

## ORIGINAL ARTICLE

# EVALUATION OF CORRELATION BETWEEN PERIODONTITIS AND ABO BLOOD GROUPING- A CLINICAL STUDY

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### ABSTRACT:

**Background:** Periodontal disease comprises a heterogeneous group of infectious disease that lead to pathologic destruction of the periodontium. This disease affects the gingiva and cause gingival inflammation and with involving the supporting fibers and bone, the tooth becomes loose and finally the tooth is lost. The present study was conducted to determine whether there was a relationship between periodontal diseases and ABO blood groups. **Materials and Methods:** This study was conducted on 1000 subjects based on periodontal condition, blood group, and medical history. The subjects were divided into three groups as those with gingivitis, periodontitis, and the healthy ones. **Results:** Results showed that higher percentage of B group patients were found in both gingivitis group and periodontitis group. **Conclusion:** Author concluded that ABO blood subgroups and Rh factor may constitute a risk factor on the development of periodontal disease.

**Key Words:** ABO, Blood, Gingivitis, Periodontal disease, Rh factor.

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## INTRODUCTION

Periodontal diseases are among the most common diseases and along with dental carries are considered the main causes of tooth loss<sup>1</sup>.

Periodontal disease comprises a heterogeneous group of infectious disease that lead to pathologic destruction of the periodontium.<sup>2</sup> This disease affects the gingiva and cause gingival inflammation and with involving the supporting fibers and bone, the tooth

becomes loose and finally the tooth is lost (Page and Schroeder, 1976)<sup>3</sup>.

The dominant etiology of most periodontal diseases are bacteria, but studies show that genetic factors also have a major role in periodontal diseases and possibly a major contributor to different prevalence rates of this condition among various nations. De Carvalho et al. (2009)<sup>4</sup> showed that genetic factors contribute to the development of AGP and some chromosomal locations can independently or in interaction with

environmental factors affect the occurrence of this condition. The first human blood group, that is, the ABO system discovered by Landsteiner, is the most commonly used blood system although many blood systems have been identified so far. The discovery of ABO system and findings of red cell agglutination in serum and recognition of blood groups laid the scientific basis for safe practice of blood transfusion<sup>2,5</sup>. The other important blood systems are the Rhesus (Rh) and the MN system. ABO and Rh systems have major clinical significance and they are determined by the nature of different proteins present on the surface of red blood cells. The antigens of the ABO system are an integral part of the red cell membrane, which is also found in plasma and other body fluids. The presence or absence of certain antigens has been associated with various diseases and anomalies, with antigens also acting as receptors for infectious agents. All human populations share the same blood systems, although they differ in the frequencies of specific types. The distribution patterns of ABO and Rh systems are complex around the world. Some variation may even occur in different areas within one small country. The blood group distribution also shows variety according to races. It was reported that the group A has a wider distribution in Eskimos, the group B in Chinese and Indians, the group O, on the other hand, in American and Canadian Indians and Czechoslovakians and those living in Kenya.<sup>1,2,6</sup> Although studies have reported that group B was common in Northern India while Group O was more prevalent in South India.<sup>6</sup> When the rate of Rh+ is considered, it was reported to be about 85% in all the population. However, varying percentages were reported in various countries of the world (Kenya 96%, India 99%, Iran 90%, Turkey 87%).

For the past few decades, research has been focused on systemic conditions and its role in the pathogenesis of periodontitis. Most studies have shown a positive correlation between periodontal disease and systemic conditions, especially cardiovascular diseases such as myocardial infarction and atherosclerosis, respiratory infections such as chronic obstructive pulmonary diseases and pneumonia and diabetes. They act individually in an additive fashion or synergistically to contribute to periodontal disease.

Although several studies have been carried out to investigate relationships between the ABO blood groups and the incidence of certain diseases in medicine, little investigation has been made to

explore the relationships between ABO blood groups and the incidence of oral and dental diseases. Study conducted by Ali S T (2009)<sup>7</sup>, they found significant relationships between ABO blood type and the severity of chronic periodontitis. Patients with group B were found to be at greater risk of developing more severe form of periodontitis.<sup>8</sup> Further continued scientific exploration is required to determine which factors should be the primary target for the treatment of periodontitis and other complications. The purpose of this present study was to describe whether there is a relationship between ABO blood groups and periodontal diseases in a group of Indian people who have same social and economic conditions.

## MATERIAL AND METHOD

This study was conducted in the Outpatient Department of Periodontics. This study comprised of 1000 subjects (554 males, 446 females), inclusive of both sexes, aged between 18 and 65 years, selected on a random basis. Following inclusion criteria was used-

1. Subjects with at least 20 teeth.
2. Subjects should not have received periodontal treatment or antibiotic-related therapy for medical or dental reasons 3 months prior to the study.
3. Subjects with no systemic disease such as diabetes, leukemia, metabolic bone disease or epilepsy.
4. Non smokers and non-alcoholic subjects.

Subjects who met the above criteria were involved in the study after taking informed consent from them. Ethical clearance was taken from institutional ethical committee. Patients were divided into three groups based upon the clinical condition and periodontal scores. (**Table 1**)

The clinical oral examination was carried out after the subject had been interviewed on behavior and socioeconomic background. Medical and dental histories were recorded for each patient. All the clinical measurements were made on the basis of Ramfjord's Periodontal index by using a manual periodontal probe (Williams' periodontal probe) on the gingival area adjacent to the teeth in each patient. (**Table 2**) The subjects were examined clinically for the presence of plaque, gingival bleeding, probing pocket depth. Then, the subjects in all three groups were referred to the Hematology Department for determination of ABO blood subgroup.

**RESULTS**

In the present study, out of 1000 (males =554, females =446) Group I consisted of 261 patients with healthy gingiva; group II consisted of 443 patients with gingivitis; and group III consisted of 296 patients with periodontitis. (Table 3)

The results of our study concluded that the higher incidence of blood group O (52.1%) in subjects with healthy periodontium followed by blood group A (23.3%), AB (16.1%) and B (8.4%). Whereas blood group B(43.3%) showed higher incidence of

gingivitis followed by blood group A (28.8%), AB (15.1%) and O (12.6%). The incidence of periodontitis was higher in group B (50%) followed by A (26.3%), AB (15.2%) and O (8.44%). (Table 4) Results of blood samples surveyed showed that B blood group (36.5%) was most common in general population followed by blood group A (29.5%), O (17.5%) and AB (16.5%). (Table 5) 85.1% had Factor Rh positive, and 14.9% had Factor Rh negative. (Table 6)

**Table 1:** Groups based upon the clinical condition and periodontal scores

<b>Group I</b>	<b>Healthy periodontium (Clinically normal supportive tissues)</b>
<b>Group II</b>	Chronic gingivitis (simple gingivitis )
<b>Group III</b>	Chronic periodontitis (beginning, established and terminal periodontal disease)

**Table 2:** Ramfjord’s Periodontal Index

CLINICAL CONDITION	PERIODONTAL SCORES
Clinically normal supportive tissues	0.0-0.2
Simple gingivitis	0.3-0.9
Beginning of destructive periodontal disease	0.7-1.9
Established periodontal disease	1.6-5.0
Terminal disease	3.8-8.0

**Table 3:** Distribution of study sample

Group I		Group II		Group III	
No. of patients	Percent	No. of patients	Percent	No. of patients	Percent
261	26.1	443	44.3	296	29.6

**Table 4:** Distribution of ABO system in three study groups

BLOOD GROUPS	GROUP-I	GROUP-II	GROUP-III
A	61(23.3%)	128(28.8%)	78(26.3%)
B	22(8.4%)	192(43.3%)	148(50%)
AB	42(16.1%)	67(15.1%)	45(15.2%)
O	136(52.1%)	56(12.6%)	25(8.44%)

**Table 5:** Distribution of blood groups in population

BLOOD GROUPS	NUMBER OF PATIENTS	PERCENTAGE
A	295	29.5
B	365	36.5
AB	165	16.5
O	175	17.5

**Table 6:** RH factor distribution in population

RH GROUP	NUMBER OF PATIENTS	PERCENTAGE
Positive	851	85.1
Negative	149	14.9

## DISCUSSION

The design and implementation of prevalence studies for comprehensive programs and preventive purposes have always been important. Correct knowledge regarding the prevalence of a particular health condition enable proper programming for prevention and control of that disease. The paradigm of pathogenesis of periodontitis is shifting. Indeed, the periodontal diseases are now recognized to be an ecogenetic disease, which highlights their multifactorial nature. Genetic variations may act as protective or risk factors for certain conditions, including periodontitis. Epidemiological studies on the associations between ABO blood group antigens, secretor status and susceptibility to infectious agents are summarized. Periodontal diseases are considered as host-based infectious disease in which the individual host response determines the nature of disease susceptibility. Scanty literature is available to infer the association between blood groups and prevalence of periodontal diseases.

It is known that ABO blood types indicate differences in terms of their proportion according to races. 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>8</sup>. It is also known that periodontal diseases show proportional differences in distribution among races. When this point is taken into consideration, the question arises whether or not the proportion of ABO blood subgroup distribution is effective on the proportion of distribution of periodontal disease in various societies. Surprisingly, little investigation has been made to explore the ABO blood groups and the incidence of oral and dental diseases.

In dentistry, Weber and Pastern were the first to study the association of various ABO blood groups with periodontal diseases<sup>9</sup>. In the earliest investigation on this matter, Suk<sup>10</sup> suggested that particular blood groups and a tendency towards caries might be constitutional characters and they were not particularly related to race, though the O group and good teeth were less common in civilized people than in primitive races. Suk's investigation was followed by a study carried out by Aitchison and Carmichael (1962), which revealed a relationship between the patient's susceptibility to caries and his blood group<sup>5</sup>. In this study, it was determined that there was a relatively higher percentage of B blood group in patients with gingivitis and periodontitis and higher

percentage of O blood group in patients with healthy periodontium. Similar study was conducted by Kaslick et al (1971) documented that chronic gingivitis is significantly different in ABO blood grouping than the normal periodontium<sup>11</sup>. In other study Kaslick et al (1971) reported that aggressive periodontitis is associated more in blood group-B, but significantly less with blood group-O<sup>12</sup>. Similarly Kaslick et al (1980)<sup>13</sup> found that periodontitis patients were more likely to have A or B blood groups. Ali S T (2009)<sup>14</sup> found significant relationships between ABO blood type and the severity of chronic periodontitis. Patients with group B were found to be at greater risk of developing more severe form of periodontitis.

Another study conducted by Al-Ghamdi AST (2009)<sup>14</sup> stated that there were significant differences between subjects with or without periodontal diseases regarding ABO blood group. Recently Arati et al (2010)<sup>15</sup> conducted a study on 1220 subjects and reported that Blood group A showed a significantly higher percentage in the gingivitis group and blood group O showed a higher percentage in the periodontitis group. Whereas the blood group AB showed the least percentage of periodontal diseases. A C Koregol(2010)<sup>16</sup> found that individuals with blood group O have greater severity of periodontal disease, whereas individuals with blood group A have greater resistance to periodontal diseases. The result of our study is also corresponds to similar study conducted by Singh M P et al (2011)<sup>17</sup> on north Indian population.

The influence of ABO blood types on the risk of developing oral diseases has been the subject of discussion. Some authors claimed that, ABO blood types constituted an increased risk for the development of oral diseases whereas a small group of researchers failed to find this increased risk. Above mentioned studies provided preliminary data concerning the associations between ABO blood groups and periodontal diseases.

## CONCLUSION

The genetic factors may alter oral ecology and the process of periodontal diseases. Genetic differences in immune cell development and antigen presentation may contribute to the susceptibility to infectious diseases. The Author concluded that the higher incidence of blood group O in subjects with healthy periodontium. The higher incidence of blood group B in group II and group III indicate that these subjects

may be more prone to periodontitis. These data are suggestive of a correlation between periodontal diseases and blood groups, which may act as risk predictors for periodontal diseases. However, long-term studies on large sample size are needed to make a more comprehensive assessment of the effects of ABO group on periodontal diseases.

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