

EVALUATION OF ASSOCIATION BETWEEN HUMAN ABO BLOOD GROUPS AND PERIODONTAL DISEASES.

Periodontology

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ABSTRACT

Objective: There have been various studies suggesting relationship between ABO blood groups and different systemic diseases. However, there is scarcity of literature available in assessing the association of blood group phenotypes to periodontal diseases.

KEYWORDS

ABO Blood Group, Periodontal Diseases, Gingivitis

INTRODUCTION

Periodontal disease is a chronic immune-inflammatory response associated which results in destruction of soft and hard tissues of the periodontium. The extent of disease is predicted to be controlled by the quality and quantity of the host response that is modulated by systemic disease. Although bacterial plaque is the main etiology of periodontal disease, the progression and severity of disease may be related to environmental influences, host-related risk factors such as diabetes and genetic predisposition.^[1,2] Periodontitis may influence the occurrence, severity of systemic conditions and diseases that share common risk factors. 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.^[3,4,5,6] They act individually in an additive fashion or synergistically to contribute to periodontal disease.

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 ABO system and the Rh system are the most commonly used blood grouping systems. The antigens of the ABO system are an integral part of the red cell membrane. The presence or absence of certain antigens has been associated with various diseases and anomalies, with antigens also acting as receptors for infectious agents.^[7]

The relative liability of some blood group phenotypes to certain diseases has been investigated. Blood group A individuals have been reported to be more susceptible to gall stones, colitis and tumors of salivary glands, pancreas as well as ovary. Cardiovascular diseases are more common in blood groups A, O and non-O. Diabetes mellitus might be higher in subjects of blood groups A and O. For several decades, the ABO groups have been suspected of contributing to infertility and fetal loss, but reports have often been conflicting and speculative. This has resulted in a large accumulation of literature and a high degree of controversy.^[3,4,5,6]

A plethora of studies have been conducted in the field of medicine. Surprisingly, very few researches have been conducted to determine the relation between ABO blood group and periodontal diseases.^[1,8,9] Some researchers claimed that there was a relation whereas some others could not find any, which could be attributed to the geographical diversity in the population groups.^[10,11]

Knowledge of the ABO blood groups of patients and their association, if any, with the severity of periodontal disease may be important in the development of early treatment strategies, and it would help to target non-responding areas to periodontal therapy of highly susceptible individuals.

The aim of this study was to investigate the association, if any, between ABO blood group and the periodontal disease.

MATERIALS AND METHODS:

The study was conducted in Government Dental College & Hospital, Jamnagar. 350 patients were included in the study based on convenience sampling, age ranging from 20 to 59 years. The design of the study was cross-sectional study.

The patients were enrolled in the study according to the following inclusion & exclusion criteria:

Materials & Methods:

The study was carried out among 350 patients who reported to dental hospital for any reason regarding dental health and related treatment. Data was obtained from patients about their demographic details, medical history, dental history and oral hygiene measures. Periodontal assessment was done. The patients were divided into three groups according to their Community Periodontal Scores (CPI) as Healthy gingival group (CPI score 0), Gingivitis group (CPI score 1 & 2) & Periodontitis group (CPI score 3 & 4). The blood samples were analysed for determination of ABO blood group and Rh factor.

Inclusion Criteria

- Age: 20 to 59 years.
- The patients with at least 20 teeth, excluding 3rd molars.

Exclusion criteria

- Patients suffering from any diseases such as diabetes, leukaemia, metabolic bone diseases, epilepsy etc that could aggravate periodontal manifestations,
- Patients having any adverse habits such as smoking, alcohol consumption etc
- Patients with any previous history of antibiotics and periodontal treatment within 6 months prior to examination

An informed consent for participation in the study was obtained from the participants. An ethical clearance was obtained from institutional review board.

Prior to the periodontal examination the following three groups were defined with regards to periodontal status: Healthy gingival group: CPI score 0. Gingivitis group: CPI score 1 & 2. Periodontitis group: CPI score 3 & 4.

Patients for healthy gingival group were randomly selected from patients who visited the department with reasons other than periodontal diseases, such as orthodontic purpose and dental caries. Prior to initiating this study, information regarding mouth cleansing habits, systemic history, gingival and periodontal status along with routine clinical details were recorded. Clinical examination was done with a Community Periodontal Index (CPI) probe (Hu-Freidly), with a 0.5 mm ball tip, with a black band between 3.5 and 5.5 mm.^[12] The venous blood samples will be collected from each patient and analysed for determination of ABO blood group and Rh factor.

Blood examination:

The venous blood samples were collected from each patient using sterile needle and finger prick method. The blood grouping was done using slide agglutination method (visual method). In this method, a drop of donor blood was mixed with anti-A, anti-B and anti-D separately on a glass slide. The agglutination was visually observed from which the ABO and Rhesus (Rh) type of blood group was determined for each patient. This test was less time consuming and inexpensive as it requires only a small volume of blood typing reagents^[13]

Statistical Analysis

All the data was entered into Microsoft Excel Sheet and then statistical analysis was done by using SPSS software. Chi- Square test was used to find correlation between secretor status and periodontal disease. In this study P-value less than 0.05 was considered significant.

RESULTS

A total of 350 patients (184 females and 166 males) were examined, of which 69 were healthy, 139 were with gingivitis and 142 were with periodontitis (Fig. 1). Characteristics of the study population were shown in Table 1. It depicts that 36.3% of the study samples were of blood group B, followed by O (30%), A (20.6%), and AB (13.1%). In addition, approx. 90% of patients were Rh-positive. Distribution of ABO blood group among study population is shown in Fig. 2.

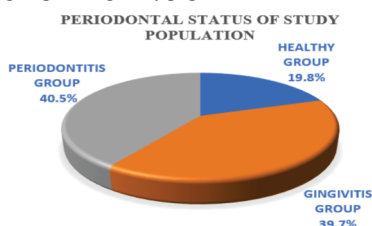


Fig. 1: Periodontal status of study population

Characteristics	Variables	N(Subjects)	%
Gender	Male	166	47
	Female	184	53
ABO blood group	A	72	20.6
	B	127	36.3
	AB	46	13.1
	O	105	30
Rh factor	Rh positive	305	87.1
	Rh negative	45	12.9
Periodontal status	Healthy	69	19.8
	Gingivitis	139	39.7
	Periodontitis	142	40.5

DISTRIBUTION OF ABO BLOOD GROUP AMONG STUDY POPULATION

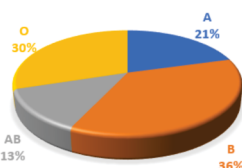


Fig. 2: Distribution of ABO blood group among study population

Table 2 depicts the distribution of ABO blood group among gingivitis, periodontitis, and healthy patients. A relatively higher percentage i.e., 68.6% of 'O' group patients were found in periodontitis group and 68.1% of 'A' blood group patients were found in gingivitis group. 'AB' blood group patients i.e., 47.8% were found in healthy gingiva. These results were statistically significant ($p < 0.05$).

	Healthy CPI 0	Gingivitis CPI 1 & 2	Periodontitis CPI 3 & 4	N
A	9 (12.5%)	49 (68.1%)	14 (19.4%)	72 (20.6%)
B	28 (22%)	56 (44.1%)	43 (33.9%)	127 (36.3%)
AB	22 (47.8%)	11 (23.9%)	13 (28.3%)	46 (13.1%)
O	10 (9.5%)	23 (21.9%)	72 (68.6%)	105 (30%)
TOTAL	69	139	142	350

Chi square – 84.01, p value- 0.0001

Table 3 depicts the distribution of Rh factor among gingivitis, periodontitis, and healthy subjects. In the study, 87% of the patients were Rh-positive & 13% were Rh-negative. Among the Rh-positive individuals, 40.3% had gingivitis, 39.7% had periodontitis & 20% were healthy. These results were not statistically significant.

	Healthy CPI 0	Gingivitis CPI 1 & 2	Periodontitis CPI 3 & 4	N
Rh positive	61 (20%)	123 (40.3%)	121 (39.7%)	305 (87.1%)
Rh negative	8 (17.8%)	16 (35.5%)	21 (46.7%)	45 (12.9%)
Total	69	139	142	350

Chi square – 0.796, p value- 0.67

DISCUSSION

The present study was carried out to evaluate the relationship between ABO blood group and periodontal disease. Periodontal diseases, including gingivitis & periodontitis, are immune- inflammatory diseases with multifactorial nature. The main cause of periodontal diseases is the bacterial dental plaque. However, with the advances in research, along with local & environmental factors, certain genetic factors play a role in the disease occurrence & progression.^[7] Thus, the present study aimed at determining genetic susceptibility of individuals towards periodontal disease.

The distribution of ABO blood group shows marked variation around the world. Some variation may even occur in 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. In this study, it was found that the most common blood group was B (36.3% of the total sample) and the lowest was AB (13.1%). 20.6% were of group A and 30% were of group O.

Possible proposed mechanisms related to the effects of ABO blood antigens in emerging risk of periodontal disease are included as follows:

Al Ghamdi pointed out that the secretion of the ABO antigens into the saliva probably inhibits the ability of bacteria to attach to teeth surfaces this is because many of these bacteria have surface lectins, which they use to attach to body surface and are often ABO specific.^[8]

Singh demonstrated that the antigens of ABO system also acting as receptors for infectious agents.^[14]

Furthermore, Demir found that various ABO blood groups might show differences in significant rates in the colonization number of bacteria that are the main etiologic agents of periodontal disease.^[15]

Some studies have been done to show association between blood group and periodontal diseases. There are some studies which reported

association between the two, and some reported no relation. In accordance with our findings, Koregol concluded that blood group A had a significantly higher frequency in patients with gingivitis.^[9]

Ghalyani in an epidemiological study from Iran reported that gingivitis was more frequent in blood group B (39%), which was followed by AB (35%), O (33%), and A (31%).^[16] Singh also demonstrated that blood group B (43.6%) had a higher incidence of gingivitis followed by A (26.5%), O (15.4%), and AB (12.4%).^[14] In addition, Pai showed a relatively high percentage of blood group B and A in moderate/severe gingivitis, while the distribution percentage of blood group O and AB was more in healthy/mild gingivitis.^[1]

In our study, blood group O had the highest frequency (68.6%) in patients with periodontitis. The same results have been reported in some previous studies.^[7,8] In contrast, some authors did not find any relationship between periodontal disease and types of blood groups.^[17,18]

CONCLUSION

This broad correlation between ABO blood group and periodontal disease points toward susceptibility of subjects with certain blood groups to periodontal disease. It is difficult to elaborate a hypothesis on why subjects with certain type of blood group are found in higher frequency in healthy, gingivitis, and periodontitis groups, and also in many grades of periodontal involvement. However, occurrence of gingivitis and periodontitis is the result of many factors and the probable genetic factor demonstrates a small facet of multifactorial etiology of this disease. Also most of these studies are carried out on a small group of participants.

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