ijlpr 2022; doi 10.22376/ijpbs/lpr.2022.12.6.L124-131

International Journal of Life science and Pharma Research

ISSN 2250-0480

Research Article

Periodontal Risk Assessment

Comparison of Change in Periodontal Risk in Adult Patients Following Phase I Therapy – A Preliminary Study

Shreya Shetty*[1], Ola Hashim Fatani[2], Raghad Abdulhadi Aljabri[2], Nojoud Mohammed Alameel[2], Nour Abdulmajeed Lardhi[2] and MS Khammarunissa Shaikh[3]

*[1]Dr Shreya Shetty, BDS, MDS(Periodontics), FICOI

[2]Dental intern, Dentistry Program

[3]Quality assurance center, Ibnsina National College of Medical Sciences, Jeddah, Ksa.

Abstract: Periodontal risk assessment is essential to ensure the successful outcome of periodontal therapy. Various assessment tools have been devised over the years of which the periodontal risk assessment(PRA) tool by Lang & Tonetti is one of the more authentic tools, and it assesses the risk of severity of periodontal disease by taking into account various components which are a combination of risk factors, indicators, and markers. The present study used this tool to evaluate the change in periodontal risk following phase I periodontal therapy. Following the approval from the institutional ethical committee, 299 male and female patients aged 18 to 60 years undergoing comprehensive clinical care (CCC) at ISNC dental clinics from October 2020 until April 2021 were selected, and PRA was assessed at baseline (before phase I therapy) and following a re-evaluation of phase I therapy (4-6 weeks after phase I therapy). All the parameters of the Lang and Tonetti's PRA model were recorded, and the periodontal risk was calculated accordingly. The data collected was entered into a Microsoft excel sheet. Statistical analysis was carried out using SPSSV 22 software. The results showed significant differences in essential risk parameters – sites with bleeding on probing(BOP), alveolar bone loss, and polygon surface area for risk. ($P<0.05$). These were the expected parameters to change following phase -I therapy, thus having a profound influence on the periodontal risk. However, chi-square values showed no changes in systemic and general factors and smoking. ($P>0.05$) These factors are usually permanent and often impossible to eliminate, even if under control. Concerning smoking, even if the patients quit or reduce the number of cigarettes smoked, the alteration in risk levels is minimal or negligible. Thus, Phase I periodontal therapy significantly influences the risk levels in adult patients.

Keywords: *Periodontal risk, PRA tool, phase I therapy and phase I re-evaluation.*

***Corresponding Author**

Shreya Shetty , Dr Shreya Shetty, BDS, MDS(Periodontics), FICOI

Received On 24 May, 2022

Revised On 30 August, 2022

Accepted On 6 September, 2022

Published On 1 November, 2022

Funding This research did not receive any specific grant from any funding agencies in the public, commercial or not for profit sectors.

Citation Shreya Shetty, Ola Hashim Fatani, Raghad Abdulhadi Aljabri, Nojoud Mohammed Alameel, Nour Abdulmajeed Lardhi and MS Khammarunissa Shaikh , Comparison of Change in Periodontal Risk in Adult Patients Following Phase I Therapy – A Preliminary Study.(2022).Int. J. Life Sci. Pharma Res.12(6), L124-131 http://dx.doi.org/10.22376/ijpbs/lpr.2022.12.6.L124-131

1. INTRODUCTION

Risk assessment and application of this information in preventing and treating periodontal disease is a tried and tested concept. Periodontal disease was once thought to be a disease that only affected adults, but it is now widely accepted that different susceptibility patterns may exist in diverse populations. A thorough risk assessment model is required to evaluate the risk faced by various kinds of periodontal disease. [1] Nonetheless, systemic risk factors in the host, such as gender, smoking, alcohol, diabetes, stress, and hereditary variables, typically impact the rate and progression of the disease, as well as the onset and severity of the condition. [2] The discovery of these periodontal risk factors has greatly aided our understanding of the pathophysiology of periodontal disease, expanding options for periodontal therapy and periodontal disease prevention for those who are at risk. [2] The therapist would be able to identify the frequency and quantity of professional support required to maintain periodontal health after active therapy based on the individual's risk level for disease progression.[3] As a reason, a thorough examination of the patient's risk factors would appear to be required to more correctly determine individual risk, create prognoses, and make informed treatment decisions. It also aids in determining the frequency and scope of professional assistance required to maintain the clinical attachment levels(CAL) achieved after active therapy.

Consequently, determining such risk levels during supportive periodontal therapy would prevent under-treatment and over-treatment [2]. Various periodontal risk assessment tools have been devised to quantify risk based on a cumulative assessment of the multiple factors. [4-7]. The periodontal risk assessment(PRA) model by Lang and Tonetti [4] assesses the risk of severity of periodontal disease by taking into account various components, which are a combination of risk factors, indicators, and markers. The PRA model is based on a multifactorial graphic i.e., the Periodontal Pentagon Risk Diagram. (figure 1) This functional diagram comprises six vectors representing a combination of six clinical, systemic, and environmental factors to predict the risk of recurrence of periodontitis. Following assessment, the patients are classified under low (figure 2), moderate (figure 3), or high-risk (figure 4) profiles. This classification enables the clinician to plan and modify treatment plans, especially in comprehensive cases. The PRA model further suggests that the patient's risk assessment for recurrence of periodontitis may be evaluated based on several clinical conditions whereby no single parameter displays a more paramount role. The entire spectrum of risk factors and indicators should be evaluated simultaneously. For this purpose, a functional diagram has been constructed, including the following aspects:

1. Percentage of bleeding on probing(BOP)
2. Prevalence of residual pockets greater than 5 mm, (PD)
3. Loss of teeth from a total of 28 teeth,
4. Loss of periodontal support in relation to the patient's age,
5. Systemic and genetic conditions, and
6. Environmental factors, such as cigarette smoking.

Each parameter has its scale for minor, moderate, and high-risk profiles. A comprehensive evaluation of the functional diagram will provide an individualized total risk profile and determine the frequency and complexity of Supportive Periodontal Therapy(SPT) visits. Modifications may be made to the functional diagram if additional factors become important according to new evidence[4]. The PRA assesses risk for patients during the supportive, post-treatment phase, after active therapy has been completed. After successful active periodontal treatment, the clinical diagnosis of supportive periodontal therapy is determined based on the patient's health status. [8] PRA appears to overestimate the possibility of disease progression and provides a valuable tool for clinicians and patients to discuss various variables that impact periodontal health. Furthermore, the model shows how periodontal treatment can reduce the further risk for periodontal disease. [3] Phase I therapy in comprehensive clinical cases involves a significant part of nonsurgical periodontal treatment, which is critical to the success of the remaining phases (II&III). At the same time, it is also crucial to achieve a successful overall treatment outcome of the case. Evaluation of the results of phase I therapy is referred to as phase I re-evaluation. The present study aimed to assess the changes in periodontal risk following phase I periodontal therapy to understand which of the risk elements may contribute to this change.

2. MATERIALS AND METHODS

Following the approval from the institutional ethical committee (approval no. IRRB-06-17102021) , 350 patients aged 18 to 60 Years undergoing comprehensive clinical care (CCC) at ISNC dental clinics from October 2020 until April 2021 were selected. CCC Patients undergo comprehensive treatment with a thorough review of risk, and treatment is carried out in phases with careful monitoring until completion. The inclusion and exclusion criteria of patient selection were as follows:

2.1 Inclusion Criteria

2.1.1 Male and female adult patients (18-60 years of age) undergoing comprehensive clinical care (requiring the involvement of multiple branches of dentistry)

2.1.2 Patients who have already consented to comprehensive treatment and participate in this study.

2.2 Exclusion Criteria

2.2.1 Patients who refused to participate in the study despite giving consent for comprehensive care treatment.

2.2.2 Physically and mentally challenged individuals were excluded.

Periodontal risk assessment(PRA) using Lang and Tonetti model was carried out at baseline to assess each patients' periodontal risk at the start of treatment using the online PRA tool; https://www.perio-tools.com/pra/en/. The changes in risk were again reassessed following phase I of the treatment. The risk was calculated using information obtained from periodontal charting and radiographs that were done at the start of the treatment (baseline) and again repeated as part of a re-evaluation of phase –I therapy. The PRA consists of an assessment of the level of infection (full mouth bleeding scores), the prevalence of sites with BOP, the number of sites with PD 5mm, bone loss/age (BL/age) ratio, an estimation of the loss of periodontal support with the patient's age, number of tooth lost, diabetes status, and smoking status . (figure 1) The alveolar bone loss was measured using millimeter scale on digital intraoral periapical radiographs (IOPA) of the sites with PD greater than 5mm. Patients were classified into low-, moderate-, or high-risk categories based on risk status[3]. Of

the 350 patients selected, 299 participated in the study. These patients underwent phase I therapy, which included scaling and root planning, caries control, plaque control, oral hygiene and diet counseling.

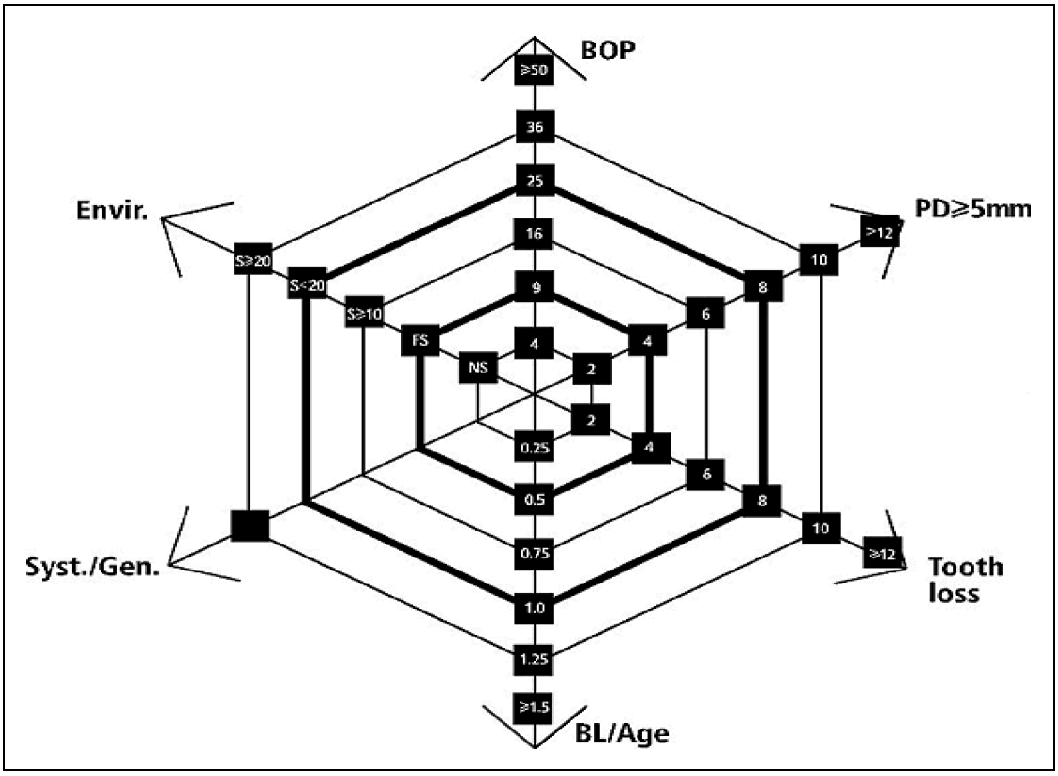

Fig 1: Functional diagram to evaluate the patient's risk for recurrence of periodontitis.

Each vector represents one risk factor or indicator with an area of relatively low risk, an area of moderate risk, and an area of high risk for disease progression. All aspects have to be evaluated together; hence, the area of relatively low risk is found within the center circle of the polygon. In contrast, the high-risk area is located outside the periphery of the second ring in bold. The area of moderate risk between the two rings in bold.

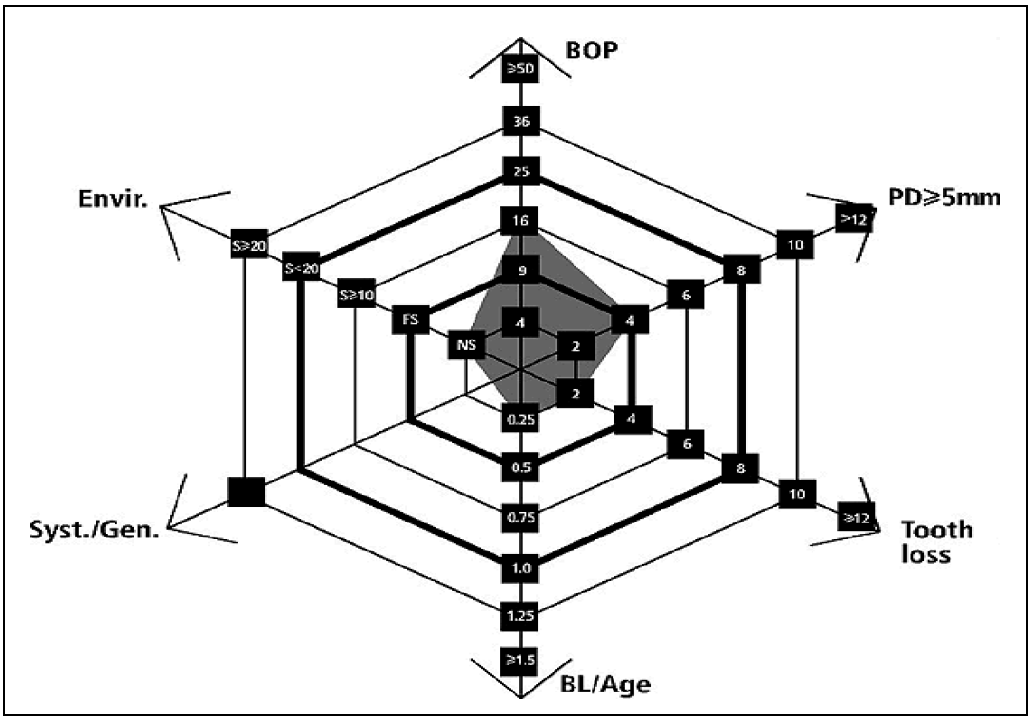

Fig 2: Functional diagram of a low-risk maintenance patient

A *low PRA* patient has all parameters within the low-risk categories or - at the most - one parameter in the moderate-risk category (Fig. 2). Functional diagram of a low-risk maintenance patient. BOP is 15%, 4 residual pockets ≥ 5 mm are diagnosed, 2 teeth had been lost, the bone factor with the age is 0.25, no systemic factor is known, and the patient is a nonsmoker.

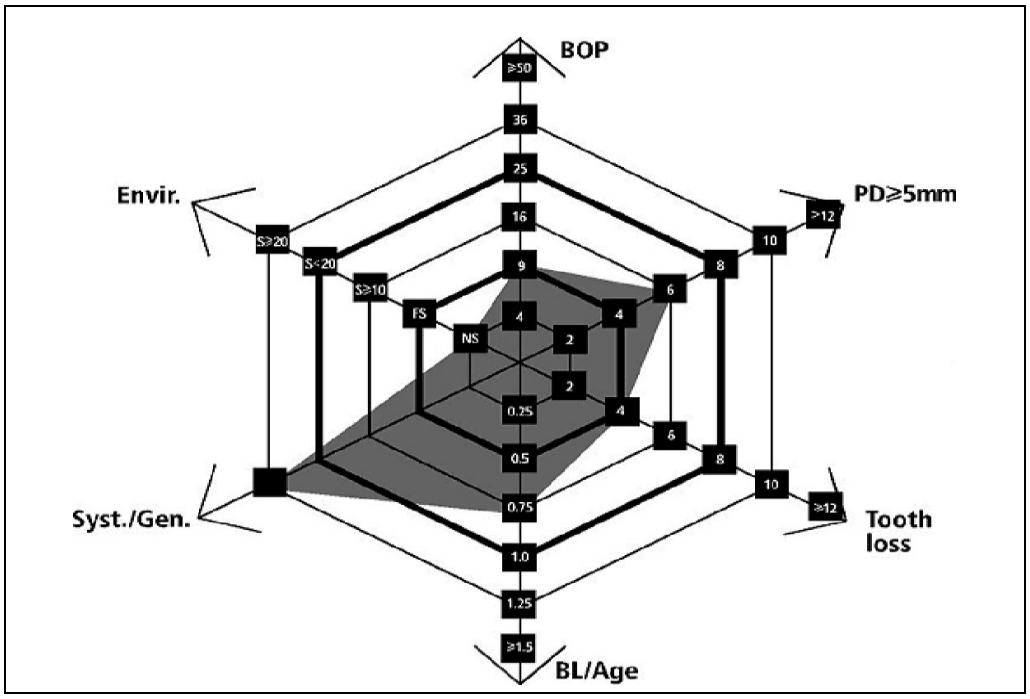

Fig 3: Functional diagram of a medium-risk maintenance patient

A *moderate PRA* patient has at least two parameters in the moderate category, but at most one in the high-risk category (Fig. 3). Functional diagram of a medium-risk maintenance patient. BOP is 9%, 6 residual pockets ³5 mm are diagnosed, 4 teeth had been lost, the bone factor with age is 0.75, and the patient is a Type I diabetic but a nonsmoker.

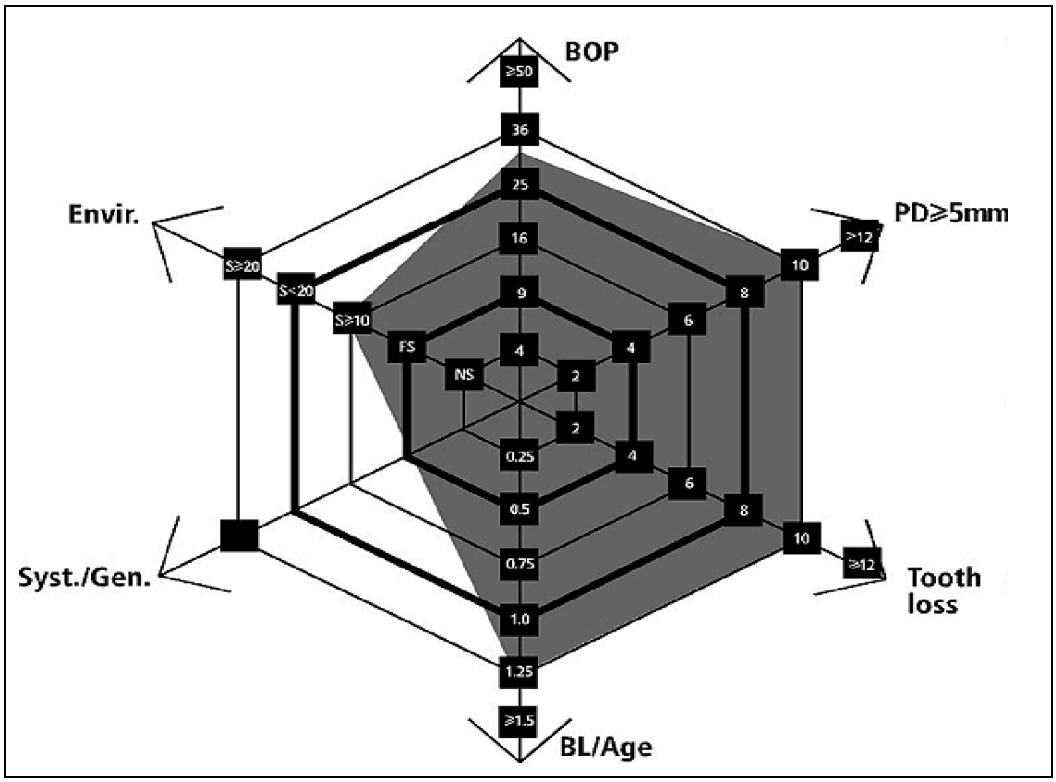

Fig. 4. Functional diagram of a high-risk maintenance patient

A *high PRA* patient has at least two parameters in the high-risk category (Fig. 4). Functional diagram of a high-risk maintenance patient. BOP is 32%, 10 residual pockets ³5 mm are diagnosed, 10 teeth had been lost, the bone factor with age is 1.25, no systemic factor is known, and the patient is an occasional smoker.

3. STATISTICAL ANALYSIS

Statistical analysis was carried out using SPSSV 22 software. Quantity variables are reported as mean (95% CI), and qualitative variables are reported as percentages (95% CI). Association between categorical variables was assessed using Chi- square, and for continuous variables, the independent t-test (for normally distributed data) was used.

4. RESULTS

Table 1: Descriptive Statistics

	Minimum	Maximum	Mean	Std. Deviation
G1_age	14.00	60.00	35.0067	10.54902
G2_age	14.00	60.00	35.0067	10.54902
G1_Number_of_teeth_implants	12.00	33.00	25.0936	4.45386
G2_Number_of_teeth_implants	12.00	33.00	25.0067	4.42081
G1_number_of_sites_per_tooth_implant	6.00	6.00	6.0000	.00000
G2_number_of_sites_per_tooth_implant	4.00	6.00	5.9933	.11566
G1_number_of_BOP_sites	.00	160.00	26.2107	25.56619
G2_number_of_BOP_sites	.00	155.00	12.2207	17.21532
G1_number_of_sites_wit_BOP_5mm	.00	22.00	1.1572	3.01429
G2_number_of_sites_wit_BOP_5mm	.00	20.00	.5686	1.91194
G1_Number_of_missing_teeth	.00	20.00	6.7124	4.47036
G2_Number_of_missing_teeth	.00	19.00	6.8930	4.35142
G1_Percentage_alveolar_bone_loss	.00	74.00	16.2475	11.33174
G2_Percentage_alveolar_bone_loss	.00	74.00	16.6689	10.90967
G1_Polygon_surface	.00	103.06	21.9078	17.10100
G2_Polygon_surface	2.60	90.50	18.8466	13.92615

Table 1 shows the descriptive data of the study sample. The parameters expected to show the change in the two groups were the number of BOP sites at baseline was 26.21± 25.57 and 12.22± 17.22 at phase 1 re-evaluation, respectively. Concerning BOP in sites more significant than 5mm, the values at baseline were 1.16± 3.01 and 0.57± 1.91 at phase -1 re-evaluation, respectively. There were no differences in the alveolar bone loss between the 2 groups having values of 16.25± 11.33 and 16.67± 10.91. However, the polygon surface area showing the quantitative risk values varied, with baseline values being 21.91± 17.10 and values at phase 1 re-evaluation being 18.85± 13.93.

Table 2: Frequency Table

	Baseline		Phase 1	
	Frequency	Percent	Frequency	Percent
Syst_gen				
NO	265	88.6	263	88.0
YES	34	11.4	36	12.0
Total	299	100.0	299	100.0
Smoking				
former s	19	6.4	19	6.4
heavy sm	16	5.4	16	5.4
Non smok	227	75.9	226	75.6
Occasion	10	3.3	11	3.7
Smoker	27	9.0	27	9.0
Risk				
Undefine	4	1.3	-	-
LOW	69	23.1	96	32.1
medium	175	58.5	172	57.5
high	51	17.1	31	10.4

The frequency table of the key risk determinants (TABLE 2) showed relatively no change in the systemic condition and smoking status of the study group in both the time frames. However, there was a considerable variation in the risk levels with low risk patients amounting to 23.1% at baseline and 32.1% at phase 1 re-evaluation, negligible change in medium risk patients at the 2 time frames (58.5% and 57.5% respectively) and significant variation in high risk with baseline values being 17.1% and phase 1 re-evaluation values being 10.4%.

Table 3: Paired Samples Test

		Mean	Std. Deviation	95% Confidence Interval of the Difference		t-test	P value and significance
				Lower	Upper		
Pair 1	G1_Number_of_teeth_implants - G2_Number_of_teeth_implants	.08696	1.01621	-.02870	.20261	1.480	P >0.05
Pair 2	G1_number_of_sites_per_tooth_implant - G2_number_of_sites_per_tooth_implant	.00669	.11566	-.00647	.01985	1.000	P >0.05

Pair 3	G1_number_of_sites_wit_BOP_5mm - G2_number_of_sites_wit_BOP_5mm	.58863	2.46206	.30842	.86884	4.134	p < 0.05 Significant
Pair 4	G1_Number_of_missing_teeth - G2_Number_of_missing_teeth	-.18060	1.53510	-.35531	-.00589	-2.034	p < 0.05 Significant
Pair 5	G1_Percentage_alveolar_bone_loss - G2_Percentage_alveolar_bone_loss	-.42140	3.40593	-.80903	-.03378	-2.139	p < 0.05 Significant
Pair 6	G1_Polygon_surface - G2_Polygon_surface	3.06120	9.61256	1.96720	4.15521	5.507	p < 0.001 Significant
Pair 7	G1_Risk Category - G2_Risk Category	.13043	.48436	.07531	.18556	4.656	p < 0.001 Significant

In table 3, the mean difference in values of the number of teeth/implants in both the time frames was 0.087± 1.02, which was statistically insignificant (P>0.05). So also, the mean difference in the values for the number of sites was 0.07 ± 0.12, which was also not statistically significant(p>0.05). However, the mean differences in the number of sites with BOP ≥ 5mm was 0.59 ± 2.46; the number of missing teeth was -0.18 ± 1.54; the percentage of alveolar bone loss was -0.42 ± 3.41; the polygon surface area was 3.06 ± 9.61, and risk category was 0.13 ± 0.48; which was all statistically significant. (P<0.05).

Table 4: Chi square test for categorical data

		Baseline	Phase I	
syst/gen				
NO	Frequency	265	263	
	Percentage	88.6%	88.0%	X^2=0.065; p>0.05
YES	Frequency	34	36	
	Percentage	11.4%	12.0%	
Smoking habit				
Non smoker	Frequency	227	226	
	Percentage	75.9%	75.6%	X^2= 0.05; p>0.05
Former smoker	Frequency	19	19	
	Percentage	6.4%	6.4%	
Occasional smoker	Frequency	10	11	
	Percentage	3.3%	3.7%	
smoker	Frequency	27	27	
	Percentage	9%	9%	
heavy sm	Frequency	16	16	
	Percentage	5.4%	5.4%	

In Table 4, Chi-square values comparing the 2 time intervals for systemic and general factors and smoking habits was 0.065 and 0.05 respectively which was not statistically significant. (P>0.05).

5. DISCUSSION

Assessment of periodontal risk is an essential element for establishment of periodontal health in order to ensure successful outcomes. This requires estimating risk factors and evaluating the risk accordingly. Over the years, various risk assessment models have been developed. [5,9,10] which enable quantification of the disease status and thereby predicting the risk. [7]. Risk assessment enables the clinician to make the necessary changes and modifications to the treatment plan and predict the probable outcomes of treatment. One of the most popular and authentic risk assessment tools is the PRA proposed by Lang and Tonetti[1], and was therefore implemented in our study. According to the PRA model, risk is assessed as follows: A low-periodontal-risk patient has all the parameters in the low-risk areas or at most, one parameter in the medium-risk area. A moderate-periodontal-risk patient has two parameters in the moderate-risk category and not more than one in the high-risk category. Finally, a high-periodontal-risk patient has only two parameters in the high-risk category.

However, the PRA model has the following limitations.[1]

a. it mainly assesses the cumulative status of a periodontitis patient,
b. there is no proper identification of risk factors and risk determinants,
c. in the functional diagram, the presence of systemic disease is assessed as a high-risk factor with no emphasis on the current status of the disease,
d. smoking is assessed in the risk assessment model, but another potential risk factor, diabetes, are not assessed separately and is included in the systemic diseases category,
e. it does not consider the various dental factors which may modify or initiate the progression of periodontal disease.[1]

It is crucial to understand whether changes in any of the parameters following treatment will notably affect the risk level. The parameters that may be altered significantly to affect the risk level appreciably are the ones that have the potential to change following phase I therapy. These include probing depths(PD), bleeding on probing(BOP), and to some extent, change in the smoking status. Alveolar bone changes may or may not be evident and largely depend on the duration of phase I re-evaluation following phase I therapy and radiographs. There was no change in the status of systemic health and smoking status of the patients in the two time frames; however, there was a variation in the risk levels from baseline to phase I re-evaluation, with the percentage of low

risk increasing and those with moderate and high risk reducing. This could be attributed to the change in the periodontal parameters following phase I therapy. It is possible that some of the patients with medium and high risk would have changed to low risk as a result of improvement of periodontal parameters following phase -I therapy[11,12].

Studies have shown that active nonsurgical periodontal therapy in patients with adult periodontitis resulted in approximately one-third of the cases in the success endpoint of no pockets deeper than 5 mm. Sub- analysis showed that the outcome depended on different factors, such as tooth type, furcation involvement, and smoking. Treatment success was higher at single-rooted teeth than molar ones, especially those with furcation involvement. The success rate was also related to periodontal disease severity at intake and smoking status[11]. Pocket depths greater than 5mm are a significant risk factor for periodontal disease. However, there was a significant reduction in these probing depths at re-evaluation, thereby considerably reducing the risk. In addition, a significant change in the number of missing teeth was also observed.

An increase in the number of missing teeth over 4-6 weeks points toward an increased risk of severity of the periodontal disease. Alveolar bone changes may not be evident as early as 4-6 weeks; however, our study observed reduced alveolar bone loss at re-evaluation, indicating reduced severity of periodontal disease and, consequently, a reduced risk. Although phase I re-evaluation is carried out in a time frame of 4-6 weeks, it is quite possible that in some of the patients in our study, this timeline may have extended to a greater frame, thus reflecting significant bone level changes. There was also a substantial reduction in the polygon surface area for the risk, thereby indicating a reduction in the overall risk factors contributing to risk levels. This correlates with the significant changes in patients' risk levels from high to medium and medium to low. However, as expected, there were no significant changes in the patients' systemic condition and smoking status at baseline and re-evaluation timelines. Although the patients were counseled concerning control of systemic condition and smoking, no change in status can be expected in 4-6 weeks. According to Lang & Tonetti [4], in assessing the patient's risk for disease progression, environmental factors such as smoking must be considered the sixth risk factor for recurrent disease in the functional risk assessment diagram. While nonsmokers (NS) and former smokers (FS; more than five years since cessation) have a relatively low risk for recurrence of periodontitis, heavy smokers (HS; as defined by smoking more than one pack per day) are definitely at high risk. Occasional smokers (OS; < 10 cigarettes a day) and moderate smokers (MS; 10-19 cigarettes a day) may be considered at average risk for disease progression. Thus, re-evaluation of phase I therapy is an important step to identify any change in the patient's level of risk. This is particularly essential in patients undergoing comprehensive clinical care wherein they undergo full mouth rehabilitation and the treatment is carried out in phases to achieve the desired outcomes[13]. A critical component of phase I therapy is nonsurgical periodontal therapy, and there is plenty of evidence over the last few decades showing positive effects following this therapy.[14-20] Successful outcome following phase -I therapy forms the basis for comprehensive care involving multiple dental specialties, which is the cornerstone for further treatment**.** This phase-wise treatment enables careful patient monitoring, especially about risk assessment as it is critical to the success of the treatment. If the controllable risk elements are in check, it paves the way for successful oral rehabilitation of comprehensive clinical cases.

6. CONCLUSION

The parameters expected to change following phase I therapy and consequently affect the risk status, namely probing depth and bleeding on examining, were significantly altered when monitored during the re-evaluation. In addition, there were also significant changes observed about alveolar bone loss. These changes in risk levels, as evidenced during the phase I re-evaluation, clearly emphasize the importance of thorough phase I therapy. Therefore, analysis of risk and careful monitoring thereafter plays a vital role in the successful management of comprehensive oral rehabilitation.

7. AUTHORS CONTRIBUTION STATEMENT

Dr Shreya Shetty is the principal investigator and corresponding author of the study. She was mainly responsible for conceptualizing the study, review of literature, data interpretation and finalizing the manuscript. Ms Olla, Ms Raghad, Ms Noujoud and Ms Nour were mainly involved with review of literature, data collection and preparation of the initial draft of the manuscript. Ms Khammarunissah was mainly responsible for statistical analysis of the data and also helped in data interpretation and organizing the results of the manuscript. All authors have read and approved the final version of the manuscript.

8. FUNDING ACKNOWLEDGEMENT

The study has not been funded by any party or organization as such, and any expenses incurred for the same were minimal and borne by the researchers and the institute.

9. CONFLICT OF INTEREST

Conflict of interest declared none.

10. REFERENCES

1. Chandra RV. Evaluation of a novel periodontal risk assessment model in patients presenting for dental care. Oral Health Prev Dent. 2007;5(1):39-48. PMID 17366760.
2. Dhulipalla R, Bade S, Bollepalli AC, Katuri KK, Devulapalli NS, Swarna C SC. Evaluation of periodontal risk in adult patients using two different risk assessment models – A pilot study. J Clin Diagn Res. 2015;9(2):ZC25–9. doi: 10.7860/JCDR/2015/11772.5556, PMID 25859520.
3. Jansson H, Norderyd O. Evaluation of a periodontal risk assessment model in subjects with severe periodontitis. A 5-year retrospective study. Swed Dent J. 2008;32(1):1-7. PMID 18540515.
4. Lang NP, Tonetti MS. Periodontal risk assessment (PRA) for patients in supportive periodontal therapy (SPT). Oral Health Prev Dent. 2003;1(1):7-16. PMID 15643744.
5. Page RC, Martin JA, Loeb CF. The Oral Health information suite (OHIS): its Use in the management of periodontal disease. J Dent Educ. 2005;69(5):509-20.

doi: 10.1002/j.0022-0337.2005.69.5.tb03939.x, PMID 15897333.
6. Persson GR, Mancl LA, Martin J, Page RC. Assessing periodontal disease risk: a comparison of clinicians' assessment versus a computerized tool. J Am Dent Assoc. 2003;134(5):575-82. doi: 10.14219/jada.archive.2003.0224, PMID 12785492.
7. Wayne K, Robert D, John M, Steven E. Current status of periodontal risk assessment. J Evid Base Dent Pract. 2012;1:2-11.
8. KOSMATH W. Der Verlust an Schwefelwasserstoff beim üblichen Trinkverfahren. Zeitschrift für Phys Ther Bäder- und. 1949;2(9-10):138-40.
9. Raul I, Garcia ME. Nunn and Thomas Dietrich. Risk calculation and periodontal outcomes. Periodontol 2000. 2009;62:65-77.
10. Page RC, Beck JD. Risk assessment for periodontal diseases. Int Dent J. 1997;47(2):61-87. doi: 10.1111/j.1875-595x.1997.tb00680.x, PMID 9448791.
11. Van der Weijden GAF, Dekkers GJ, Slot DE (F). Success of nonsurgical periodontal therapy in adult periodontitis patients: A retrospective analysis. Int J Dent Hyg. 2019;17(4):309-17. doi: 10.1111/idh.12399, PMID 30942938.
12. Cobb CM. Clinical significance of nonsurgical periodontal therapy: an evidence-based perspective of scaling and rootplaning. J Clin Periodontol. 2002;2:6-16.
13. Becker W, Becker BE, Berg LE. Periodontal treatment without maintenance. A retrospective study in 44 patients. J Periodontol. 1984;55(9):505-9. doi: 10.1902/jop.1984.55.9.505, PMID 6592322.
14. Axelsson P, Lindhe J. Effect of controlled oral hygiene procedures on caries and periodontal disease in adults. Results after 6 years. J Clin Periodontol. 1981a;8(3):239-48. doi: 10.1111/j.1600-051x.1981.tb02035.x, PMID 6947990.
15. Becker W, Becker BE, Berg LE. Periodontal treatment without maintenance. A retrospective study in 44 patients. J Periodontol. 1984;55(9):505-9. doi: 10.1902/jop.1984.55.9.505, PMID 6592322.
16. Cobb CM. Clinical significance of nonsurgical periodontal therapy: an evidence-based perspective of scaling and rootplaning. J Clin Periodontol. 2002;2:6-16.
17. Kim TS, Schenk A, Lungeanu D, Reitmeir P, Eickholz P. Nonsurgical and surgical periodontal therapy in single-rooted teeth. Clin Oral Investig. 2007;11(4):391-9. doi: 10.1007/s00784-007-0144-x, PMID 17690922.
18. Badersten A, Nilveus R, Egelberg J. Effect of nonsurgical periodon- tal therapy. II. Severely advanced periodontitis. J Clin Periodontol. 1984;11(1):63-76. doi: 10.1111/j.1600-051x.1984.tb01309.x, PMID 6363463.
19. Baelum V, Lopéz R. Defining and predicting outcomes of non-sur- gical periodontal treatment: a 1-yr follow-up study. Eur J Oral Sci. 2016;124(1):33-44. doi: 10.1111/eos.12240, PMID 26714428.
20. Sanz M, Bäumer A, Buduneli N, et al. Effect of professional me- chanical plaque removal on secondary prevention of prevention of periodontitis and the complications of gingival and periodontal pre- ventive measures: consensus report of group 4 ofthe. J Clin Periodontol 11th Eur Workshop on Periodontology on effective prevention of periodontal and peri-implant diseases. 2015;42:214-20.