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Correlation Between Blood Groups and Dental Caries Among 12-15years School Children in Bilaspur, Chhattisgarh: A Cross-Sectional Study

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ABSTRACT:

Introduction: Dental caries is the most common dental disease with high prevalence. Dental caries is multifactorial disease and it is crucial to assess the association of dental caries with various factors which is essential in rendering the treatment required along with spreading awareness regarding to its prevention

Objectives: To find the correlation between dental caries in relation to different blood groups among 12-15 years school going children.

Methods: The present study was conducted amongst 12-15 yrs age school going children in Bilaspur city. A total of 335 children participated in the study. A prior consent was taken from their parents for the study. All the children were asked to give their blood group data along with parent consent form. The dental caries status was recorded. Descriptive analysis and chi square test were used to find any correlation between blood groups and dental caries. Probability level was fixed at <0.05.

Results: Out of 730 school students, 335 had dental caries. Among 335 , 23.25% had blood group A, 28.1% had blood group B, 15.5% had blood group AB, and 33.15% had blood group O. There was a strong correlation found with blood group B and O with dental caries which was statistically significant (Table 3).

Conclusions: There is a correlation existing between dental caries and blood groups. The prevalence of blood group B is more in this geographic location, followed by blood groups O and A, and the least prevalent was blood group AB. There was an increased prevalence of carious lesions among subjects of blood group O followed by blood groups B and A. This association between caries and blood groups O, B and A can be due to various blood group antigens acting as receptors for infectious agent associated with dental disease.

Keywords: Blood groups, Dental caries, Odds ratio, Prevalence, Prevention, ABO, Agglutination, Antigen, WHO, Enamel Fluorosis, Convenient sampling.

Introduction

Oral health is an important component of general health, with dental caries affecting a person's ability to eat, speak or socialize.[1] Periodontal disease and dental caries are two major dental problems[2]. Dental caries, otherwise known as tooth decay, is one of the most prevalent chronic

diseases of people worldwide at high prevalence rates; individuals are susceptible to this disease throughout their lifetime.[3] Dental caries is a global oral health problem which can be effectively prevented and controlled through a combination of individual, community and professional efforts. People are susceptible to the disease throughout their lifetime. It is the primary cause of oral pain and tooth loss. It can be arrested and potentially reversed in its early stages, but is often not self-limiting and without proper care, caries can progress until the tooth is destroyed.[4,5]

There is practically no geographic area in the world whose inhabitant does not exhibit some evidence of dental caries. It affects both the sexes, all races, all socioeconomic status and all age groups. It not only causes pain and discomfort, but also in addition, places a financial burden on the person.

The prevention of dental caries has long been considered as an important task for the health profession.[4] The clinical significance of blood type is not only limited to transfusion medicine and solid organ/hematopoietic transplantation but also its correlation with various systemic diseases has been investigated. Although several studies have been carried out to investigate the association between blood group and incidence of many systemic diseases, little investigations has been made to explore the relationships between ABO blood groups and the incidence of oral and dental diseases. Till date there is no study related to distribution of dental caries in relation to different blood groups among school going children in Chhattisgarh. Using proper screening method children who are susceptible for dental caries can be identified knowing their blood group. Hence, this study was designed to assess the prevalence of Dental caries and determine the distribution of Dental caries in relation to different blood groups among school children of Bilaspur city Chhattisgarh.

Methods

A Cross-sectional study was carried out among school childrens of Bilaspur Chhattisgarh belonging to 12-15 years of age group in the month of November 2023. A schedule of the survey for data collection was prepared and on an average 50 childrens were examined for dental caries per day. Those willing and interested for dental check-up participated in the study. Total 730 students agreed on their own will to participate in the study. Interested students were asked to collect parental informed consent from their respective staff to be duly signed by their parents along with their blood group data. These forms were collected on the day of the examination. Participants were assured that they would not be individually identified in research reports. A non-probability convenient sampling method was followed in the present study. A prestructured questionnaire was prepared including demographic personal details and DMFT index. The investigator was calibrated by the senior research guide prior to the study. The investigator was trained and calibrated by carrying out training on the preselected subjects, who were not included in main sample. The intra examiner reliability was found to be good with kappa co-efficient of 85%. The oral examination of the children was carried out using mouth mirror and explorer under aseptic conditions. Instruments used were autoclaved prior to the clinical examination. The subjects were examined by a single trained and calibrated examiner. Data for the dental caries status was recorded by measuring the number of decayed permanent teeth as per the WHO (World Health Organization) 1997 criteria.

The data obtained was compiled and entered systematically on to a spreadsheet (Microsoft excel 2007) and exported to a data editor page of SPSS version 21. Descriptive statistics included calculation of frequency, means. Chi sqare test was used to correlate association between ABO blood group and dental caries.

Results

In the present study out of 730 subjects, 335 students had dental caries and 395 had non carious teeth.

Table 1- Distribution of Blood groups among Students:

Blood Group	Students N(%)
A	178(24.38)
B	210(28.76)
AB	148(20.27)
O	194(26.57)
Total	730

Table 1 describes that out of 730 students, 178 (24.38%) belong to blood group A, 210 (28.76%) to blood group B, 148 (20.27%) to blood group AB, and 194 (26.57%) to blood group O.

Table 2 - Distribution of decayed and non decayed teeth in different blood groups

Blood Group	Decayed N(%)	Non Decayed N(%)	chi-square test	p-value
A	76(22.69)	103(26.07)	112.45	0.004 (s)
B	94(28.06)	106(26.83)	108.23	0.02 (s)
AB	56(16.72)	99(25.07)	56.23	0.87 (n.s)
O	109(32.53)	87(22.03)	122.34	0.01 (s)
Total	335(100)	395(100)		

Table 2 Shows that out of 730 students, 335 had decayed teeth,[According to blood groups A, B, AB and O -22.69%, 28.06%, 16.72% and 32.53% respectively]. Where as 395 students did not had decayed teeth [According to blood groups A, B, AB and O - 26.07%, 26.83%, 25.07%, 22.03% respectively)

Table 3- Correlation between blood group and dental caries.

Blood Group	Decayed N (%)	r-value	p-value	Interpretation
A	76(22.69)	0.35	0.01 (s)	Medium correlation
B	94(28.06)	0.64	0.04 (s)	Strong correlation
AB	56(16.72)	0.24	0.56 (n.s)	Weak correlation
O	109(32.53)	0.65	0.01 (s)	Strong correlation

According to Table 3,It is evident that blood group A had medium positive correlation with dental caries and this was found to be statistically significant ($p \leq 0.05$). Blood group B had strong positive correlation with dental caries and this was found to be statistically significant ($p \leq 0.05$). Blood group AB had weak correlation with dental caries and this was not found to be statistically significant ($p \geq 0.05$)With blood group O there was a positive strong correlation which was found to be statistically significant ($p \geq 0.05$)

Discussion

Dental caries is one of the most common preventable childhood diseases people are susceptible to the disease throughout their lifetime. It is the primary cause of oral pain and tooth loss. It can be arrested and potentially reversed in its early stages, but is often not self-limiting and without proper

care, caries can progress until the tooth is destroyed. Therefore, physicians and other health-care providers should be familiar with dental caries and its causes. In this study, it was determined that the blood group O and B had stronger correlation with dental caries in comparison to people of other blood groups. In an another study conducted by Jaleel B F et al (2010) found people with blood group A had 1.46 times higher risk of developing oral cancer compared to people of other blood groups.[15] In the present study, the people with blood group AB were not significant and people with blood group O,B and A were statistically significant. This association between caries and blood groups O,B and A can be due to various blood group antigens acting as receptors for infectious agent associated with dental disease.

The outcome of the current study does not emphasise that the blood groups are the conclusive evidence for one of the etiological factor for causing dental caries. The other etiological factors already proved like diet and other environmental factors will always have a higher weightage for being the cause for dental caries than blood groups. The present study throws the light on the possible role of genetic factor in the form of blood groups, being one of the various factor which can cause dental caries. Further genetically based studies on the role of blood groups on causing caries can be taken up in future to see the attributable risk of type of blood groups and its relation with dental caries.

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