



Is Life time caries experience related with Blood group?

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Abstract:

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Introduction: Dental caries has a high prevalence worldwide. Its etiology is complex and multi factorial; however the question of a possible true genetic predisposition toward dental caries has piqued the minds of dental investigators for decades. Blood group remains stagnant for all individuals throughout their life.

Aims: To assess the relation of blood group with life time caries experience.

Material and Methods: A descriptive, cross-sectional study was conducted among 233 dental students of Mahesana District, Gujarat, India. Dental caries of students was recorded by using DMFT index. To identify the blood group of study subjects, a drop blood of each subject was placed on a slide and mixed with anti-A, anti-B, and anti-Rh sera.

Results: Out of 233 students, 35.6% were having life time caries experience. Majority of the students were having blood group B, among these 33.7% were having life time caries experience. Significant difference was found between Rh factor and life time caries experience. Statistically analysis performed using SPSS 16.0 version. Pearson chi-square test and contingency coefficient test were used. Level of significance was set at $P \leq 0.05$.

Conclusions: Use of blood group to assess the life time caries experience is still an inexact science at the present time. Further extensive research in this field has to be done in order to determine and evaluate the significance of this variation.

Key-words: Blood group, Life time caries experience, DMFT index, Dental caries

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Introduction: Human identification is the recognition of an individual based on some physical characteristics of the individual. It involves some normal or abnormal

characteristics that define an individual. ^[1]The most important blood-typing system, the ABO blood group, is the determinant for transfusion reactions and organ



transplantation. Unlike the other blood-typing systems, the ABO blood type system has significance beyond transfusion and transplantation, as, for example, it determines many of the digestive and immunological characteristics of the body. [2] Blood group system was discovered in 1901 by Karl Landsteiner. So, for 19 major groups have been identified which vary in their frequency of distribution amongst various races of mankind. Clinically, only 'ABO' and 'Rhesus' groups are of major importance. 'ABO' system is further classified as A, B, AB, O blood group types according to presence of corresponding antigen in plasma. 'Rhesus' system is classified into 'Rh +ve' and 'Rh -ve' according to the presence or absence of 'D' antigen. [3] Blood group O erythrocytes have no true antigen, but blood serum of O-type individuals carries antibodies to both A and B antigens. Type A and B erythrocytes carry the A and B antigens, respectively, and make antibodies to the others. Type AB erythrocytes do not manufacture antibodies to other blood types because they have both A and B antigens. [3, 4] Anthropologists have used the ABO blood types as a guide to the development of modern humans. Many diseases, particularly digestive disorders, cancer, and infection, show preferences among the ABO blood types. [4-6]

In Contrast to any other oral disease like periodontal disease, Dental caries has a high prevalence worldwide. Its etiology is complex and multi factorial; however the question of a possible true genetic predisposition toward dental caries has piqued the minds of dental investigators for decades. [7, 8]

Dental caries remain the most common problem in dentistry. Dental plaque, dietary factors, oral hygiene are presumed to be major etiological factors, so most of the studies have an emphasis on these factors only, but the genetic factor is one of the major factor which is inherited from the birth, for example, blood groups. Every individual has their own blood group similar with caries index. ABO blood group is the most important blood-typing system because this system has

significance beyond transfusion and transplantation as it determines many of digestive and immunological characteristics of the body. [9]

No relation present between blood group and life time caries experience is the null hypothesis of the study. Presence of relation between blood group and life time caries experience is the alternative hypothesis for the present study. Research question is "Is Life time caries experience based on Blood group?" The study was undertaken to assess the relation of blood group with life time caries experience among dental students of Mahesana District, Gujarat, India

Materials & Methods: A study was conducted among 233 dental students of Mahesana district of Gujarat state during the month of May to July, 2015. Ethical clearance was obtained from the ethical committee. Written informed consent was obtained from all the study subjects. A single calibrated trained interviewer described the purpose and process of the study to the participants and recorded blood group and DMFT index. [10] The examination was done on a dental chair in the dental college of Mahesana district.

Inclusion and exclusion criteria

Subjects with syndromes, inflammatory disease, trauma, malformation, injury, deformity of TMJ were excluded from the study. Subjects with mayo-facial pain dysfunction syndrome and Oral sub-mucous fibrosis were also excluded. Rests of the students were included in the study.

Study materials

1. Mouth mirror
2. WHO probe
3. Slides
4. needle
5. Anti-A sera, anti-B sera, anti-Rh sera and slides for ABO blood group testing.

Techniques: The blood group of the subjects were identified by placing a drop of blood on the slide and treated with anti-A, anti-B, and then on anti-Rh sera. Positive agglutination of the blood on treating with anti-A is considered as blood group A, positive reaction with anti-B is considered as blood group B, if no agglutination is produced then the blood



group is O and if agglutination is seen with both antisera then blood group AB is considered. Similarly positive agglutination reaction with Rh antigen is considered Rh+VE or otherwise Rh-VE.

Dental caries was recorded by using WHO probe and mirror on dental chair in the dental college. Life time caries experience of students was measured by using DMFT index modification by WHO (1987).^[10]

Statistical analysis: The collected data was tabulated using Excel 2007 and analysis performed using SPSS 20.0 version. Pearson chi-square test and contingency coefficient test were used. Level of significance was set at $P \leq 0.05$.

Results: Total of 233 dental students were included in the study out of which 50 males (21.45%) & 183 (78.54%) females. The mean age of subjects was 19.60 ± 1.54 years.

Majority of the study subjects (83) were having blood group B. In which 33.7% were having life time caries experience. Statistically, no significant difference was found between blood group ABO and life time caries experience. ($P > 0.05$) (Table 1)

Out of 233 subjects, 215 were having Rh +VE blood group. Subjects with Rh -VE blood group was having more life time caries experience than subjects with Rh +VE blood group. Statistically, significant difference was found between Rh factor and life time caries experience. ($P \leq 0.05$) (Table 2)

Majority of the study subjects (81) were having blood group O +VE (33.3% with life time caries experience) and B +VE (35.8% with life time caries experience). In which 33.7% were having life time caries experience. Statistically, no significant difference was found between blood group ABO and life time caries experience. ($P > 0.05$) (Table 3)

Table 1: Distribution of study subjects based on ABO blood group and life time caries experience

Blood group	Life time Caries experience	No caries experience	Total
A	11 (32.4%)	23 (67.6%)	34
B	28 (33.7%)	55 (66.3%)	83
AB	11 (40.7%)	16 (59.3%)	27
O	33 (37.1%)	56 (62.9%)	27
Total	83 (35.6%)	150 (64.4%)	233
P > 0.05, Non-Significant			

Level of significant $P \leq 0.05$

Table 2: Distribution of study subjects based on Rh factor and life time caries experience

Blood group	Life time Caries experience	No caries experience	Total
+VE (%)	73 (34.0%)	142 (66.0%)	215
-VE (%)	10 (55.6%)	8 (44.4%)	18
Total (%)	83 (35.6%)	150 (64.4%)	233
P ≤ 0.05, Significant			

Level of significant $P \leq 0.05$

Table 3: Distribution of study subjects based on ABO blood group with Rh factor and life time caries experience

Blood group	Life time Caries experience	No caries experience	Total
A +VE (%)	9 (29.0%)	22 (71.0%)	31
A -VE (%)	2 (66.7%)	1 (33.3%)	3
B +VE (%)	27 (33.3%)	54 (66.7%)	81
B -VE (%)	1 (50.0%)	1(50.0%)	2
AB +VE (%)	8 (36.4%)	14 (63.6%)	22
AB -VE (%)	3 (60.0%)	2 (40.0%)	5
O +VE (%)	29 (35.8%)	52 (64.2%)	81



O -VE (%)	4 (50.0%)	4 (50.0%)	8
Total (%)	83 (35.6%)	150 (64.4%)	233
P > 0.05, Non-Significant			

Level of significant P ≤ 0.0

Discussion: The study was undertaken to assess the relation of blood group with life time caries experience among 233 dental students of Mahesana District, Gujarat, India. Many authors were conducted studies to assess the relation of blood group with oral cancers and periodontal diseases, while very less number of the authors conducted studies on the relation of blood group with dental caries.

The study done on oral cancer clearly demonstrated that people having blood group A were found to have a greater tendency to develop oral cancer. This can be explained by the fact that blood group antigens, in addition to being present on red blood cell membranes are also found on epithelial cells of various other tissues, including the oral mucosa. The relative down regulation of glycosyltransferase that is involved in the biosynthesis of A and B antigens is seen in association with tumor development. [11]The partial or complete deletion of epithelial blood group antigens due to aberrations in their synthesis brings about changes in their cell surface. It has been indicated that the altered antigen pattern on cell surface is a tumor-associated change resulting in malignancy. [12]

It has been noted that many individuals with high rates of caries have low rates of periodontal disease, and vice versa. One possible mechanism by which individuals of a specific blood group have a lower frequency of periodontal disease could be due to increased levels of antibodies against more strains of periodontitis-causing bacteria. [13-16] Limited efforts have been made to investigate the relationship between ABO blood group and periodontal disease. The majority of the researchers had claimed that different ABO blood groups constitute an increased risk for the development of periodontal and oral diseases; whereas one study failed to find such an association. [17-21]

Suk's investigation was followed by a study carried out by Aitchison and Carmichael, which revealed a relationship between the patient's susceptibility to caries and his blood group. [22]The decayed, missing, and filled teeth (DMFT) index has been widely utilized in epidemiological surveys of oral health. It is recommended by the World Health Organization (WHO) for measuring and comparing the experience of dental caries in populations. The index expresses the mean number of DMFT in individual whose DMFT index is taken. [23] In all the studies, Authors had taken mean value of DMFT index to assess the severity of caries while in our study, we had taken proportion to measure the life time caries experience from DMFT index.

ABO blood group is the most commonly used blood identification system. The other important blood system is the Rhesus (Rh) system. This system is determined by the nature of different proteins present on the surface of erythrocytes. Few studies have investigated the relationship between blood type and dental caries. Individuals of blood group A appear to have a lower incidence of caries and cavities compared with those with other blood groups; this difference is particularly marked if the Group A individuals are secretors. The secretion of ABO antigens into saliva probably inhibit the ability of bacteria to attach to the tooth surface; this is because many of these bacteria have surface lectins, which they use to attach to body surfaces and are often ABO specific. Also, non-secretors tend to have lower levels of the immunoglobulin A (IgA) antibodies in their saliva, which may compromise their ability to keep bacterial counts low. [13-17] In the present study, subjects with blood group AB had high caries experience. The result was similar to study done by Janghorbani M. [24]



Conclusions: Subjects with Rh -VE blood group was having more life time caries experience than subjects with Rh +VE blood group. Use of blood group to assess the life time caries experience is still an inexact science at the present time. Further extensive research in this field has to be done in order to determine and evaluate the significance of this variation.

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