STUDY OF THE RELATION BETWEEN PLATELET COUNT AND PERIODONTAL CONDITION IN PATIENTS WITH IMMUNE THROMBOCYTOPENIC PURPURA

ABSTRACT

Immune thrombocytopenic purpura (ITP) is a disease associated to the decrease of platelet count in peripheral blood, with repercussion on the oral cavity, due to the potential risk of spontaneous bleeding or provoking it. The aim of this work was evaluate the relation between the platelet count of chronic IPT patients and their periodontal condition. Thereunto, 31 patients were evaluated; 15 with this pathology (group 1) and 16 Dentistry students with no hematologic disease (group 2). Both groups were examined in their periodontal condition through gingival condition index (G), periodontal attachment loss (P) and gingival recession (R), as well as blood tests were performed to verify the platelet count, further a questionnaire on the socioeconomic aspects, access to dentistry services and mouth health self-perception. It was observed that 68.8% of IPT patients' mouth sextants presented some degree of gingivitis, despite some 16.8% manifested loss of periodontal insertion. Gingival retraction occurred in only 2 patients of the group 1, and the average measure for this event in this group was 0.22mm. The questionnaires applied allowed characterizing the sample of the group 1 as low income and low education in relation to the group 2, but with need of dental treatment. We concluded, therefore, there was no direct relation between the platelet count of IPT individuals when the intraoral test was performed, and their periodontal conditions received the indexes "G", "P" e "R".

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INTRODUCTION

Immune thrombocytopenic purpura (ITP) is a self-immune disease associated to the decrease of platelet count due to its premature phagocytosis. It attacks adults with higher frequency between the second and the fourth decades of life, mostly women (chronic disease) and children between 2 and 5 years of both genders (acute). It is a benign disease that may be or not related to other diseases.[1,2]

The appearing of petechiae, bruising and hematomas in the mouth mucosa of IPT patients are common and premature. Spontaneous gingival bleeding or after light trauma are frequent signals of IPT. History of bleeding on gastrointestinal and urinary tracts, as well as epistaxis is also frequently found.[3]

Nowadays, despite occurs the inclusion of disciplines like Dentistry for patients with special needs in the curriculum of courses of Dentistry in Brazil, the field of Hematology is still few known. Especially about IPT pathology, there is no official data on the occurrence in Brazil.

Besides, the number of patients with this pathology, including the chronic type is expressive and significant. On the report by HEMOPA foundation[4], provided by the Medical File Management with updated data until September 2013, 653 patients were counted, many of them with chronicle type of the disease, that will require medical care and from other health professional for long time and with high frequency.

Then, it was observed the necessity to elaborate well defined protocols to describe the Dentistry approach for IPT.

Therefore, the aim of this study is perform an analysis on the possible correlation between the platelet count and the periodontal condition of IPT patients.

MATERIAL AND METHODS

After data collection, a process of elaboration and filling the data bank on the electronic spreadsheet using the software Microsoft Excel 2010® was carried out. On the same *software* was performed the descriptive statistic from the calculus of absolute and relative frequencies of quantitative variables and of measures of the average and standard deviation of quantitative variables.

Analytical statistics was performed through the software BioEstat 5.0. It was performed analysis of Independence among qualitative variables from the applying of the G test and analysis of comparison of quantitative variables by the Mann-Whitney test. It was adopted the level of significance (α) of 5% for reference to the decision making about the analysis of results on the statistical tests.

This study is classified as prospective cross-sectional analytical one. The patients were organized in 2 groups: Group 1 - IPT patients registered on HEMOPA foundation in

treatment for more than 1 year and platelet count < 100.00/mm^3 (15 individuals), Group 2 - control, composed by Dentistry students at Esamaz, without current or previous history of bleeding hematologic diseases, with normal platelet counting over 150.000 platelets/mm^3 (16 individuals).

Besides, the individuals of the study should are in the age group from 15 to 60 years, both genders. The exclusion criteria were (1) be patient of systemic disease (co-morbidities) which have influence on the periodontal health, like diabetes, heart disease or other autoimmune diseases, (2) be smoke, (3) using or having used recently medication or anti-aggregant platelets, including acetylsalicylic acid, (4) having other inherited or acquired bleeding disorders, (5) possessing bone marrow diseases (myelodysplastic syndromes, aplastic anemia, among others), (6) being pregnant.

The individuals of this study have access to read the Free and clear consent agreement statement (appendix C). When accept participate in the study, they were submitted to a clinical trial composed by intra-oral examination and a questionnaire (appendix B) about oral health and socioeconomic aspects.

The calibration of examiners was previously performed in order to standardize the method of data collection among them and the index of concordance obtained inter-examiners was 96 %. During this stage, millimeter probes type Who (Quinelato) were used, with rounding tip and marking of 3.5mm, 5.5mm, 8.5mm and 11.5mm (Figures 1 and 2).

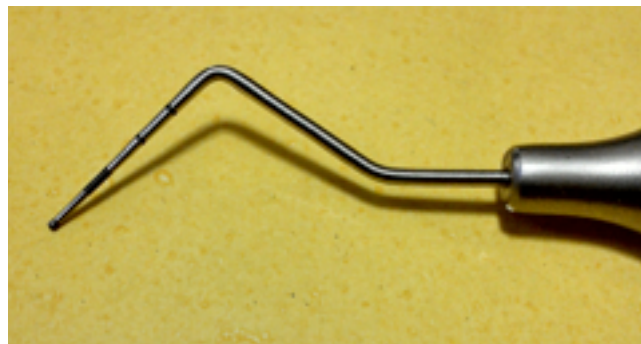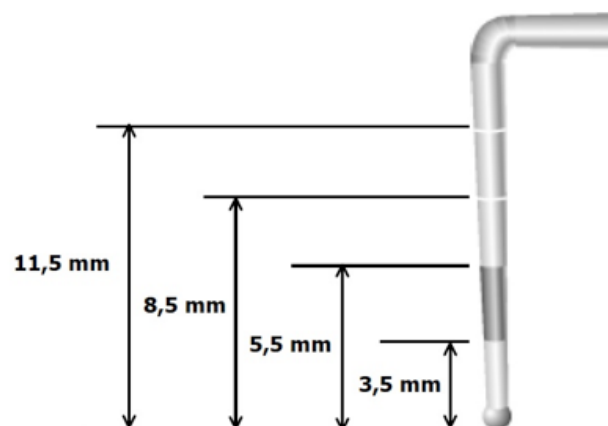Figure 1. Active tip of probe WHO/OMS highlighted.

Figure 2. Active tip illustrated of Probe WHO/OMS showing marking in millimeters.

The mentioned probe was the same used during the definitive data collection. The probing procedure was carried out in four points for each tooth: mesial, medium, distal by vestibular, and the same points by lingual/palatine face.

Taking the Manual do examinador SB Brasil 2000 as base, the intraoral examination consisted on the periodontal health evaluation,

including visual inspection and use of the probe WHO/OMS (Quinelato) (Figure 3), through report of 3 (three) parameters: (1) gingival condition (G): index obtained by visual inspection of the gum, associated to the periodontal probing with millimeter probe with rounding tip, of all the present teeth, evaluating shape, tissue color presence or absence of gingival bleeding. The results were registered through the following codes: G0: health gum, G1: light gingivitis: small changes on the color and mild edema. Some seconds after probing may appear bleeding points, G2: moderated gingivitis: moderated inflammation, redness and edema. Bleeding occurs on gingival margin after probing, G3: advanced gingivitis: severe inflammation, redness and edema, and might occur ulcerations and trend to spontaneous bleeding; (2) Periodontal loss insertion (P): it will be measured through probation in the gingival groove or periodontal pocket of all the teeth in order to evaluate the periodontal insertion condition of them. The periodontal insertion loss index was established by the visibility of the junction cement-enamel (JCE). P is measured from JCE until the depth of gingival pocket. The results will be registered as codes in standardized files: P0: insertion loss from 0 to 3 mm (without JCE visible), P1: insertion loss from 4 mm to 5 mm (JCE visible in the black area on the probe WHO), P2: insertion loss from 6 mm to 8 mm (JCE visible on the superior limit from the black area on the probe WHO and the mark of 8.5 mm), P3: insertion loss from 9 mm to 11 mm (JCE visible between the marks of 8.5 mm and 11.5 mm), P4: insertion loss from 12 mm or else (JCE visible further the mark of 11.5 mm), X: excluded sextant (less than 2 teeth present); (3) Gingival retraction (R): quantified through calculation obtained after periodontal probation, the exposition of the junction cement-enamel resulted from gradual migration of the gum to the apical region of the tooth, exposing the JCE. It is obtained subtracting the periodontal insertion loss of the probing depth. The letter "R" will be registered followed by the value in mm measured (Figure 4): R0: no retraction, R1: 1 mm retraction, R2: 2 mm retraction and so on (in other words, the number that follows the letter "R" translate the dimension of the retraction in mm).

Figure 3. Probe WHO OMS.

Figure 4. Scheme for Periodontal insertion loss examination.
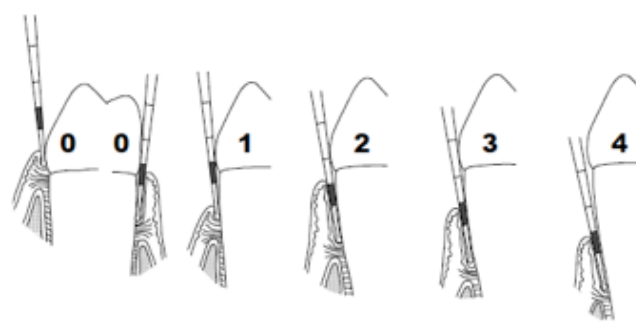
Next, to the physical examination and in the same day, the patients were addressed to the blood sample collection in order to obtain the platelet count, which was confronted with the results of 3 indexes mentioned below (G, P e R). It allowed a correlation of the periodontal health condition with the platelet count.

The probing was performed carefully, tilting the probe in an angle around 10^0 in order to avoid discomfort and gingival bleeding to the patient by additional trauma. The files were simultaneously filled by an annotator also previously calibrated. The data were reported to obtain the indexes G, P and R, and their posterior analysis. All the teeth inside the individuals' mouth were examined because it is the more precise way, regarding to use teeth index.

The results obtained were divided into six sextants corresponding to the two dental arches, three superior (17 to 14, 13 to 23 and 24 to 27) and three inferior (37 to 34, 33 to 43 and 44 to 47), choosing as value of each index the worst condition found by sextant for determination of each index (appendix A).

Finally, the laboratorial tests were performed by technicians from the Hemotherapy and Hemology Center Foundation of Pará (Hemopa) in order to standardize this stage of the research. We highlight that Hemopa submit periodically their procedures to quality routines through the good practices required in Resolutions by Collegiate Direction (RDC/ANVISA # 57, 16/12/2010). Also their internal operative procedures are revised periodically; therefore, the procedures are standardized, validated and ensured under biological aspects and reliability.

RESULTS

The sample studied was constituted by 31 patients, divided into 1 group of 15 thrombocytopenic patients (Group 1), and another one (control group) formed by 16 patients with no previous or current thrombocytopenic history (Group 2).

The age of patients examined from the group 1 varied from 17 to 52 years old, and the average of thrombocytopenic patients was 28.2. The average of age of the control group was 22.3 years. Regarding to the gender, 100% of thrombocytopenic individuals were female, due to the higher significance of this disease occur in women. On the control group, 25% were male and 75% were female.

Regarding to the platelet count of the individuals studied, the group of IPT patients presented an average of 40.406/mm^3 (Table 1), while all the patients of the control group presented platelet count superior than 150.000/mm^3 (appendixes D and E).

The percentage of buccal sextants affected by gingivitis ("G") in IPT patients was 68.8% of the sample, considering all the degrees of gingivitis (Table 2). From them,

41.1% presented light gingivitis (G1), 23.3% moderate (G2), and 4.4% were affected by severe gingivitis (G3). 22.2% of sextants were evaluated and presented the condition of

absence of gingivitis (G0). 8.9% of sextants were excluded because there were no 2 or more teeth in conditions to be evaluated.

Table 1. Measures of age and platelet count according to the group observed.

	Thrombocytopenic	Control	P
Age			
Average	28.2	22.3	0.093
Standard deviation	10.8	2.6	
Platelet count			
Average	40406.0	>100000.0	<0.05
Standard deviation	29038.4	-----	

p: probability of Mann-Whitney test.

Table 2. Frequency of buccal sextants affected by gingivitis and Insertion loss.

Variables	Thrombocytopenic		Control		P
	Af	%	Af	%	
Gingivitis					
Normal gum	20	22.2	33	34.4	<0.05
Light	37	41.1	63	65.6	
Moderate	21	23.3	0	0.0	
Severe	4	4.4	0	0.0	
Excluded	8	8.9	0	0.0	
Insertion loss					
0	66	73.3	96	100.0	<0.05
1	14	15.6	0	0.0	
2	2	2.2	0	0.0	
3	0	0.0	0	0.0	
4	0	0.0	0	0.0	
X	8	8.9	0	0.0	
Total	90	100.0	96	100.0	

Af: Absolute frequency. %: relative frequency in percentage. p: probability of Teste G.

In the control group, 34.4% presented health gum (G0), while 65.6% sextants were classified as (G1), and there were no register of the scores G2 and G3, representative of relevant degrees of gingivitis.

In 73.3% of sextants evaluated in thrombocytopenic there was no found periodontal insertion loss (P0). However, in 15.6% of this group was found insertion loss between 4mm and 5mm (P1). Only 2.2% of these sextants presented more significant

insertion loss, between 6mm and 8mm (P2), there were no more severe loss (P3 or P4). In the group control, 100% of patients did not present insertion loss (P0).

The average of gingival retraction of thrombocytopenic was 0.22%, and there was no gingival retraction on the group control.

The questionnaires applied to all the individuals who composed the samples from both 2 groups revealed remarkable differences regarding to the socioeconomic situation of

both groups, and less privileged group is on this viewpoint. The results obtained through the questionnaires can be observed on the tables 3 to 5 containing information on the access of these people to dentistry services and on the way they have self-perception of their mouth health.

Table 3. Education and Family income according to the observation group.

Variables	Thrombocytopenic		Control		P
	Af	%	Af	%	
Education					
Incomplete Elementary School	2	13.3	0	0.0	<0.001
Incomplete High School	4	26.7	0	0.0	
Complete High School	8	53.3	0	0.0	
Incomplete Higher Education	1	6.7	11	68.7	
Complete Higher Education	0	0.0	3	18.8	
Graduation	0	0.0	2	12.5	
Family income					
0 to 1 minimum wage	7	46.6	1	6.3	<0.001
1 to 2 minimum wages	6	40.0	0	0.0	
2 to 3 minimum wages	1	6.7	0	0.0	
3 to 4 minimum wages	0	0.0	1	6.3	
4 or + minimum wages	0	0.0	14	87.4	
No information	1	6.7	0	0.0	

Af: Absolute frequency. %: relative frequency in percentage. p: probability of Teste G.

Table 4. Characterization of access to the Dentistry services according to the observation group.

Variables	Thrombocytopenic		Control		P
	Af	%	Af	%	
Time from the last visit to the dentist					
<1 year	9	60.0	14	87.4	0.087
1 to 2 years	4	26.7	0	0.0	
≥3 years	2	13.3	1	6.3	
No information	0	0.0	1	6.3	
Reason for the visit to the dentist					
Routine	3	20.0	15	93.7	0.006
Pain	3	20.0	0	0.0	
Gingival bleeding	2	13.3	0	0.0	
Cavity on teeth	5	33.3	1	6.3	
Sores / bumps / spots	1	6.7	0	0.0	
Other	1	6.7	0	0.0	
Did you receive previous directions on prevention of mouth problems?					
Yes	4	26.7	16	100.0	<0.001
No	11	73.3	0	0.0	
Do you notice that you need treatment?					
Yes	15	100.0	0	0.0	<0.001
No	0	0.0	16	100.0	

Af: Absolute frequency. %: relative frequency in percentage. p: probability of Teste G.

Table 5. Characterization of self-perception on mouth health according to the observation group.

Variable	Thrombocytopenic		Control		P
	Af	%	Af	%	
Self-classifying on mouth health					
Awful	5	33.3	0	0.0	<0.001
Bad	3	20.0	0	0.0	
Regular	6	40.0	0	0.0	
Good	1	6.7	5	31.3	
Great	0	0.0	11	68.7	
Self-classification of how teeth and gum look					
Awful	3	20.0	0	0.0	<0.001
Bad	5	33.3	0	0.0	
Regular	4	26.7	1	6.3	
Good	3	20.0	6	37.5	
Great	0	0.0	9	56.2	
Graduation of pain in teeth and gum in the last 6 months					
None	6	40.0	15	93.7	0.012
Few	4	26.7	1	6.3	
Medium	3	20.0	0	0.0	
Much	2	13.3	0	0.0	
Influence of mouth health on social relationship					
It does not affect	4	26.7	1	6,3	0.009
It does a few	3	20.0	0	0.0	
It does moderately	3	20.0	0	0.0	
It does a lot	4	26.7	13	81.2	
I do not know	1	6.7	2	12.5	

Af: Absolute frequency. %: relative frequency in percentage. p: probability of Teste G.

DISCUSSION

According to the results obtained, the gingival condition (G) found in IPT patients showed that 22.2% of sextants evaluated presented normal gum, while 68.8% presented gingivitis from light to severe degree. It was also observed, in general, an aggravation of gingival condition according to the age increase, with strong influence of socioeconomic conditions (evaluated through questionnaires), and with no obligation of direct relation with platelet count. It is according to the results obtained by Alves (1998)[5], when he studied the prevalence of periodontal disease using similar methodology, evaluated 400 patients from 20 to 74 years old, describing also a tendency of gingivitis aggravate according to the increase of age.

The relation of periodontal disease with the age revealed clearly when evaluated the periodontal insertion loss index (P). In an individual analysis of IPT patients' data bank (appendix D) was possible register only the index "P0" in a 21 years old patient (individual # 2), platelet count significantly low (<10.000/ mm^3) and gingivitis moderated degree; in contrast, another 52 years old individual (# 1 form the mentioned data bank) presented some degree of insertion loss ("P1" and "P2")

in all of the sextants evaluated, even with platelet count near to 50.000/mm^3.

In the sample of this study, 41.1% of sextants in the IPT patients and 65.5% of sextants of the control group presented light gingivitis, as well as on the study performed by Alves (1998)[5], in which the code "G1" was the most found, with 944 sextants, from 2024 considered valid for diagnosis.

According to the data from the "National Research in Mouth Health" (SB Brasil 2010)[6], performed with patients from different regions and age groups, the percentage of patients with bleeding after probing on the age group from 15-19 years was 7.1%, and in the group from 35-44 years, of 1.1%, regarding to the North region in the country. At national level, the same results were 9.7% and 1.9%, respectively.

There was no specific index of bleeding in this work. However, if considering the modalities "G2" and "G3", where always gingival bleeding happens, we noticed 27.7% frequency for this event. Comparing data from the North region, of 8.2%, and from Brazil, of 11.6%, of both age groups (15-19 years and 35-44 years), the bleeding index reported for IPT patients was significantly higher, according to the sample in this study.

In a similar study involving dentistry patients with no IPT performed at Unicamp[5], the analysis of reports on the loss insertion demonstrated that more prevalent codes were

"P1" on the age groups from 20 to 24 years old, e "P3" on the age group from 45 to 54 years. These results are different from this study, once 15.6% of sextants of thrombocytopenic patients presented loss insertion "P1" and 2.2% presented loss insertion code 2 ("P2"), while 73.3% of sextants did not present loss of insertion (P0). Besides, no IPT patient presented loss insertion superior than 8.5mm ("P3" or "P4"). However, it is possible infer, both from this study and from that performed by Alves (1998)[5], there was new trend to aggravate the periodontal insertion loss according to the age. In this case, the code "P0" was found most frequently in the groups of lower average age and the codes "P1" and "P2" the most prevalent. "PX" was present in 376 sextants and obtained the higher average age of 50.2 years, due to the higher number of teeth lost.

The absence of loss insertion observed in IPT patients ("P0") was relatively elevated (73.3% of sextants) did not match to the results pointed by the survey "SB Brasil 2010", in which the age group from 35 to 44 years, the same value for the country was 51.3%. When considered only the North region, the value was 37.4% of sextants with "P0".

Considering the code "P1", the value referent to the IPT patients was 15.6%, while the results of SB Brasil 2010 noticed 13.2% of sextants in Brazil and 8.4% for the North region. For P2, the results were 2.2% (PTI), 4%

and 1.5%, respectively. In short, the comparison between the values of real insertion (>P0) obtained through this research and the survey on mouth health performed by the Ministry of Health from Brazil (SB Brasil 2010)[6], using the same methodology for data collection point to the approximation between the population in general and people affected by chronic IPT treated at Hemopa, with no significant differences.

In a study performed by the Federal University of Pernambuco, which evaluated the gingival retraction levels in Dentistry students from the 5th to the 10th period, it was noticed that from 110 students evaluated, only 16.4% do not have retractions. The average of retraction was 2 mm in 80.1% from the students researched. These results did not match to those found on the groups of observation of this study, once there was no retraction on the 16 individuals of the group control, even on the IPT patients group, where the average retraction found was 0.22mm.

Through the table is possible observe that individuals presented some degree of gingival retraction and considerable degrees of gingivitis (G2 and G3), as can be seen by the individuals # 1 and 13, what is according to the study by Paredes et al (2008)[7] which related the presence of plaque to gingival retraction and its severity. However, this correlation between the level of plaque and the retraction degree was not found by Lopes (2005)[8] when

they study the frequency of this changing in 60 students of Dentistry at University of São Paulo, campus Bauru. This last author verified strong correlation between the orthodontic treatment and the retractions visualized, especially in pre-molars, with 49.74% frequency of individuals affected by the problem. It is highlighted that no one individual of this study was in orthodontic treatment, or even had passed by this type of treatment previously.

Regarding to the socioeconomic aspects, comparing the groups 1 (IPT patients) and 2 (group control), it was visible the significant difference in relation to this characterization. Mostly IPT patients registered on HEMOPA showed lower education level and family income, compared to the individuals from the group 2 (Higher Education students in Dentistry at Esamaz). The percentage of 93.3% of IPT individuals did not have Higher Education (complete or incomplete), and 13.3% have not finished the Elementary School.

Family income of IPT patients did not overcome the 2 minimum wage in 86.6% of cases, data that contrasted the reality of the group 2, where was observed that 93.7% have family income equal or superior than 3 minimum wage. However, the number of family members by residence was similar to the groups 1 and 2: 4 and 3.7, respectively.

The analysis of socioeconomic aspects is important when a disease is evaluated, in which the education and life standard are closely linked, like the periodontal disease. We are waiting for groups with significant different show distinct degrees of the pathology. It can be observed in several studies, like by Gesser et al (2001)[9], who concluded that the worst bleeding conditions and presence of salivary calculus occurred in patients with worst socioeconomic conditions, including the education degree.

Nuto et al (2007)[10] evaluated cultural aspects in chronic periodontitis patients and they concluded that they understand the process health-periodontal disease through the intermediation of popular and scientific knowledge, from the involvement of life and work conditions and the access of good quality services; in other words, they did not incorporate only the biomedical speech.

The access to services was also analyzed, demonstrating that 40% of IPT patients spent more than one year with no return to the visits to the dentist. On the other hand, these patients recognized there was need of dentistry treatment. Gingival bleeding was the main complaint on the last visits for these patients in only 13.3% of cases. In only 20% of the cases, the IPT patients found the dentist to routine visits, just for prevention, contrasting with patients from the group 2,

where it was the main motive (93.7% of cases) for their visits to the dentist.

Only 26.7% of patients from the group 1 informed that have received some instruction about oral hygiene (oral health lectures, professional directions regarding to the maintenance of oral hygiene, among methods). It suggests that, in these cases, the dentistry visit focus have been solution of a main complaint, with no prioritization of preventive aspects. The importance of the communication between professionals of dentistry and patients is mentioned by Nuto et al (2007)[10], who evaluated cultural aspects in patients with chronic periodontitis, and they conclude that the patients comprehend the process health-periodontal disease by the intermediation of popular the knowledge and scientific one, from the involvement of life and work conditions and the access to good quality services; in other words, they only incorporate the biomedical speech.

Mouth health self-perception was also evaluated because we understand that periodontal disease, like other ones, may generate functional, social and psychological problems which affect the quality of life and well-fare of patients. Batista et al (2012)[11] describe it as a subjective condition of the mouth health that measure its functionality and social and cultural values, and it is associated to behavior related to the care with the mouth health. In this way, data collected

about self-classification and how the teeth and gum look revealed relative dissatisfaction from patients of the group 1, once 53.3% of them have bad or awful concept about it. The occurrence of recent pain in teeth or gum in patients from the group 1 was described as frequent, mentioned by 60% of individuals. At the end, 46.4% judged that changes of mouth health did not affect, or just a few the interpersonal relationships.

CONCLUSION

Despite more studies are necessary on the theme with different methodologies, it was possible conclude that the platelet count did not have direct influence on the gingivitis degree of IPT patients, as well as did not have direct relation to the severity of periodontal attachment loss and with gingival retraction. Periodontal attachment loss in patients demonstrated a trend to increase with age, while the degree of gingival retraction in these patients demonstrated occur when there was associated gingivitis.

Socioeconomic factors, as well as the access to dental services and the self-perception degree related to the individuals evaluated had significant influence on determination of their periodontal health.

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