ISSN No:-2456-2165

Risk Assessment: A Mandatory Evaluation and Analysis of Periodontal Tissue in General Population- A Survey

[1]Dr. Parimala Kumar
Reader
Department of periodontics
A.J. Institute of Dental Sciences
Mangalore

[2]Dr. Faima Banu
Post graduate
Department of periodontics
A.J. Institute of Dental Sciences
Mangalore

[3]Dr. Nidha Begum
Post graduate
Department of periodontics
A.J. Institute of Dental Sciences
Mangalore

[4]Dr. Rahul Joseph
Post graduate
Department of periodontics
A.J. Institute of Dental Sciences
Mangalore

Abstract:-

- ***Aim***

To assess the risk for periodontitis patients and the diagrammatic form of the chart would be of help in patient awareness and motivation as it is easy to comprehend.

- ***Methods and Materials***

The study was conducted in the Department Of Periodontics, A. J . institute of dental sciences, Mangalore from March 2017 to March 2018. Fifty patients diagnosed with chronic periodontitis and gingivitis were selected randomly for the study. This study was based on the risk assessment model by R VISHWA CHANDRA published In 2007.

- ***Result***

In this model 62% cases were in low risk category, 36% cases were under high risk category and 2 % cases were under medium risk category. Five subjects were smokers and five subjects were confirmed diabetics . Three subjects in the high risk category were under extreme stress and 1 subject each in low and medium had traumatic experience in last 7 years.

- ***Conclusion***

This study has its importance in providing personalized periodontal therapy by taking into consideration each risk factor and modifying them to obtain periodontal health. The factors OHI-S, BOP and pocket depth were the main risk factors that categorize the patients into high risk group. The population also had fewer patients with other risk factor like stress, smoking habit and diabetes in the high risk category. The diagrammatic form of the chart would be of help in patient awareness and motivation as it is easy to comprehend.

Keywords:- *Periodontitis; Risk Assessment; Risk Factors; Risk Assessment Model.*

I. INTRODUCTON

Risk can be defined as “the probability that an event will occur in the future, or the probability that an individual develops a given disease or experience the change in health status during a specific interval of time.[1]” A risk factor can be defined as any characteristic, behavior or exposure with an association to a particular disease. The relationship is not necessarily causal in nature” [2].

Risk assessment is the identification of patients or population with an elevated risk for development of periodontal diseases. It is of utmost importance for clinical decision making. However, the recognition and control of risk factors should become a more explicit focus in many dental practices [3].

Within the past two decades, substantial evidence indicates that susceptibility to periodontal disease varies among patients and is a function of both acquired and intrinsic risk factors [4].These conclusions are the result of key epidemiological studies. The prevalence of chronic periodontitis in an adult population is 35% to 50% [5]. Coupled with epidemiologic evidence, a better understanding of the pathogenesis of periodontitis has emerged [6].

ISSN No:-2456-2165

Recent studies have been more focused on creating a viable algorithm for risk assessment, thereby improving clinical decision making and reducing the need for complex periodontal therapy thus improving treatment outcome as well reducing health care costs.[7]

From a clinical point of view the stability of periodontal conditions reflects a dynamic equilibrium between bacterial challenge and an effective host response. Whenever changes occur in either of these aspects, homeostasis is disturbed. Hence, it is evident that the diagnostic process must be based on a continuous monitoring of the multilevel risk profile. The assessment of the risk level for disease progression in each individual patient would enable the practitioner to determine the frequency and extent of professional support necessary to maintain the attachment levels obtained following active therapy. The determination of such risk levels would thus prevent both under treatment, and excessive overtreatment, during SPT[8].

II. MATERIALS AND METHODS

This study was based on the risk assessment model (table 1) by R VISHWA CHANDRA published In 2007. The parameters included in this model are

1. Percentage of sites with BOP
2. Number of sites with probing depth more than 5 mm
3. Number of teeth lost
4. Attachment loss /age ratio
5. Diabetic status
6. Smoking
7. Dental status- systemic factors interplay
8. Other background characteristics

However after discussion certain small modifications was done in relation to tooth loss scoring ,where only teeth lost due to periodontal disease was considered .The teeth lost other than periodontal disease where recorded under dental health problems affecting the periodontium including iatrogenic, endodontic, prosthodontics and orthodontic problems in the coding system for dental status –systemic factors interplay(table 2). In addition, we have also added OHI to assess the overall oral status of each patient. The scoring for OHI was graded as 0 and 1 when the index score was 0-1.2, and was graded 2, 3 when the index score was 1.3-3likewise 4 , 5 when the index score was 3.1-6.

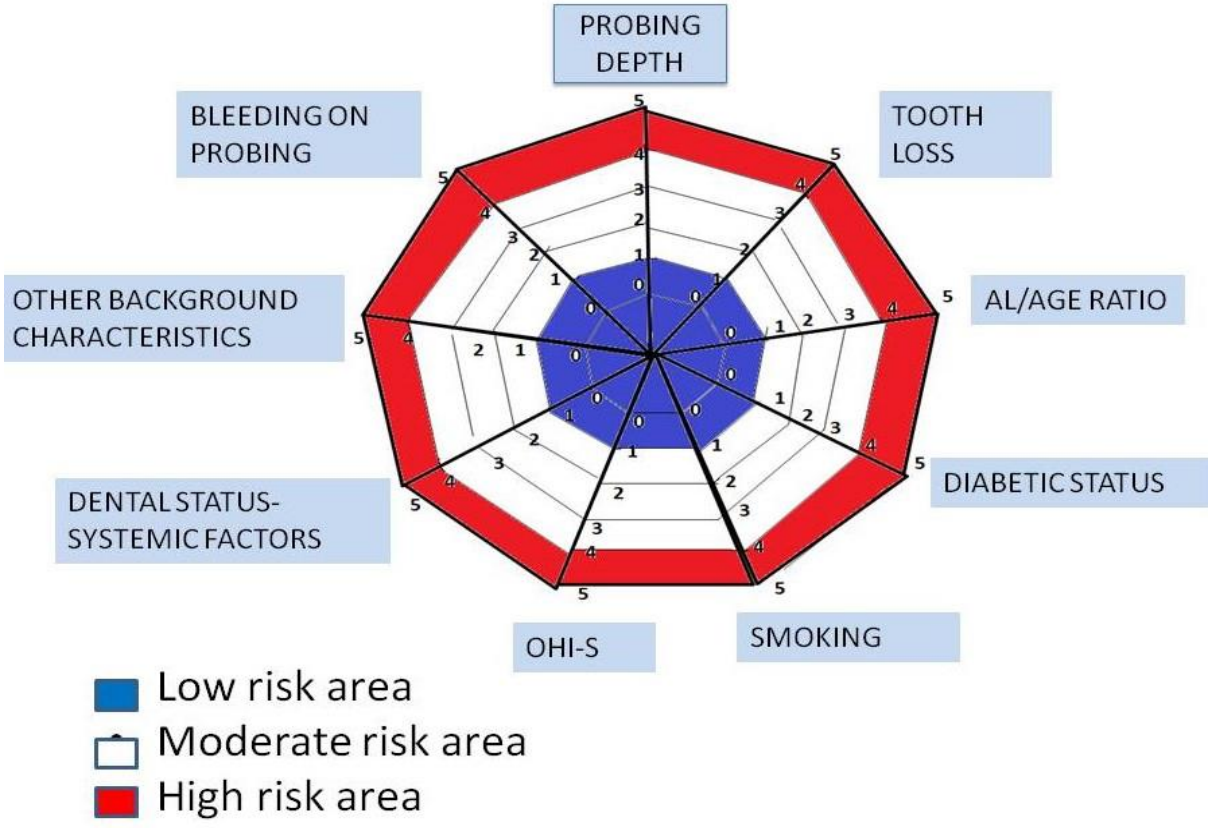

Fig 1:- Modified Risk Assessment

In our study we excluded the use of IOPA as it did not add any more information to the study. The study was conducted in the Department Of Periodontics AJIDS, Mangalore from March 2017 to March 2018. Fifty patients diagnosed with chronic periodontitis and gingivitis were selected randomly for the study. After initial examination, detailed case history was recorded and charting of the periodontal status was carried out. To avoid examiner variability, a single examiner performed the charting and examination. Parameters were plotted manually on the radar chart as per the proposed model. The patient underwent routine blood test and random blood sugar. A stress questionnaire was filled which was specially created to assess the stress level of the patients which was scored under other background characteristics (table 3). Stress can be due to variety of factors related to environmental factor and personal factor like physical and emotional health. The questionnaire stressed on any particular traumatic incident in the person's life and their influence of this incident was having on his well being and whether it was affecting his sleep.

Axis score	BOP (%)	No. of sites with PD ≥ 5mm	Tooth loss	Smoking (cigarettes/day)	AL/age ratio	Diabetic status (Fasting glucose in mg/dl)
0	0	0	0	Non-smoker (NS)	0	<102
1	≤ 4	1-2	1-2	Former smoker (FS)	≤0.25	102-109
2	5-9	3-4	3-4	<10	0.26-0.5	110-117
3	10-16	5-6	5-6	10-19	0.51-0.75	118-125
4	17-25	7-8	7-8	20	0.76-1.0	126-133
5	>25	>9	>9	>20	>1	≥134

Table 1:- Coding system for BOP, sites with PD ≥5mm,tooth loss,smoking,AL/age ratio and diabetic status

Axis score	Status
0	Healthy
1	Healthy with minor dental problems not affecting periodontium
2	Dental health problems affecting the periodontium including iatrogenic, endodontic, prosthodontic and orthodontic problems
3	General health problems that might modify the progression of periodontal disease including genetic, nutritive, endocrine, haematologic, immunodeficiency and psychosomatic disorders, including risk indicators like HIV and osteoporosis
4	Severe dental problems in the presence of diseases that can modify periodontal diseases
5	More severe than above and associated with severe tooth morbidity

Table 2:- Coding system for dental status-systemic factors interplay

➢ *Questionarre for Self Assessment of Stress Factor*

1) Patient can easily fall asleep ☐
2)Traumatic first 15 years ( ) /difficulty in falling asleep ☐
3)Traumatic episode within last 7 years/lacking full night's sleep/highly restless ☐
4)Traumatic episodes within a year/severe lack of sleep/intensely restless ☐
5)Very stressful environment ☐

Assigning the individual to the three risk groups was done similar to the Vishwa Chandra model where low risk category has all the parameters in the low risk area or at the most two parameters in the moderate and high risk area. A moderate periodontal risk patient has at least 3 parameters in the moderate risk area and not more than one parameter in the high risk area. A high periodontal risk patient has atleast two parameters in the high risk category.

ISSN No:-2456-2165

III. RESULTS

The study comprised of 48% of male patients and they had a mean age of 42.05. In this proposed model 62% cases were in low risk category, 36% cases were under high risk category and 2 % cases were under medium risk category. Five subjects were smokers and five subjects were confirmed diabetics . Three subjects in the high risk category were under extreme stress and 1 subject each in low and medium had traumatic experience in last 7 years. Given below are the graphical representation of distribution of risk factors in low, medium and high risk categories.

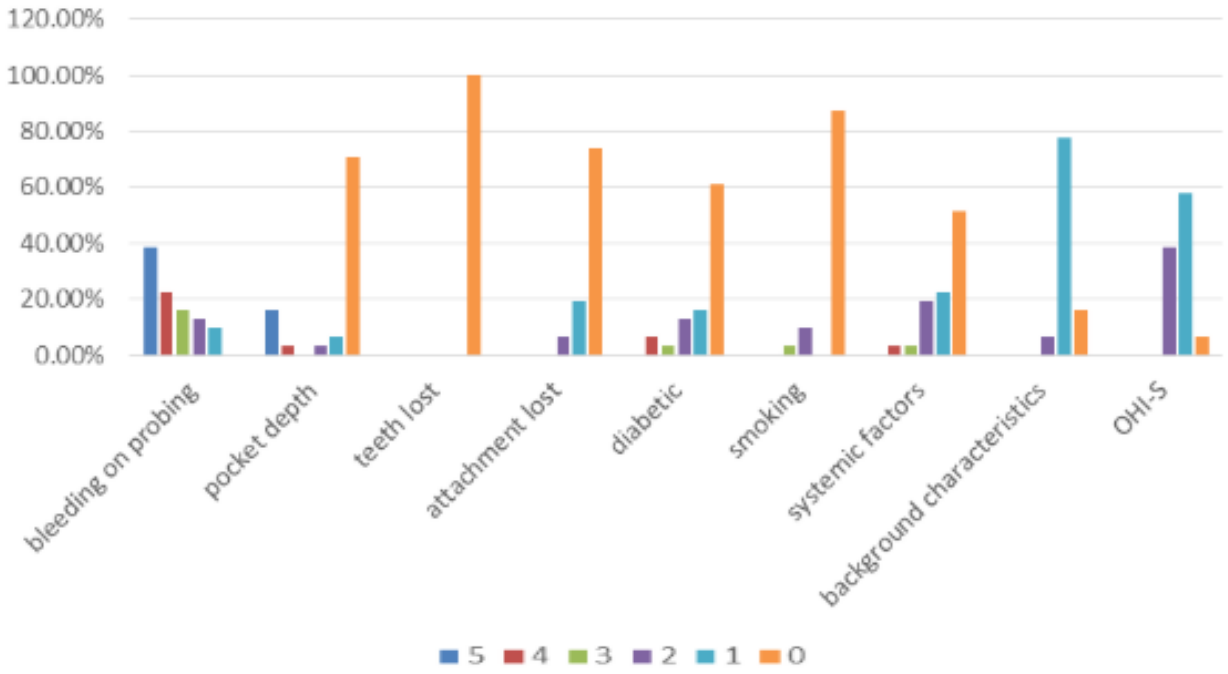

Table 3:- Showing distribution of risk factors among low risk category

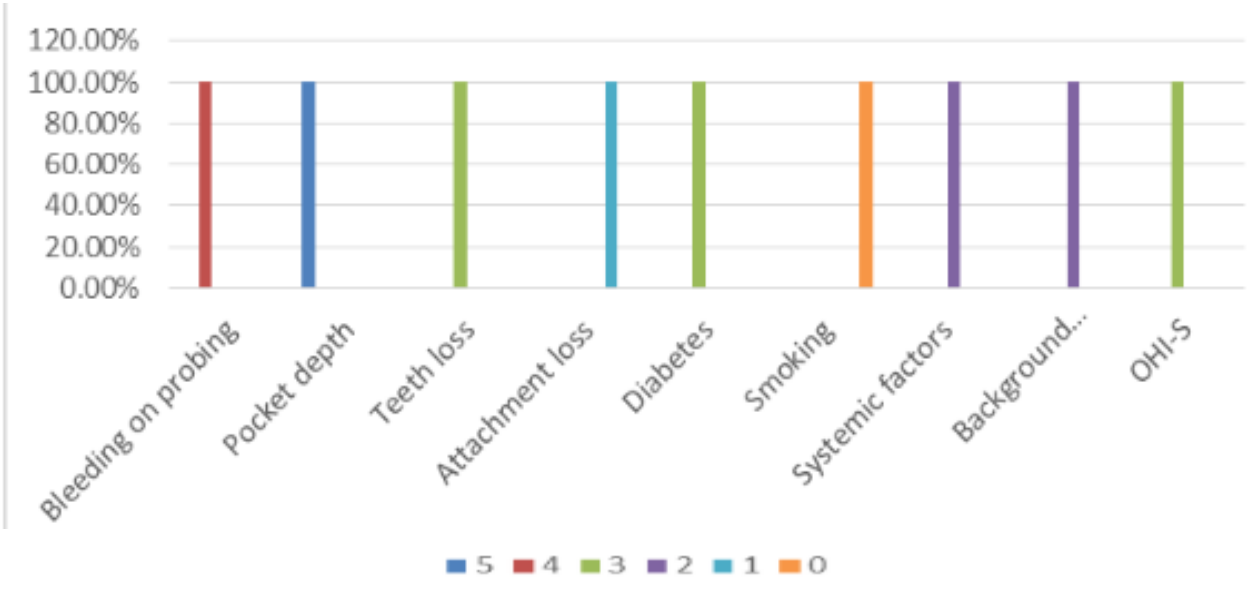

Table 4:- Showing distribution of risk factors among medium risk category

ISSN No:-2456-2165

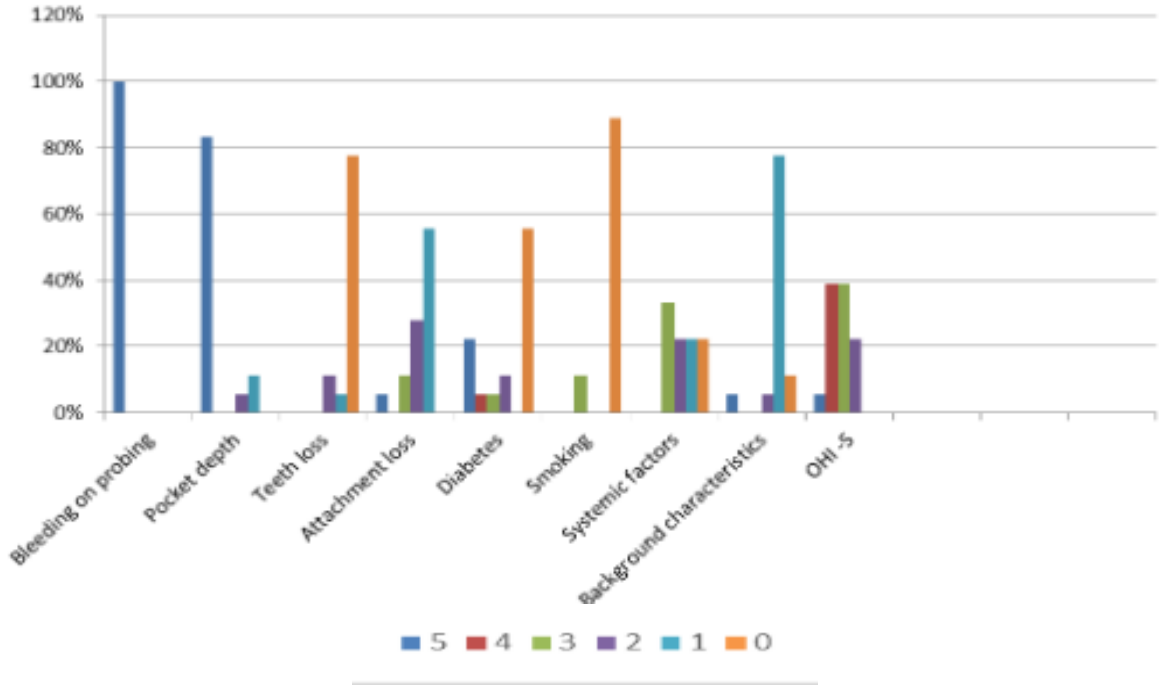

Table 5:- Showing the distribution of risk factors among the high risk category

According to each parameter and their axis score (as mentioned in table 1,2) this model demonstrates the following:

1) Bleeding On Probing- In low risk category score 5 was seen in 38.7% and score 4 was seen in 22.5 % subjects . In medium risk category score 4 was recorded. It was highest in the high risk category and had a score of 5 (100%) in all the subjects whereas.
2) Pocket depth- About 70.9% of patients in low risk category had a score of 0 which means there were no periodontal pockets whereas 16.10% had score 5 that means more than 9 sites had periodontal pockets.In the medium risk category the patients had a score of 5. In high risk category 83.3% of patients had score 5.
3) Tooth loss- There were no tooth loss in low risk category .In medium risk category score 3 was recorded (5-6 tooth loss) and in high risk category 11% of patients had score 2 (3-4 tooth loss).
4) Attachment loss/age ratio- In 74% of cases in low risk category had 0 score but 19.3% of cases had score 1 and 6.4% had score 2.In medium risk category score 1 was recorded and in high risk category score 5 was seen in 5 % and score 1 was seen in 55.5%.
5) Diabetic- In low risk category 61.2% of cases had score 0 (<102 FBS) and score 1,2,3,4 in 16.1% ,12.9%,3.2%,6.4% respectively .In medium risk category score 3 was recorded (100-125FBS) and in high risk category 22.2% of cases had score 5 (>134 FBS) ,5.5%,5.5%,11.1% 55.5% of cases were score 4,3,2,0 respectively.
6) Smoking- Low risk category had 87% of nonsmokers and 9% and 3.2% had score 2 ,3 respectively.11% of cases with score 3 (10-19 cigarettes/day) were in high risk category.
7) Systemic factors and dental status interplay- About 51.6% of cases in low risk category were healthy with score 0. 22.5% of cases with score 1 and 19% had score 2 . In medium risk category score 2 was recorded and in high risk category score 3 was seen in 33.3% of cases. score 2,1,0 seen in 22.2% cases each.
8) Background characteristics- In low risk categories 77% with score 1 who had mild stressful event 6.4% and 16.1% cases with score 2 and 0 respectively .In medium risk category score 2 was recorded and in high risk category 5% of cases had score 5 (very stressful) and Score 2. score 1 in 77.7%.
9) OHI-S- In low risk category 50% of cases were score 1 and 35% of cases had score 2 .In medium risk category score 3 was recorded and in high risk category 5% had score 5 ,38.8% had score 4 and score 3 and 22% had score 2. Only 2% of cases fell in medium risk category and all the cases had score 4 for bleeding and probing , score 5 for pocket depth, score 3 for tooth loss(5-6 tooth loss) , score 1 for attachment loss/age ratio , score 3 for diabetes (110-125 FBS) , score 2 for systemic factors dental status interplay, score 2 for background characteristics and score 3 for oral hygiene index – simplified and there were non smokers in this category.

IV. DISCUSSION

The aim of the study is to evaluate the association of risk factors with periodontal disease and categorizing their severity into high risk, low risk and medium risk in Mangalore population. Various risk models been proposed by various authors. The present model which is based on risk assessment by Vishwa Chandra (2007) is modified because certain parameters like the overall oral hygiene status was not assessed in the previous model. Here loss of teeth due to periodontal disease was considered separately and tooth loss due to other reasons was considered as affecting the overall dental status and recorded under that group. In the present study evaluation of stress was done by providing questionnaires to the patients.

In our study we have noted high risk group having 100% BOP with score 5 which shows that it can be a major risk factor in progression to periodontal disease. This has been shown and supported by several studies. Lang and colleagues[9], demonstrated the absence of BOP as a reliable indicator of periodontal stability. Recently, it has been demonstrated how a persistent presence of gingivitis in a periodontal site all over a long period of observation (26 years), is responsible for future periodontal breakdown[10]. Besides, the value of BOP as predictor of future periodontal deterioration seems to significantly increase when associated with periodontal pocket depth greater than or equal to 6 mm[11]. Our study showed 83.3% of patients in high risk category having score 5 where as 16% had score 5 in low risk category.

Periodontal disease is the main cause of tooth extraction in adults aged ≥ 40 years[12]. A study conducted by Ramsier et al showed that after 40 years in the absence of oral care, tooth loss due to periodontal disease significantly increased with age in all subjects with a mean of 13.1 teeth per subject.One-sixth of the subjects were edentulous after 40 years. It substantially increased during the second 20 years of observation compared with the first 20-year period[13]. This is consistent with our study were the mean age of 42 was noted in high risk group with 11% of population experiencing 3-4 tooth loss due to periodontal disease.

Majority of the subjects in low risk category had score 0 of attachment loss/ age ratio and thus shows that they are less likely to develop periodontitis. Preshaw et al[14] have demonstrated that refractory diabetes mellitus can cause periodontits and the resolution of periodontal disease may improve clinical symptoms of diabetes mellitus, suggesting that there is a cross-susceptibility between periodontal disease and diabetes mellitus. There is data evidencing the fact that the severity of the periodontal destruction can be linked to the type of diabetes, the duration of the disease and the level of metabolic control[15,16,17]. Landmark studies of Nelson[18](1990); Emrich[19] (1991) and Taylor[20] (1996) on Pima Indians reported a 2.6, 3 and 4 times amount of periodontal destruction in diabetics when compared with non-diabetics respectively. In our study the low risk category had majority score 0 for diabetes mellitus suggesting they are less likely to develop periodontitis.

Cigarette smoking is a well-established risk factor for periodontitis and it is the strongest of the modifiable risk factors. In 1983, Ismail et al[21] analyzed smoking and periodontal disease and found that after adjusting for potential confounding variables such as age, oral hygiene, gender and socioeconomic status, smoking remained a major risk indicator for periodontal diseases. Locker and Leake[22] found that among Canadians, smoking was one of the most consistent predictors of periodontal disease experience. Smoking is associated with a two to eight-fold increased risk for periodontal attachment and or bone loss, depending on the definition of disease severity and smoking dose. Since the present study in mangalore population had only 10% subjects who were smokers, It does not conclude the role of smoking in high risk category but its absence is very well explained in low risk category with the absence of periodontal disease.

OHI-S Index is an additional parameter in our model to reflect overall oral status of the patient. Daily removal of supragingival plaque is considered essential for the prevention of oral disease as well as in maintaining the good oral hygiene. By reducing the biofilm mass there will be reduction in proportion of pathogenic bacteria that in turn will help prevent caries and periodontal disease[23]. In this study the low risk category had good oral hygiene which indicates that the population had less risk of progression of disease.

Medium risk category showed that the parameters were mainly in the central zone of the radar chart but to conclude which parameter is strongly associated with the patients in this group is debatable as only 2% of total population were in this category.

V. CONCLUSION

This study has its importance in providing personalized periodontal therapy by taking into consideration each risk factor and modifying them to obtain periodontal health. The factors OHI-S, BOP and pocket depth were the main risk factors that categorize the patients into high risk group. The population also had fewer patients with other risk factor like stress ,smoking habit and diabetes in the high risk category . Though charting of risk factors is time consuming, regular practise with this radar chart should be easy to master. Furthermore this observational study has the scope to obtain significant results by statistically analyzing each parameter and also increasing the sample size.The diagrammatic form of the chart would be of help in patient awareness and motivation as it is easy to comprehend. We could bring into practice the regular assessment of risk in every patient to give

them a personalized oral health care which is where the future lies.

REFERENCES

[1]. Albandar JM. Global risk factors and risk indicators for periodontal diseases.. Periodontol 2000 2002;29:177-206.
[2]. Brownson RC, Pettiti, D. B. Applied epidemiology: theory to practice. New York: Oxford University Press; 1998.
[3]. Beck JD. Methods of assessing risk for periodontitis and developing multifactorial models. J Periodontol 1994;65:468-78.
[4]. Genco RJ. Current view of risk factors for periodontal diseases. J Periodontol 1996;67:1041-9.
[5]. Kornman KS. Patients are not equally susceptible to periodontitis: does this change dental practice and the dental curriculum? J Dent Educ 2001;65:777-84.
[6]. Albandar JM, Brunelle JA, Kingman A. Destructive periodontal disease in adults 30 years of age and older in the United States, 1988-1994. J Periodontol 1999;70:13-29.
[7]. Albandar JM. Underestimation of periodontitis in NHANES surveys. J Periodontol 2011;82:337-41
[8]. Page RC, Kornman KS. The pathogenesis of human periodontitis: an introduction. Periodontol 2000 1997;14:9-11.
[9]. Lang NP, Adler R, Joss A, Nyman S. Absence of bleeding on probing. An indicator of periodontal stability. J Clin Periodontol 1990; 17: 714-21.
[10]. Schätzle M, Löe H, Bürgin W, Ånerud Å, Boysen H, Lang NP. Clinical course of chronic periodontitis. J Clin Periodontol 2003; 30: 887-901.
[11]. Claffey N, Egelberg J. Clinical indicators of probing attachment loss following initial periodontal treatment in advanced periodontitis patients. J Clin Periodontol 1995; 22: 690-6.
[12]. Reich E, Hiller KA. Reasons for tooth extraction in the western states of Germany. Community Dent Oral Epidemiol 1993;21:37983
[13]. Ramseier CA, Anerud A, Dulac M, Lulic M, Cullinan MP, Seymour GJ, Faddy MJ, Bürgin W, Schätzle M, Lang NP. Natural history of periodontitis: Disease progression and tooth loss over 40 years. Journal of clinical periodontology. 2017 Dec;44(12):1182-91.
[14]. Preshaw PM, Foster N, Taylor JJ. Cross-susceptibility between periodontal disease and type 2 diabetes mellitus: an immunobiological perspective. Periodontol 2000 2007;45:138-57
[15]. Tervonen T, Oliver RC (1993) Long-term control of diabetes mellitus and periodontitis. J Clin Periodontol 20: 431-435. 13.
[16]. Westfelt E, Rylander H, Blohmé G, Jonasson P, Lindhe J (1996) The effect of periodontal therapy in diabetics. Results after 5 years. J Clin Periodontol 23: 92-100. 14.
[17]. Oliver RC, Tervonen T (1994) Diabetes--a risk factor for periodontitis in adults? J Periodontol 65: 530-538.
[18]. Nelson RG, Shlossman M, Budding LM, Pettitt DJ, Saad MF, Genco RJ, Knowler WC: Periodontal disease and NIDDM in Pima Indians. *Diabetes Care* **13**:836–840, 1990
[19]. Emrich LJ, Shlossman M, Genco RJ: Periodontal disease in non-insulin-dependent diabetes mellitus. *J Periodontol* **62**:123–131, 1991
[20]. Taylor GW, Burt BA, Becker MP, Genco RJ, Shlossman M, Knowler WC, Pettitt DJ: Severe periodontitis and risk for poor glycemic control in patients with non-insulin-dependent diabetes mellitus. *J Periodontol***67**:1085–1093, 1996
[21]. Ismail AI, Burt BA, Eklund SA. Epidemiologic patterns of smoking and periodontal disease in the the United States. JADA 1983; 106: 617-623.
[22]. Locker D, Leake JL. Risk indicators and risk markers for periodontal disease experience for older adults living independently in Ontario, Canada. J Dent Res 1993; 72: 9-17.
[23]. Collins FM. Biofilm Formation, Identification and Removal. www.ineedce.com. 1-7