

# Role of Vitamin D & Immunoglobulins E in patients of Seasonal Allergic Conjunctivitis

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## ABSTRACT

**Introduction:** Allergic conjunctivitis is in fact a bunch of diseases affecting the visual surface and is usually related with type1 hypersensitivity reactions. Two acute disorders, seasonal allergic conjunctivitis and perennial allergic conjunctivitis, exist, as do 3 chronic illnesses, vernal keratoconjunctivitis, atopic keratoconjunctivitis, and giant papillary conjunctivitis.

Seasonal allergic conjunctivitis is related with seasonal hypersensitivities that ordinarily happen amid the spring and summer months, and in some cases amid the fall. Exposure to dust, grass and other airborne allergens causes seasonal allergic conjunctivitis.

Low levels of vitamin D somewhat related to allergic disorders. This study show a relationship between Serum vitamin D and Immunoglobulin's E in patients of seasonal allergic conjunctivitis

**Objective:** To evaluate serum vitamin D and serum total immunoglobulin E levels in patients with seasonal allergic conjunctivitis (SAC).

### Material and Methods

**Study design:** quantitative cross sectional

**Duration:** Six months i.e. 1<sup>st</sup> September 2021 to 28<sup>th</sup> February 2022

**Data Collection procedure:** A cross sectional study was conducted on 100 patients. The study was conducted in Holy Family Hospital Rawalpindi. Ethical approval was taken from ethical committee. An educated consent was taken from the participants. 60 patients in this study presented with seasonal allergic conjunctivitis and 40 healthy normal persons were included. Serum vitamin D and serum total IgE levels were calculated.

**Results:** The average age of the participant in this study was in between 30-50 years of age. In SAC group 40 were males and 20 females. Group two healthy normal consist of 25 males and 15 females. There is a significant decrease of vitamin D level in patients who were diagnosed seasonal allergic conjunctivitis and IgE levels were high when compared to normal healthy group

**Conclusion:** In conclusion, we demonstrated lower plasma vitamin D levels in patients with SAC compared with the control bunch. To conclude a certain association between vitamin D status and allergic conjunctivitis, both multicenter larger case arrangement and further studies examining the impacts of vitamin D supplementation ought to be performed in the long run.

**Keywords:** Vitamin D, seasonal allergic conjunctivitis, IgE, Allergy

## INTRODUCTION

Allergic conjunctivitis is in fact a bunch of diseases affecting the visual surface and is usually related with type1 hypersensitivity reactions. Two acute disorders, seasonal allergic conjunctivitis and perennial allergic conjunctivitis, exist, as do three chronic illnesses, vernal keratoconjunctivitis, atopic keratoconjunctivitis, and giant papillary conjunctivitis<sup>1</sup>.

Seasonal allergic conjunctivitis is related with seasonal hypersensitivities that ordinarily happen amid the spring and summer months, and in some cases amid the fall. Exposure to dust, grass and other airborne allergens causes seasonal allergic conjunctivitis<sup>2</sup>.

Low levels of vitamin D somewhat related to allergic disorders. This study show a relationship between Serum vitamin D and Immunoglobulin's E in patients of seasonal allergic conjunctivitis.

Seasonal allergic conjunctivitis is a type 1 hypersensitivity response mediated by immunoglobulin E (IgE), which is evoked by airborne environmental antigens. When an allergen enters the visual surface, it is processed by antigen-presenting cells at to begin with and presented to T helper lymphocytes as a peptide part, coordinating them to T helper type 2 cells. These cells produce interleukins and other specific cytokines fortifying the B-cell production of IgE, which at that point ties to the surface of mast cells<sup>3</sup>.

When particular allergens reach to the visual surface, they respond with particular IgE antibodies bound to sensitized pole cells leading them to degranulate and discharge a considerable number of preformed and recently shaped mediators. Histamine, which is the overwhelming mediator, together with other mediators and chemotactic variables induces the major clinical signs and

indications of allergic conjunctivitis (tingling, conjunctival hyperaemia, tearing, chemosis and lid oedema. Allergic illnesses, which were very rare a century back, are frequently encountered as of late and influence as much as 40% of the population in developed nations. Also more recently, particularly upon the discovery of the administrative impacts of vitamin D on the resistant system, variations in vitamin D status have been implicated in the advancement of allergic diseases. It has been recommended that vitamin D has a significant part, primarily immunomodulatory, in human physiology beyond skeletal and calcium homeostasis<sup>4-6</sup>.

## MATERIAL AND METHODS

A cross sectional study was conducted on 100 patients. The study was conducted in Holy Family Hospital Rawalpindi. Ethical approval was taken from ethical committee. An educated consent was taken from the participants. 60 patients in this study presented with seasonal allergic conjunctivitis and 40 healthy normal persons were included. Serum vitamin D and serum total IgE levels were calculated. The persons who are smokers, having known systemic illness and the females who are pregnant were excluded from the study.

Venous blood was obtained from each subject into tubes. Centrifugation was done at 2500g for 10 minutes. The samples of plasma and serum were liquoted and stored at -30C for 3 weeks for further analysis.

The data were collected and analyzed by SPSS version 23. Mann Whitney U test was performed for testing vitamin D and IgE levels in patients and control groups. In Seasonal allergic conjunctivitis group serum vitamin D and IgE were compared using pearson correlation. Mean age of group was compared with

independent samples t test and gender distribution in groups by chi square test. p value <0.05 were considered significant.

## RESULTS

The average age of the participant in this study was in between 30-50 years of age. In SAC group 40 were males and 20 females. Group two healthy normal consist of 25 males and 15 females. There is a significant decrease of vitamin D level in patients who were diagnosed seasonal allergic conjunctivitis and IgE levels were high when compared to normal healthy group. The mean age of the patients with seasonal allergic conjunctivitis who were participated in the study range 16-45 years and the control group 14-40 years of age. There were no significance related to age ( $p = 0.45$  independent-samples t test) and gender ( $p=0.956$  chi square test). Serum vitamin D levels of the subjects with seasonal allergic conjunctivitis (9.25+ 5.35), median 10.21ng/ml range 4.5-18.25ng/ml were significantly lower than control group (13.25+ 7.55) median 12.89 and range 4.89- 32.33. as shown in figure 1 ( $p = 0.008$  Mann whitney U test).

The serum total IgE levels of patients with seasonal allergic conjunctivitis were 165.23+ 213.45 IU/ml median 52.5 IU/ml range 2.10-850. lu/ml were significantly higher when compared to control group (37.25+ 32.52 median 33 range 0.24-110 lu/ml as shown in figure 2 ( $p = 0.004$ ).

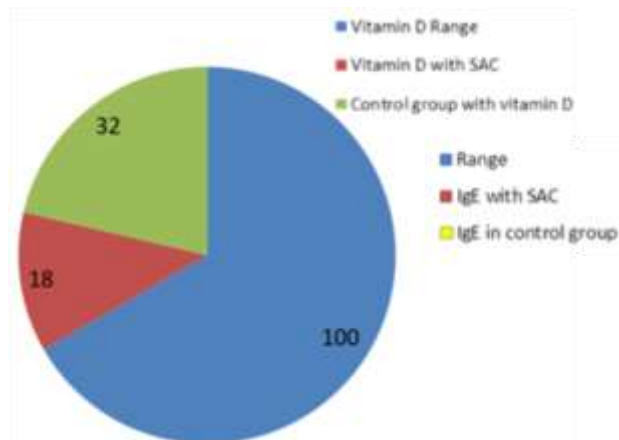


Figure 1: Levels of Vitamin D with SAC and control group

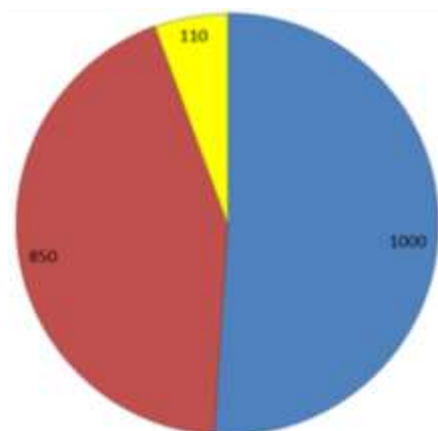


Figure 2: Levels of IgE with SAC and control group

## DISCUSSION

This study assessing the relationship between seasonal allergic conjunctivitis and vitamin D status. Plasma levels of vitamin D in patients with SAC were essentially lower than the control group. This finding includes to the developing evidence Comparison of

plasma 25-hydroxyvitamin D levels of patients with seasonal allergic conjunctivitis and control subjects. Plasma vitamin D levels of the subjects with regular allergic conjunctivitis were altogether lower than the control group ( $p = 0.008$ , Mann–Whitney U-test)<sup>7</sup>.

The primary source of vitamin D is natural production within the skin secondary to sun presentation, because it does not naturally happen in most nourishment. It is characterized that allergic infections are more predominant in areas absent from tropical region, and some authors pointed out that the reason may be insufficiency of vitamin D. But there may be a wide spread insufficiency of vitamin D detailed around the world indeed in sun-replete areas of the world. In our study, vitamin D levels were low both in patients with SAC and in control subjects. This can be in accordance with other considers from our country announcing a tall recurrence of vitamin D deficiency. In spite of the fact that both groups had low vitamin D levels in our study, patients with SAC had significantly lower plasma vitamin D values<sup>8,9</sup>.

In truth, there are a considerable number of studies within the literature linking vitamin D lack with various types of unfavorably susceptible illnesses. In a large survey conducted in USA, vitamin D insufficiency was found to be positively correlated with predominance of hypersensitivities. Moreover there are several case–control studies showing higher rates of vitamin D deficiency among unfavorably susceptible patients than in controls. In spite of the fact that most studies within the literature illustrate a positive relationship between vitamin D lack and hypersensitivities, there are also a few conflicting reports that no relationship between vitamin D levels of patients with asthma and controls. The clashing reports of these publications may be due to that vitamin D levels were measured as it were once, which may not be adequate to form a conclusion in these inveterate illnesses. Demonstrating vitamin D levels at the peak season of sensitivity indications may be an advantage of our study as it is known that serum vitamin D level change seasonally<sup>10</sup>.

In spite of the fact that the relationship between vitamin D status and unfavorably susceptible diseases has been well set up, there are few studies examining whether vitamin D supplementation is viable in preventing or treating unfavorably susceptible illnesses. Despite the visit perception of protective association between vitamin D and allergy, supplementation was linked with expanded hazard of unfavorably susceptible infections<sup>11</sup>.

## CONCLUSION

In conclusion, we demonstrated lower plasma vitamin D levels in patients with SAC compared with the control bunch. To conclude a certain association between vitamin D status and allergic conjunctivitis, both multicenter larger case arrangement and further studies examining the impacts of vitamin D supplementation ought to be performed in the long run. Agreeing to those results, supplementation of vitamin D can be considered, in case of established insufficiency, for the treatment of patients with unfavorably susceptible conjunctivitis in expansion to the classic treatment.

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