Engl. Plantain (Plantago Lancelata)	Gula	Very Common
7	Barley (Hordeum Vulgare)	Wushik	Frequent
8	Prunus persica	Aru	Frequent
9	Birch (Betula Utilis)	Buj Pater	Rare
10	poplar (populus alba)	Phras	Frequent
11	Willow ( Salix caprea)	Veer	Frequent
12	Dandelion (Taraxacum Vulgare)	Hund	Very Common
13	Nettle ( Urtica diocia)	Soi	Common
14	Plane Tree ( Platanusntalis)	Boone	Common

Source: Field study 2015.

**Table 4: Allergen pollen types reported from the atmosphere of district Baramulla and its surrounding**

S.No	Allergen	Common Name	Occurrence	Pollination / Flowering period	Images
1	Cynodon dactylon	Dramun	Very Common	April- July	
2	Zea Mayus	Makai	Frequent	August - September	
3	Triticum Sativum	Khenuk	Rare	April - May	
4	Artemisia Vulgaris	Tetwain	Frequent	April -June	
5	Morus alba	Tul	Common	May-June	
6	Chenopodium Album	Kun	Common	July -August	
7	Plantago Lancelata	Gula	Very Common	April -June	
8	Prunus persica	Aru	Frequent	March-April	

9	Robinia pseudoacacia	Kiker	Very Common	April-May	
10	Betula Utilis	Buj Pater	Rare	April	
11	populus alba	phras	Frequent	March-June	
12	Salix caprea	Veer	Frequent	March	
13	Taraxacum Vulgare	Hund	Very Common	March - November	
14	Urtica diocia	Soi	Common	May -July	
15	Platanusntalis	Boone	Common	March	

Source: Field study 2015.

Table 3 and 4 shows the occurrence of different vegetation as well as allergen flora types and their flowering period. In the study it was found that concentration of these flora allergen types in the study area are enjoying favorable conditions for their growth as the whole Kashmir valley enjoys temperate latitude and geographical factors which are highly favorable for such kind of flora. The table also leads to the fact that whole valley especially plain lying areas experience such type of allergen flora which might make the whole population susceptible to these pollens.

**Table 5: Seasonal trend in the total number of allergic patients in Sopore Tehsil (2010-2015)**

Seasons (vernacular name)	Months	Total Allergic patient		Gender	
		Total	Percentage	Male (%)	Female (%)
Spring (Sonth)	Mid-March- Mid May	344	24.29	190(23.51)	154(25.45)
Summer(Grishm)	Mid May- Mid July	288	20.38	164(20.29)	124(20.49)
Rainy (Wahrat)	Mid July- Mid September	208	14.72	121(14.97)	87(14.38)
Autumn(Harudh)	Mid-September-Mid November	192	13.58	118(14.60)	74(12.23)
Winter (Wandh)	Mid November- Mid January	184	13.02	105(12.99)	79(13.05)
Cold (Sheshur)	Mid-January- Mid March	197	13.94	110(13.61)	87(14.38)
Total	-	1413	100	808 (57.18)	605 (42.81)

Source:(District, Sub District Hospital Sopore and PHC) of the study area from 2010-2015.

Table 5 shows the seasonal wise flow of allergic patients. During the study it was find that highest concentration of allergic patients were recorded during spring season (Mid-March- Mid May) 24.29 percent of the total 1413 patients recorded during half decade, as being the period of flowering, steady and sharp increase in temperature, high wind velocity which helps the allergen pollens to spread in the atmosphere easily and the exposure of population to work in the open fields in order to generate their daily livelihoods make them more vulnerable to inhale suspended allergen pollens.



**Table 6: Disease profile allergic disorders of Study area (2010-2015)**

Diseases	Total (%age)	Male (%age)	Female (%age)
Rhinitis	502 (35.52)	322 (64.14)	180 (35.85)
Conjunctivitis	397 (28.09)	224 (56.42)	173 (43.57)
Dermatitis	216 (15.28)	122 (56.48)	94 (43.51)
Bronchial asthma	298 (21.08)	140 (46.97)	158 (53.02)
Total cases	1413	808 (57.18)	605 (42.81)

Source: District, Sub District Hospital Sopore and PHC) of the study area from 2010-2015

Table 6 indicates the disease profile of allergic disorders recorded in the study area during a period of 2010-2015. i.e. rhinitis 35.52 percent, conjunctivitis 28.09 percent, dermatitis 15.28 percent and bronchial asthma 21.08 percent as shown in the table 6. It is clearly evident that males were more susceptible to allergic diseases about 57.18 percent. This phenomenon is not related to any genetical character rather nature of work as with work nature of males they are more exposed to open environment than females who mainly perform their duty inside the houses.

**Table 7: Age wise allergic disorders in Sopore Tehsil (2010-2015)**

Age groups	Months												Total (%age)
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec	
< 1	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
1-Oct	3	3	7	12	12	9	8	8	6	6	5	6	85 (6.01)
Nov-20	7	5	22	29	30	27	13	11	12	12	10	12	190 (13.44)
21-30	15	17	28	35	37	34	25	23	20	20	18	16	288 (20.38)
31-40	18	16	38	43	42	33	31	28	27	25	21	21	343 (24.27)
41-50	20	20	35	39	36	29	22	21	21	23	20	21	307 (21.72)
51-60	10	9	14	18	17	8	11	10	6	6	10	8	127 (8.98)
>60	12	10	4	6	3	3	2	3	3	6	10	11	73 (5.16)
Total	85	80	148	182	177	143	112	104	95	98	94	95	1413

Source: Field Survey; Medical Records

Table 7 shows the age wise prevalence of allergic disorders in the population of the study area from year 2010-2015. In the study it was found that the population in the age group of <1 year were free of any kind of allergen disorders mainly due to the indoor protection. While 66.38 percent of allergic disorders were found in the age group between 21-50 years such as rhinitis, conjunctivitis, dermatitis and bronchial asthma as they were the main forces to work in the open environment in order to earn daily livelihood for the rest. The asthma cases were found in the higher age groups.