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Research Article

A Cross-Sectional Study Assessing the Association Between Periodontal Disease and Socio-Behavioral Risk Factors

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Abstract

Aim of the study The objective of this study was to know and evaluate the level of knowledge and skills on oral hygiene in a population group of children with cardiovascular diseases by means of a questionnaire and thus achieving the classification in a certain class of periodontal risk, in order to design and implement an educational program tailored to the needs and interests of this category of patients. Material and methods The total group of patients included in the study consisted of 124 patients who were divided into four groups: group A-31 patients with cardiovascular disease and periodontal disease, group B-31 patients with cardiovascular disease and without periodontal disease, group C-31 patients without cardiovascular disease but with periodontal disease, group D-31 patients without cardiovascular disease and without periodontal disease. A clinical and observational survey study was conducted using a questionnaire. To assess local hygiene and inflammation status, in this study we used the O'Leary plaque index (PI) and the Silness and Löe gingival index (GI). The questionnaire was designed in four sections and presented pre-selected multiple-choice questions with a square that patients checked for the answer they considered correct. The questionnaire was used to assess oral hygiene knowledge and skills in a population group of children. Results For patients in group A, even if the daily hygiene program is better than for patients in group C, the clinical inflammatory manifestations are more evident, which is demonstrated by the high GI values, showing the influence of the general condition on the local inflammatory status. Secondary means of oral hygiene are rarely used by respondents; 77.4% of respondents in group A and 87.1% of respondents in group C do not use secondary means of hygiene. The use of mouthwash is associated with proper hygiene 32.3% of respondents in group B and 54.8% of respondents in group D. Oral health information is mostly obtained from the family, similar percentage for group A and for group C 45.2% of respondents. Conclusions By analyzing the oral hygiene program, the frequency of dental visits, eating habits and general and oral health, an accurate assessment of periodontal risk can be made from childhood, allowing early preventive interventions. Promoting oral health in families, in schools, through early and comprehensive interventions in the young population, can contribute to the growth and development of future adults with the best possible oral health.

Keywords: periodontal disease, cardiovascular disease, risk factors, correct oral hygiene, periodontal disease prevention

Introduction

A thorough understanding of the factors that contribute to periodontal disease is very important to significantly reduce its impact on global public health and to improve the quality of life of patients [1, 2].

There Are three major components

underlying the onset of periodontal disease, which constitute a complex mechanism that interact with each other. The establishment and progression of the disease involves the interaction between the subgingival microbiota, the body's immuno-inflammatory response and the action of environmental factors [3, 4]. Environmental factors include aspects such as oral hygiene, smoking, poor diet, genetic predisposition and general health. These factors may influence how the subgingival microbiota interacts with the host immune system [3, 4]. The microbiota includes diverse bacterial species, some of which are pathogenic. These micro-organisms are part of the bacterial plaque that, in the absence of proper hygiene, multiply and may lead to the initiation of local inflammation and damage to periodontal tissues [5-10]. There is a close link between oral health and cardiovascular health, with periodontal disease being considered an independent risk factor for cardiovascular disease [11]. The presence of common risk factors creates a close link between periodontal and cardiovascular diseases, suggesting common pathogenetic mechanisms [7]. Modifiable risk factors such as lifestyle, smoking, obesity, socio-demographic characteristics may influence both

oral health and cardiovascular health [7]. Reducing these risk factors by implementing lifestyle changes can significantly contribute to the prevention and appropriate management of periodontal and cardiovascular diseases [11]. Susceptibility to periodontal disease and the rate of progression of periodontal disease differ from person to person. Thus, some individuals may show an increased susceptibility to the effect of local plaque accumulations and develop aggressive forms of periodontitis at a young age, while others may never develop periodontal disease, even in the presence of poor hygiene [12-14]. There is substantial evidence that several mechanical and chemical methods of plaque control can prevent the onset of gingivitis, the early stage of periodontal disease [15-18]. According to long-term cohort studies, adequate oral hygiene practices in the general population correlate with a low prevalence of periodontal disease [17].

These long-term cohort studies have demonstrated a reduction in plaque and gingival inflammation over the past 30 years. At the same time, the prevalence of periodontitis has decreased. In addition, the number of arch retained molars has increased in all age groups between 20 and 80 years [17]. In view of the data presented, it was considered essential to assess the level of knowledge on proper oral hygiene and to correlate this information with the oral health status of the patients in order to identify early periodontal risk and implement a personalized monitoring program.

The increasing prevalence of periodontal and cardiovascular systemic diseases as major public health risk factors is triggering an increased interest in conducting new studies investigating the link between these pathologies and common local or general factors.

Material And Methods

Subjects included in the group were selected from among patients who presented for diagnosis and treatment at the Cardiology Department of the Children's Emergency Hospital "St. John" in Galati and from among patients of a private dental office in Galati. The study was conducted between September 2022 and April 2024. The patients were informed about the study in which they were invited to participate through an information form and detailed explanations about the procedures and aims of the research. Participants and their legal representatives consented to the required clinical and paraclinical investigations by signing an informed consent form.

A clinical and observational survey study was conducted using a questionnaire.

The study protocol involved the following steps:

-Patient selection and collection of demographic and general condition data;

-Informing patients in the selected group about the scientific research study (purpose, stages, risks, benefits of participating in the scientific research study);

-obtaining informed consent for participation in the study;

-completion of the questionnaire designed for this purpose;

-specialized consultation, recording of local clinical parameters (anamnesis, extraoral clinical examination, periodontal clinical examination);

-establishing the periodontal diagnosis and treatment plan;

-presentation to the patients of the results obtained on periodontal risk by correlating the answers to the questions with the local hygiene and inflammation status;

-periodontal treatment phase, adapting indications and follow-up visits according to periodontal risk. The specialist consultation was performed by inspection, palpation and percussion by a single examiner, included analysis of the superficial and deep marginal periodontium. To assess the local hygiene and inflammation status, we used the O'Leary plaque index (PI) and the Silness and Löe gingival index (GI) in this study.

Questionnaire completion and periodontal clinical examination

The interview-type questionnaire was designed after a thorough documentation in the literature on behavioral risk factors of periodontal disease, as well as prevention and practice guidelines of periodontal societies.

The questionnaire was designed in four sections. For the age range 7-12 years, patients were assisted in filling in the questionnaire by parents or medical staff, for the age range 13-17 years patients were assisted only if they requested it. The questionnaire was designed with the age of the participants in mind, using a small number of items and easy to understand and easy to complete language.

Presentation of the four sections of the questionnaire:

1.General data section:

-Gender;

-Age;

-Urban or rural background;

-Weight and height;

-Diagnosis of general condition.

2.Section on oral hygiene program and rules:

-Frequency of brushing;

-Brushing technique;

-Type of toothbrush used;

-Frequency of toothbrush change;

-Additional means of oral hygiene.

3.Knowledge related section on the importance of maintaining oral health:

-The importance of dental health;

-How often do you go to the dentist;

-Where did you get information about proper oral hygiene;

-What is bleeding gums.

4.Section on eating habits:

-Consuming sweets and sweet drinks daily.

Correlation of questionnaire data with local parameters

The information collected through the questionnaire was given a score between 0-8, depending on the importance of the parameter for the effect on oral health. The sum of all items leads to a maximum score of 92 points, which represents a predisposition to develop severe periodontal disease in adulthood.

Analyzing the literature and the influence of each parameter, collected from information related to the general condition, local status analyzed by indices of hygiene and inflammation, periodontal diagnosis, information related to hygiene, nutrition, knowledge of the importance of oral hygiene, on the periodontal health status, patient- dentist relationship, the following score was designed to reflect the periodontal risk [19-31]:

92-55 (points) High risk;

54-35 (points) Moderate risk; 34-25 (points) Low risk;

≤ 24 (points) No risk.

Statistical data analysis

The data obtained from the clinical examinations, through the analysis of the observation sheets and the completion of the questionnaire, were entered and centralized with Microsoft Excel 2011, to form the database necessary for statistical analysis. In our study, descriptive statistics (percentage, mean, frequency and standard deviation) were calculated as the first step of data analysis.

Statistical tests (Pearson Chi-Square and Fisher's test - used where the Chi-Square test could not be performed because it did not yield results) were used to better analyze the data.

-H0 (null hypothesis) - the two variables (study group and control group) are independent.

-H1 (alternative hypothesis) - the two variables (study group and control group) are not independent (i.e. are associated).

Results And Discussions

1.Results on general and demographic characteristics tracked the age, gender, and background of the patients in the four groups and no significant changes were found between them.

In the whole group analyzed, the mean age was 14 years, while in the groups with periodontal disease (group A and group C), the mean age was 13.5 years. In the groups diagnosed with periodontal health (group B and group D), the mean age was 14.5 years. Between the four groups there was no significant difference in the age of the included patients.

Gender distribution, in the total group the female gender dominated with an average of 54.83%. In the groups with periodontal diagnosis (group A and group C), the male gender predominated 54.83% (group A) and 61.29% (group C). In the groups with periodontal health diagnosis (group B and group D), the female gender predominated 74.19% (group B and group D) and 61.29% (group D). There was a significant difference in the gender distribution between the groups with periodontal disease and the groups with periodontal health diagnosis.The most representative environment of origin, at the level of the whole group, was the urban environment, being much easier to reach for consultations and treatment, 74.17% of patients and only 26.82% of patients from rural areas. The highest number of patients from rural areas was recorded in batch A, 32.25% of patients, and the lowest number was in batch D, 25.58% of patients.

Body mass index in the total group 83.87% of patients (n=104) had normal body mass and only 16.13% of patients (n=20) had modified body mass. The overweight patients were found in groups A, B, and C as 9.67% of patients (n=3) in group A, 6.45% of patients (n=2) in group B and 9.67% of patients (n=3) in group C. There were also 9.67% of patients (n=3) with severe overweight according to the status-weight parameters identified in group A and 3.22% of patients (n=1) for group B. There are significant differences for modified BMI in the groups with cardiovascular impairment, which emphasizes an imbalance in general health status and possibly inadequate nutrition.

2.Presentation of information related to the clinical parameters plaque index (PI) and gingival index (GI) values presented as minimum, maximum, mean, standard deviation, for all four groups.

There were highly statistically significant

differences between GI values in periodontally affected and periodontally healthy patients, also the most numerous cases of severe inflammation, 3 values, of GI were identified in children with cardiovascular disease 13(41.9%) patients in group A and only 1(3.2%) patient in group C. Maximum GI values were identified in descending order as follows: in group A 90%, 70% for group C, 15% for groups B and D (Table 1.).

There are highly statistically significant differences between the oral hygiene status quantified by means of IP between group A, C and group B, D, but also differences between the group with impaired general status and patients with general status indemn, thus in group A were identified a number of 8 (25.8%) patients with inadequate oral hygiene, compared to group C where 1 (3.2%) patient was identified (Table 2.).

Significant differences in the values of clinical parameters were observed between the groups with a diagnosis of periodontal disease (group A and group C) and the groups with a diagnosis of periodontal health (group B and D).

3.For the results related to the oral hygiene program and rules, the patients' answers were recorded and counted for each of the five questions related to oral hygiene (Frequency of brushing, Brushing technique,

Type of toothbrush used, Frequency of toothbrush change, Additional means of hygiene), the results are presented for each group and the comparison between the groups (group A and group C versus group B and D). When asked about the frequency of dental brushing, most subjects in group A 54.8% of patients (n=17) brush once a day - in the morning, the situation is similar in group C, where 67.7% of patients (n=21) have similar answers. For groups B and D, the majority of the respondents follow the general oral-dental hygiene guidelines: to brush their teeth both in the morning and in the evening, 45.2% of the patients (N=14) in group B and 58.1% of the patients (n=18) in group D (Table 3.).

For the dental brushing technique used the highest percentage of patients in groups A, B and C brushed with horizontal movements, 71.0% of patients (n=22) in group A, 45.2% of patients (n=14) in group B, 71.0% of patients (n=22) in group C. Only group D used mostly correct brushing movements, i.e. 38.7% of the patients (n=12) used rotary movements and 29.0% of the patients (n=9) used vertical brushing movements (Table 4.)

When asked about the type of toothbrush used, the majority of respondents used manual toothbrush, 74.2% of patients (n=23) in group A, 61.3% of patients (n=19) in group B, 71.0% of patients (n=22) in group C and 37.7% of patients (n=21) in group D (Table 5.)

When asked about the frequency of toothbrush changes, respondents in the groups with periodontal disease changed their toothbrush most frequently once every six months, 54.8% of patients (n=17) in group A and 35.5% of patients (n=11) in group C. Patients in groups B and D change their toothbrush most frequently every three months, 58.1% of patients (n=18) in group A and 61.3% of patients (n=19) in group D. Unfortunately there were also patients who reported changing their toothbrush only on deterioration 35.5% of patients (n=11) in group A and 22.6% of patients (n=7) in group C, this being associated with gingival inflammation of various stages (Table 6.).

For additional means of oral hygiene used, there are significant differences between groups. For the groups with periodontal disease, the majority were patients who did not use secondary means of oral hygiene, 77.4% of patients (n=24) in group A and 87.1% of patients (n=27) in group C. For the groups with a diagnosis of periodontal health the auxiliary means of oral cavity hygiene mainly consist in the use of mouthwash, 32.3% of the patients (n=10) in group B and 54.8% of the patients (n=13) in group D.

The other additional means of hygiene are used extremely little, dental floss is used by 3.2% of patients (n=1) in group B and similarly for group D (Table 7.).

4.Results for the section related to knowledge on the importance of maintaining oral health, questions related to the patient-dentist interrelationship, the degree of interest shown by the patient in oral health education and information, knowledge on the importance of maintaining oral health. It includes answers to the following questions (Is the health of your teeth important, How often do you go to the dentist, Where did you get the information about proper oral hygiene, What is bleeding gums).

For the question related to the importance of maintaining oral health, an important difference is observed between the groups with periodontal disease (group A and group C) where 53.2% of the respondents (n=33) consider oral health to be important, in contrast to the groups with periodontal health (group B and group D) where a very high percentage of 98.6% of the respondents (n=61) consider oral health to be important (Table 8.).

Visiting the dentist at 6 months is quite rarely done by 4.8% of respondents (n=21) from group A and group C and 33.9% of respondents (n=21) from group B and group

D. There are also respondents who have never been to the dentist, 12.9% of the respondents (n=4) from group A, 6.5% of the respondents (n=4) from group C (Table 9.).

Looking at the frequency of visits to the dentist, there is a significant difference between the groups, so the groups with a diagnosis of periodontal disease go to the dentist when they need to, when they have problems 12.5% of patients in group A and 58.1% of patients in group C, which is also visible in the graphs (Table 10.).

The information related to oral health is obtained from the family in quite a large number, thus 45.2% of the respondents (n=28) in groups A and C, while 64.5% of the respondents (n=40) in groups B and D obtain this information from the family and also from the dentist, which is reflected in their oral health status (Table 11.)

When asked about the significance of gingival bleeding in the groups with periodontal disease, group A and group C, 50.0% of the respondents (n=31) do not know what gingival bleeding means, in contrast to the groups with good periodontal health, group B and group D, where the number of respondents who do not know what it means is much lower, 14.5% of the respondents (n=9) (Table 12.).

5.Results on eating habits (Consumption of sweets and sweet drinks)

The results on the consumption of sweets and sweet drinks show that most of the respondents in groups A and D consume sweets and sweet drinks daily 51.6% (n=16) and in groups B and C most of the respondents consume sweets and sweet drinks three or four times a week 54.8% (n=17). There are no differences in the answers to this question for groups with periodontal disease compared to groups with periodontal health diagnosis (Table 13.)

The periodontal risk scores were calculated by summing the scores obtained by answering the questionnaire questions.

Patients included in the four groups were scored on the basis of information related to general condition, local status and diagnosis of periodontal disease, and each response to the questionnaire questions. The scores assigned placed patients into a particular periodontal risk category.

In order to observe the differences between the groups, Fisher's test and Pearson Chi-squared test were used, and the descriptive method was used to present the results obtained (Table 14., Table 15.) The highest cumulative score was 84 points and belonged to a patient in group Awith gingival inflammation and cardiovascular damage, the lowest cumulative score was 7 points and belonged to a patient in group D without inflammation and without general condition.

The results of Fisher's test, for groups A and C, did not show a statistically significant difference in periodontal risk p values = 0.07443, for groups B and D p values = 0.1226. It can be seen that p values are above 0.05, although, the null hypothesis cannot be rejected (there is not enough statistical evidence).

There is no statistically significant association between belonging to lot A or C and periodontal risk, so the general health status represented by cardiovascular disease does not necessarily place the patient in a particular periodontal risk category, oral hygiene behavior, regular visits to the dentist, proper nutrition, local inflammatory status have a greater weight in terms of the onset of this risk in childhood.

For the comparison between the pooled groups, those with periodontal disease group A and group C versus those without periodontal disease group B and group D, both Fisher and Pearson Chi-Square statistical tests with very low p values, well below the

0.05 threshold, show that the null hypothesis can be rejected.

Being in batches A or C shows a different periodontal risk profile compared to being in batches B or D. Batches and risk may be associated. By identifying lot membership, periodontal risk can be estimated (Table 15.).

Oral health habits, such as daily tooth brushing, regular flossing to remove plaque, mouthwashing to reduce the microbial load on gum tissues, help to maintain good oral hygiene and prevent localized dental or periodontal diseases in the oral cavity [3, 31]. The acquisition of adequate oral health knowledge from childhood, obtained from professional sources, is directly related to the development of health-promoting behaviors and a high level of oral hygiene [2]. Through the aggregation of the results obtained, it was possible to place patients in a specific periodontal risk category, which will allow proper monitoring in order to improve hygiene rules and change poor oral health behavior.

In the context of evidence-based medicine, risk assessment is an essential tool for clinical decision making, allowing a personalized and efficient approach to patients with periodontal disease. Evidence regarding contemporary mechanical oral hygiene practices for the prevention of periodontal disease is mainly based on studies of patients with gingivitis [25-29].

Groups / Index	Group A				Group B			
	Min	Max	Mean	Std. dev.	Min	Max	Mean	Std. dev.
GI	1	3	2.13	0.85	0	0	0.00	0.00
Groups	**Group C**				**Group D**			
Index	Min	Max	Mean	Std. dev.	Min	Max	Mean	Std. dev.
GI	1	3	1.48	0.57	0	0	0.00	0.00

Table 1. Gingival Index (GI) values, groups A, B, C, D

Groups / Index	Group A				Group B			
	Min	Max	Mean	Std. dev.	Min	Max	Mean	Std. dev.
PI	25.00%	90.00%	57.48%	15.80%	5.00%	15.00%	8.87%	2.80%
Groups	**Group C**				**Group D**			
	Min	Max	Mean	Std. dev.	Min	Max	Mean	Std. dev.

Index								
PI	35.00%	70.00%	50.94%	10.30%	2.00%	15.00%	7.71%	3.30%

Table 2. Plaqe Index (PI) values, groups A, B, C, D

Answer / Groups	Once a day (in the morning)		Once a day (in the evening)		Twice a day he morning and evening		Not daily	
Group A	17	54.8%	1	3.2%	7	22.6%	6	19.4
Group B	12	38.7%	5	16.1%	14	45.2%	0	0%
Group C	21	67.7%	4	12.9%	2	6.5%	4	12.9%
Group D	10	32.3%	3	9.7%	18	58.1%	0	0%
Group A&C	38	51.6%	5	8.1%	9	14.5%	10	16.1%
Group B&D	22	35.5%	8	12.9%	32	51.6%	0	0%

Table 3. Frequency of dental brushing - groups A, B, C, D, combined groups A and C & B and D

Answer / Groups	Horizontal_movements		Vertical_movements		Rotational_movements	
Group A	22	71.0%	8	25.8%	1	3.2%
Group B	14	45.2%	7	22.6%	10	32.2%
Group C	22	71.0%	7	22.6%	2	6.5%
Group D	10	32.2%	9	29.0%	12	38.7%
Group A&C	44	71.0%	15	24.2%	3	4.8%
Group B&D	24	38.7%	16	25.8%	22	35.5%

Table 4. Brushing technique - groups A, B, C, D, combined groups A and C & B and D

Answer / Groups	Manual		Electric		Sonic	
Group A	23	74.2%	7	22.6%	1	3.2%
Group B	19	61.3%	6	19.4%	6	19.4%
Group C	22	71.0%	9	29.0%	0	0%
Group D	21	67.7%	4	12.9 %	6	19.4%
Group A&C	45	72.6%	16	25.8%	1	1.6%
Group B&D	40	64.5%	10	16.1%	12	19.4%

Table 5. Type of toothbrush used - groups A, B, C, D, combined groups A and C & B and D

Answer / Groups	Three months		Six months		One year		When damaged	
Group A	1	3.2%	17	54.8%	2	6.5%	11	35.5%
Group B	18	58.1%	11	35.5%	2	6.5%	0	0%
Group C	0	0%	11	35.5%	13	41.9%	7	22.6%
Group D	19	61.3%	12	38.7%	0%	0%	0	0%
Group A&C	1	1.6%	28	45.2%	15	24.2%	18	29.0%
Group B&D	37	59.7%	23	37.1%	2	3.2%	0	0%

Table 6. Frequency of toothbrush changes - groups A, B, C, D, combined groups A and C & B and D

Answer / Groups	Mouthwash		Interdental brushes		Dental floss		None	
Group A	6	19.4%	0	0%	1	3.2%	24	77.4%
Group B	10	32.3%	1	3.2%	1	3.2%	19	3.2%
Group C	3	9.7%	0	0%	1	3.2%	27	87.1%
Group D	17	54.8%	1	3.2%	0	0%	13	41.9%
Group A&C	9	14.5%	0	0%	2	3.2%	51	82.3%
Group B&D	27	43.5%	2	3.2%	1	1.6%	32	51.6%

Table 7. Additional means of hygiene - groups A, B, C, D, combined groups A and C & B and D

Answer / Groups	Yes		No		Don't know	
Group A	16	51.6%	3	9.7%	12	38.7%
Group B	31	100%	0	0%	0	0%
Group C	17	54.8%	2	6.5%	12	38.7%
Group D	30	96.8%	0	0%	1	3.2%

Group A&C	33	53.2%	5	8.1%	24	38.7%
Group B&D	61	98.6%	0	0%	1	1.6%

Table 8. Dental health is important - groups A, B, C, D, combined groups A and C & B and D

Answer / Groups	Every six months		Yearly		When dental problems occur		Never	
Group A	0	0%	3	9.7%	24	12.5%	4	12.9%
Group B	9	37.5%	13	54.2%	9	29.0%	0	0%
Group C	3	9.7%	8	25.8%	18	58.1%	2	6.5%
Group D	12	38.7%	13	54.2%	6	19.4%	0	0%
Group A&C	3	4.8%	11	17.7%	42	67.7%	6	9.7%
Group B&D	21	33.9%	26	41.9%	15	24.2%	0	0%

Table 8. Dental health is important - groups A, B, C, D, combined groups A and C & B and D

Answer / Groups	Family		Dentist		Family anddentist		School		Internet		Other	
Group A	14	45.2%	0	0%	5	16.1%	3	9.7%	8	25.8%	1	3.2%
Group B	0	0%	8	25.8%	20	64.5%	3	9.7%	0		0	0%
Group C	14	45.2%	0	0%	7	22.6%	5	16.1%	2	6.4%	3	9.7%
Group D	3	9.7%	5	16.1%	20	64.5%	3	9.7%	0	0%	0	0%
Group A&C	28	45.2%	0	0%	12	19.4%	8	12.9%	10	16.1%	4	6.5%
Group B&D	3	4.8%	13	21.0%	40	64.5%	6	9.7%	0	0%	0	0%

Table 10. Where did you get your information about good oral hygiene - groups A, B, C, D, combinedgroups A and C & B and D

Answer / Groups	Healthy gums		Injured gums by brushing or food		Diseased gums		Don't know	
Group A	4	12.9%	7	22.6%	3	9.7%	17	54.8%
Group B	0	0%	10	32.3%	17	54.8%	4	12.9%
Group C	5	16.1%	8	25.8%	4	12.9%	14	45.2%
Group D	0	0%	9	29.0%	17	54.8%	5	16.1%
Group A&C	9	14.5%	15	24.2%	7	11.3%	31	50.0%
Group B&D	0	0%	19	30.6%	34	54.8%	9	14.5%

Table 11. What is bleeding gums hygiene - groups A, B, C, D, combined groups A and C & B and D

Answer / Groups	Daily		Three to four times a week		Two to three times aweek		Once a week	
Group A	16	51.6%	12	38.7%	3	9.7%	0	0%
Group B	5	16.1%	17	54.8%	7	22.6%	2	6.5%
Group C	14	45.2%	17	54.8%	0	0%	0	0%
Group D	16	51.6%	7	22.6%	8	25.8%	0	0%
Group A&C	30	48.4%	29	46.8%	3	9.7%	0	0%
Group B&D	21	33.9%	24	38.7%	15	24.2%	2	3.2%

Table 12. Consumption of sweets and sweet drinks - groups A, B, C, D, combined groups A and C & Band D

Answer / Groups	No risk	Low risk	Moderate risk	High risk

Group A	0	0%	0	0%	11	35.5%	20	64.5%
Group B	14	45.2%	14	45.2%	3	9.7%	0	0%
Group C	0	0%	0	0%	19	61.3%	12	38.7%
Group D	20	64.5%	11	35.5%	0	0%	0	0%
Group A&C	0	0%	0	0%	30	48.4%	32	51.6%
Group B&D	34	54.8%	25	40.3%	3	4.8%	0	0%

Table 13. Periodontal risk - groups A, B, C, D, combined groups A and C & B and D

Groups	Test	p-value	Obs.
Group A&C	Fisher	p-value = 0.07443	ipoteza alternativă: bilaterală
Group B&D	Fisher	p-value = 0.1226	ipoteza alternativă: bilaterală
Group A&C vs. Group B&D	Pearson Chi-Square	p-value < 2.2e-16	X-squared = 113.09, df = 3
Group A&C vs. Group B&D	Fisher	p-value < 2.2e-16	ipoteza alternativă: bilaterală

Table 14. Periodontal risk assessment Fisher and Pearson Chi-Square test

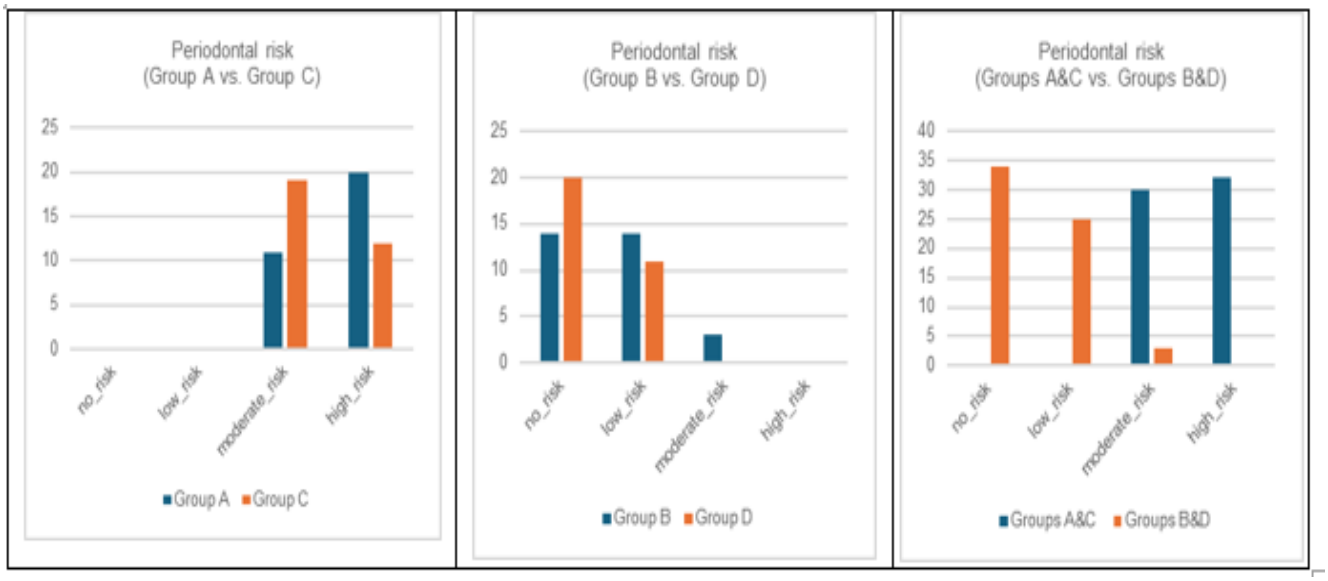

Figure 1: Graph on periodontal risk (AvsC and BvsD but also ACvsBD)

Conclusions

1.For patients in group A, even if the daily hygiene program is better than for patients in group C, the clinical inflammatory manifestations are more evident, which is demonstrated by the high GI values, showing the influence of the general condition on the local inflammatory status.

2. The auxiliary means of oral cavity sanitization are mainly the use of mouthwash. Respondents' interest in performing a proper brushing twice a day, associated with regular visits to the dentist every 6 months were correlated with proper oral hygiene.

3. It is recommended to improve the treatment skills of dentists by shifting from a curative approach to periodontal diseases to a proactive attitude towards the prevention of periodontal diseases.

4. Information about oral health is mostly obtained from the family, similar percentage for group A and group C 45.2% of the respondents. Patients with good oral hygiene and without signs of local inflammation obtain the information cumulatively from the dentist and from the family in 64.5% of the respondents in groups B and D.

5.The epidemiologic study demonstrated significant associations between the periodontal inflammation fence, the presence of cardiovascular diagnosis, oral hygiene habits, regular visits to the dentist, consumption of sweets and sweet drinks.

6.Given the significant impact of periodontal diseases on overall health, it is important to develop meaningful therapeutic guidelines for the prophylaxis of periodontal diseases. If periodontal diseases are one of the major causes of tooth loss in adulthood, we emphasize the importance of implementing periodontal treatments and specialist consultation as early as

7.Promoting oral health among families, in schools, through early and comprehensive interventions in the young population, can contribute to the growth and development of future adults with the best possible oral health\

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