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ABO blood group phenotypes and dental disorders-Is there any relation? A cross sectional study in Haridwar, Uttarakhand, India

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Original Article

Abstract

BACKGROUND AND AIM: Research has focused on relating ABO blood group systems and different systemic disorders in recent years. Studies showing relation between dental disorders and ABO blood groups, to date, are limited. The current study was undertaken to explore whether blood group affects dental diseases, especially dental caries.

METHODS: 346 patients who attended the Dental Clinic and Research Center, Patanjali Ayurved Hospital, Haridwar, India, were randomly selected for the study. Patients who showed their blood group test performed in a registered pathological laboratory or in our pathobiology laboratory were included in the study. Dental caries were recorded based on the Decayed, Missing, and Filled Teeth (DMFT) index issued by the World Health Organization (WHO).

RESULTS: The prevalence of caries among the adults and older people was within 100% both in Yerevan and its regions. The most common dental disorder was dental caries among all blood groups. Dental caries were more prevalent in blood group B, followed by O, A, and AB. No significant correlation was found between the DMFT index score and blood groups.

CONCLUSION: Further studies are required on a larger population to conclude any correlation between the ABO blood group phenotypes and dental disorders.

KEYWORDS: Dental Caries; Dental Attrition; Dental Disease; ABO Blood Group System

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Oral diseases pose a major public health burden worldwide.[1] Dental caries are one of the most prevalent oral diseases which occur due to demineralization of enamel.[2] Likewise, periodontitis is the main cause of tooth loss, which occurs due to inflammatory disruption of periodontal tissues.[3] Additionally, periodontium is also damaged due to the persistent movement of the mobile tooth in oral function, which further accelerates the disease progression implying tooth loss.[4] Food consistency and muscle strength affect occlusal attrition (OA), while the interproximal attrition results from the adjacent teeth differential movement.[5,6] The amount of attrition varies with age, gender, and type of tooth and depends on the tooth's position in size and morphology in the jaw.[7,8] Abrasion is a pathological process that occurs due to abrasive substances on the tooth surface or any item found continually on the

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teeth or between them.[9,10]

The ABO system was first discovered by Landsteiner and Weiner[11] and had 4 different blood types: O, A, B, and AB. Blood group O erythrocytes do not possess any antigen, but O-serum possesses antibodies to A and B antigens. Erythrocytes of blood groups A and B bear the A and B antigens respectively and make antibodies to the other groups. Type AB erythrocytes have both A and B antigens and do not make antibodies.[12,13] Interestingly, numerous researchers have reported that the blood group variation occurs in different areas and races.[14,15]

For years, scientists have been engrossed in finding the relationship between blood type and well-being. Recent research has provided major advances, indicating a strong relationship between different blood types and diseases varying from infertility to diabetes mellitus (DM). A correlation has been observed between the blood group type and various diseases like dental caries, salivary gland tumors, chickenpox, malaria, oral carcinoma, hematological cancer, cardiac diseases, and cholera. Individuals gallstones, colitis, and tumors of the pancreas as well as ovary, coronary artery disease (CAD), DM.[16-27]

A limited amount of work has been reported in the field of dental research except for few reports on periodontal diseases,[12,16,28-32] dental caries, and salivary gland tumors. Therefore, the present study was carried out with the aim to find any relation between the ABO blood group phenotypes and dental disorders.

Methods

Ethical approval and consent: Approval for the study was obtained from the Institutional Ethics Committee, Haridwar, India. Data were collected from the patients who visited the Dental Clinic and Research Centre, Patanjali Ayurved Hospital, Haridwar. The patients were also informed about the method and purpose of the study and consent was obtained from them. They were instructed to submit their blood group record from certified laboratories.

Inclusion criteria: The study subjects with at least 20 teeth were included. Patients aged between 20 to 60 years, both males and females, participated in the study. Patients who submitted their blood group certificate were selected for the study.

Exclusion criteria: Individuals who refused to give consent for the study, those with uncooperative behavior, and pregnant woman were excluded from the study.

Data collection: A total of 346 patients suffering from oral disorders were included in the study. Oral examination was carried out, and the interview was conducted on behavior and socioeconomic background. The data was collected using oral health examination card, designed by the Dental Research Centre, Haridwar, based on the guidelines provided by the World Health Organization (WHO). Oral health of the patients was assessed while they were sitting on a dental chair using a mouth mirror, a standard WHO probe, and adequate illumination (WHO, 1997). The DMFT index was recorded according to the WHO guidelines. Qualified dentists diagnosed oral disorders of the subjects through visual clinical examination.

The chi-square test was performed using SPSS software (version 20, IBM Corporation, Armonk, NY, USA). Descriptive statistics were carried out to calculate the mean and standard deviation (SD). The analysis of variance (ANOVA) test was performed for dental caries (DMFT score) to show its relation with the ABO group.

Results

239 (69%) and 107 (31%) of the study participants were respectively men and women with a mean age of 38.00 ± 13.74 years. Among the subjects, the most prevalent blood group was B (39%), followed by O (36%), A (17%), and AB (8%) (Figure 1). Dental caries were the most common dental disorder among the subjects (Figure 2 and Table 1).

Table 1. Distribution of different dental disorders among the blood groups

Dental disorders	Blood group A (n = 59)	Blood group AB (n = 29)	Blood group B (n = 133)	Blood group O (n = 125)
	n (%)	n (%)	n (%)	n (%)
Dental caries	34 (57.63)	20 (68.97)	85 (63.91)	79 (63.20)
Missing teeth	23 (38.98)	10 (34.48)	56 (42.11)	40 (32.00)
Filled teeth	17 (28.81)	6 (20.69)	37 (27.82)	37 (29.60)
Mobile teeth	5 (8.47)	11 (37.93)	9 (6.77)	3 (10.40)
Impacted teeth	3 (5.08)	0 (0)	11 (8.27)	13 (5.60)
Cervical abrasion	8 (13.56)	3 (10.34)	14 (10.53)	7 (18.40)
Attrition	1 (1.69)	1 (3.45)	15 (11.28)	23 (16.00)

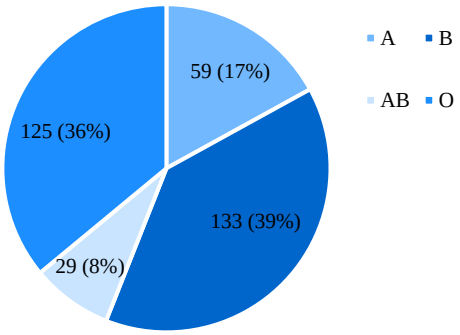

Figure 1. Distribution of blood groups among the subjects

Out of the 346 individuals, 336 had dental caries decayed, missing, or filled components. There was no statistically significant difference among different blood groups in relation to the DMFT score (Table 2).

Table 2. Dental caries [Decayed, Missing, and Filled Teeth (DMFT) index] associated with blood groups

Blood group	n	DMFT (Mean ± SD)	P (ANOVA)
Blood group A	57	2.91 ± 2.30	0.97 (NS)
Blood group AB	28	2.92 ± 2.90	
Blood group B	129	2.99 ± 2.60	
Blood group O	122	3.10 ± 2.40	
Total	336	3.01 ± 2.80	

P value < 0.05 was considered as statistically significant.
NS: Not Significant; DMFT: Decayed, Missing, and Filled Teeth; ANOVA: Analysis of variance

Discussion

For a long time, dental caries have been the most prevalent disease in the history of dentistry. The major etiological factors for dental caries are plaque, dietary factors, and oral hygiene; however, the role of genetics, e.g. blood groups, cannot be ruled out. The ABO blood group has a major role in blood transfusion process, organ transplantation procedures, and in many gastric and physiological processes.[12,33] Similarly, a study[34] elaborated the relation between the ABO blood group and their propensity to chronic disease. Later on, a number of trials were performed to establish the relationship of the ABO blood group with various diseases; however, only a few of them are related to dental diseases. Most of these dental diseases are periodontal or dental caries; interestingly, there is no consistency in the reports on dental disease.[12,35] This inconsistency of the results was maybe due to the region or the population to which they belong.[29,36]

In the present study, no significant correlation was found between the ABO blood group and dental caries, which is similar to the findings of other studies.[34,37,38]

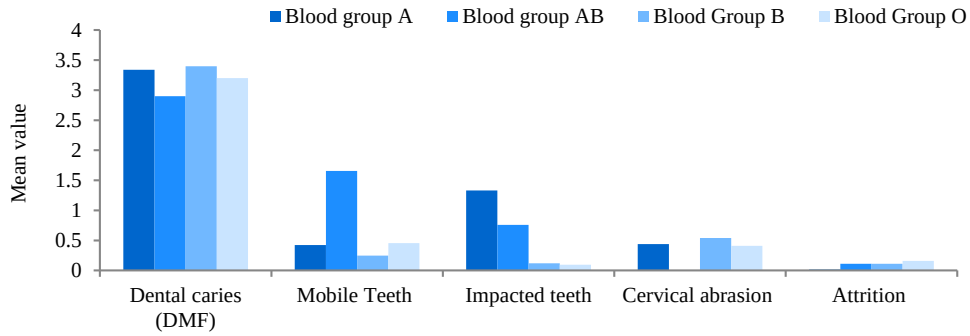

Figure 2. Distribution of dental disorders among the blood groups

Dental caries were more prevalent among individuals with blood group B. Similarly, we also observed that the AB group is more prevalent than the other groups, followed by B, A, and O in other dental diseases like mobile teeth. In the case of impacted teeth, the most prevalent group is O, followed by B and A; however, in our study, none of the AB group patients had impacted teeth.

In a study,[39] the DMFT score was more in the A and B blood groups, followed by the AB group, with the least score being in the individuals with O blood type. However, in our study, blood group B was the most prevalent, followed by O, A, and AB blood groups, which contradicts the result of the above study. The association of blood group phenotypes with dental caries (DMFT score) can be elaborated by the secretion of blood group substance in saliva, which may aggregate the microorganisms, and subsequently moving out them from the oral cavity. It is suggested that the release of ABO antigens into saliva may hamper microbes' capability to bind with tooth surface as lectins being ABO specific, which they use for binding. In one of the studies, no association between the DMFT scores and the ABO and MN system was observed.[34,40] In contrast, Roark and Leyschon[41] observed a significant association between the MN blood group and dental caries. In another study, the lowest and highest mean values of the DMFT index were in blood groups B and AB as 3.9 and 4.9, respectively;[38] however, no difference was observed between them (P = 0.09). These results further strengthen our view that though the ABO blood group was proven crucial in correlation with various diseases, it can still not be correlated with dental diseases like dental caries in a small number of patients. Large multicentric epidemiological trials are required to find out the correlation between the ABO group and dental disease, especially in the case of dental caries.

As our results reflect findings on patients from dental health care center from a specific region, these should be interpreted cautiously. The limited and specific type of the study population was one of the limitations of the study. Geographical, racial, and ethnic diversity can affect these findings. In addition, the Rhesus (Rh) factor could not be considered. Salivary factors were also not taken into account.

Conclusion

Dental caries were more prevalent in blood group B, followed by O, A, and AB. Mobility of teeth was higher in the AB blood group. Individuals with blood group O had more number of impacted teeth. No statistically significant correlation was found between ABO blood groups and dental caries.

Conflict of Interests

Authors have no conflict of interest.

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