

Association of Dental Caries with Different ABO Blood Groups

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Abstract

BACKGROUND: ABO blood type affects general and oral health, as salivary physiochemical features are different among various blood kinds. Thus, these may affect the dental caries severity. This work studied the caries experience prevalence in individuals displaying various blood types. This work tested the association between ABO blood group and dental caries. Also, this work evaluated which ABO groups are associated with a higher vulnerability to dental caries.

MATERIALS AND METHODS: Sixty Tikrit University students were randomly selected and were put into four groups based on blood type, and dental caries experience was diagnosed and scored based on the index of Decay Missing Filling Teeth and Surfaces (WHO, 2013). This index scores caries lesions by severity.

RESULTS: The blood type O was the most frequent (37%), followed by B, A, and AB types. Caries experience (DMFS and DMFT) was statistically significantly higher among the B blood group ($P < 0.05$).

CONCLUSION: ABO blood group was associated with dental caries disease.

KEYWORDS: Dental caries; ABO blood group; correlation; Tikrit; Oral health; DMFS

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Introduction

Dental caries (tooth decay) is a common human chronic disease, if not treated, it will destroy the teeth [1].

Dental plaque, oral hygiene and diet rich in sugars are significant etiological factors, and other causes as inherited factors, including blood groups, may play a role [2]. ABO blood type is the commonest system for clinical decisions, such as blood transfusion and tissue

histocompatibility for grafting of tissue and organ transplants. This system includes A, B, AB, and O [3-5]. The O group is known as universal donor, with no antigen, while having A and B antibodies. The AB group does not have antibodies but A and B antigens, so it is known as the universal recipient. The Rhesus factor (Rh) is usually measured along the ABO system. It depends on red blood cell surface proteins [6]. Antigens A and B appear on the erythrocyte cell

membranes and the antibodies of the plasma [7].

The ABO system distribution is complex universally [8]. Some differences could appear in various areas in a small country [9]. Although the amount of work that was done for several areas of medicine, ABO blood types and oral diseases have been less studied [10]. Also, the investigation of dental caries' relationship with ABO blood group and salivary secretor status has been a lonesome field. Yet, some scholars

reported low dental caries in secretors' group than those of nonsecretors [11,12]. Chung et.al. in 1965, reported that salivary secretor status and caries score are not related [13]. Mazumdar et.al. in 2014 found no significant difference in blood group distributions by dental caries experience [14]. Previous studies in Iraqi [15,16] showed that the O blood type is the most frequent, followed by B and A, and then the less frequent AB type.

Blood groups have been employed as genetic markers to investigate the links between certain blood types and certain disorders [17,18]. Despite being previously referred to as red cell antigens, these biological processes have nothing to do with red blood cells. It is the antigens on the exterior erythrocyte carbohydrate coating (glycocalyx) that determine whether germs, parasites, and immunological proteins and variation in ABO blood types are recognized and attacked [19-23]. Different ABO blood types appear in different populations, suggesting that some blood types benefit from natural selection in the form of resistance to infectious diseases [24]. Aitchison and Carmichael were the first to study the distribution of blood groups of randomly selected patients in a dental hospital and people with rampant caries showing that those with O blood suffered more from dental caries and people with the A type were the least affected [25]. In

addition, O'Rark and Lyschon reported a statistical significant difference in the distribution of the blood category in relation to caries experience [26]. In contrast, Janghorbani showed that dental caries was less prevalent among 427 soldiers in Kerman whose ages were 19 years and had the B blood had the lowest DMF index, whereas soldiers with the AB type had the highest [27]. In addition, the secretors of A had the fewest cavities [28]. Yet, Barros and Witkop studying Chileans reported no association between the DMFS scores and ABO groups [29]. Here, we generated data on the association between dental caries experience and ABO blood types in Iraqis, which are historically a population less studied.

Material and Methods

Sixty students in good health from the Dentistry college, University of Tikrit participated in the study. They had their blood type determined and received an oral exam. We obtained informed consent from the participants before collecting any data. The participant's age ranged from 18 to 28 years and 22 were males and 38 were females. Oral test was conducted in standardized circumstances based on the usual methods of oral health surveys (WHO, 2013) [30].

Oral health examination was performed in an appropriate chair by portable lamps for artificial illumination. Sterile disposable mouth

mirrors and sterilized dental probe for visual examination of the incisal, occlusal, buccal and lingual caries on the surfaces was used. DMFT and DMFS indexes were used to measure caries experience in permanent teeth.

Determination of blood types was done by agglutination, which is a method that collects distinct particles like red blood cells into masses. Determination of blood types was performed at a private laboratory. Blood samples were obtained with a punch in the tip of the thumb with lancet needles. Three drops of blood were set in a clean glass slide and antiserum A, B, and D were sequentially added to one drop each. Antisera were mixed with blood with the tip of toothpicks and let them stand for 2 to 3 minutes noting the result according to the clump formation.

Results

Blood group distribution for the sample was 23 participants with type O, 13 with type A, and 12 B and AB each.

Caries experience (DMFS) mean value per blood group was reported in Table 1. Individuals type B showed the highest mean DMFS value (14.5; $p < 0.05$).

Table 1: Caries experience among different blood groups.

Blood group	Mean DMFS	Mean DMFT
Group A	7.67	4.74
Group B	14.5	6.44
Group AB	8.75	5.42
Group O	10.1	5.62
p-value	0.04	0.39

Discussion

The association between blood types and systemic disorders such as diabetes mellitus, cancer, genetic disease, skin disease, cardiovascular disease, and dental caries has been the subject of several studies [31-34]. Here we found that individuals with ABO blood type B had the highest caries experience. Evidence suggests that blood groups are critical in the ability or resistance to differentiating the infectious and non-infectious diseases [35,36]. Distribution of blood types in the study group with O most prevalent is similar to other geographic areas [37] and contrasted to others as expected [38,39].

Individuals with the blood type A had significantly lower DMFS values than those with blood type B and this agrees with a past study that showed DMF index was the lowest in A type and the highest in B [39]. Other study, however, found that individuals of blood group B had the lowest numbers of cavities [40]. This discrepancy is perhaps because of

differences in sample size and measuring methods of dental caries, aside from geographical, racial, and ethnic differences in blood type distributions. In conclusion, blood type A appears to protect against dental caries.

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