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Correlation of ABO Blood Group with Personality Trait and Dental Anxiety – An In vivo study

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Abstract

Introduction: Dental anxiety is a significant concern among children, often influencing their dental experiences. Anxiety is multifaceted and can be influenced by various factors including personality traits and genetic predispositions, such as ABO blood groups. Knowledge of personality trait and blood group can help dentists better assess dental anxiety. AIM: Correlation of ABO blood groups with individual personality traits and dental anxiety.

Methodology: 260 healthy children between the age group of 6 to 14 yrs, were selected based on their ABO group. Personality Traits were recorded using Pictorial Personality Traits Questionnaire for Children (PPTQ-C) and Dental anxiety was measured using the Chotta Bheem Chutki scale during the procedure. Data collected was subjected to statistical analysis.

Results: Children with Rh–ve blood group displayed extreme Dental Anxiety. AB-ve blood group showed Neuroticism as predominant personality trait and displayed higher levels of anxiety.

Conclusions: ABO blood group does influence personality traits and response to stress.

Keywords: ABO blood group, Dental anxiety, Personality traits.

Introduction

A significant challenge in pediatric dentistry is addressing dental anxiety and fear. This common issue often leads to children avoiding dental treatment, which in turn results in poor oral health.[1] Dental anxiety in pediatric patients has a multifactorial etiology, involving various factors. Both genetic and environmental elements contribute to the development of fear and anxiety in a dental setting.[2] The term "personality" originates from the Latin word" persona," meaning the mask worn by actors on stage. Personality is defined as the combination of an individual's traits that dictate their behavior. It represents the pattern of characteristic thoughts, feelings, and behavior that make one person distinct from another.[3] Mohamed sharif et al in 2015 showed that blood type was linked with personality traits.AF Wilson et al in1988 hypothesized that the

dopamine beta-hydroxylasegene is in tight linkage with the ABO gene onchromosome9q34.[8] The gene controlling blood type expression is linked to the genes encoding the enzymes dopamine beta-hydroxylase, catechol-O-methyl transferase and arginine succinate synthetase. These enzymes affect our neurohormonal response to environmental stress. Additionally, it has been shown that the chemical structure of dopamine is similar to that of ABO antigens.[9] Because ABO blood type is genetically determined and easily identifiable, it can serve as a biological marker.[8]

There is a lacunae of studies associating blood group with personality trait and dental anxiety. Therefore, this study aimed to assess the correlation of ABO blood group with personality trait and dental anxiety in children aged 6- to 14-year.

Materials and Methodology

260 children were divided into 8 groups based on their blood group and Rh factor. Blood group was obtained based on prior medical records. Ethical clearance was obtained from the Institutional Review Board and informed parental consent was also obtained.

Inclusion Criteria

1. Healthy children between the age group of 6 to 14 years.
2. Children with carious lesion limited to enamel on primary and permanent molars.
3. Children with prior parental consent.

Exclusion Criteria

1. Teeth indicated for extraction
2. Teeth with lesions involving the pulp
3. Patients with special health-care needs
4. Patients suffering from any systemic illness.

Children were assessed for personality traits using pictorial personality trait questioner (PPTQ-C) [10] prior to the procedure. Based on this assessment, children displayed one or more of the 5 personality traits i.e. Extraversion, Neuroticism, Openness, Conscientiousness, and Agreeableness. Dental anxiety was recorded using Chotta Bheem Chutki scale. This scale ranges from 1(Happy) to 6 (Running) [2]. Dental anxiety was assessed during the restorative procedure. Data collected were tabulated and subjected to statistical analyses using Statistical Package for Social Sciences [SPSS] for Windows Version 22.0 Released 2013. Armonk, NY: IBM Corp.

Results

Table 1, shows a statistically significant correlation between Blood groups and Dental anxiety scores. 42.7 % of children who scored 1(happy) were B +Ve. 25.5% children who scored 2 (sad) were O +ve and 20.7% and 19% of children who scored 3 (crying) were AB +ve and O +ve respectively. 42.1% of children who scored 4 (angry) and 80% of children who scored 5 (shouting) were AB-ve. 60% and 40% of children who scored 6 (running) belonged to A-ve and O-ve respectively.

Table 2 shows a statistically significant correlation between Blood groups and Personality traits. 41.1% and 37.2% of children with B +ve and A +Ve respectively displayed agreeableness. 41.7%, 37.2 % and 32% of children with A -ve, O +ve and B-ve blood groups respectively showed Extraversion. 26.7% of children with AB +Ve displayed Consciousness. 78.6% of AB-ve children displayed Neuroticism. 40% of O-ve showed Openness.

Table 3 shows 37.3% of children who scored 1 (Happy) showed Agreeableness as their personality trait. 32.7% of children who scored 2 (Sad) and 37.5% of children who scored 3 (Crying) displayed extraversion whereas 84.2% and 80% of children who scored 4 (Angry) and 5(shouting) respectively had neuroticism as their personality trait.

Discussion

A peek into an individual's personality can help in better understanding the general disposition of a person in various situations. Personality is a stable and intricate mix of traits, attitudes, interests, needs and behaviour.[3]

In 1929 Tokeji Furukawa et al linked personality trait and Blood group.[8] During the mid-1980s various countries like United States [5], Korea[6], United Kingdom[7] and Japan investigated the relationship between Blood Group and Personality traits.[4]

The five broad personality traits theory describes five basic Personality trait which are Extraversion, Agreeableness, Openness, Conscientiousness, and Neuroticism. It was developed in 1949 by D. W. Fiske (1949) and later expanded upon by other researchers including Norman (1967), Smith (1967), Goldberg (1981), and McCrae & Costa (1987).[8]

Research has been attempted to find a simple and reproduce able way of assessing personality trait. The PPTQ-C was developed to measure children's Personality traits based on the Big Five model. It uses images within the questionnaire to illustrate the traits, rather than relying on traditional questionnaire method. It is a valid and reliable self-report measurement of personality traits. Picture-based measurement of children's personalities is appropriate, particularly in younger children. Thus, it fills the niche between the Berkeley Puppet Interview (Measelle et al., 2005), which is designed for children aged 5–7 years, and verbal questionnaires that is used for older children (Barbaranelli et al., 2003).[10]

A scientific hypothesis concerning ABO blood groups and personality traits was proposed by Hobgood DK et al in 2011.[9] Dopamine beta-hydroxylase (DBH) is an enzyme that catalyzes the conversion of dopamine to nor epinephrine, and the DBH gene is in tight linkage with the ABO gene on chromosome 9q34.[12] The Dopaminergic System is a complex neural network in the brain that involves the neurotransmitter dopamine. Dopamine is a crucial chemical messenger that plays a central role in various psychological functioning. The dopaminergic system is involved in regulating mood, motivation, reward, learning, and motor control. In the central nervous system, nor epinephrine acts as a neurotransmitter, it is involved in the regulation of mood, attention, and arousal. In normal situations, the dopaminergic system is associated with extraversion whereas decreased functioning of dopaminergic system leads to decreased transmission and reuptake which is seen in neuroticism.[13]

Dental anxiety is a well-established hurdle for both patients and dental health providers. Anxiety refers to patients' specific response to stress associated with dental situations and poses a significant challenge to proper dental care.[14] This anxiety often results in irregular visits, delays in seeking treatment, or complete avoidance of dental care. Personality of an individual does influence his/her response to anxiety.

The Chotta Bheem Chutki Scale (CBC) was employed in the present study as it is an easy tool for measuring dental anxiety. The "Chotta Bheem" cartoon character is used to illustrate various emotions for boys, while the "Chutki" cartoon character is used for girls. Each card features a series of six figures, ranging from happy to unhappy and running emotions depicted by the specific cartoon character. Children were asked to select the face that best represented how they felt at that moment. On the scale, a score of one was given to Happy, and a score of six was assigned to Unhappy and running.[2]

Chotta bheem chutki (CBC) scale was used as children can relate more easily to cartoon characters. CBC is a valid scale and shows a high degree of agreement with

Venham picture test (VPT) and Facial Image Scale. It is also shown that children preferred the CBC scale as there was no confusion with the figures as seen in VPT cards where certain figures looked similar and were often time consuming to interpret.[2]

The present study was done to assess the correlation between ABO blood groups, personality trait and dental anxiety. Table 1 showed that 42.1 %of children who scored 4 (Angry) and 80%of children who scored 5 Shouting were AB -ve. 60% of the children who scored 6(Running) were A -ve. This clearly indicates that children with Rh – ve factor displayed extreme anxiety. It was also seen that children with B+ve as their blood group scored 1(Happy). Fleeger et al in 2015 reported that individuals with Rh-ve factor displayed certain mental health disorders such as panic disorder, social personality disorder and attention deficit etc.[15] Xu et al in 2019 showed in their study that blood group AB had significantly higher anxiety scores on HADS (Hospital Anxiety and Depression Scale).[16]

Table 2 shows that children belonging to A +ve and B +ve displayed Agreeableness whereas 78.6% of children with AB-ve as their Blood group displayed Neuroticism as their Personality trait. A study done by Furukawa et al (1927) stated that people with AB blood group demonstrated a more conservative, defensive, and negative character when compared to other blood types.[17] Paul et al in 2023 also reported that AB blood group correlated with higher levels of anxiety and cognitive impairment.[18] Tajik, Malakpour and Bidgoli in 2016 extrapolated from their study that, people with AB blood group to be more emotionally unstable and lacked self-motivation.[19]

Table 3 shows that 84.2% of children who scored 4 (Angry) and 80% of children who scored 5(Shouting) exhibited Neuroticism as the Personality trait. Similar studies done by Juan valdes et al in 2021 stated that Loneliness and Neuroticism are direct / indirect risk factor for dental anxiety.[20] Widiger TA et al in 2017 stated that neuroticism is the trait likely to experience negative effects, including anger, anxiety, self-consciousness, irritability emotional stability and depression.[21] The present study clearly indicates that there is a strong correlation between blood groups, personality traits and anxiety levels.

Conclusion

A pre-determined knowledge of anxiety in children can help dentists in better patient management. The present study shows that children with Rh -ve factor displayed extreme anxiety as compared to Rh+ ve. In addition, children with AB-ve tend to have Neuroticism as their personality trait and exhibit high levels of anxiety.

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Legend Tables

Table 1: Relationship of Dental anxiety with ABO Blood Group

DENTAL ANXIETY SCORE	BLOOD GROUP								
	Counts	A+VE	A -VE	B+VE	B-VE	O+VE	O-VE	AB+VE	AB-VE
1 (happy)	n (%)	12 (16.0%)	6 (8.0%)	32 (42.7%)	8 (10.7%)	5 (6.7%)	0 (.0%)	7 (9.3%)	5 (6.7%)
2 (Sad)	n (%)	21 (21.4%)	7 (7.1%)	16 (16.3%)	10 (10.2%)	8 (8.2%)	0 (.0%)	25 (25.5%)	11 (11.2%)
3(Crying)	n (%)	9 (15.5%)	7(12.1%)	7(12.1%)	4 (6.9%)	12 (20.7%)	2 (3.4%)	11 (19.0%)	6 (10.3%)
4 (Angry)	n (%)	1 (5.3%)	1 (5.3%)	0 (.0%)	3 (15.8%)	5 (26.3%)	8 (42.1%)	0 (.0%)	1 (5.3%)
5 (shouting)	n (%)	0 (.0%)	0 (.0%)	1 (20.0%)	0 (.0%)	0 (.0%)	4 (80.0%)	0 (.0%)	0 (.0%)
6 (Running)	n (%)	0 (.0%)	3 (60.0%)	0 (.0%)	0 (.0%)	0 (.0%)	0 (.0%)	0 (.0%)	2 (40.0%)
	Chi Square Value : 186.6 & p- value <0.001								

Table 2: Relationship of Personality Trait with ABO Blood Group

Blood Group	Personality Traits inference						
	Counts	Agreeableness	Consciousness	Extraversion	Neuroticism	Openness	Multiple trait
A+VE	n (%)	16 (37.2%)	4 (9.3%)	11 (25.6%)	0 (.0%)	8 (18.6%)	4 (9.3%)
A-VE	n (%)	2 (8.3%)	3 (12.5%)	10 (41.7%)	4 (16.7%)	5 (20.8%)	0 (.0%)
B+VE	n (%)	23 (41.1%)	7 (12.5%)	9 (16.1%)	0 (.0%)	11 (19.6%)	6 (10.7%)
B-VE	n (%)	6 (24.0%)	3 (12.0%)	8 (32.0%)	3 (12.0%)	5 (20.0%)	0 (.0%)
AB+VE	n (%)	6 (20.0%)	8 (26.7%)	6 (20.0%)	4 (13.3%)	5 (16.7%)	1 (3.3%)
AB-VE	n (%)	1 (7.1%)	1(7.1%)	1 (7.1%)	11 (78.6%)	0 (.0%)	0 (.0%)
O+VE	n (%)	3 (7.0%)	10 (23.3%)	16 (37.2%)	0 (.0%)	9 (20.9%)	5 (11.6%)
O-VE	n (%)	6 (24.0%)	2 (8.0%)	4 (16.0%)	3 (12.0%)	10 (40.0%)	0 (.0%)
	Chi Square Value : 140.5 & p- value <0.001						

Table 3: Relationship of Dental anxiety with Personality Traits

Dental Anxiety Score	Personality Traits Inference						
	Counts	Agreeableness	Consciousness	Extraversion	Neuroticism	Openness	Multiple trait
1 (happy)	n (%)	28 (37.3%)	12 (16.0%)	10 (13.3%)	0 (.0%)	19 (25.3%)	6 (8.0%)
2 (Sad)	n (%)	18 (18.4%)	14 (14.3%)	32 (32.7%)	0 (.0%)	27 (27.6%)	7 (7.1%)
3(Crying)	n (%)	15 (25.9%)	12 (20.7%)	22 (37.9%)	0 (.0%)	7 (12.1%)	2 (3.4%)
4 (Angry)	n (%)	1 (5.3%)	0 (.0%)	1 (5.3%)	16 (84.2%)	0 (.0%)	1 (5.3%)
5 (shouting)	n (%)	1 (20.0%)	0 (.0%)	0 (.0%)	4 (80.0%)	0 (.0%)	0 (.0%)
6 (Running)	n (%)	0 (.0%)	0 (.0%)	0 (.0%)	5 (100.0%)	0 (.0%)	0 (.0%)
	Chi Square Value : 245.9 & p- value <0.001						