

# ABO Blood Group & Periodontitis: Correlation or No-Relation.

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## ABSTRACT

**Background:** The purpose of the present study was to determine whether there was a relationship between periodontal diseases and ABO blood groups. **Methods:** This epidemiological study was carried out on 300 subjects who were randomly selected from individuals referred to the periodontics of Ahmedabad Dental College & Hospital for periodontal treatment or for other reasons regarding dental health. The study based on periodontal condition, blood group. The effects of blood subgroups on periodontal health, gingivitis and Periodontitis were investigated separately. **Results:** The findings of our study revealed that subject's blood group "O" and "B", Rh positive had a greater propensity for periodontitis followed by blood group A and least prevalent is blood group AB. **Conclusions:** ABO blood subgroups and Rh factor may constitute a risk factor on the development of periodontal disease.

**Keywords:** ABO blood group, Periodontitis, Rh factor.

## INTRODUCTION

Periodontal disease comprises a heterogeneous group of infectious disease that lead to pathologic destruction of the periodontium. It is well known that periodontal disease can vary with respect to bacterial etiology, host response and clinical disease progression. Although differences exist among the various types of periodontal disease, all share the common characteristic of complex host bacterial interactions and the disease onset and progression reflect the balance between homeostasis and destruction of the periodontal tissue.<sup>[1]</sup> Although bacteria are the main cause of the inflammatory periodontal disease, there is increasing evidence that it is a chronic immune-inflammatory response associated with environmental influence, various host factors such as diabetes, smoking and genetic predisposition. It has been estimated that less than 20% of the variability in periodontal disease severity can be attributed to the quantity of specific bacteria seen in disease-associated plaque. Instead, a key role for genetic effects has been suggested.<sup>[2]</sup> In 1900, Landsteiner first described the existence of serologic difference between individuals, and classified people into four groups depending on whether their RBC cell membrane contained agglutinin (antigens) "A," agglutinin "B," neither A nor B (group O) or both A and B (group AB).<sup>[3]</sup>

Although human population shares the same blood systems, they differ in the frequencies of specific types. Some variations may occur in different areas within one country.

It was reported that Group O was found to be more common in India although studies have reported that group B was common in Northern India while Group O was more prevalent in South India.<sup>[4-5]</sup> Unlike other blood typing systems, the ABO blood system has significance beyond transfusion and transplantation, for example it determines many of the immunological characteristics of the body.<sup>[1]</sup> Blood group A individuals have been reported to be more prone to gall stones, colitis and tumors of salivary glands, pancreas as well as ovary.<sup>[6]</sup> Subjects with Blood group A, O and non O were found to be more prone for Cardiovascular diseases.<sup>[7-11]</sup> Results from the Framingham study and several other reports indicated the occurrence of ischemic heart disease might be higher in subjects with blood group A.<sup>[12,13]</sup>

Stakisaitis found that blood group B might be related to coronary atherosclerosis in Lithuanian women.<sup>[14]</sup> although several studies have been carried out to investigate the relation between ABO blood group and incidence of disease in medicine, limited research has been made to investigate the relation between ABO blood groups and incidence of oral diseases. Few researchers claimed that there was a relation where as some others could not find any, which was attributed, to geographical diversity in the population. Studies by Koregal C Arati et al.<sup>[15]</sup> and Demir et al<sup>[3]</sup> showed that periodontitis was more common in blood group O and gingivitis more common in blood group A, while another study by Al Ghamdi<sup>[1]</sup> showed that blood group B were found to be at greater risk for developing periodontitis. Another study by Pradhan AC et al fails to show any significant association between blood group and periodontal disease.<sup>[16]</sup>

In view of the existing conflicting results a study was planned to investigate the association, if any, between ABO blood group and Periodontitis in a group of people reporting to Ahmedabad Dental College and Hospital, Ahmedabad.

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## MATERIALS & METHODS

The present cross sectional study was conducted at Ahmedabad dental college & hospital in Ahmedabad city, Gujarat, India. The study sample includes 300 patients (240 males), (60 females) who were referred to department of the periodontics at Ahmedabad dental college & hospital and they were assessed about their periodontal condition. The subjects who full fill the inclusion and exclusion criteria were considered for the Present study. Before starting the study informed consent was obtained from the patients. The purpose and procedure of the study was informed to each participant and also information sheet was provided to each of them, which explains the all aspects of the study. Ethical approval was obtained from the Ahmedabad dental college & hospital ethical board.

Data was collected by principal investigator. Periodontitis subjects who exhibited at least one site attachment loss greater than 3mm, periodontal pocket depth higher than 4 mm. The venous blood samples were collected to classify the subjects based on their ABO blood groups and the Rh factor. Blood samples were taken by a sterile finger prick with a disposable needle. The blood grouping and Rh factor examination was done by the slide method. The number of participants in each study groups and their ABO blood groups were tabulated. The percentage distribution was calculated in both. Person who displayed less than 3 mm of attachment loss periodontal pocket depth less than 3mm and no gingival signs were diagnosed as healthy subjects. The survey was scheduled to spread over a period of 1 month. A detailed weekly schedule was prepared well in advance. Although a detailed schedule was prepared meticulously, few adjustments and changes were done due to logistic reasons. Six days in a week were allotted for conducting the study. A questionnaire related to history was given to each

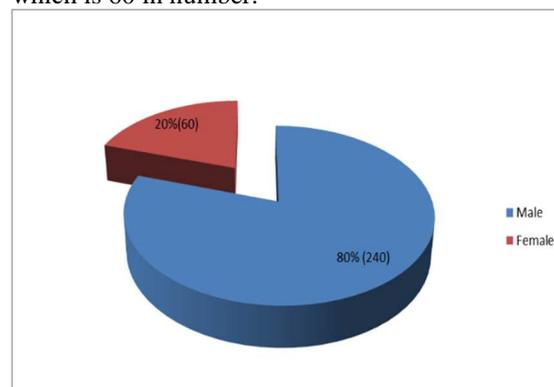
participant and the response sheets were collected. Data was collected by using pre-tested self-designed proforma. The proforma was developed in English only because it was expected that all patients were able to comprehend English.

**Statistical analysis:** Collected data was coded, compiled and tabulated. The data was analyzed by applying descriptive and inferential statistical analysis. Analysis was carried out using SPSS package version 17. To maintain the data quality rechecking and cross checking were done during data entry phase.

## RESULTS

The present study was conducted to access the relationship between periodontitis and ABO blood group system. A total of 300 participants from private dental colleges of Ahmedabad city were included in the study population.

Figure 1 shows distribution of subjects according to their gender which shows that in random sample of 300 patient majority were male which is 240 almost 80% of the population, While female were only 20% which is 60 in number.



**Figure 1:** Distribution of subjects with periodontitis according to gender

**Table 1:** Distribution of subjects according to blood group with periodontitis.

Blood Group	Males (n)	Female (n)	Total (%)
O	26	09	35
A	24	03	27
B	27	08	35
AB	03	00	03

Table 1 shows the distribution of subjects who were already having Periodontitis with their ABO blood group system. We can appreciate from the table that blood group “O” and “B” is leading blood group followed by blood group “A” and the least is blood

group “AB” so we can say that subjects having blood group “O” and “B” are at the maximum risk to establish Periodontitis. The least vulnerable subjects are with blood group “AB”.

**Table 2:** Distribution according to Rh factor with periodontitis.

Rh factor	Male (n)	Female (n)	Total (%)
Rh +	73	18	91
Rh -	07	02	09

Table 2 illustrates the distribution of the subject with Periodontitis with their Rh factor. We can appreciate

that majority case are with Rh+ subjects whereas Rh- were too small in participation.

## DISCUSSION

Periodontal diseases, including gingivitis and periodontitis, are serious infections that, if left untreated, may lead to loss of teeth. The principal cause of periodontal diseases is bacterial plaque. Poor oral hygiene and plaque were cited as the main etiology of periodontitis. However, with the increase in understanding the etiology of periodontitis, it was concluded that periodontal diseases are multi-factorial. With advances in research it was understood that apart from the common etiological agents and environmental factors, certain unknown factors did play a role in the development of periodontal disease. Thus, the focus of determining the disease susceptibility changed to genetics. However, the studies investigating the relation between ABO blood grouping and periodontitis is limited.

ABO blood group and Rh system distributions show marked variation around the world. Some variations have even been reported different areas within the same country. It has been reported that the O blood type is most common in American and Canadian individuals, the B type in Chinese and Indian individuals, and the A type in Eskimos.<sup>[13]</sup>

In the present study population there was highest prevalence with O group and the least with AB group. Periodontal disease is the most common disease affecting mankind. The various risk factors for the periodontal disease have been identified and preventive strategies aimed at reducing the disease. Very few studies have tried to elucidate the association between blood group, Rh factor and periodontal disease in the Indian population. The identification of this particular association may open new arenas in the prevention of periodontal disease. The tissue localization of the histo-blood group antigens has shown that the antigens in the tissues correspond to the erythrocyte blood group, but the tissue expression is dependent on the secret or status of the individual. Secretor status is secretion of blood group antigens ABO (H), which may be a factor influencing the development of systemic oral diseases in the stratified epithelium. The expression of histo-blood group antigens depends on the level of cellular differentiation and maturation, and there is a sequential elongation of the terminal carbohydrate chain during the life span of the cell. Basal cells usually exhibit the short carbohydrate chains that are A/B precursors, whereas A or B antigens may be seen in the spinous cell layer. Variation in the differentiation patterns among keratinized against non-keratinized epithelium plays a vital role in the expression of blood group antigens. Keratinized squamous layer may express A or B antigens in only very a small number of highly differentiated cells, leaving the precursor H antigen expressed on spinous cells.<sup>[16-18]</sup> The present study showed a greater propensity for periodontal disease

among O blood group individuals while the propensity was least among AB blood group individuals. This is similar to a study done by Vivek S and Gawrzewska.<sup>[19]</sup> However a study by pai et al found that periodontitis patients were more likely to have A blood groups.<sup>[17]</sup>

A significant association of periodontitis with Rh factor was seen with more individuals being Rh positive as compared with Rh-ve. This is in contrast to a study done by Demir et al which showed no significant difference in the prevalence of periodontitis between Rh+ve and Rh-ve individuals.<sup>[3]</sup>

## CONCLUSION

Following conclusion drawn from the present study: among the ABO blood groups, "O" and "B" blood groups having the highest prevalence of periodontitis followed by blood group "A" and least prevalent blood group is "AB" and males (80 %) are found to be more affected compared to females (20 %) with periodontitis.

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