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Adequacy between needs and offers of dental prostheses among edentulous individuals in dental clinics in the city of Yaoundé

Parfait Josely Manga Ambassa [1, 2, *], Marie-José Essi [1] and Rose Mbede Nga Mvondo [1, 2]

[1] *Faculty of Medicine and Biomedical Sciences of the University of Yaoundé I.*
[2] *Socio-Medical Center Rare Disease Info.*

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Abstract

Introduction: Edentulism, the partial or total absence of natural teeth, remains a current a public health problem and is manifested by the need for dental prostheses. The challenge being to reduce its prevalence and its various consequences, the offer must be adequate to the need for dental prostheses. However, several parameters can influence this suitability. It was necessary to verify the effectiveness of the latter in our context, by undertaking this study, the objective of which was to study the adequacy between needs and offers of dental prostheses in edentulous individuals.

Methods: We conducted a descriptive cross-sectional study in five dental clinics, over a period of 10 months. Were included, edentulous participants who were undergoing prosthetic rehabilitation. An adapted and pre-tested questionnaire was used for data collection. Statistical analyses were performed using SPSS version 25.0 software.

Results: The sex ratio was 0.52, the median age was 42 years. Amongst the edentulous individuals, 43.5% needed bridges, 29.9% needed strong cast metal dental prostheses and 18.2% needed implants. Acrylic dental prostheses were the most popular offer (80.4%). The adequacy was 33.3% (bridges), 0% (strong cast metal prostheses) and 28.2% (implants). The lack of financial resources was against this adequacy (56.5%).

Conclusion: The adequacy between needs and offers of dental prostheses among edentulous individuals in dental clinics in the city of Yaoundé is not fully effective.

Keywords: Dental prosthesis needs; Prosthetic offers; Adequacy; Edentulous

1. Introduction

Edentulism is the partial or total absence of natural teeth. It is a public health concern manifested by a need for dental prostheses [1]. The challenge being to reduce the prevalence and consequences of edentulism, it is imperative that the dental prostheses needs of edentulous individuals are in line with the prosthetic offers in response. This adequacy implies that for a specific type of edentulism (need), a specific dental prosthesis (offer). Data on the adequacy between the needs and offers of dental prostheses in edentulous individuals are scarce, however some studies provide an overall idea of the needs and offers of dental prostheses in the edentulous population [2, 3]. The choice of offer can be influenced by several parameters [3].

In Cameroon, oral pathology is widespread and plural, edentulism affects a considerable proportion of citizens and its management is expensive. The Cameroonian health system does not include universal health coverage dedicated to prosthetic care, so payments are direct [5]. In view of these challenges, we proposed to undertake the present research,

* Corresponding author: Parfait Josely Manga Ambassa

which aimed to study the adequacy between the needs for dental prostheses of the edentulous population and the prosthetic offers in response.

2. Materials and methods

We conducted a descriptive cross-sectional study (an analytical component was added to search for associations between variables) in five dental clinics in the city of Yaoundé. The dental clinics were chosen on the basis of a stratified random sampling. The choice of these sites was justified by the abundance of prosthetic cases, as well as the multitude of prosthetic treatments performed. The study took place over a period of ten months from November 2024 to September 2025. Participants sampling was non-exhaustive and consecutive. Included in our study was any edentulous individual who came to or was followed for prosthetic rehabilitation, English or French-speaking and who had given his or her consent or assent to participate in this study. Any edentulous individual who withdrew his or her consent during the participation or who interrupted their prosthetic rehabilitations for any reason was excluded from our study. Data were collected from participants using a pre-established and pre-tested questionnaire, administered on one hand to edentulous individuals in prosthetic rehabilitation and on the other hand completed by the principal investigator. The information collected was computed and analyzed using SPSS software version 25.0. Diagrams and figures were made with Microsoft Excel 2016, and tables using Microsoft Word 2016. Qualitative variables were described as frequencies and percentages, while quantitative variables were described as median and interquartile range. The Kruskal Wallis and chi-square tests were statistically significant for a p-value less than 0.05 with a 95% confidence interval. This study obtained the ethical clearance of the Institutional Ethical and Review Board of the Faculty of Medicine and Biomedical Sciences of the University of Yaoundé I and also research authorizations in the various study sites. The study was conducted with respect for the dignity and integrity of the participants; data were anonymized and were only used for the study.

3. Results

We received a total of 307 edentulous individuals coming for consultations, 245 were included, 31 excluded (27 edentulous individuals ended up not having prosthetic rehabilitations, 4 were lost to follow-up) and 214 finally retained for a participation rate of 87.35%.

3.1. Socio-demographic characteristics of participants

The sex ratio of rehabilitated edentulous individuals was 0.52 with a median age of 42 years and an interquartile range of [31-56]. The participants' minimum and maximum ages were 14 years and 86 years. (Table 1)

Table 1 Distribution of the study population by socio-demographic characteristics

Variable	Frequency	Percentage (%)
Sex		
Male	73	34.1
Female	141	65.9
Academic level		
Primary	05	2.3
Secondary	46	21.5
Higher	163	76.2
Marital status Single widower	57	26.6
Married	157	73.4
Profession		
Pupil	09	4.2
Student	25	11.7

Public Sector	65	30.4
Private sector	71	33.2
Informal sector	44	20.5
Monthly income (in FCFA)		
[0-94445[	113	52.8
[94445-188890[	20	9.3
[188890-283335[	20	9.3
[283335-377780[	43	20.1
[377780-566670[	14	6.5
[566670-850005[	04	1.9

3.2. Prosthetic needs

3.2.1. Characteristics of edentulism:

In some participants, edentulism was only maxillary (31%), or mandibular (35%) and in others it was both mandibular and maxillary (34%).

Maxilla: Speaking of the maxilla, isolated edentulism of the anterior sector was predominant, more than half of the participants (50.4%) had 1 to 2 missing teeth. In general, edentulism on the maxilla was partial in 97.8% of cases.

The table below summarizes the characteristics of maxillary edentulism (isolated and maxillo-mandibular).

Table 2 Characteristics of maxillary edentulism (N=139)

Maxilla	**Frequency**	**Percentage (%)**
Number of missing teeth		
1	35	25.2
2	35	25.2
3	14	10.1
4	19	13.6
5	08	5.7
6	05	3.6
7	11	7.9
8	03	2.2
10	01	0.7
12	01	0.7
13	01	0.7
14	03	2.2
16	03	2.2
Edentulous sector		
Anterior	71	51.1
Lateral	01	20.9

Posterior	29	0.7
Anterior and posterior	23	16.5
Lateral and posterior	06	4.3
All sectors	09	6.5

On the mandible: In contrast to the maxilla, the isolated edentulism of the posterior sector predominated on the mandible; an illustration of all the characteristics of the mandibular edentulism is presented on the table below.

Table 3 Characteristics of mandibular edentulism (N=148)

Mandible	**Frequency**	**Percentage (%)**
Number of missing teeth		
1	43	29.1
2	39	26.3
3	28	18.9
4	12	8.1
5	03	2
6	03	2
8	03	2
9	03	2
12	05	3.4
13	01	0.7
14	03	2
16	03	2
Edentulous sector		
Anterior	12	8.1
Lateral	03	2
Posterior	110	74.3
Anterior and posterior	14	9.5
All sectors	09	6.1

Similar to the maxilla, the absence of teeth on the mandible was partial in 95.9% of cases. The following figure summarizes the variation of edentulism according to the type and the arch (maxilla, mandible, mixed).

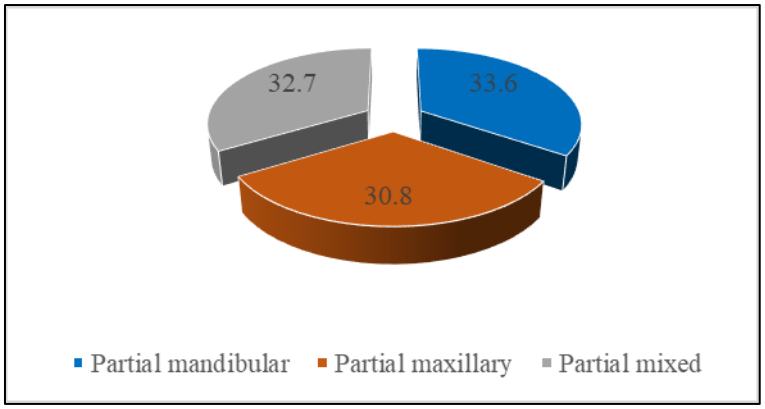

Figure 1 Variation of edentulism (N=214)

Whether it was only maxillary, only mandibular or maxillo-mandibular, partial edentulism was the most represented. A small portion of participants had complete mandibular (1.4%) and complete mixed (1.4%) edentulism.

3.2.2. Reasons for rehabilitation in dental prostheses

The different situations of edentulism led participants to express their needs through a request for prosthetic care. The reasons that motivated the edentulous participants, whether they were at their first visit or not, for prosthetic rehabilitation were diverse; the restoration of mastication was first in line. A more detailed presentation of the different motivations is highlighted in the table below.

Table 4 Reasons for prosthetic rehabilitation (N=214)

Variables	**Frequency**	**Percentage (%)**
Reasons for the need for the dental prosthesis		
Mastication	104	48.6
Phonation	03	1.4
Aesthetics	81	37.9
Mastication and phonation	16	7.5
Phonation and aesthetics	04	1.9
Mastication and aesthetics	06	2.8
Reasons to visit the dental office		
First visit	104	48.6
Appointment	110	51.4

3.2.3. Needs for dental prosthesis types

The appropriate type of dental prosthesis for each participant was defined by the practitioner. Thus, 43.5% of edentulous individuals needed fixed dental prostheses on teeth for better rehabilitation of their edentulism. 29.9% permanent dental prosthesis, 18.2% implants and 8.9% temporary dental prosthesis.

From their young age (14 years old) to almost sixty, edentulous individuals needed permanent dental prostheses (permanent removable dental prostheses, teeth-supported and implant-supported fixed prostheses) more than temporary ones. This trend decreases beyond the age of 62 when the need for temporary dental prostheses is more likely due to the state of aging. The distribution of these ages according to the need for dental prostheses is illustrated in the following figure.

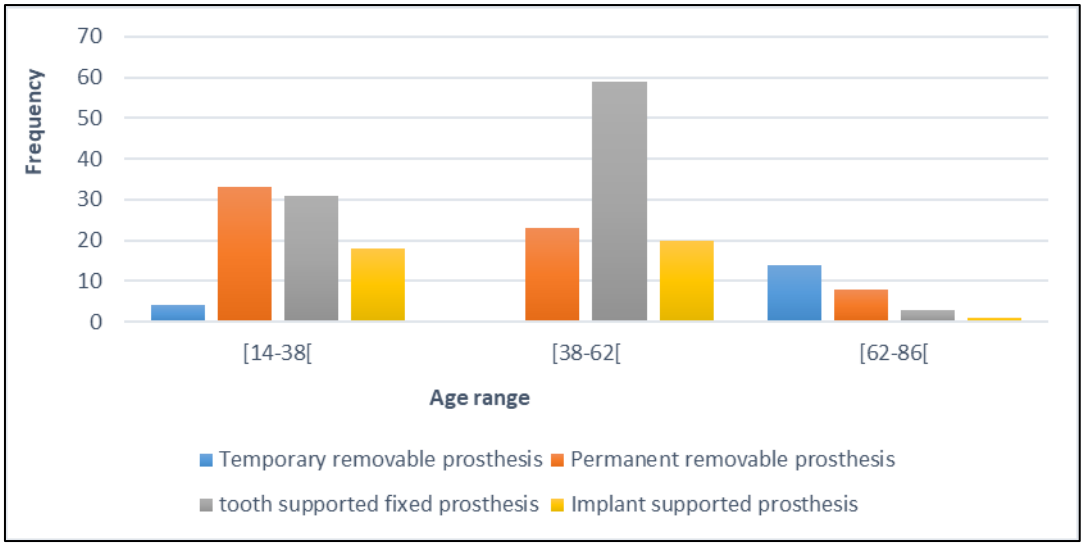

Figure 2 Distribution of the population according to age group and dental prosthesis needs

3.3. Prosthetic offers

By mutual agreement between the doctor and the edentulous individual, the temporary removable dental prosthesis was the most widely made offer, with hard acrylic as the most widely used manufacturing material.

Table 5 Distribution of the prosthetic offer (N=214)

Variables	Frequency	Percentage (%)
Prosthetic offer in agreement between practitioner and patient		
Temporary removable	172	80.4
Fixed teeth-supported	31	14.5
Fixed implant-supported	11	5.1
Dental prosthesis materials		
Hard acrylic	119	55.6
Flexible acrylic	53	24.8
Metal-ceramic	31	14.5
Zirconia	03	1.4
Titanium	08	3.7
Number of teeth restored by the dental prosthesis		
1	64	29.9
2	51	23.8
3	38	17.8
4	31	14.5
5	02	0.9
6	05	2.3
7	03	1.4
12	06	2.8

16	08	3.7
25	03	1.4
28	03	1.4

Overall, more than half (53.7%) of the dental prostheses restored between 1 and 2 teeth.

Among the edentulous individuals in need of permanent removable dental prostheses, none obtained one, although they were proposed as adequate. The table below summarizes the adequacy between the needed dental prostheses and those actually made.

Table 6 Adequacy of the need for a type of dental prosthesis and the prosthetic offer

Dental prosthesis needs	Availability	Cost (FCFA)	Offers	Adequacy (%)
Temporary removable (n=18)	Available++	>= 50.000	18	100
Fixed removable (n=64)	Available	>= 180.000	00	00
Fixed teeth-supported (n=93)	Limited	>= 225.000	31	33.3
Fixed implant-supported(n=39)	Very limited	>= 700.000	11	28.2

The adequacy between prosthetic needs and offers is not fully effective, and this is not without reason because various barriers influence the choice of the prosthetic offer and consequently the adequacy. The following section illustrates the different determinants.

3.4. Determinants influencing the choice of prosthetic offer

The lack of financial resources was the major challenge to accessing an adequate prosthetic offer for patients with temporary removable dental prostheses.

As for those who with teeth-supported fixed dental prostheses, the difficulty of physical access prevented them from obtaining the implant-supported fixed ones. The different types of determinants are presented in the table below.

Table 7 Determinants of the choice of each prosthetic offer

Determinants of choice	Frequency	Percentage (%)
Temporary removable dental prosthesis (n=172)		
Financial	121	70.4
Geographical	15	7
Physical	22	12.8
Clinical	14	8.1
Teeth-supported fixed dental prostheses (n=31)		
Clinical	23	74.2
Patient's desire	05	16.1
Physical	03	9.7
Implant-supported fixed dental prostheses (n=11)		
Clinical	11	100

4. Discussion

4.1. Socio-demographic characteristics

Our study population was predominantly female (65.9%), with a sex ratio of 0.52, this ratio of femininity could reflect the difference in oral health behavior, with women more likely to take measures to protect their oral health. Our results are similar to those observed in 2015 in Bamako and 2019 in Ouagadougou [6, 7]. The median age was 42 years, which can be explained by the fact that at this age, the consequences of edentulism are more noticeable and the need for dental prostheses is increasingly expressed. Our results corroborate those of Fall M et al. In 2019, where the average age was 42 years +/- 13.38 [7]. The majority (52.8%) of the rehabilitated edentulous individuals had a salary between 0 and 94,450 CFA francs. This could be explained on the one hand by the fact that some patients were pupils and students without income whose rehabilitation was paid for by their parents, and on the other hand by the fact that salaries vary considerably according to professional categories and sectors of activity. As a result, a large part of the active population was deployed in sectors of activity where the monthly income was less than 95,000 CFA francs. Monthly income, sex, marital status, and level of education were significantly associated with the choice of prosthetic offer in our study.

4.2. Prosthetic needs

In our study, 43.5% of edentulous individuals needed teeth-supported fixed dental prostheses (bridges) for better rehabilitation of their edentulism. This translates into the fact that this type of dental prosthesis offers better stability and increased comfort compared to conventional removable dental prostheses; This is a viable option for patients who still have healthy teeth that can serve as abutments as was the case in our study. 29.9% of the edentulous participants required permanent dental prostheses (strong metal cast prostheses), due to the fact that these dental prostheses can be adjusted and modified to adapt to changes in the patient's oral morphology. 18.2% of edentulous individuals needed implants, this lower rate could be explained by the fact that implant practice is not yet widespread in our context, so practitioners make less use of this offer. Finally, temporary dental prostheses were offered to 8.9% of participants. This is explained by the fact that this dental prosthesis is a repair, transitory dental prosthesis, while waiting for a (permanent) dental prosthesis, it is the last resort when you want to effectively rehabilitate an edentulous area.

4.3. Prosthetic offers

The removable acrylic dental prosthesis (temporary) was the most common offer in 80.4% of cases (172 cases/214). This offer, which is not only transitory but also limited in time, was considered final and was the choice of the majority of the edentulous population. This reflects the fact that patients prioritize short-term functionalities (mastication, phonation, aesthetics) rather than considering the long-term benefits of permanent offers. Only 14.5% of the edentulous population (31 cases/214) were rehabilitated by fixed dental prostheses and 5.1% (5 cases/214) by fixed implant-supported dental prostheses. This shows the low uptake of these dental prostheses as a rehabilitation option by patients. Bathio et al. show similar results where 8.75% of edentulous patients chose teeth-supported fixed dental prosthesis [6], the same for Fall M et al. who revealed that 17.75% (19 cases/107) of the patients were rehabilitated by teeth-supported fixed dental prostheses and 4.67% (5 cases out of 107) by the implants [7].

4.4. Determinants influencing the adequacy between dental prosthesis needs and offers

The lack of financial means was the major challenge of access to an adequate prosthetic offer for patients with temporary dental prostheses. In other words, 70.4% of patients wore temporary dental prostheses to the detriment of permanent dental prostheses (fixed or removable) due to insufficient financial means. This could be explained by the socio-economic context where the monthly income of most edentulous individuals (52.8%) was less than 95,000 CFA francs, and the lack of insurance for prosthetic care, making medical payment direct. Apart from the lack of financial means, the physical (12.8%) and geographical (7%) determinants forced patients to undergo temporary rehabilitation to the detriment of fixed offers. Our results corroborate those of Fall et al in 2017 where the therapeutic choice was guided mainly by financial criteria (94.1%) and secondarily by aesthetic requirements (52.9%) [8].

4.5. Adequacy of dental prosthesis needs and offers

The teeth-supported fixed dental prosthesis offer (bridge) was the best solution in 43.5% of cases (93 cases/214), 31 patients had the means to effectively rehabilitate themselves with this prosthetic option. The adequacy for bridge was 33.3%, a relatively low fit influenced by factors such as the cost of the prosthetic offer, physical condition and geographical location. A priori, the high cost of the dental prosthesis, and the lack of coverage by mutual insurance companies are an obstacle for the participants.

Permanent dental prostheses were the appropriate option for better rehabilitation in 29.9% of edentulous individuals (64 cases/214), a better alternative to fixed dental prostheses. However, no participant was rehabilitated by this prosthetic offer, i.e. a 0% adequacy. This raises questions about the non-choice of this dental prosthesis, due to a lack of information, financial constraints or other factors.

Implants were the ideal option for rehabilitation in 18.2% of edentulous individuals (39 cases/214), which shows that implant dental prosthesis is not unknown in our context. Of the 39 patients, 11 were rehabilitated with implants for an adequacy of 28.2%. This is appreciable when we know that there is a deficiency in the technical platform and implant dental prosthesis laboratory in many of our dental clinics. Implant dental prostheses remain little popularized in developing countries like in Cameroon [9].

The removable acrylic dental prosthesis (temporary) was the best prosthetic option in 8.4% of participants (18 cases/214), who were also mainly represented by pupils/students and people of the 3rd age whose fixed dental prosthesis was not an option. All 18 participants were rehabilitated with temporary dental prostheses, a 100% adequacy. Logical because no other alternative was possible.

Limitations

- In the course of our study, we encountered difficulties of several kinds, namely:
- The hesitation by some edentulous individuals because of the variation in income;
- Refusal to participate in the study by certain dental clinics offering prosthetic care
- Few studies have been conducted, making it difficult to compare our results to those of countries of the same economic and social status.

5. Conclusion

At the end of our study, which aimed to study the adequacy between dental prosthesis needs and offers among edentulous individuals in Yaoundé, it emerged that participants had a greater need for teeth-supported fixed dental prosthesis (bridge) for better rehabilitation, followed by the permanent removable dental prosthesis (strong metal cast), implant and temporary dental prosthesis. The prosthetic offer in response to the need for dental prostheses was more marked by temporary dental prostheses and few by teeth and implants-supported dental prostheses. The factors influencing the choice of offer were financial, physical and geographical. It is possible to say that the needs and offers of dental prostheses for the edentulous in Yaoundé are not totally adequate.

Compliance with ethical standards

Disclosure of conflict of interest

The authors do not declare any conflicts of interest.

Statement of informed consent

Informed consent was obtained from all individual participants included in the study.

Authors' contributions

- Manga Ambassa Parfait Josely: study design, data collection, interpretation and analysis of results, manuscript writing.
- Mbede Nga Mvondo Rose: Study design, manuscript writing.
- Essi Marie-José: supervision of the study, reading, correction and validation of the final version of the manuscript.

Recognition

To the various heads of dental clinics (EFFILA EBE dental clinic, ADVENTIST dental clinic, EPC dental clinic of Djoungolo, the Implantology and Periodontology laboratory of the Faculty of Medicine and Biomedical Sciences of the University of Yaoundé I and the Biyem-assi District Hospital Dental Clinic) for having given us their authorization and thus made this study possible.

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