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Periodontology

Periodontal Disease and Diabetes: Observational Survey of 110 Subjects at the National Center for Diabetes Control of Bamako (CNLD)

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Abstract: Diabetes is a condition characterized by chronic hyperglycemia resulting from a deficiency of insulin secretion. Unbalanced, it can cause severe complications. Periodontal disease is one of the complications of unbalanced diabetes. This bacterial condition destroys the tissues that support the teeth and causes them to be lost. The purpose of our study is to evaluate the treatment needs in periodontal care of diabetic patients of the National Diabetes Control Center of Bamako. We conducted a descriptive and cross-sectional study, based on the observation of the oral status of diabetic patients during an oral examination. The study took place over a period of three months from July to September 2013. In this study we administered a medical questionnaire, followed by an oral exam. The data were collected from a survey form developed for the occasion, follow-up diaries, registers (consultation and hospitalization), entered on the software Epi info 3.5.3. Statistical calculations were performed with Pearson's chi-2 with alpha risk ≤ 0.05. We collected 110 subjects presenting cases of periodontal diseases that is a frequency of 80.00%. Females accounted for 74.55% of cases with a sex ratio of 0.34. The age group of 41-60 years was the most represented with 59.09% of cases, with extremes of age of 20 years and 77 years (Tab I). Type 2 diabetes was most represented with 89.10% of cases (Tab II). Patients with 0 to 5 years of diabetes accounted for 64.54% of cases (Tab III). Only 3 patients have no risk of complications, ie 33.34% of cases (Tab IV). A mean plaque index (mean oral hygiene) was observed in 43.63% of cases (Tab VI) for mild gingival inflammation in 64.55% of cases (Tab VII). Scaling and polishing was the most represented need for treatment with 50.91% of cases (Tab VIII). This increase in the frequency of periodontal disease in diabetics requires a restoration of the oral cavity and the introduction of oral hygiene satisfactory for a good quality of the glycemic equilibrium.

Keywords: Diabetes, Gingival Index, Plaque Index, CPITN, Oral Diseases.

INTRODUCTION

Diabetes is a condition characterized by chronic hyperglycemia resulting from a deficiency of insulin secretion. Unbalanced, it can cause severe complications. Periodontal disease is one of the complications of unbalanced diabetes. This bacterial condition destroys the tissues that support the teeth and causes them to be lost. However, the prevention of dental conditions can have a beneficial effect on the balance of diabetes and the quality of life of people with diabetes [1].

The diabetic patient is considered an immunocompromised patient, predisposed to infections. The impact of diabetes on the oral cavity is very influenced by the glycemic balance [2]. Globally, an estimated 422 million people were living with diabetes in 2014, up from 108 million in 1980. The worldwide (age-standardized) prevalence of diabetes has almost doubled since 1980, from 4.7% in 8.5% [3].

The number of people suffering from diabetes in Africa will increase by 98.1% over the next 20 years, from 14.7 million in 2011 to 28 million in 2030 [4].

In Mali in 1996, studies in two national hospitals in Bamako showed that diabetes was the second leading cause of hospitalization and 40% of

internal medicine consultations. The prevalence of diabetes today exceeds 9.3% of the Malian population [5].

The aim of our study is to evaluate the treatment needs in periodontal care of diabetic patients of the National Diabetes Control Center of Bamako.

MATERIALS AND METHODS

We conducted a descriptive and cross-sectional study, based on the observation of the oral status of diabetic patients during an oral examination. The study took place over a period of three months from July to September 2013.

During this study we administered a medical questionnaire, followed by an oral examination in all our diabetic patients in charge at the National Center for Diabetes Control of Bamako, having accepted to answer the questionnaire and to be examined. Those who did not agree to the questionnaire and to be examined were not included in the study.

The clinical characteristics of diabetes were collected from the follow-up diaries, reference cards, consultation registers and hospitalization records. The population concerned was diabetic patients followed at the National Diabetes Control Center of Bamako.

We used the Green Oral Hygiene Index (IHOS) of Green and Vermillon and WILKINS to assess the quality of oral hygiene. The gingival index of LOË and SILNESS for gingival inflammation and the CAO / D index for dental status. Dental mobility was assessed by the MUHLEMANN index [5]. Statistical calculations were performed with Pearson's chi-2 with alpha risk ≤ 0.05.

RESULTS

We collected 110 subjects presenting cases of periodontal diseases with a frequency of 80.00%. Females accounted for 74.55% of cases with a sex ratio of 0.34. The age group of 41-60 years was the most represented with 59.09% of cases, with extremes of age of 20 years and 77 years (Tab I).

Out-of-school patients accounted for 67.28% of cases. Type 2 diabetes was most represented with 89.10% of cases (Tab II). Patients with 0 to 5 years of diabetes accounted for 64.54% of cases (Tab III). Only 3 patients have no risk of complications, ie 33.34% of cases (Tab IV).

Eighty-five patients had blood glucose greater than or equal to 1.26g / l or 77.27% of cases (Tab V). The diseases observed in our patients were patients with gastritis or ulcer in 31.81%, followed by patients with hypertension in 20.90%.

All our patients brushed their teeth 100% of the time for twice-daily brushing (51.81%). However, a bad brushing technique was found in 90.00% of cases. A mean plaque index (mean oral hygiene) was observed in 43.63% of cases (Tab VI) for mild gingival inflammation in 64.55% of cases (Tab VII). Scaling and polishing was the most represented need for treatment with 50.91% of cases (Tab VIII).

Our patients had a malocclusion in 4.55% of the cases, in 37.27% a case of halitosis, and patients had a tooth mobility rate of 24.55%.

Our patients did not consult a Dentist in 40.91% of cases. We found no statistical link between the sociodemographic variables and the various indices.

Table-I: Distribution of patient population by age group

Age range	Effective	Fréquency (%)
20 – 40	18	16,36
41- 60	65	59,09
61- 80	27	24,55
Total	110	100,00

Table-II: Distribution of Patient Size by Type of Diabetes

Type of diabetes	Effective	Fréquency (%)
Type 1	12	10,90
Type 2	98	89,10
Total	110	100,00

Table-III: Distribution of patient numbers by age of diabetes

Age of diabetes	Effective	fréquency (%)
0 - 5 years	71	64,54
6- 10 years	24	21,81
11-15 years	9	8,20
16 to 21 years	6	5,45
Total	110	100,00

Tableau-IV : Répartition de l'effectif des patients en fonction du résultat de l'hémoglobine glyquée HbA1c

HbA1c	Our results	State of balance	Risks of complications	Effectifve	Fréquency(%)
< 7 %	5,46 %	Very good	Little or no risk	2	33,34
	6,80 %			1	
7 - 8 %	7,15 %	Way	Low but existing	1	33,34
	7,20 %			1	
	7,54 %			1	
8 - 10 %	8,60 %		Important	1	11,11
> 10 %	11,4 %	Imbalance	Very important	1	22,21
	15 %			1	
			Total	9	100,00

Table-V: Distribution of patient population by blood glucose result

Result of blood glucose	Effective	Fréquency (%)
Less than 0.70g / l	0	0,00
0.70 g / l - 1.25 g / l	25	22,73
Greater than or = 1.26 g / l	85	77,27
Total	110	100,00

Table-VI: Distribution of patient population by plaque index

Plate index	Effective	Fréquency(%)
Excellent (0)	22	20,00
Good (0.1-0.9)	27	24,55
Medium (1- 1.9)	48	43,63
Low (2- 3)	13	11,82
Total	110	100,00

Table-VII: Distribution of patient population by gingival index

Gingival index	Effective	Fréquency (%)
No inflammation	22	20,00
Inflammation slight (0,1 - 0,9)	71	64,55
Average inflammation (1 - 1.9)	16	14,55
Severe inflammation (2 -3)	1	0.90
Total	110	100,00

Table-VIII: Distribution of patient numbers by CPITN index

CPTIN Index	Besoins de traitement	Effective	Fréquency(%)
0: Healthy periodontium	No treatment	24	21,82
1: At least one tooth with bleeding	Teaching in oral hygiene	8	7,27
2: At least one tooth with tartar	Teaching in oral hygiene and descaling	56	50,90
3: At least one tooth with a periodontal pocket of 4 to 5 mm	Teaching in oral hygiene, descaling and curettage	17	15,45
4: At least one tooth with a 6mm pouch	Complex treatment at a specialist	5	4,55
Total		110	100,00

DISCUSSION

In our study we recorded an overall frequency of 80.00% of cases of periodontal disease. Our results are consistent with other similar studies by Thiam M in Senegal 97.5% [6], Essama *et al.* in Cameroon reported 87.80% cases of gingivitis and 12.20% of periodontitis) [7].

In our case series, females were the most represented with 74, 55% of the cases and a sex ratio of 0.34. Our results are contrary to those of, Togo A. and Coulibaly F, in Mali who reported respectively male predominance of 51.4% and 55.3% of cases [8.9], and Thiam M. [6] who found in his study in Senegal 57.5% of cases in favor of the male. In our study, the most represented age group was 41-60 years old with a frequency of 59.09%, and the average age was 48.5 years with extremes of 20 and 77 years.

This is corroborated by other similar studies, including IFOUTA RAZINGUE M.G. [10] in Mali in its study conducted at the Diabetic Center of Bamako,

found a frequency of 19.4% in the age group 46-50 years. In Côte d'Ivoire, a 42% prevalence of periodontal involvement in the age group between 31 and 40, and 88% in the 51-70 age group and 100% in the 81-90 age group was reported by A. Lokrou *et al*. [11].

Mavuemab T. *et al*. [12] reported in their study in the Democratic Republic of Congo (DRC) that beyond 30 years, severe periodontal disease reached 53.1% of subjects. Type 2 diabetes was the most represented with 89.10% in our study. 63.96% of our patients had a seniority of diabetes of 0 - 5 years.

In comparison with the result of glycated hemoglobin, nine patients, or 8.20% of the patients, performed the glycated hemoglobin examination, and among these, three patients had a normal level, and therefore did not present a risk of complications about 33.34% of cases. Eighty-five patients had a blood glucose level greater than or equal to 1.26g / l (hyper glycemic), ie 77.27% of the cases.

The diseases encountered in our patients were gastric problems, followed by hypertension with respectively (31.81%) and (20.90%). Costedoat G. *et al.* in France reported a frequency of 14% of type 1 diabetes and 81% of type 2 diabetes; the age of diabetes was greater than or equal to 10 years in 48.8% of cases and that of less than 5 years in 24.8% of cases. Of 1468 Type 2 diabetics examined and interviewed, 64.9% of them reported that they did not know their HbA1c level.

Coulibaly F. [9] reported in his study a blood glucose level greater or equal in 84.6% of cases. Thiam M. [6] reported a 4-year seniority of diabetes, 67% of cases.

In France, TERNOIS M. *et al*. [13] reported in 74 diabetic children aged 1 to 17.5 years a glycemic hemoglobin very imbalance of 8 to 10% or> 10%, or 54% of cases. They reported having little information on the link between diabetes and oral health in 39% of children. Essama *et al*. [7] in Cameroon reported a 7-year seniority (2-15), a median glycated hemoglobin level of 8% (6.90-10.63); a history of 65.85% hypertension and 4.88% stroke.

Compared to oral hygiene in our study Patients brushed twice in 51.81% of cases. The special moment of brushing was the morning before the meal followed by the evening before the meals with respectively 97,27% and 57,27% of the cases. They had a bad brushing technique in 90.00% of cases.

In the study by Essama *et al*. [7] In Cameroon, all patients reported brushing their teeth at least once a day; used a toothbrush, but no patient used inter-dental brushes or inter-dental wire. Compared to the plaque index, our patients showed a mean index (1-1.9) corresponding to average oral hygiene in 43.63% of cases.

Essama *et al.* [7], found a median plaque index of 0.58 in a sample of 41 patients. Compared to the gingival index in our study gingival inflammation was average in 64.55% of cases. Costedoat G. *et al*. [15] reported a frequency of 44.9% gingival inflammation and 55.4% presence of tartar and 38.2% of patients reported experiencing brushing bleeding

In the Thiam M. [6] study, 72.5% of diabetics had average gingival inflammation and 6% had severe inflammation. Thiam M [6]. In Senegal reported that 67% of his patients had been living with diabetes for less than 4 years and 32% for more than 4 years. The majority of people with diabetes 77.5% had average oral hygiene. Twice-daily brushing was most often applied, and

Thiam F [9]. Reported seniority of 1 and 3 years, and 40% of diabetic children had poor oral hygiene. Compared to the CPITN Index, in our study 21.82% of the patients did not need treatment, 7.27% had at least one tooth with bleeding and needed oral hygiene instruction only. (Score 1)

50.91% of our patients had tartar in their mouths, and therefore needed education in oral hygiene, scaling, and polishing. (Score 2) 15.45% of the patients had at least one tooth with a periodontal pocket of 4 to 5 mm, so these patients needed scaling, curettage and oral hygiene instruction. (Score 3)

4.55% of our patients needed complex treatment in a specialist. (Score 4) Essama *et al*. [7] in Cameroon evaluated the need for periodontal treatment in type 2 diabetics, in this study 90% of cases needed scaling, while less than 5% needed scaling associated with root planing , and 7.32% of cases required surgical periodontal treatments.

Mavuemab T. coll [12]. Reported in their study a need for the following periodontal treatment: 97% of cases needed oral hygiene instruction (EHBD), 95% needed scaling, and 10.5% cases needed complex treatment, 3% did not require treatment.

Our patients had a malocclusion in 4.55% of cases, in 37.27% a case of halitosis, and patients had a tooth mobility rate of 24.55%. Our patients did not consult a Dentist in 40.91% of cases. We found no statistical link between the sociodemographic variables and the various indices.

CONCLUSION

This increase in the frequency of periodontal disease in diabetics requires rehabilitation of the oral cavity and the introduction of oral hygiene satisfactory for a good quality of the glycemic balance. The dental

professional must be actively involved in the medico-surgical team that provides for the prevention, diagnosis and treatment of diabetes-related complications.

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