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Validation of Two Different Periodontal risk Assessment Methods: Periodontal Risk Assessment And Periodontal Risk Calculator: A Retrospective Study

[1]Dr. Kalicheti Deepika, Postgraduate, Department of Periodontics, Sree Balaji Dental College and Hospital, Chennai-60010, TamilNadu, India

[2]Dr. J. Bhuvaneswarri, MDS, Professor, Department of Periodontics, Sree Balaji Dental College and Hospital, Chennai-600100, TamilNadu, India

[3]Dr. Anitha Balaji, MDS, Ph.D., HOD & Professor, Department of Periodontics, Sree Balaji Dental College and Hospital, Chennai-600100, TamilNadu, India

Corresponding Author: Dr. J. Bhuvaneswarri, MDS, Professor, Department of Periodontics, Sree Balaji Dental College and Hospital, Chennai-600100, TamilNadu, India

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Abstract

Aim: The aim of the present study is to evaluate the level of agreement and validation between the Periodontal Risk Assessment (PRA) and the Periodontal Risk Calculator (PRC).to know the efficacy of risk assessment for use in clinical perspective.

Materials And Methods: Periodontal risk was retrospectively assessed among 60 patients using PRA and PRC from the available data after thorough periodontal examination for a period of 1 year in Sree Balaji dental college Chennai. PRA by assessing probing pocket depths and bleeding on probing at six (PRA6) sites per tooth, PRC by permanently marking or unmarking the dichotomously selectable factors and statistical analysis was done to see if there is any correlation between PRA and PRC.

Results: Statistically it was analyzed by SPSS version 26. There was no statistically significant relation (p value 0.744) and kappa test was done for level of agreement between risk assessment there was no correlation found between the criteria that were considered to assess risk.

Conclusion: PRA and PRC showed no agreement when compared to each other. Specific disease severity may result in improved agreement.

Keywords: Risk, Periodontal Disease, risk indicators, risk determinants, periodontal risk

Introduction

Periodontal disease is a diverse group of disorders affecting the periodontium, the most common of which are gingivitis and chronic periodontitis. In the past 2 decades, remarkable evidence stated that susceptibility to periodontal disease differs in patients and is a function of both acquired and intrinsic risk factors[1,2]. Key epidemiological studies conclusions suggested that the prevalence of chronic periodontitis in an adult population is 35% to 50%[3].

With large array of factors that influence the development and progression of disease understanding the relationship of these factors to initiation and progression of disease becomes very important. In the past, it was believed that all individuals were equally susceptible to develop periodontitis and accumulation of plaque, poor oral hygiene and occlusal trauma initiates periodontitis.[12] However, in the four decades it was accepted that periodontitis is caused by specific bacterial infections and individuals are not equally susceptible to these infections and to the damage caused by them.

The foremost step in the treatment of periodontal disease is identification of the key pathogen. Periodontal pockets lodge many bacterial phylotypes which is difficult to differentiate commensals and true pathogens. The predominant microorganisms of supragingival plaque are gram positive facultative anaerobic bacteria particularly Actinomyces species, streptococci and capnocytophagaspecies[2,3]. The gram-negative bacteria include Veillonella species, Prevotella species as well as Porphyromonasgingivalis (P.gingivalis) and Tannerella forsythia (T forsythia) whereas, the subgingival plaque comprises the following species, Streptococci, Prevotelladenticola (P.denticola), Porphyromonasendodontalis (P.endodontalis), and Porphyromonasgingivalis (Pg).

Risk is the probability that individual will develop a disease in a given period (Kleinbaum 1982)[4].

Risk assessment : In recent times we have become all too aware of the influence of health and safety regulations on our personal and practicing lives and how the term ‘risk assessment’ has been applied to many activities as diverse as a new surface disinfectant for use in the surgery to a school skiing trip. The process of risk assessment as having ‘five steps’:(Health and Safety Executive (HSE). Five Steps to Risk Assessment. Identify the hazards, Decide who will get harmed and how. Evaluate the risks &decide on precautions, Record your findings & implement them, Review the assessment & update if required.

Risk assessment in periodontics: In the absence of any simple, reliable, accurate prognostic tests for periodontal disease or susceptibility to such diseases, we currently rely on clinically driven risk assessments of our patients. The five steps are broadly expressed in our efforts to determine those at risk of destructive periodontal diseases and to plan their subsequent management: Clinical& radiographic examination of tissues and biofilm-related problems, Considering systemic, genetic, medical, and social factors, Concluding to a diagnosis from these observations and producing a treatment plan, Recording initial (and subsequent) findings accurately as part of executing the planned treatment, Reviewing the outcome of such treatment against expectations and modifying therapy if necessary.

Accordingly, many recent efforts related to risk assessment have been researching for identification of new risk factors and mainly for developing a viable algorithm to assess risk in the clinical setting.

Materials And Methods

The present study was reviewed and approved by the Institutional Ethical Committee, Sree Balaji Dental College and Hospital.

The proposed study was conducted on 60 subjects. Study was conducted for duration of one year.

The patients and data were collected from outpatient department (OPD), Department of Periodontics and Implantology, Sree Balaji Dental College and Hospital, Chennai, Tamil Nadu, discrimination in Gender, religion, and socioeconomic status. Demographic data (age, gender), habits(smoking), systemic status (Hb%, WBC and diabetic status) and Periodontal disease status(staging and grading) were correlated with periodontal risk assessment tool s like periodontal risk assessment (PRA) and Periodontal risk calculator(PRC).

The subjects were selected according to the following criteria's,

Inclusion Criteria: Age ≥18 years at start of the therapy, Gender – male/female, Patient with at least 20 permanent teeth, Complete periodontal status at time of examination with pocket probing depths (PPD), clinical vertical attachment level (CAL), and bleeding on probing (BOP)at six sites per tooth, Evaluable radiographs (set of periapical or panoramic radiographs) at the time of examination, If patients were diabetics at the follow-up examination, a recent HbA1c value not older than 3 months available from their medical history. Diabetes was defined as HbA_{1c} ≥6.5% (≥47.5 mmol/mol). Prediabetes was classified as HbA_{1c} between 5.7 and 6.4%.

Exclusion Criteria: Pregnant and lactating mothers, Any antibiotic or steroid therapy for the past 6 weeks, Periodontal treatment for past six months, Individuals on antidepressants, PCOD individuals.

Patients were diagnosed according to the 1999 classification of periodontal diseases valid at the time of the respective examination. Periodontal charts recorded at the examination time were use for this study, all patients were assigned to stages according to the 2018 classification based on interproximal CAL-V, teeth missing due to periodontal reasons and complexity. A localized stage3 periodontitis was classified as a moderate Supportive periodontal treatment diagnosis, a generalized stage 3 or stage 4 periodontitis as well as a molar-incisor pattern with CAL-V ≥ 5mm were categorized as a severe baseline diagnosis. All patient-specific and tooth-specific parameters recorded were taken from the medical history at re-examination or from the patient charts obtained manually and transferred to the PRA or PRC software. The distance from the cemento-enamel-junction (CEJ) to the most apical extension of the bone defect is considered as bone loss. The restoration margin was used as reference when tooth is restored. Only the root with the apparently largest bone loss was measured in case of multi-rooted teeth. The patients who was recruited were included in the study.

Periodontal risk is to be retrospectively assessed among 60 patients using Periodontal Risk Assessment (PRA) and Periodontal Risk Calculator(PRC).

PERIODONTAL RISK ASSESSMENT (PRA)[5]: Lang and tonetti 2003

PRA is calculated based on the data collected for the following six parameters:

1. Percentage of sites with BOP.
2. Number of residual pockets ≥5mm.
3. Number of lost teeth except 3rd molars (28 teeth) irrespective of their replacement.
4. Loss of periodontal support in relation to the patient´s age.

5. Cigarette consumption.

6. Systemic/genetic factors.

Finally, a classification of low, moderate, or high risk was assigned.

Periodontal Risk Calculator (PRC)[6]: PREVISER person et al 2003

For PRC risk assessment, the following factors were entered in a commercially accessible online platform(http://www.previser.com; Previser Corp., Concord, NH,

USA):

1. Gender

2. Age

3.Cigarette consumption

4. Oral hygiene improvement needed (yes/no)

5. Irregular recall visits (yes/no)

6. Scaling and root planning completed (yes/no)

7. Periodontal surgery done during APT or SPT(yes/no)

8. Presence of furcation involvement (FI) (yes/no)

9.Presence of subgingival restoration margins (yes/no)

10. Clinically/radiographically visible calculus(yes/no)

11. Deepest PPD per sextant (<5mm, 5–7mm,and >7mm measured at six sites per tooth or edentulous sextant)

12. BOP per sextant (yes/no)

13. Radiological bone loss (<2mm, 2–4mm, or >4mm)

The digital tool calculated the so-called "Gum Disease Risk Score." comprising five categories(1=very low risk, 2=low risk, 3=moderate risk, 4=high risk,5=very high risk).

Statistical Analysis

Statistical analysis was done in SPSS version 26 software. The outcome variables evaluated in this study were periodontal risk (PRA) level and periodontal risk calculator(PRC) levels for each subject. The parameters that were correlated with PRA and PRC are age, sex, smoking status, Hb%, WBC count, Diabetic status, Periodontal disease status. Pearson chi square test was used to explore association between PRA and PRC individually with all the parameters mentioned above. Correlations were calculated using kappa using the data set for all individuals.

Results

A retrospective study was done in 60 patients (29 females and 31 males) with mean age group of 18 – 60 years was conducted over a period of 2 months who were clinically categorized according to the staging and grading of periodontitis. The average value of age when correlated to PRA &PRC is 5.010 and 2.638 respectively. There is no statistical significance found between age when associated with PRA (pvalue:0.542) and PRC (p value: 0.853) separately. (Table1, Figure3). The mean value of PRA & PRC in comparison with gender is 1.355&4.423. There was no statistical significance found between gender when correlated with PRA (pvalue:0.0508) and PRC (pvalue:0.110) separately.(Table2 and Figure 4).There was no statistical significance found between Hb% when correlated with PRA(pvalue:0.651)and PRC (pvalue:0.307) separately.(Table 3 and Figure5). Out of 60 individuals, only 1 individual has higher levels of WBC. Remaining individuals have normal counts of WBC. There is no statistical significance found between WBC counts and PRA (P value: 0.491)and PRC(p value: 0.234) separately (Table6 and Figure5).

Among 60 individuals, 9 individuals were diabetic 51 individuals were non-diabetic when compared to normal range. There is no statistical significance found between diabetic status of the individuals when correlated with PRA(P value : 0.802) and PRC(p value:0.545) separately.(Table 7 and Figure6).Out of 60 patients, according to periodontitis staging15% patients belonged to stage –I, 35% patients belonged to stage–II,50%

patients belonged to stage-III.As there is no equal distribution of cases there is no statistical association found between staging and PRA(pvalue:0.819) &PRC (p value:0.348) separately (Table 8 and Figure 7).Distribution of periodontitis grading was 10% patients were Grade A, 70% patients were Grade B,20% patients were Grade C. There is no statistical association found with PRA(P value :0.773) &PRC (p value :0.238) individually when correlated to grading.(Table9 and Figure 8).In PRC, 6 were categorized as low risk, 7 medium risk and 47 high risk. In PRA, 1individual has low risk, 10 has medium risk and 49 are in high risk. There is no statistical significance (pvalue:0.744)found between PRA and PRC(Table10 and Figure9).

Kappa statistics for staging and PRA is negative(-) 0.46.which specifies there is no agreement than the expected between staging and PRA. The value is negative, that is staging and PRA has less agreement, Kappa statistics for Grading and PRC is negative(-)0.425.which specifies there is less agreement than the expected between Grading and PRC. the value is negative, that is Grading and PRC has less agreement, according to the Kappa value there is fair agreement between grading and PRC. kappa value is 0.233333

No of agreements is 37 between PRA and PRC done using cohen kappa agreement. Kappa statistics for PRC and PRA is negative (-) 0. 705.which specifies there is worst agreement than the expected between PRC and PRA. The value is negative, that is PRC and PRA has less agreement,

Results

Table 1: Co -Relation of Age with PRA And PRC:

Age*PRA					
		PRA			Total
		Low	Medium	High	
≤30Years	Count	0	2	8	10
	Row%	.00	20.00	80.00	100.00
31–40	Count	0	5	17	22
	Row%	.00	22.73	77.27	100.00
41–50	Count	1	1	11	13
	Row%	7.69	7.69	84.62	100.00
>50Years	Count	0	2	13	15
	Row%	.00	13.33	86.67	100.00
Total	Count	1	10	49	60
	Row%	1.67	16.67	81.67	100.00
Pearson Corelation test Value:5.010;P=0.542					
Age*PRC					
Age		PRC			Total
		Low	Moderate	High	

≤30Years	Count	2	1	7	10
	Row%	20.0	10.0	70.0	100.0
31–40	Count	1	3	18	22
	Row%	4.5	13.6	81.8	100.0
41–50	Count	2	1	10	13
	Row%	15.4	7.7	76.9	100.0
>50Years	Count	1	2	12	15
	Row%	6.7	13.3	80.0	100.0
Total	Count	6	7	47	60
	Row%	10.0	11.7	78.3	100.0
Pearson Corelation test Value:2.638;P=0.853					

Figure 1:Co-Relation of Age with PRA AND PRC

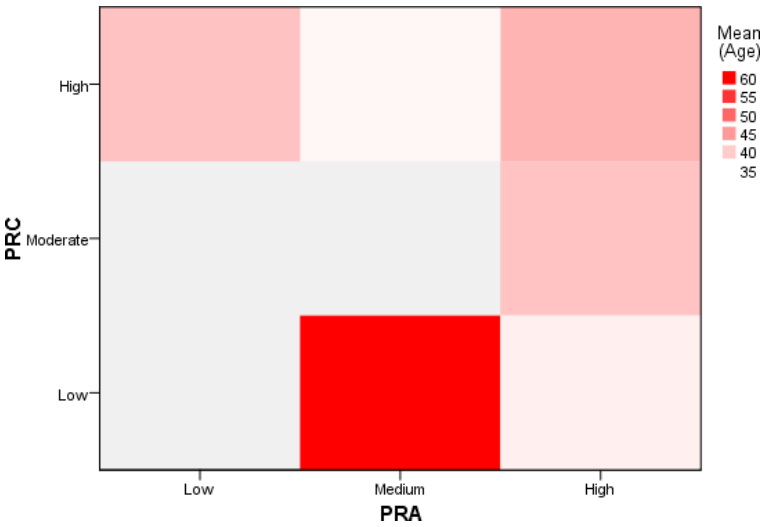


Table 2: Co-Relation of Gender With PRA AND PRC:

Gender*PRA					
Gender		PRA			Total
		Low	Medium	High	
Female	Count	1	4	24	29
	Row%	3.4	13.8	82.8	100.0
Male	Count	0	6	25	31
	Row%	.0	19.4	80.6	100.0
Total	Count	1	10	49	60
	Row%	1.7	16.7	81.7	100.0
Pearson Corelation test Value:1.355;**P=0.508**					
Gender * PRC					
Gender		PRC			Total

		Low	Moderate	High	
Female	Count	1	2	26	29
	Row%	3.4	6.9	89.7	100.0
Male	Count	5	5	21	31
	Row%	16.1	16.1	67.7	100.0
Total	Count	6	7	47	60
	Row%	10.0	11.7	78.3	100.0
Pearson Corelation test Value:4.423;**P=0.110**					

Figure 2:Co-Relation of Gender with PRA AND PRC:

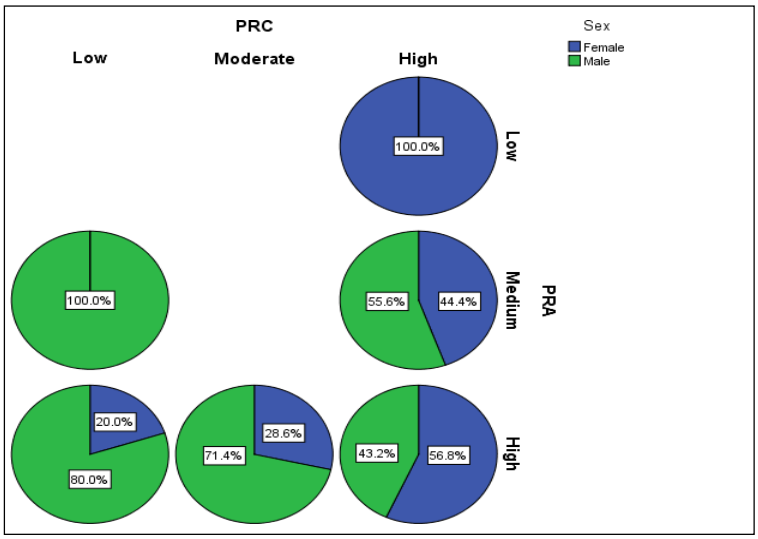


Table 3:Co-Relation of Anemia with PRA AND PRC:

Anemic/Normal*PRA					
Anemic/Normal		PRA			Total
		Low	Medium	High	
Anemic	Count	1	6	27	34
	Row%	2.9	17.6	79.4	100.0
Normal	Count	0	4	22	26
	Row%	.0	15.4	84.6	100.0
Total	Count	1	10	49	60
	Row%	1.7	16.7	81.7	100.0
Pearson Corelation test Value:0.859;P=0.651					
Anemic/Normal * PRC					
Anemic/Normal		PRC			Total
		Low	Moderate	High	
Anemic	Count	2	3	29	34

	Row%	5.9	8.8	85.3	100.0
Normal	Count	4	4	18	26
	Row%	15.4	15.4	69.2	100.0
Total	Count	6	7	47	60
	Row%	10.0	11.7	78.3	100.0
Pearson Corelation test Value:2.359;P=0.307					

Figure 3:Co-Relation of Anemia WITH PRA AND PRC:

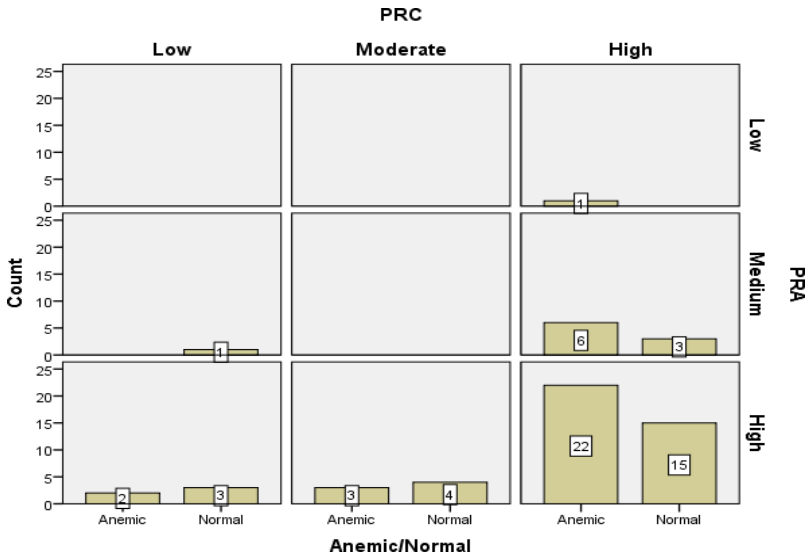


Table 4: Co-Relation of WBC With PRA AND PRC:

	PRA						Independent Sample-test	
	Low		Medium		High			
	Mean	SD	Mean	SD	Mean	SD	t-Value	P-Value
WBC	6540.0	.	7885.0	1556.6	7561.4	1300.7	.694	**.491**

	PRC						One way ANOVA	
	Low		Moderate		High			
	Mean	SD	Mean	SD	Mean	SD	F- Value	P-Value
WBC	8448.3	1060.8	7725.7	1079.1	7491.1	1384.9	1.488	**.234**

Figure 4 :Co-Relation of WBC With PRA AND PRC:

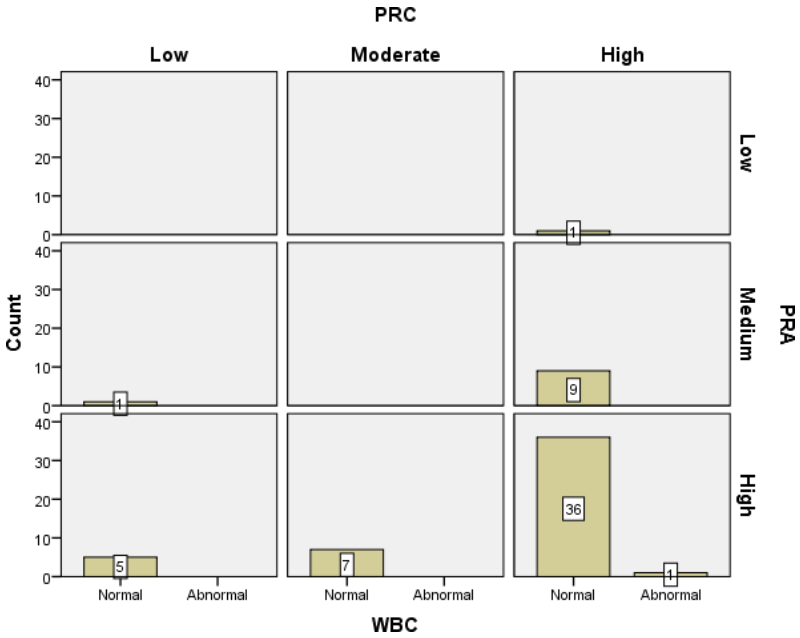


Table 5: Co-Relation of Diabetes with PRA AND PRC:

Diabetic/Non-diabetic*PRA					
Diabetic/Non-diabetic		PRA			Total
		Low	Medium	High	
Diabetic	Count	0	1	8	9
	Row%	.0	11.1	88.9	100.0
Non-Diabetic	Count	1	9	41	51
	Row%	2.0	17.6	80.4	100.0
Total	Count	1	10	49	60
	Row%	1.7	16.7	81.7	100.0
Pearson Chi-Square test:	Chi-SquareValue:0.440;P=0.802				
Diabetic/Non-diabetic * PRC					
Diabetic/Non-diabetic		PRC			Total
		Low	Moderate	High	
Diabetic	Count	0	1	8	9
	Row%	.0	11.1	88.9	100.0
Non-Diabetic	Count	6	6	39	51
	Row%	11.8	11.8	76.5	100.0
Total	Count	6	7	47	60
	Row%	10.0	11.7	78.3	100.0
Pearson Chi-Square test:	Chi-SquareValue:1.212;P=0.545				

Figure 5 :Co-Relation of Gender with PRA AND PRC:

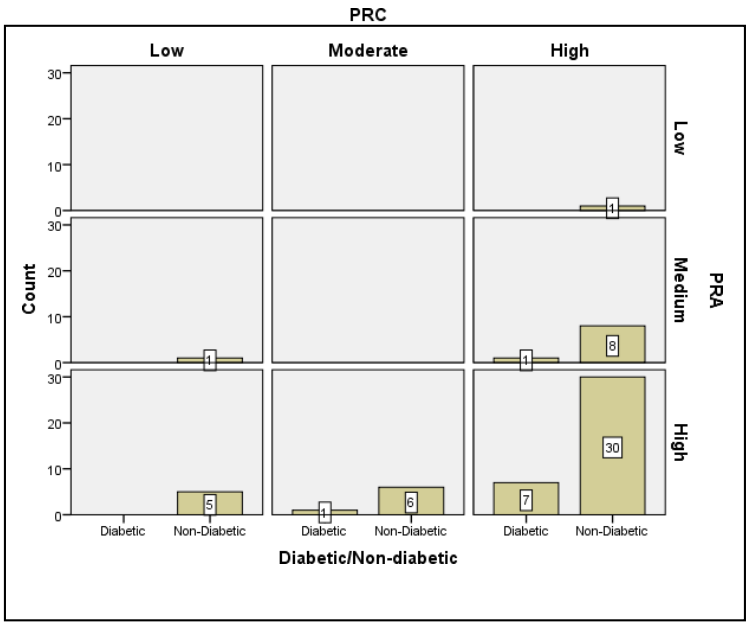


Table 6: Co-Relation of Periodontitis Staging With PRA AND PRC:

Staging*PRA					
Staging		PRA			Total
		Low	Medium	High	
Stage I	Count	0	2	7	9
	Row%	.00	22.22	77.78	100.00
Stage II	Count	0	4	16	20
	Row%	.00	20.00	80.00	100.00
Stage III	Count	1	4	26	31
	Row%	3.23	12.90	83.87	100.00
Total	Count	1	10	49	60
	Row%	1.67	16.67	81.67	100.00
Pearson Corelation test Value Value:1.541; P=0.819					
Staging*PRC					
Staging		PRC			Total
		Low	Moderate	High	
Stage I	Count	2	2	5	9
	Row%	22.22	22.22	55.56	100.00
Stage II	Count	1	1	18	20
	Row%	5.00	5.00	90.00	100.00
Stage III	Count	3	4	24	31
	Row%	9.68	12.90	77.42	100.00

Total	Count	6	7	47	60
	Row%	10.00	11.67	78.33	100.00
Pearson Chi-Square test:		Chi-SquareValu:4.457;P=0.348			

Figure 6:Co-Relation of Periodontitis Staging With PRA

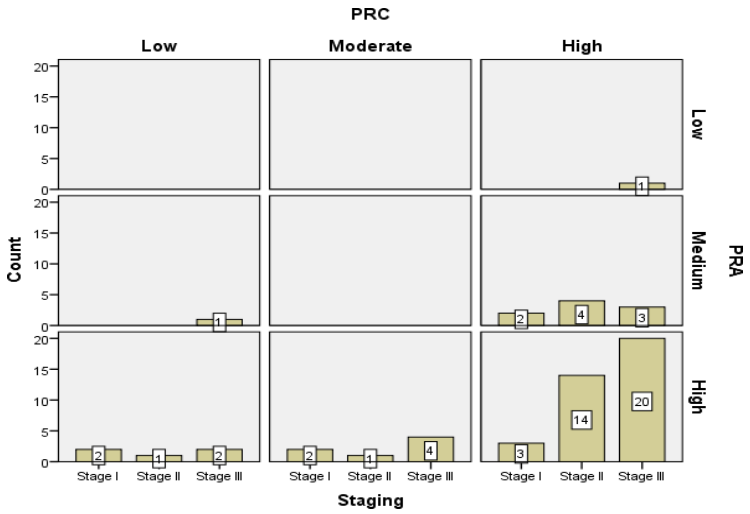


Table 7:Co-Relation of Periodontitis Grading with PRA AND PRC:

Grading*PRA					
Grading		PRA			Total
		Low	Medium	High	
Grade A	Count	0	2	7	9
	Row%	.00	22.22	77.78	100.00
Grade B	Count	0	4	23	27
	Row%	.00	14.81	85.19	100.00
Grade C	Count	1	4	19	24
	Row%	4.17	16.67	79.17	100.00
Total	Count	1	10	49	60
	Row%	1.67	16.67	81.67	100.00
Pearson Chi-Square test:		Chi-SquareValue:1.798;P=0.773			
Grading*PRC					
Grading		PRC			Total
		Low	Moderate	High	
Grade A	Count	2	2	5	9
	Row%	22.22	22.22	55.56	100.00
Grade B	Count	1	4	22	27
	Row%	3.70	14.81	81.48	100.00
Grade C	Count	3	1	20	24

	Row%	12.50	4.17	83.33	100.00
Total	Count	6	7	47	60
	Row%	10.00	11.67	78.33	100.00
Pearson Chi-Square test:	Chi-SquareValue:5.518;P=0.238				

Figure 7: Co-Relation of Periodontitis Grading with PRA AND PRC:

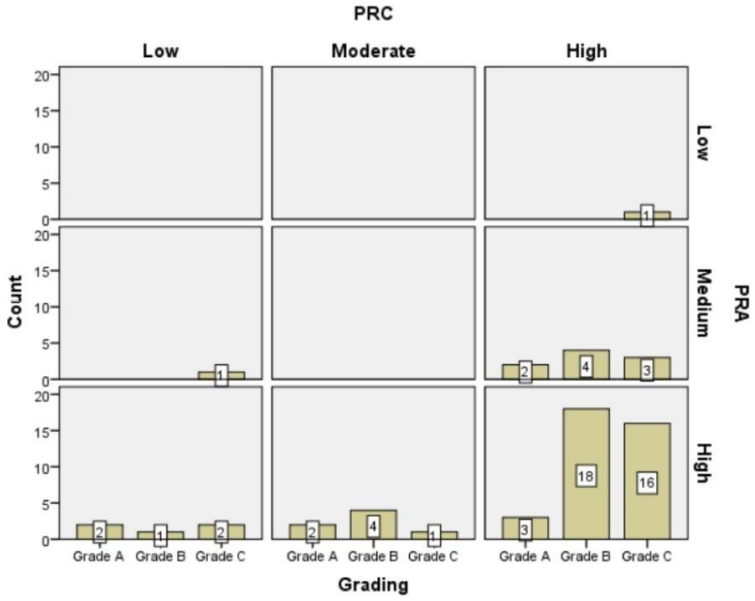
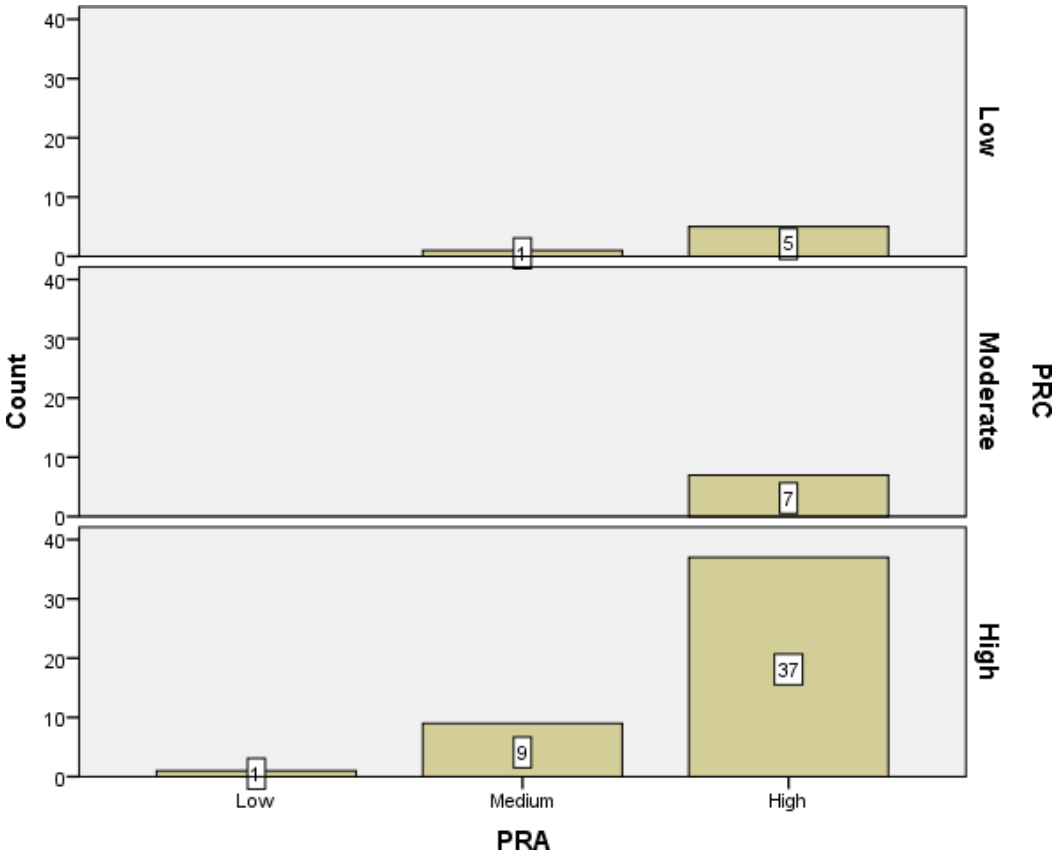


Table 8:Co-Relation Between PRA AND PRC:

PRA*PRC					
PRA		PRC			Total
		Low	Moderate	High	
Low	Count	0	0	1	1
	Row%	.0	.0	100.0	100.0
Medium	Count	1	0	9	10
	Row%	10.0	.0	90.0	100.0
High	Count	5	7	37	49
	Row%	10.2	14.3	75.5	100.0
Total	Count	6	7	47	60
	Row%	10.0	11.7	78.3	100.0
Pearson Chi-Square test:	Chi-SquareValue:1.9572;P=0.744				

Figure 8 :Co-Relation Between PRA AND PRC:



Discussion

Periodontitis is a chronic inflammatory disease driven by bacterial pathogens and one of the most common oral infections worldwide (WHO 2004) that affects around 5-20% of adult population globally[7]. Although in population with poor oral care, the prevalence of periodontitis as high as 60% and up to 90% for gingivitis[8], the host response to periodontal pathogens represents a crucial determinant of the individual's susceptibility to periodontitis. Risk assessment has become a regular feature in both dental practice and society, and principles used to assess risk in society are like those used in a clinical setting. Although the concept of risk assessment as a sign for periodontal disease incidence and activity is well established for managing periodontitis, the use of risk assessment to manage the treatment of periodontitis practically and its sequelae appears to have weak foundation. Initial risk assessment system uses Basic Periodontal Examination (BPE), clinical, medical, and social factors. The risks of not treating the patient are considered as failure and the problems of successful treatment are illustrated by the practical management of posttreatment. Periodontal risk assessment may help clinicians to identify patients with an impaired periodontal prognosis as well as determine the impact of treatment on prognosis[9]. It is incumbent upon the clinician to recognize when treatment has been less successful and to reassess the situation to try and identify the reasons for the lack of a positive treatment response. This study aimed to evaluate the level of agreement between the Periodontal Risk Assessment (PRA) and the Periodontal Risk Calculator (PRC) and was done to evaluate if both risk analysis methods i.e; periodontal risk assessment (PRA)and periodontal risk calculator (PRC) differ from each other about calculated risk categories in the first visit of the individual.

In this study, we assessed PRC and PRA for 60 patients. According to PRC and PRA, patients were categorized into low, medium and high risk. In PRC, 6 were categorized as low risk and in PRA 1 individual is in low-risk category, in PRC 7 are in medium risk group and in PRA 10 are in medium risk group and in PRC 47 are in high risk and in PRA 49 are in high risk. The difference between PRC and PRA among the study groups is because of the variability in the parameters taken to calculate. In PRC parameters like previous history of periodontal surgery, furcation involvements, subgingival restorations and calculus seen in radiographs or below the gingival margins have been taken. Whereas in PRA greater detail about bleeding sites than PRC and details of the genetic makeup of the patient were used. While in the PRC pocket depth are assessed segment wise in the PRA pocket depth is assessed tooth wise. Other differences are that while PRA assesses for tooth loss, PRC does not.

In a study done by Hari Petsos[10] in 2020 on periodontal risk assessment tools, results showed that PRA4 and PRCred did not match p=0.13 and concluded that the assessment of the individual risk for the progression of periodontitis using 2 risk assessment methods showed only a minimal agreement. In the current study p-value is 0.87 which is >0.01 showing that PRA and PRC has no correlation indicating no agreement between the tools when compared.

In a similar study by Naga Sai Sujai[11], it was concluded that there is a significant relation between PRA and PRC ($p < 0.05$) indicating accuracy of both the tools. However, in the present study, it is found that there is no significant relationship between the tools (PRA and PRC).

Matuliene G[12]used PRA for assessing recurrence of periodontitis and tooth loss and stated that patients with a high-risk profile after APT were more prone to recurrence of periodontitis and to tooth loss than patients with a moderate or a low risk profile. But in the current study PRA is only calculated in the first visit and the individuals were categorized into high, medium, and low profiles but prediction of recurrence of disease was not assessed.

Mayer baumer[13]A done a study to evaluate the predictive value of the modified periodontal risk assessment (PRA) in patients with aggressive periodontitis (AgP). for the first time on 86 patients and results showed that total of 14 patients showed a localized AgP, 60 a high-risk-profile and 19 were compliant with the proposed maintenance-interval and concluded that the prognostic value cannot be confirmed in case of aggressive periodontitis. But in this study, new classification of periodontitis(2017) was considered. Since there is no category for aggressive periodontitis in the current classification, individuals were categorized into staging and grading and results showed that among 60 patients 47 has high risk profile, 10 medium risk and 1 low risk profile.

Yong Hur[14]conducted a study to check the association between risk calculator and microbial testing in periodontitis pts in 74 patients and concluded that 46 patients scored as “very high” risk of periodontitis and 22 patients scored as “high” risk of periodontitis by PRC. Patients with a risk score of “very high” risk showed a higher detection of each bacterium except C. spec. than the rest of the study population. Treponema denticolaand Prevotella intermedia ($p = 0.01$ and $p = 0.02$, respectively) were two bacteria that showed statistical significance between patients at very high risk. But, in the present study, no microbiological assessment was done. Due to the retrospective nature of our study, it was not possible to retrieve information on

the causes for tooth loss or extraction. In absence of this information, it is uncertain whether tooth loss may represent here a true indicator of periodontitis progression. BOP or BI reflects the inflammatory status of the gingiva. Combined with the presence of deep pockets, BOP >30% is known as a risk factor for TL. The present study suggests that the prevalence of BOP was high in individuals who has high risk category when PRA tool was used. But in PRC, BOP was recorded dichotomously.

This is the first study where haematological parameters like Hb% and WBC were correlated with PRA and PRC. However, the results don't show any statistical significance. The limitation of the current study is there is no equal distribution of cases that lead to variations in the results.

In all the other studies, patients were categorized according to AAP 1999 classification, whereas in the current study, new classification (world workshop 2017) was used to categorize the individuals into staging and grading. However, when periodontal status is correlated with periodontal tools like PRA and PRC, no statistical significance was found.

No data, however, is available on the impact that risk assessment may have on patient management. In this aspect the use of risk assessment to determine the frequency of supportive periodontal care appointments has been proposed along with the idea that it may help in treatment approach.

To further elucidate the use of risk assessment tools, a long-term study with large sample of subjects with equal distribution of samples should be carried out.

Conclusion

In today's health - and cost-conscious environment, it is essential that rational and cost -effective decisions be made for prevention and treatment of the periodontal diseases which is based on accurate diagnosis of populations at increased risk of developing periodontal disease reduction that may reduce the need for complex periodontal therapy and improve patient outcome.

The aim of risk assessment is to provide the clinician an opportunity to develop a risk-based treatment plan which will incorporate the level of risk and the severity of periodontal disease. It also highlights the opportunity to develop an accurate treatment plan that targets the risk factors.

Risk assessment on site level may be useful in evaluating periodontal disease activity and determining periodontal stability or on-going inflammation. The site risk assessment is essential for the identification of the sites to be instrumented during Supportive Periodontal Therapy.

Making use of chair side risk assessment tools like PRA, PRC would aid in personalized treatment plan for the patient and efficient periodontal therapy can be delivered to the patients and this can be an eye opener for interdisciplinary approach. As we are switching to more adult treatment approach in the current scenario, using risk assessment tools can be handy tool for other specialty clinicians.

Both PRC and PRA are well suited in achieving the goals proposed with patient -based risk assessment. Use of the risk assessment tools over time may result in more uniform and accurate periodontal clinical decision making , improved oral health, reduction in the need for complex therapy, reduction in feasibility , and speed up transition from a repair model to a wellness model of care.

A future tool which incorporates the best aspects of all the mentioned tools above would probably be a better way forward in this aspect. There are no longitudinal studies where risk assessment models are validated.

Many studies are to be needed for determining the most effective way to incorporate risk assessment .

Incorporation of risk into clinical practice has the efficiency to change the traditional approach to deliver the periodontal care. It is anticipated that this will reduce the need for complex periodontal procedures and can be feasible by the patient for periodontal care.

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