

# Profile of Prosthetic Care Consumers at the Institute of Odontology and Stomatology Clinic of Dakar

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## Abstract

The high frequency of dental extractions creates a high demand for prosthetic rehabilitation. Therefore, this study aimed to describe the profile of consumers of prosthetic care at the Institute of Odontology and Stomatology in Dakar. It was a descriptive and retrospective study of patients who had been consulted at the prosthetic clinic of the Institute of Odontology and Stomatology of Dakar. Data were collected from medical records from 09 November 2019 to 09 June 2020. The tools used to collect and process the information were the Sphinx software and the Excel spreadsheet. Out of the 101 patient records, 51% were male and 48% belonged to the age group of 18 to 39 years. Nearly 38.61% of the patients lived less than 5 km from the health care facility and 70.3% of the respondents had a monthly income of fewer than 100,000 FCFA. Clinically, 96% of patients came for functional reasons, 78.2% for aesthetic reasons, and partial edentulism was the most frequent diagnosis (96%). Chi-square tests were performed to find a dependency or non-dependency relationship between diagnosis and age, but also between income and treatment cost. In sum, age and diagnosis were independent of each other, just as patient income was not related to treatment cost. Proximity to health facilities, income, and cost of treatment are factors that influence accessibility to oral health care. It is important to integrate the profile of the consumer of care into global management.

## Keywords

Prosthetic Care, Consumers, Profile, Prosthetic Clinic, Senegal

## 1. Introduction

Oral diseases, including caries and periodontal disease, are among the most pre-

valent conditions in the world [1]. They affect all segments of the population and are the major causes of edentulism, resulting in a high need for prosthetic rehabilitation [2] [3]. In developing countries, particularly in Africa, the prevalence of these conditions remains particularly high [1] [4]. In Mali, a 2018 study by Ba *et al.* reported a 41.5% prevalence of periodontal disease in general practice patients at the CHU-OS in Bamako [5]. In Senegal, the prevalence of caries is 76.3% and a study by Guirassy *et al.* in 2020 reported a prevalence of 69.5% of periodontitis in a population of Senegalese soldiers [6] [7]. Such a context becomes worrying. Indeed, Gueye *et al.* in 2015 reported a diagnosed need for prosthetics in 53.8% of the urban population in Dakar [8]. At the Atakpamè Regional Hospital in Togo, Agoda *et al.* reported a prosthetic need of 62.66% in 2018 [3]. To address this worrying reality, it is imperative to provide adequate care. This requires a qualitative, but also financially and geographically accessible care offer. However, the results of Diop *et al.* in 2020 highlighted the unequal distribution of public sector dentists across the country, with 69% practicing in the Dakar region alone [9]. Furthermore, Diop *et al.* in 2017 reported that 78.2% of Senegalese households paid directly for their oral health care [10]. This confirms the difficulties in accessing oral health care for financial reasons, not to mention the proximity of health care facilities.

In light of these elements, the study of the specific characteristics of consumers of prosthetic care would make it possible to better understand the barriers that hinder access to this care to remove them. Therefore, this study aimed to describe the profile of consumers of prosthetic care at the prosthetic clinic of the Institute of Odontology and Stomatology in Dakar.

## **2. Methodology**

### **2.1. Framework of the Study**

The only public training structure for oral health care in Senegal, the Dakar Institute of Odontology and Stomatology provides four years of teaching leading to the state doctorate in dental surgery. It is an integral part of the Cheikh Anta Diop University as a department of the Faculty of Medicine, Pharmacy, and Odontology. Its missions are articulated around the models of teaching, research and training within the framework of the system that combines theory and practice. All this is done in a balanced way between reflection and action (acquisition of skills). The institute has specialists in all areas of dentistry, but this study focuses on the prosthetics clinic.

### **2.2. Type of Study**

A descriptive and retrospective study.

### **2.3. Survey Population**

A comprehensive survey of all patient records consulted in the prosthetics clinic during the 2019/2020 academic year.

## 2.4. Selection Criteria

Records of patients from the Institute of Odontology and Stomatology of Dakar during the academic year 2019-2020 with a need for prosthetic rehabilitation, validated by a prosthetics teacher. No exclusion criteria besides.

## 2.5. Survey Variables

The epidemiological data collected were socio-demographic and clinical characteristics.

Sociodemographic characteristics were estimated by age, gender, income, and distance traveled.

- Age was collected in years and divided into three modalities, namely [18 to 39], [40 to 59], and >60 years;
- Sex was divided into male and female;
- The monthly income evaluated in FCFA, corresponded to the individual's total monthly earnings and was divided into six modalities namely < 50,000, [50,000 to 100,000[, [100,000 to 150,000[, [150,000 to 200,000[, [200,000 to 300,000[ and  $\geq 300,000$ ;
- Estimated in km, the distance between the patient's home and the care facility was divided into five modalities namely < 5, [5 to 9.9], [10 to 14.9], [15 to 20], and  $\geq 20$  km;
- The cost of treatment also evaluated in FCFA was divided into four modalities namely < 90,000, [90,000 to 180,000[, [180,000 to 270,000[, [270,000 to 359,000[, [360,000 to 450,000[ and  $\geq 450,000$ .

The clinical characteristics refer to the reason for the consultation and the type of pathology diagnosed. The latter reflects the prevalence of edentulism in the study population.

## 2.6. Data Collection

To collect the information for this study, the following procedure was adopted.

### ✓ Administrative processes

Before starting the survey, correspondence was sent to the Director of the IOS in Dakar to request authorization, which was obtained. Similarly, the confidentiality of the data was respected.

### ✓ Period of the study

The study took place during the period from November 09th, 2019 to June 09th, 2020.

### ✓ Data collection and processing tools

The distance data was calculated using Google Maps. To get the data on income, a document from the National Agency for Statistics and Demography was used as a reference. It can be found in appendix A. To collect the data, a questionnaire presented in appendix B was used. Sphinx software was used to enter the data and generate results to process the information. The Excel spreadsheet was then used to organize these results in the form of tables and calculate

chi-square.

✓ **Data sources**

The data were collected from patient records of the prosthetics clinic.

### 3. Results

This chapter consists of three parts presenting the socio-demographic, the clinical characteristics of the patients, and the correlation between variables.

#### Socio-demographic characteristics

Of the 101 cases in the study, 46.53% of the patients were between 18 and 39 years of age with an average age of 37.56 years and a sex ratio of 0.98. Patients traveled an average of 18.23 km to receive care, but the majority of patients, 38.61%, lived within 5 km of the IOS. The average income was 102,525 FCFA while the average cost of treatment was 157,534 FCFA (**Table 1**).

**Table 1.** Distribution of sociodemographic characteristics of patients according to their frequency.

Characteristics	Quantity (n = 101)	Frequency	Average (min; max)
<b>Gender</b>			Sex-ratio = 0.98
Male	50	49%	
Female	51	51%	
<b>Age (in years)</b>			37.56 (18; 77)
[18 to 39]	47	46.53%	
[40 to 59]	35	34.65%	
≥60	17	16.83%	
Not indicated	2	1.98%	
<b>Distance traveled (in km)</b>			18.23 km (2; 99)
<5	39	38.61%	
[5 to 9.9]	19	18.81%	
[10 to 14.9]	14	13.86%	
[15 to 19.9]	5	4.95%	
≥20	24	23.73%	
<b>Income (in FCFA)</b>			102,525 FCFA (50,000; 30,000)
<50,000	20	19.8%	
[50,000 to 100,000[	51	50.5%	
[100,000 to 150,000[	12	11.88%	
[150,000 to 200,000[	7	6.93%	
[200,000 to 300,000[	2	1.98%	
≥300,000	7	6.93%	
Not indicated	2	1.98%	
<b>Cost of treatment (in FCFA)</b>			157,534.65 FCFA (40,000; 603,000)
<90,000	26	25.7%	
[90,000 to 180,000[	49	48.5%	
[180,000 to 270,000[	19	18.8%	
[270,000 to 359,000[	3	3%	
[360,000 to 450,000[	2	2%	
≥450,000	2	2%	

## Clinical characteristics

### Nosological profile

The study revealed that the most frequent reason for consultation was functional (96%), followed by aesthetic (78.2%). In 96% of the cases, the diagnosis was partial edentulism, thus justifying that the majority of treatments were bridges, 53.5%. However, the PAPM was also the most common treatment, at 43.6%. The majority of patients, 47.5%, had average hygiene (**Table 2**).

### Income distribution by diagnosis

The study revealed that patients with an income between 50,000 and 100,000 FCFA were those with a high prosthetic need due to partial edentulousness (48.51%) and total edentulousness of the maxilla (13.86%) (**Table 3**).

### Income distribution by hygiene

Regarding patient hygiene, patients with an income between 100,000 and 150,000 FCFA were the most likely (5.94%) to have good hygiene. They were directly followed by those with incomes between 50,000 and 100,000 FCFA, *i.e.* 3.96%. However, the latter was the most likely to have average hygiene, at 23.76%. They were then followed by those earning less than 50,000 FCFA, *i.e.* 11.88% (**Table 4**).

**Table 2.** Distribution of clinical characteristics of patients according to their frequency.

Characteristics	Quantity	Frequency
<b>Reason for consultation</b>		
Functional	97	96%
Aesthetic	79	78.2%
Psychosocial	26	25.7%
Referred	2	2%
<b>Diagnosis</b>		
Severe coronal decay	3	3%
Partial edentulousness	97	96%
Total maxillary edentulousness	26	25.7%
Total mandibular edentulousness	6	5.9%
<b>Patient hygiene</b>		
Good	18	17.8%
Average	48	47.5%
Poor	28	27.7%
Absent	1	1%
Not indicated	6	5.94%
<b>Treatment</b>		
Bridges	54	53.5%
PAC	30	29.7%
PAPM	44	43.6%
Bimaxillary PAPM	2	2%
PAP resin	13	12.9%
PAT	1	1%

PAC: Complete Removable Prosthesis; PAPM: Partial Removable Metal Prosthesis; PAP: Partial Removable Prosthesis; PAT: Total Removable Prosthesis.

**Table 3.** Income distribution by diagnosis.

Diagnosis/Income	Severe/total coronal decay	Partial edentulousness	Maxillary total edentulousness	Mandibulary total edentulousness	Total
<50,000	0 (0.0%)	19 (14.73%)	7 (5.43%)	1 (1.55%)	27 (26.73%)
[50,000 to 100,000[	2 (1.55%)	49 (37.99%)	14 (10.85%)	4 (3.1%)	69 (68.32%)
[100,000 to 150,000[	0 (0.0%)	12 (9.30%)	1 (0.77%)	0 (0.0%)	13 (12.87%)
[150,000 to 200,000[	1 (0.77%)	6 (4.65%)	1 (0.77%)	0 (0.0%)	8 (7.92%)
[200,000 to 300,000[	0 (0.0%)	2 (1.55%)	0 (0.0%)	1 (1.55%)	3 (2.97%)
≥300,000	0 (0.0%)	7 (5.43%)	2 (1.55%)	0 (0.0%)	9 (8.91%)
Total	3 (2.33%)	95 (73.64%)	25 (19.38%)	6 (4.65%)	129 (100%)

**Table 4.** Income distribution by hygiene.

Hygiene/Income	Good	Average	Poor	Absent	Total
<50,000	3 (3.22%)	12 (12.88%)	3 (3.22%)	0 (0.0%)	18 (19.36%)
[50,000 to 100,000[	4 (4.33%)	24 (25.76%)	21 (22.58%)	0 (0.0%)	49 (52.69%)
[100,000 to 150,000[	6 (6.44%)	3 (3.22%)	1 (1.08%)	0 (0.0%)	10 (9.9%)
[150,000 to 200,000[	3 (3.22%)	2 (2.15%)	2 (2.15%)	0 (0.0%)	7 (6.93%)
[200,000 to 300,000[	0 (0.0%)	2 (2.15%)	0 (0.0%)	0 (0.0%)	2 (1.98%)
≥300,000	2 (2.15%)	3 (3.22%)	1 (1.08%)	1 (1.08%)	7 (6.93%)
Total	18 (19.36%)	46 (49.46%)	28 (30.11%)	1 (1.08%)	93 (100%)

#### Income distribution by caries

Regarding the presence of caries, patients with an income between 100,000 and 150,000 FCFA were the most likely to have no caries (7.79%) or to have treated them (18.18%). However, those earning between 50,000 and 100,000 FCFA were the most likely to have them (27.27%) (**Table 5**).

#### Income distribution by treatment cost

Regarding the cost of treatment, the majority of patients, 48.49%, had spent between 90,000 and 180,000 FCFA for their care. The majority of these patients earned between 50,000 and 100,000 FCFA (**Table 6**).

#### Correlation between variables

Based on a chi-square test, we seek to know the existence of an association between age and type of diagnosis. It results in the p-value being greater than the significance level of 0.1. We can therefore conclude that the variables are not associated and that the diagnosis does not vary according to age (**Table 7**).

We also performed a chi-square test between cost and income. For these data, the p-value is above the significance level of 0.05. We can therefore conclude that the variables are not associated and that the cost does not vary with income (**Table 8**).

## 4. Discussion

The present study carried out in the prosthesis clinic of the Institute of Odontostomatology in Dakar has made it possible to highlight the socio-demographic and clinical characteristics of patients.

Out of the 101 cases analyzed, the majority of patients, *i.e.* 46.53%, were aged between 18 and 39 years. In 2015, Gueye *et al.* found the same majority in a study on the need for prosthetic rehabilitation in an urban population of Dakar. The average age of 32 years in this study is similar to that of the present survey which was 37.56 years [8]. The youth of Senegalese society [11], the location of the service (university) which favors student attendance, but also the high prevalence of dental caries in Senegal and its complications [12], thus leading to a need for prosthetic rehabilitation, corroborate these results.

**Table 5.** Income distribution by caries.

Presence of caries/Income	Treated	Moderate	Absent	Total
<50,000	4	7	5	16 (20.77%)
[50,000 to 100,000[	14	21	6	41 (53.25%)
[100,000 to 150,000[	3	4	2	9 (11.69%)
[150,000 to 200,000[	3	2	1	6 (7.79%)
[200,000 to 300,000[	1	0	1	2 (2.6%)
≥300,000	0	2	1	3 (3.9%)

**Table 6.** Income distribution by treatment cost.

Cost/Income	<90,000	[90,000 to 180,000[	[180,000 to 270,000[	[270,000 to 359,000[	[360,000 to 450,000[	≥450,000	Total
<50,000	6	9	5	0	0	0	20
[50,000 to 100,000[	14	25	10	0	1	1	51
[100,000 to 150,000[	3	4	3	2	0	0	12
[150,000 to 200,000[	0	4	1	1	0	1	7
[200,000 to 300,000[	1	1	0	0	0	0	2
≥300,000	1	5	0	0	1	0	7

**Table 7.** Chi-square test between age and diagnosis.

Diagnosis	Age (in years)			Total	p-value
	[18 to 39[	[40 to 59[	[60 and more[		
Severe coronal decay	1	0	0	1	0.99
	0.99	0	0	0.99	
Partial edentulousness	41	27	14	82	0.838
	40.59	26.73	13.86	81.19	
Total maxillary edentulousness	1	1	1	3	0.99
	0.99	0.99	0.99	2.97	
Total mandibular edentulousness	6	7	2	15	0.99
	5.94	6.93	1.98	14.85	
Total	49	35	17	101	0.838
	48.51	34.65	16.83	100	

**Table 8.** Chi-square test between cost and income.

Income	Treatment cost						Total
	<90,000	[90,000 to 180,000[	[180,000 to 270,000[	[270,000 to 359,000[	[360,000 to 450,000[	>450,000	
<50,000	6	9	5	0	0	0	20
	4.94	8.91	9.95	0.00	0.00	0.00	17.82
[50,000 to 100,000[	15	26	10	0	1	1	53
	14.85	25.74	9.90	0.00	0.99	0.99	52.48
[100,000 to 150,000[	3	4	3	2	0	0	12
	2.97	3.96	2.97	1.98	0.00	0.00	11.88
[150,000 to 200,000[	0	4	1	1	0	1	7
	0.00	3.96	0.99	0.99	0.00	0.99	6.93
[200,000 to 300,000[	1	1	0	0	0	0	2
	0.99	0.99	0.00	0.00	0.00	0.00	1.98
>300,000	1	5	0	0	1	0	7
	0.99	4.95	0.00	0.00	0.99	0.00	6.93
Total	26	49	19	3	2	2	101
	25.74	48.51	18.81	2.97	1.98	1.98	100.00

Pearson Chi2 = 34.18, Prob = 0.2736.

There was a slight female predominance in the present study. Indeed, the sex ratio was 0.98. These results differ from those of Gueye *et al.* who found a male predominance with a sex ratio of 1.14 [8]. This difference can be explained by the size of their sample (405 patients) and the setting of their study which was the urban environment of Dakar. However, they corroborate those of Zouaoui (2021) and Soofi (2020) who found a female predominance with respectively 56.45% and 55.4% against 51% in this study [13] [14].

The distribution of patients according to distance traveled is also a key indicator of geographical accessibility to care. In the present study, the majority of patients, *i.e.* 38.61%, lived less than 5km from the health care facility. This proximity could be explained by the fact that the majority of users are students. The studies by Diop in 2018 and Berthé in 2020 support this finding with 99.3% and 77.04% respectively [15] [16]. However, an average distance of 18.23 km was traveled by the patients in the present survey, as almost 23.73% of them lived more than 20 km away, some of them more than 99 km. This confirms the problems of accessibility to oral health care for rural Senegalese populations reported by Faye *et al.* in 2016 [17].

The income level of the patients is also essential to assess their ability to pay for their oral health care. This study revealed that their average income was 102,525 FCFA and 70.3% of them received less than 100,000 FCFA. However, they had to pay an average of 157,534.65 FCFA per treatment, and 48.5% of



these treatments cost between 90,000 and 180,000 FCFA. These results reflect the low capacity of these patients to pay for dental prosthetic care, the majority of whom were students with a grant of only 50,000 CFA francs. Lô's study corroborates these results by reporting that shopkeepers and others (mostly students) attend public dental establishments, while civil servants (with higher incomes) prefer private establishments [18].

At the same time, the lack of awareness of health coverage and the high rate of informal activity increase direct payment. According to Diop in 2017, this rate was 78.3% [10]. It should also be noted that in the university context of this study, IOS students pay for their patient's care in order not to invalidate the procedures performed.

Clinically, the present work reported that the most frequent reasons for consultation were functional at 96% and aesthetic at 78.2%. These results are corroborated by a study by Fall in 2021 which also reported that these were the main reasons for consultation [19]. This could be explained by the fact that the tooth is essential for such basic functions as chewing, swallowing, and speaking. Furthermore, dental aesthetics has always been a concern for people as reported by Zouaoui in 2020 [13].

Regarding the diagnosis, partial edentulism was found in 96% of cases compared to 31.9% for total edentulism of one or both jaws. These results corroborate the Mbodj *et al.* study in 2011 which reported that the average number of missing teeth in edentulous patients in Senegal was 4.4 [20]. This allows us to better understand the therapeutic choice of patients, which is strongly oriented towards bridges in 53.5% of cases. However, 43.6% of patients opted for the PAPM, which seems to be more affordable than a fixed prosthesis.

In addition, the present study investigated the relationship between income and oral hygiene of patients. It was found that patients could have good, average, poor, or even no oral hygiene regardless of their income. Chi-squared tests were conducted for the correlation between age and diagnosis but also between income and treatment cost. None of these tests showed any dependency between these variables. These results serve as a reminder that the oral health status of the population in our sub-Saharan countries remains worrying and that the diseases that result from this fact invariably affect populations regardless of income. This supports the findings of several authors who argue that better education policies are needed to promote oral hygiene [21] [22] [23].

During our survey, several obstacles were encountered. Indeed, obtaining some data was difficult, as some files were poorly completed. In addition, it should be noted that some students pay for their patient's care to validate their academic acts. This results in patients with very little income being able to pay for high-cost prostheses.

## 5. Conclusion

In the context of difficult accessibility to oral health care, while the need for

prosthetic rehabilitation is increasingly present, it is necessary to better perceive the profile of the consumer of this care. The present study, therefore, made it possible to estimate the socio-demographic and clinical characteristics of patients in the prosthetic department of the Institute of Odontology and Stomatology in Dakar. Data such as the frequency of edentulism, the financial possibilities of patients, and the average costs they face to benefit from prosthetic rehabilitation are all means of refining health policies aimed at improving accessibility to oral care. However, it would be even more relevant to study the real costs of this prosthetic rehabilitation to help better decision-making in the elaboration of a pricing system more adapted to the profile of the consumers of this care.

### Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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## Appendix

### Appendix A

Patients' incomes were assessed through a regional integrated survey on employment and the informal sector (ERI-ESI) of the National Agency for Statistics and Demography (ANSD). This is the reference for statistics in Senegal. The survey was conducted from 12 June to 19 August 2017 for the employment component and from 19 June to 30 August 2017 for the informal component. The most important information used was the following.

[https://www.ansd.sn/ressources/rapports/Senegal\\_ERI-ESI\\_RapportFinal.pdf](https://www.ansd.sn/ressources/rapports/Senegal_ERI-ESI_RapportFinal.pdf).

### Appendix B

The following questionnaire is the one that was integrated into the Sphinx software to collect the data we needed.

- 1) Date of consultation
- 2) Identification number
- 3) Gender
- 4) Age
- 5) How much is the monthly income by occupation?
- 6) How much is the distance between the patient's home and the clinic?
- 7) What is the reason for the consultation?
- 8) How did the patient get to the institute?
- 9) What is the assessment of the patient's hygiene?
- 10) What is the diagnosis?
- 11) What is the proposed treatment?
- 12) What is the cost of the treatment?
- 13) What is the number of sessions for the whole treatment?