Ministry of Higher education

& scientific Research University

of Babylon College of Dentistry

Association of ABO Blood Groups and Rh factor with Periodontitis

Presented by:

Hussain Mazaid Kalaf

Dalia Haider Hashem

Zainab Mahdi Latif

Safa Talal Rashid

Jaafar Bahaa Hameed

Supervised by:

Assist. Prof. Dr. Fatima Malik

Assist. Prof. Dr. Zainab Hadi

April,2024

(بِسْمِ اللَّـهِ الرَّحْمَـٰنِ الرَّحِيمِ)

{يَرْفَعِ اللَّهُ الَّذِينَ آمَنُوا مِنكُمْ وَالَّذِينَ أُوتُوا الْعِلْمَ دَرَجَاتٍ}

[المجادلة: 11]

Thanks and appreciation

Thanks and praise to **Allah** the Almighty for inspiring and giving us the strength, willingness and patience to complete this work. our deepest gratitude and sincere appreciation to Honorable **Dean of babylon University College of dentistry** for his kind care and continuous support.

We would like to thank **Assist. Prof. Dr. Fatima Malik**

Assist. Prof. Dr. Zainab Hadi their advice and Moral support .

our sincere appreciation and thankfulness to our supervisors who supported me throughout this project and introduced me to the wonders of science.

Thank you for your invaluable guidance and for your tremendous effort to help me finish this thesis. Thank you for your time, advice, care and motivation during the entire research period. We am very grateful for your supervision and We owe you the greatest degree of respect and

appreciation.

Introduction

Periodontal disease (PD) is a broad term that refers to many chronic inflammatory conditions affecting the gingiva bone and ligament that supports the teeth. It includes alveolar bone inflammation, gingiva, and periodontal ligaments {1}. Primarily, bacterial infection is the main cause of PD, which results in localized gingival inflammation produced by bacteria in dental plaque, a microbial biofilm that accumulates on the teeth and gingiva. When left untreated, PD can result in the deterioration of the structure around the teeth. There are a variety of periodontal risk factors which can affect the prevalence, rate, extent and severity of the disease progression{2}. Major risk factors include smoking, lack of oral hygiene with inadequate plaque biofilm control.

The disease may be associated with systemic diseases (e.g. diabetes mellitus, HIV infection), it can also be modified by factors other than systemic disease such emotional stress, anxiety and depression{9}.

Periodontitis is caused by the red complex, bacterial species which consists of three kinds of bacteria , Porphyromonas gingivalis(3) , Treponema denticola and Tannerella forsythia. Porphyromonas gingivalis considered mostly causative bacteria for periodontitis, is a Gram-negative, commit anaerobic bacterium that lives in the mouth and is connected to periodontitis, and has destructiveness factors, for example, (the trypsin like protease, PrtH protease, glycosidases, Leucine BspA, and S layer) .

The red complex presents a portion of the climax community in the biofilms at sites expressing progressing periodontitis.According to the blood group classification(4), blood type is divided into groups A, B, O,and AB, each representing the presence or absence of different types of antigens red blood cells (RBCs){10}.Additionally, understanding of blood groups has expanded to include not just transfusion related difficulties but also the possibilty of an individual developing a specific disease due to RBC surface antigens{12}. Another notable example is that individuals who belong to the group A blood type have been associated with an increased risk of gallstones(5), ulcerative

colitis, and some types of tumor, whereas the other blood group has been associated with certain cardiac disorders, including ischemic heart disease and atherosclerosis{13}.

This association can be due to various blood group antigens acting as receptors for the infectious agents associated with periodontal disease. This broad correlation between periodontal disease and ABO blood group points toward susceptibility of subjects with certain blood groups and Rh factor to periodontal disease(6).

The purpose of the present study was to explore such a possibility to determine the prevalence of periodontal diseases among different blood groups using ABO system and Rh and correlate periodontal disease severity with different blood groups and Rh factor.(7)

Aim of The Study

The current study aimed to detect the ABO blood groups and Rh factor among periodontitis which achieved by following objectives.

1- Determination of ABO blood group in Periodontitis patients .

2-investigation RH factor with Periodontitis Patients .

3-Explaining the level of PH factor in Periodontitis Patients .

Material and methods

Study Population and Study Design: The study was performed on patients referred to the periodontics clinic. The subjects who met the following criteria were included in this clinical study: ages 18–65 years; systemically healthy; having at least 20 teeth, not including the third molars. The exclusion criteria were: had periodontal treatment in the last three months; antibiotic use in the previous six months; smokers; pregnancy. Periodontal diseases were classified according to the 2017 World Workshop on the Classification of Periodontal and Peri-Implant Diseases and Conditions.(7)

Selection of samples: This sampling method was conducted at the College of Dentistry, University of Babylon, using the following tools to measure ABO blood groups and saliva pH by a group of patients who were Interview them and inform themVerbal consent was obtained from each of them to conduct the test.

Sample collection

used the tools in the clinical

slides,Capillary tube, Capillary punctures ،antibody and antigen

1-Slide Testing

The slide method is a simple and rapid (5–10 min) method for blood typing that uses small amounts of reagents and is routinely used for emergency blood group testing However, the sensitivity of this method is low and can be easily affected by multiple factors, thus making standardization difficult. In addition(8), weakly expressed or rare antigens cannot be easily detected by the slide method. Low-titers of anti-A or anti-B antibodies often lead to false-negative results, which increases the risk of mistyping before blood transfusion .

PH measurement of saliva

Fill mouth with saliva again and then place a small amount of it on a pH strip. The strip will change colors based on the acidity/alkalinity of your saliva.

stastical Analysis: A sample size calculation was performed using nQuery advisor (Version 7.0, Statistical Solutions; Cork, Ireland) to achieve a type 1 rate of _ =0.05 and power of 85%. Statistical analysis was performed using SPSS version 26 (SPSS; Chicago, IL, USA). The chi-squared test was used to determine statistically significant differences between the study groups. p-values ≤ 0.05 were defined as statistically significant

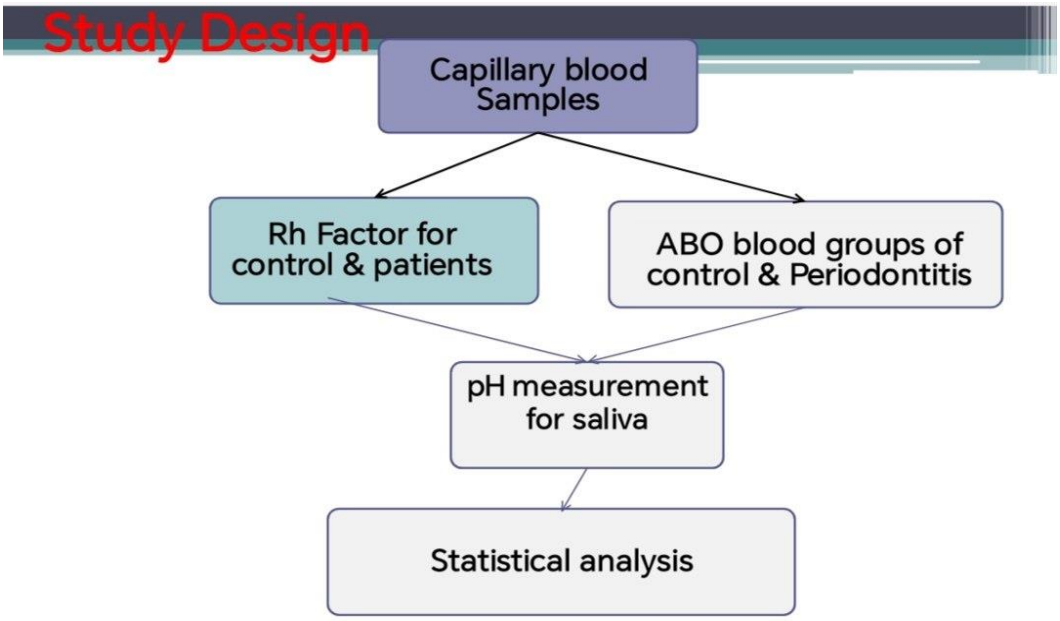

Figure (1) study design.

Results

Table (1) Gender Distribution according to Blood Groups and Rhesus factor in Periodontitis Patients.

Blood Groups	Gender		Total
	Male	Female	
A	38	3	41
B	13	7	20
O	37	8	45
AB	15	4	19
Total	103	22	125
Rh^+	94	19	113
Rh^-	9	3	12

According to table (1).. gender distribution after analysing 125 patient we have 103 male , and 22 female with greater percent of blood groups related to O,A,B,AB respectively. And the percent for Rhesus factor Rh+ > Rh- and register greater for male than female.

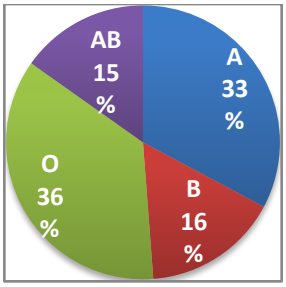

Figure (2) Blood Groups Distribution in Periodontitis Patients.

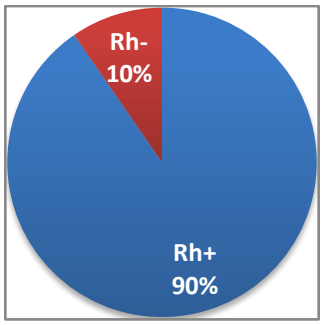

Figure (3) Rhesus factor (Rh) Distribution in Periodontitis Patients.

Table (2) Association of Blood Groups to Clinical Parameters in Periodontitis Patients.

Blood Groups	PI (%)	BOP (%)	PPD (mm)	CAL (mm)
A	1.521 ± 0.14	22.15 ± 5.17	1.97 ± 0.16	3.43 ± 0.17
B	1.3719 ± 0.18	26.24 ± 7.84	2.30 ± 0.27	3.8 ± 0.25
O	1.7893 ± 0.16	18.25 ± 4.36	2.01 ± 0.17	3.4 ± 0.15
AB	1.34 ± 0.16	12.39 ± 4.64	2.19 ± 0.25	3.63 ± 0.25
P value	0.301	0.777	0.850	0.540

Data are presented as mean ±SE . (Kruskal Wallis H-test)

According to table (2).. there is no significant differences between blood groups and clinical parameters (PI , BOP% , PPD , CAL) .

Table (3) Association of Blood Groups to Salivary Potential of Hydrogen (pH) in Periodontitis Patients.

Blood Groups	pH
A	6.73 ± 0.16
B	6.55 ± 0.19
O	6.53 ± 0.15
AB	6.58 ± 0.23
P value	0.769

Data are presented as mean ±SE. . (Kruskal Wallis H-test)

According to table (3).. there is no significant differences between blood groups in ph based on the 125 samples

Table (4) Association of Rhesus factor to Clinical Parameters and Salivary Potential of Hydrogen in Periodontitis Patients

Parameters	Rh^+	Rh^-	P value
PI (%)	1.61 ± 0.09	1.07 ± 0.16	0.060
BOP (%)	18.88 ± 2.83	29.70 ± 9.23	0.031*
PPD (mm)	2.13 ± 0.01	1.50 ± 0.27	0.048*
CAL (mm)	3.53 ± 0.1	3.25 ± 0.09	0.402
pH	6.65 ± 0.09	6.25 ± 0.21	0.134

Data are presented as mean ±SE. . (Mann-Whitney U-test)

* significance at (P≤0.05)

According to table (4).. there is significant differences between Rhesus factor in clinical parameters especially (BOP% , PPD) with Rh+ and Rh- (0.031 , 0.048)
Respectively .

Table (5) Correlations of Clinical Parameters in Periodontitis Patients

Parameters	**BOP**	**PPD**
PI	r= 0.301** P = 0.000	r= 0.389** p= 0.000
BOP	1	r= 0.365** p= 0.000

** significance at (P≤0.001)

According to table (5).. there is significant correlation between clinical parameters, PI and BOP% with PPD . And at the same time there is correlation between PI and BOP% .

Table (6) Correlations of pH and CAL in Periodontitis Patients

Parameters	pH
CAL	r= -0.176* p= 0.05

* significance at (P≤0.05)

According to table (6).. there is significant correlation between clinical parameter (CAL) and PH .

Discussion

Periodontitis is the inflammatory disease of the supporting tissue of the teeth caused by bacterial biofilm and is well known to be one of the most common causes of teeth loss in adult population. In current study we included 125 patients from different blood groups and measured different clinical parameters for periodontitis including PI, BOP, PPD, CAL and pH, however we didnt find any significant association between Blod groups and these clinical paramaters of periodontitis (significance at $P \leq 0.05$). In support Pradhan AC et al (1971) found similar results . almost half (47.2%) of all adults aged 30 years or older has some form of periodontitis with age being considered as a risk factor. other risk factors include poor oral hygiene, smoking(9), diabetes, hormonal change and others. In the other hand we found significant relation between Rh factor and BOP with Rh negative group shows more BOP scores than Rh positive group. While Patil Anup et al (2016) suggested that there was higher prevalence of gingivitis in Rh positive group. In the other hand Noopur B Kokane et al (2018) didn't find any relation between Rh factor and periodontal diseases. One limitation of our study is the low sample size specially for blood group B and AB. Mansour Al-Askar (2022) conducted a systematic review with meta analysis and found no association between blood groups and periodontitis except for blood group AB. This may suggest that further research with larger sample size of blood group AB is needed. Other factors like ABO blood group and Rh factor is being investigated for possible relation with periodontal diseases(10). Vivek S et al (2013) and Koregol AC et al (2010) found that periodontitis was more common among patients with blood group O, while Pai GP et al (2012) found an association with blood group B. In the other hand SUZAN M. SALIH (2015) failed to show any significant association between blood group and periodontitis. There is conflicting evidence regarding Rh factor relation with periodontitis as some studies suggest no relation while our study and others suggest the contrary, hence further research is needed in this area. The Rh factor is an inherited protein that is present on the cell surface of the RBC, there are mainly 5 Rh antigen with the Rh(D) antigen being the most important, the Rh(D) is immunegenic antigent which can provoke immune response, thus it may affect the severity of the host response to the bacterial challenge which is the main cause of periodontitis.(11)

Conclusion

There is no relationship between ABO blood groups and periodontitis. and there is higher relationship between Rh and periodontitis according to clinical parameters such as BOP, CAL ,PPD .

So according this study to should take the care regarding Rh group about to periodontitis Males are more susceptible to periodontitis than females. Blood type A and O were the most among periodontal patients. There is no association between ABO blood groups and periodontitis. There is a significant association between Rh and periodontitis according to clinical parameters such as BOP, CAL, PPD which is high in Rh positive patients . (12)Recommendations Rh positive people should take care to their oral hygiene. Further genetic studies in blood groups could be achieved to find out its association with periodontitis. Further cross sectional studies in blood group and periodontitis should carry out.

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