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Financing Oral Health Care in Yaoundé Cameroon: Policy Strategy for Universal Health Coverage

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ABSTRACT

Introduction: Oral diseases affect 3.5 billion people (45%), mainly in low- and middle-income countries. The high prevalence of oral diseases represents a substantial economic and financial burden for individuals, households and societies in Africa. Their costly management requires specialized interventions and mobilizes significant, often inaccessible resources, leading to catastrophic expenditures for dental patients. This study aimed to analyze the financing of oral health care in Yaoundé Cameroon with emphasis on policy strategy for universal health coverage. Methods: A descriptive cross-sectional study was conducted in Yaoundé, with data collected in five dental clinics namely: laboratory of implantology and periodontology (LIP), Social and Health Animation Center (CASS), Dental Clinic of the Presbyterian Church Hospital (PCH), and District Hospital (HD) of Biyem Assi. Data were collected using a questionnaire administered to patents. Data were analyzed using the statistical computer software IBM® SPSS® version 24, with the results presented the forms of frequencies, tables and graphs. A confidence interval of 95% and a p value <5% were used for assessing the level of statistically significance. Results: The sex ratio was 0.69 in favor of female, which is explained by the fact that, in case of dental illness, women are more likely to go to dental clinics than men, with a mean age of 35.43 years. The predominant dental health problems were: dental caries (73.91%), pulpopathy and periapical diseases

(71.73%), edentulism (43.47%) and periodontal disease (26.08%) in the study settings. Dental care pricing depends on each hospital financial management system and Direct payments by patients for dental care and services represent the largest source of funding, on average more than half (51%) of total dental care spending in study settings comes from out-of-pocket payments. At the end of the consultation, only 22.17% of patients had a single diagnosis, the average direct costs of which were XAF83,715, XAF855,505, XAF33,250, XAF214,785 and XAF305,000 respectively for dental caries, single tooth edentulism, periodontal disease, pulpopathies and periapical diseases, and orthodontic anomaly. Regarding financing strategies, no individual dental patient benefited from state or public financing as the payments for oral health care came mainly from private expenditure, notably through direct out of pocket payment associated with social safety network and savings for about 98.3% of dental patients, with the participation of health insurance for about 3% of dental patients. Indeed, oral health care is not integrated into the package of universal health coverage. The use of oral health services increases with income, rather than need for care, where the predominant form of remuneration, fee for-service, rewards providers for delivering services to clients as opposed to meeting the needs of populations. Conclusion: In Cameroon, oral health care ranks among the costliest health interventions in the country where financing strategies are heavily influenced by out-of-pocket payments, with little private health insurance coverage for individuals. Public health financing is non-existent for private dental health care and no oral health policy is yet effective to ensure the financial health protection desired by the WHO by 2030. Therefore, the policy strategy for universal health coverage should improve access to high quality and affordable dental care services that remains a major public health challenge.

Keywords: Financing, oral health care, costs, policy strategy, universal health coverage, Yaoundé, Cameroon.

INTRODUCTION

Oral diseases (ODDs) are among the most common noncommunicable conditions globally, affecting approximately 45% of the world's population. Oral diseases, which include dental caries, periodontal disease, and oral cancer, constitute the most prevalent health conditions that pose a major global public health challenge as it is estimated that approximately 3.5 billion people suffered from oral diseases worldwide [1]. Of these, three-quarters reside in developing countries (DCs), where a small proportion of this population receives essential oral health services, while 70%, mainly in developing countries, lack access to them [2]. The African region has experienced the largest increase in the number of cases of oral diseases such as dental caries, gum disease, and tooth loss over the last three decades across all WHO regions. Approximately 44% of the population in the African Region is affected by oral disease while in 2021, approximately 42% of the population in the African Region suffered from untreated oral diseases [1]. Dental outpatient care includes the whole range of services usually performed in an outpatient setting, such as restorative care, tooth extractions, the fitting of dental prostheses, and dental implants and orthodontics [3].

Economically, the high prevalence of oral diseases represents a substantial economic burden for individuals, households and societies. The African Region has recorded the highest increase in the incidence of oral diseases globally over the last three decades, with expenditure on

treatment remaining extremely limited. One of the main factors driving this imbalance is the high cost of care, which involves significant out-of-pocket expenses for patients and often results in catastrophic costs and a heavy financial burden for families and communities [1, 2]. Oral diseases affect negatively productivity and educational attainments as the international literature pointed out that the global productivity loss due to oral diseases reached an estimated US$ 323 billion in 2019, while children with poor oral health are 52% more likely to exhibit poor academic performance and 43% more likely to experience school absenteeism [1,4]. Meanwhile, resources for oral health care and the burden of oral diseases are unevenly distributed across regions, countries, and socioeconomic groups as in 2019, 88% of the direct costs of oral health care were spent for only 22.5% of the world's population, mainly residing in high-income countries since more than three-quarters of those with oral conditions lived in low- and middle-income countries (LMICs) [2], where due to high out-of-pocket spending, disadvantaged households paying for necessary oral health care are more likely to experience catastrophic health expenditures and face impoverishment than their better-off counterparts [2, 5]. In addition, countries with public dental care coverage have lower socioeconomic inequalities in dental care utilization than those without such programs [6].

In 2021, the World Health Assembly (WHA) adopted a resolution on the integration of oral health into national health policies with more emphasis on universal health coverage (UHC) [7 13], thereby releasing the Global Strategy on Oral Health during the 2022 WHA, which envisions achieving UHC for oral health for all communities and individual's members by 2030 [8]. In the process of implementing this strategy, the World Health Organization (WHO) released the Global Oral Health Action Plan (2023–2030), which provides guidance for member states to operationalize objectives at the national and sub-national levels [9]. However, oral health remains a low priority in many African countries, resulting in inadequate financial and technical investments. This compromises prevention and care services, as well as oral health promotion. Nearly 70% of sub-Saharan African countries spent less than $1 per person per year on oral health care in 2019, the latest year for which data are available. Oral health remains a low priority in many African countries, resulting in inadequate financial and technical investments [2]. Furthermore, oral health has historically been siloed and treated separately from general health and the broader healthcare system thereby contributing to isolated oral health management approaches, separate staff training, increased costs, and siloed care delivery infrastructure [3,4]. This siloed approach has led to competition for already limited human and financial resources.

Dental care coverage varies across countries; it is generally more extensive for children and the elderly. Also, some countries have specific regulations for the coverage of dental services for vulnerable population groups, including low-income people, the homeless, social assistance recipients, pregnant women, and people with an increased need for dental care due to a specific condition [2, 3]. Moreover, in countries with comprehensive coverage, dental care is part of the general health system, while in those with limited coverage, dental care tends to remain outside the health system and the majority of dental care services are available from private sources [2]. Thus, public health financing has been largely allocated to specific diseases with oral health leaving to private financing where the population covered the cost of dental care services either out of pocket or through private insurance arrangements. Consequently, the use of services increases with income, rather than need for care, while the predominant form of remuneration, fee for-service, rewards providers for delivering services to clients as opposed to meeting the

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needs of populations [2]. In Cameroon, the configurations of oral health financing and provider remuneration fail to support the use of resources in accordance with relative need for care in the population. Hence, there is no national oral health policy, which hinders the coordination and effective organization of care [10]; nevertheless, there is a set of public and private social protection health systems. Public systems consist of social security programs, whose coverage is provided by affiliation to the National Social Security Fund (CNPS), and is free for anyone aged at least 18; and policies of subsidizing and free care and services not concerning oral health [11]. As for private systems, they are represented by mutual health insurance (for populations in the informal and agricultural sectors), commercial insurance, which targets populations from the formal sectors; and health services offered by employers of large companies such as CAMRAIL, whose employees bear 20% of health expenses while the company covers 80% of the remaining expenses [11]. Social support influences individuals' health through a wide range of mechanisms, such as health-related advice, financial assistance to pay bills to avoid forgoing care, or encouragement to adopt health-promoting behaviors [12]. Members affected by the disease can access credit from the association at interest rates; a waiver can also be arranged for them if necessary [13]. In Cameroon, to our knowledge, no study has been conducted on oral health care financing strategies. This study therefore aimed to assess the cost of care and analyze the local resources mobilized for the financing of oral health in Yaoundé, Cameroon. The findings of this study will provide an important first evidence in informing policymakers and other stakeholders concerned with making the best use of the resources allocated to dental care in the country.

METHODS

A descriptive cross-sectional study was conducted with intra-hospital data collection in the city of Yaoundé, Cameroon, within the following five structures: Laboratory of Implantology and Periodontology (LIP) of FMSB UY1; Odontostomatology Department of the Social and Health Animation Center (CASS) of Nkolndongo; Dental Office (CD) of the Cameroonian Presbyterian Church (EPC) of Djoungolo; District Hospital (HD) of Biyem Assi. The study was carried out over a period of 8 months, from October 2022 to May 2023. Including a data collection period carried out at the LIP of FMSB UY1 and at the CASS of Nkolndongo during the months of February and March; that of the CD of the EPC of Djoungolo and the HD of Biyem Assi during the month of April. The source population of the study was patients received for consultation and treatment at the LIP of the FMSB UYI, at the CASS of Nkolndongo, at the dental office of the EPC of Djoungolo and at the district hospital of Biyem Assi. The target population consisted of: people who had consulted and paid for oral care. Included in the study were people who had given their informed consent and who were able to express themselves in French or English. The sample size was calculated using the following statistical formula:

$$n = z^2 \, x \frac{p(1-p)}{e^2},$$

where:

- n: minimum sample size;
- z: confidence level according to the reduced centered normal distribution (z = 1.96 for 95% confidence level);
- p: estimated proportion of the population that presents the characteristic studied; p=0.756
- e: permissible margin of error (5%).

Digital application: $n = (1.96)^2 \times 0.5 (1 - 0.756) / 0.05^2 = 283.6$

So we have increased to 284 individuals.

The collection tool was a questionnaire comprising (45) questions including (09) on the sociodemographic profile, (11) on the pathological profile, (16) on the cost of care, and (09) on the financing strategies for oral care.

The ethical considerations of this study were the respect and protection of the life, health, dignity and integrity of the participants as well as their personal information and the data collection was done anonymously, with respect for free and informed consent. Ethical clearance was obtained from the Ethics Committee of the Faculty of Medicine and Biomedical Sciences. Administrative research authorizations were sent to the head of the Implantology and Periodontology Laboratory (LIP) of the FMSB UY1, to the director of the CASS of Nkolndongo, to the head of the dental office of the EPC of DJOUNGOLO and to the director of the district hospital of Biyem Assi.

The collection of information began on February 2, 2023 and ended on April 22, 2023. It was done face to face with the participants, who were both patients and people in charge of financing: after explanation of the interest of the study; informed consent was signed by adult patients and the parents or guardians of minor patients, followed by assent requested from the minors; then, a 4-digit code was assigned to each patient, the first two digits of which constituted the order number and the second two the month during which they had been questioned; subsequently, the questionnaire was administered by the investigator.

The collected data were recorded according to the list of variables in the questionnaire. They were analyzed using IBM SPSS version 24 software. Qualitative variables were described by numbers and percentages, while quantitative variables were analyzed by means and mode. The direct cost of the disease included consultation, examinations, medications and oral care. Differences between proportions were tested with the Chi-square test, considered significant at $p < 0.05$.

RESULTS

Recruitment of the Participants

Data collection was carried out in the city of Yaoundé, from patients and stakeholders involved in the financing of care according to the following recruitment scheme (Figure 1).

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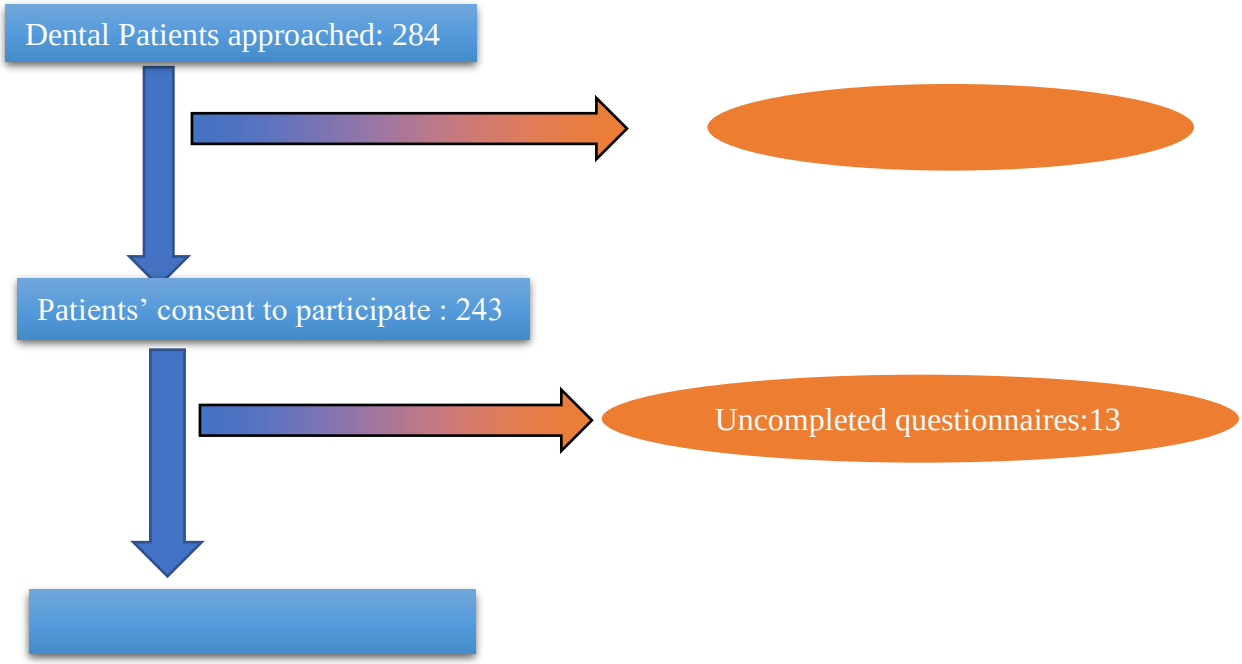

Figure 1: Population sample recruitment flow of the study

At the end of recruitment process, 230 dental patients were retained for a participation rate of 80.98%, their sociodemographic data are detailed below.

Sociodemographic Characteristics of Dental Patients

The sex ratio of the dental patients surveyed was 0.69. The majority of these patients had completed higher education (56.1%), and the people responsible for financing dental care had at least one dependent child (82.6%). Table 1 presents the socio-demographic characteristics of the study population.

Table I: Sociodemographic characteristics of the study population

Variables	Terms and Conditions	n (%)
Sex	Female	136 (59.1)
	Male	94 (40.9)
Age (years)	0-24	80 (34.78%)
	25-35	57 (24.78)
	36-45	29 (12.6)
	46-60	33 (14.34)
	60 years +	31 (13.47)
Cultural area	Side	13 (5.7)
	Forest	109 (47.4)
	Grassfields	82 (35.7)
	Sahel	9 (3.9)
	Savannah	17 (7.4)
Occupation	Without	15 (6.5)
	Student	65 (28.3)
	Informal sector	44 (19.1)
	Official	20 (8.7)
	Private sector	46(20.0)

	Liberal Retirement	13(5.7) 27 (11.7)
Monthly income	<50000 [50000-100000]]100000-200000]]200000-300000]]300000-400000] >400000	19 (8.3) 64 (27.8) 57 (24.8) 35 (15.2) 23 (10.0) 32 (13.9)
Responsibility for financing	Self-financing Children Siblings Spouse	201 (87.3) 6 (2.6) 14 (6.08) 9 (3.9)

Patients working in high-risk occupations represented 46.5% of the study population. The majority of patients generally received (52.6%) a monthly income of between 50,000 and 200,000 CFA francs. Regarding the financing of dental care, 12.58% of patients were not responsible for it; payment was the responsibility of siblings, spouses or children.

Pathological Profile of Dental Patients

Among the study population, the most common pathologies were dental caries, pulpopathies and/or periapical diseases, edentulism and periodontal diseases. Their respective prevalences were 73.91%, 71.73%, 43.47% and 26.08%. Gingivitis was the most common pathology within periodontal diseases, with a proportion of 95%. The pathological profile is shown in Table 2.

Table 2: Diagnosed pathologies in the study settings

Variables	Terms and Conditions	n (%)
Single diagnosis	Cavities Toothlessness Periodontal disease Complications of cavities Orthodontic anomaly Dental trauma Others	14 (6.08) 15 (6.52) 3 (1.3) 13 (5.65) 1 (0.43) 1 (0.43) 2 (0.86)
Dual diagnosis	Cavities-Complications Caries-Edentulism Caries-Periodontal disease Edentulousness-Caries complications Periodontal disease - Caries complications Others	53 (23.04) 8 (3.47) 3 (1.3) 9 (3.91) 3 (1.3) 10 (4.34)
Triple diagnosis	Caries-Complications-Edentalism Caries-Complications-Periodontal Disease Caries-Edentality-Periodontal disease Edentulousness-Complication-Periodontal disease Others	38 (16.52) 26 (11.30) 4 (1.73) 3 (1.3) 5 (2.17)
Quadruple diagnosis	Caries-Complications-Edentity-Periodontal disease Others	11 (4.78) 7 (3.04)
Quintuple diagnosis	Caries-Complications-Edentity-Periodontal disease - Trauma	1 (0.43)

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The pathological profile was dominated by the presence of multiple pathologies in the oral cavity. Indeed, 37.4% of patients had two pathologies at the time of diagnosis, 33% had 3 and 7.8% had 4. However, only 21.3% of patients were diagnosed with a single or single pathology. Their CAF (Caries, Absences, Fillings) index was 6.63. The CAF is an oral health indicator, used in epidemiology, to measure the level of carious disease in a population by adding the number of teeth with caries (C), Absent (A) due to caries, and Filled (F) following a cavity. The distribution of which is shown in Figure 2.

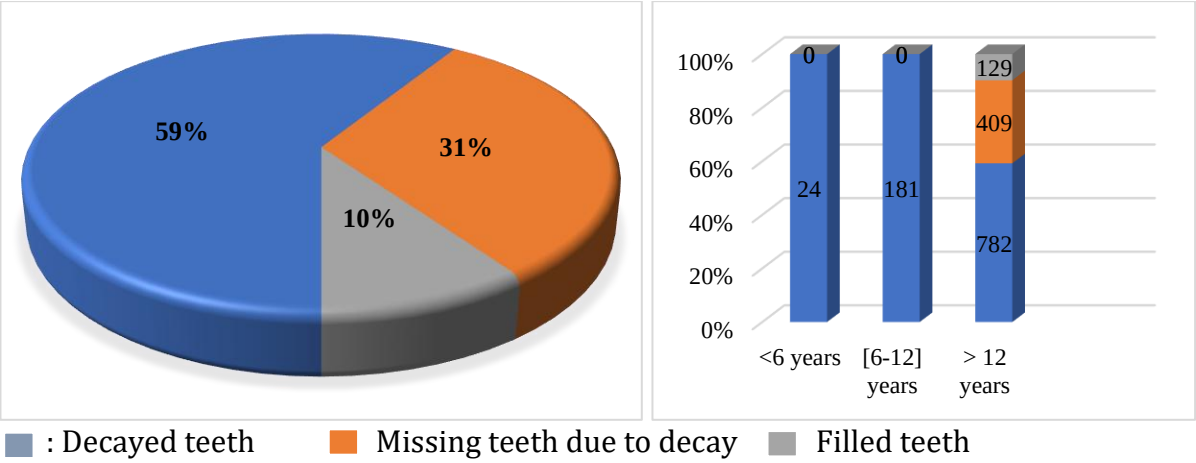

Figure 2: CAF (Caries, Absences, Fillings) index

In temporary and mixed dentition, the pathological profile was dominated by carious pathology (100%). In permanent dentition, insufficient treatment of carious pathologies was noted in relation to the cost of the pathology.

Direct Cost of Dental Care

The cost of dental care depended on each hospital structure's type, conservative dental care was billed to:

- 10,000 XAF at the CASS hospital of Nkolndongo, the LIP of the FMSB UY1 and the district hospital of Biyem Assi;
- 15,000 XAF at the dental clinic of the EPC hospital in Djoungolo.

Table 3 below assesses the cost of illness based on pathological profile

Table II: Direct cost of dental illness in the study settings in Yaoundé, in XAF

Pathological profile	Min	Average	Max
Decay	14,800	83,715	231,100
Toothlessness	16,125	855,505	6,273,375
Periodontal disease	24,100	33,250	41,725
Carious complications	110,700	214,785	307,525
Orthodontic anomaly	305,000	305,000	305,000
Tooth decay	41,150	124,200	319,200
Caries-Caries complication	26,275	104,830	262,500
Edentulousness-Caries complication	22,075	289,755	1,831,000
Caries-Periodontal disease	60,100	81,435	122,100
Periodontal disease - carious complication	169,000	190,150	210,625

Caries-Complication-Edentulism	62,500	166,560	471,300
Caries-Edentality-Periodontal disease	84,300	147,800	226,300
Edentulousness-Complication-Periodontal disease	86,175	117,845	171,175
Caries-Complication-Periodontal disease	38,000	125,155	277,200

Overall, the cost of the dental diseases ranged from 14,800 XAF for isolated dental caries to 6,273,375 XAF for complex edentulism. Depending on the pathological profile, several treatments were prescribed, namely conservative, surgical, endodontic, periodontal and prosthetic. However, a difference was noted between the number of people to whom care was initially prescribed and the number of those who received it. More than half of the patients (51.31%) had given up at least one type of treatment other than surgery; while 6.83% of patients to whom an exodontia prescription had not been made had resorted to it. In addition, of the 1,211 total treatments prescribed by dentists, only 47.3% (n = 635) of treatments prescribed, had been carried out. The contrast between the treatments prescribed and those carried out by dental patients is highlighted in Figure 3.

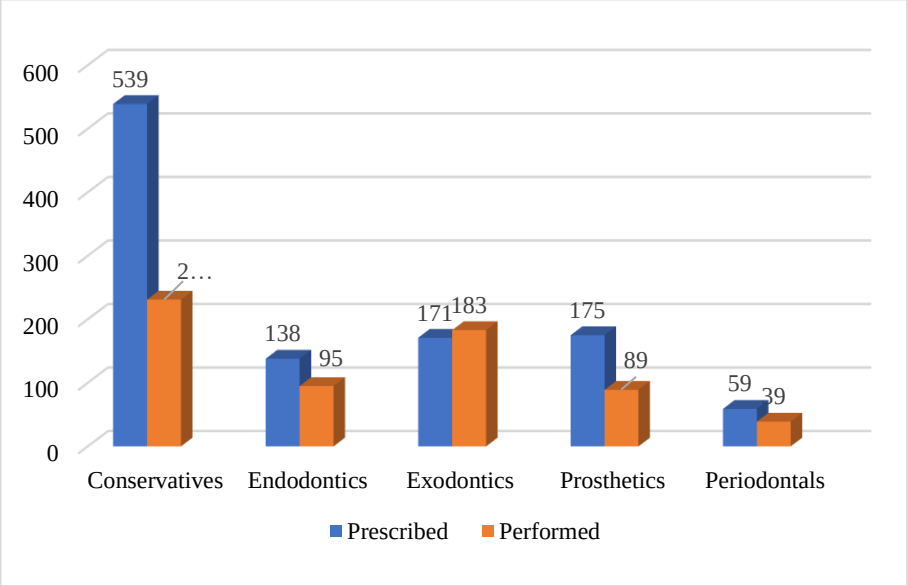

Figure 3: Comparison between prescribed treatments and actual performed dental care by patients in Yaoundé, Cameroon.

Unlike conservative, prosthetic and endodontic treatments, of which 57.14%, 49.14% and 31.15% respectively were not performed due to high costs, there was a significant use of exodontia. Indeed, about 16.66% of endodontic treatments were converted to exodontia.

Patients' Strategies for Financing Dental Care in Yaoundé, Cameroon

The dental patients' strategies for financing dental care was mainly through direct out pocket payments only (51%), the strategies of which are illustrated in Figure 4.

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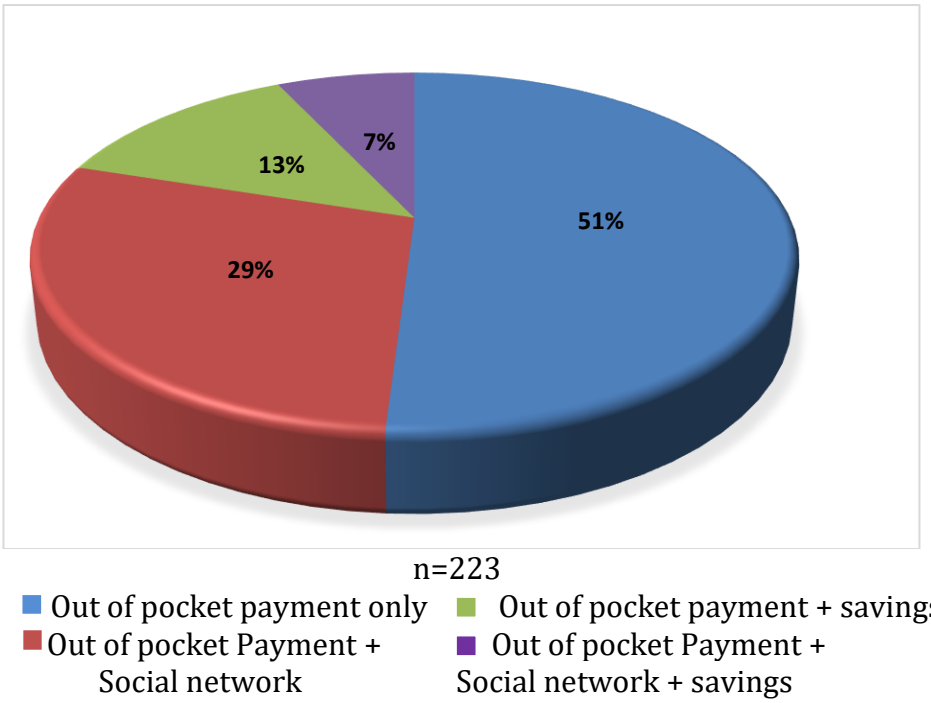
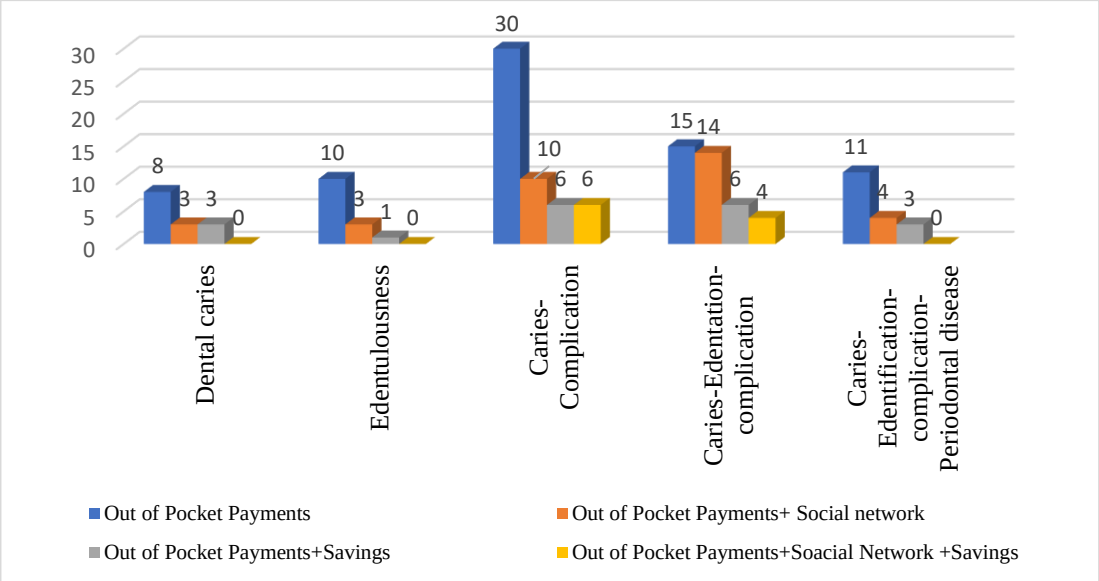


Figure 3: Direct out pocket payment strategies

Oral health financing by patients and third parties came mainly from out-of-pocket payments; however, in 49% of cases, savings and/or a support network were needed to more easily finance the dental disease. Generally, financing dental care after a simple diagnosis was more easily done through out-of-pocket payments and social network safety net (80%), while financing complex dental pathologies required additional recourse from savings and/or a social support network (SSN) (20%). The distribution of these financing strategies of dental care according to the most common pathologies is shown in Figure 5.



n=132

Figure 54: Financing strategies of dental care based on the most common pathologies in Yaoundé, Cameroon

The presence of toothlessness in complex pathology resulted in greater recourse (62.74%) to Savings and/or the support network. Regarding social support networks, 35.7% of dental patients used them through family (79%) and through the hand of benefactors (21%). However, community associations to which 81.23% of dental patients belonged did not provide any financial support for the treatment of oral pathologies. As observed above, the payments for dental care were mainly made by direct out of pocket payments and with recourse to social support networks; Table 4 establishes the associations between these main sources of financing and the sociodemographic profile.

Table III: Distribution of sources of financing dental care with sociodemographic profile in Yaoundé, Cameroon

Variables	Modalities	Sources of financing		Total	P value
		Direct payment (1)	Direct payment + Network (2)		
Sex	Female Male	76 64	56 26	132 90	(1)0.062 (2)0.035
Occupation	Student/Pupil Informal sector Official Private sector Retirement Liberal	3 45 26 38 11 17	4 28 12 16 16 6	7 73 38 54 27 23	(1)0.150 (2)0.035
Monthly income	<50000 [50000-100000]]100000-200000]]200000-300000]]300000-400000] >400000	6 32 35 22 18 27	12 30 22 11 5 2	18 62 57 33 23 29	(1)0.001 (2)0,000
Cost of dental care	< 30000 [30000-50000]]50000-100000]]100000-200000]]200000-300000] >300000	55 40 26 15 1 3	29 29 9 12 3 0	84 69 35 27 4 3	(1)0.100 (2)0.271

The use of a social support network is statistically linked to gender, the profession of the individual responsible for payment of dental care, and their monthly income. The analysis revealed that dental care was financed primarily through direct out of pocket payments, either isolated or combined with recourse to social support networks, generally organized around the family or household unit and the raising of benefactors. In addition, some dental patients also used savings from tontines to easily afford their dental care costs in the study settings.

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DISCUSSION

Sociodemographic Profile of Dental Patients

The sex ratio was 0.69 in favor of female, which is explained by the fact that, in case of dental illness, women are more likely to go to health facilities than men. In addition, they are willing to answer health questions compared to men; this constitutes an advantage, because the experience acquired due to their strong associative involvement [15] can serve as a benchmark in the development of financing strategies for oral care. This female predominance is also reported in a previous study conducted in Bamako, Mali [1,16]. Up to 46.5% of individuals worked in high-risk occupations were not sure that they could adequately finance their dental care due to insufficient income or unemployment. This is especially true since, in the city of Yaoundé, unemployment affects one in five people of working age, with underemployment at 6,9% according to the National Institute of Statistics [17]. These findings are consistent with the international literature which pointed out oral diseases share many common risk factors with noncommunicable diseases (diet, smoking, etc.) and hence a significant part of the disease burden is associated with socioeconomic status, age and lifestyle behaviour, as is the case for many chronic conditions (diabetes, obesity, heart disease, etc.) [3]. It is therefore important to make oral health care accessible to these populations in order to guarantee health equity since the accessibility to direct health services to those who need them most is essential to advance health equity and improve the quality of life of populations [18].

The majority of dental patients (52.6%) frequently received monthly income between XAF50,000 and XAF200,000. Indeed, the monthly income of XAF50,000 was slightly higher than the guaranteed minimum wage (GMW) in Cameroon which is currently XAF43,969 per month, the amount was set by the Cameroonian government, and no worker may be paid below this threshold. This could reflect a certain capacity of dental patients even working to take care of themselves and thus be able to finance dental care from their earnings. Nevertheless, given the increase in the general price level of 0.8% since July 2022[8], it is becoming increasingly difficult for Cameroonians to take charge of their health, the risk being exposure to catastrophic oral health expenditure for households, i.e. direct expenditure exceeding 10% or 25% of the total amount of consumption or household income [9]. It therefore appears that reducing private expenditure on oral health care in order to avoid significant impoverishment of households is of critical importance [9].

Pathological Profile of Dental Patients

The predominant dental health problems were: dental caries (73.91%), pulpopathy and periapical diseases (71.73%), edentulism (43.47%) and periodontal disease (26.08%) in the study settings. This shows that the financing for oral health care should focus primarily on carious pathology in order to stop its progression to local pulpal, periapical, and locoregional complications. These findings were consistent with the data from WHO report on oral health in 2022, which reported that the most common oral pathologies were carious pathology, periodontal disease, and edentulism [1, 6]. However, these findings contrast somewhat with the WHO report which noted that the prevalence of periodontal disease was higher than that of edentulism. This difference can be explained by the fact that our study was only carried out in an intra-hospital setting, and patients had already been exposed and educated previously on hygiene and periodontal health maintenance advice. At the end of the consultation, 78.7% of patients had multiple diagnoses, indicating poor oral health, with a decreasing proportion of patients as the diagnosis became more complex: 37.4% had 2 pathologies, 33% had 3 and

7.52% had 4 pathologies. In addition, there was a predominance of associations including carious pathologies (67.91%) and their pulpal and periapical complications (65.65%). Therefore, when developing oral health care financing policies, particular emphasis should be placed on the management of patients with multiple or complex pathologies, particularly those with pulpal and periapical complications. Furthermore, the decrease in proportion with the multiplicity of diagnosis was reported in a previous study conducted in 2012 in the USA which showed a decrease in the proportion of patients with oral pathologies with the increase in the diagnosis, ranging from 24% for patients suffering from no pathology, to 3% for those who had 4 pathologies [10]. This difference would be reflected in the fact that in Cameroon, the standard of living is low and dental care does not yet benefit from universal health coverage that would help reduce the incidence and prevalence of the disease, in order to facilitate access to dental care. Moreover, in the USA, the standard of living is high, while there are coverage systems developed to facilitate affordability thereby making oral health care accessible. The CAF index of the entire population was 6.63. Patients aged 0 to 12 years had only dental caries, and those aged over 12 years had a CAF index of 6.37, with a predominance of carious teeth. In view of these results, it is therefore essential that oral health care financing being initiated from early childhood, in order to guarantee better oral health in adulthood. Thus, a study conducted in South Africa reported similar results, it was noted that the CAF index increased with advancing age [18], even if the CAF index was strongly dominated by the number of missing teeth; a difference probably due to the high proportion of elderly individuals and the larger sample size.

Direct Costs of Dental Care in Yaoundé, Cameroon

Dental care pricing depends on each hospital financial management system. Thus, in the study settings, the minimum amount spent for dental care by patients was estimated at XAF14,800 for the treatment of dental caries, and the maximum was estimated at XAF6,273,375 for implant care. In addition, an increase in the cost of the dental disease was noted with the presence of edentulism. Therefore, the treatment of carious pathology should be the smallest amount financed by national policies and the financing of edentulism should be subtantially covered in order to alleviate the expenses of edentulous patients. Furthermore, it should be noted that the direct costs of oral pathologies are not sufficiently documented in developed countries due to the presence of well-established coverage systems, which consequently leads to less sensitivity to costs. Nevertheless, in general, the differences in direct costs of pathologies are proportional to the pricing of the corresponding dental care. Thus, the direct costs of carious pathology are always lower than the costs of a single tooth loss requiring the placement of a dental implant. At the end of the consultations, the need for dental care was high and the most frequently prescribed treatments were conservative, endodontic and surgical care, especially exodontia; because they constitute the greatest workload of the general practitioner in oral medicine. It would therefore be important that these treatments constitute the priority treatments on which strategies and policies for financing oral health should be focused. However, these findings are not in line with a previous study conducted in the USA that found that the need for dental care of the population was in decreasing order: conservative and endodontic care, periodontal care and finally prosthetic care [19]. This difference in findings may be due to their larger sample size and the conduct of their research both in hospital settings and out-of-hospital in community. Furthermore, a study conducted in Türkiye showed that the need for dental care of individuals was highest for prosthetic care, followed by restorative care and dental extractions and finally periodontal care [20]. Overall, there was a greater renunciation of conservative (57.14%), endodontic (31.15%) and prosthetic (49.14%) treatments due to the

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costs of the treatment, in favor of the preferential execution of dental extractions, because they have an immediate outcome from the patient's point of view and allow the radical elimination of pain, which constitutes the main reason for consultation at the dental clinic.

In view of these findings, it is appropriate to establish appropriate health policies to enable early treatment of oral pathologies, through including oral health diseases into the package of universal health coverage i.e. at the stage of dental caries, in order to avoid premature aging of patients caused by systematic recourse to dental extraction. In the same perspective, on average, 51.31% of dental patients had given up at least one treatment prescribed by a dentist. Similar findings were obtained during a survey conducted in France, in fact, the renunciation of oral care for financial reasons represented 61% of total renunciations in health, ahead of the change of frames, complete health checks and cardiology consultations [21]. In order to resolve this problem, it will be imperative to put in place mechanisms to combat the renunciation of dental care, aimed at controlling the remaining costs of households in terms of health, by not resorting to accountability mechanisms aimed at households who experience financial constraints or lower reimbursement, and to make the most modest households solvent so that they have access to social health protection mechanisms.

Financing Strategies of Oral Health Care in Yaoundé, Cameroon

Regarding financing strategies, no individual dental patient benefited from state or public financing as the payments for oral health care came mainly from private expenditure, notably through direct out of pocket payment for about 98.3% of dental patients, with the participation of health insurance for about 3% of dental patients. These findings reflect the reality of the precariousness of the social health protection system in Cameroon. Indeed, to date about 6.46% of the population benefits from a social health protection mechanism for the coverage of health expenses, while the majority of the population continues to bear direct health expenses through the private own payments [23]. Thus, even in developed European countries, the share of public funding in dental care is relatively low compared to most other health services due to restricted service packages, where on average, only one third of dental care is borne by government schemes or compulsory insurance while more than two thirds of dental care spending is paid out-of-pocket or by voluntary health insurance [3]. The voluntary health insurance often plays an important role in many countries, covering dental care services that are either completely or partially excluded from the publicly financed benefit packages. For insured patients, co-payments are higher in the field of oral medicine due to the high costs of services, the capping of dental care by insurance companies and the lack of coverage for dental care such as scaling and dentures. These findings are consistent with a previous study conducted in Sub-Saharan Africa where high direct health expenditure was recorded in 20 countries with peaks in Cameroon, Nigeria, the Comoros Islands and Guinea Bissau, Togo and Chad, while only 5 countries had low direct expenditure, such as South Africa, Botswana, Zambia, Zimbabwe and Namibia [22]. In view of the critical situation, WHO Member States adopted a historic resolution on oral health consisting of the development and adoption of a comprehensive global strategy on oral health, with a bold vision of universal health coverage of oral health services by 2030[1]. However, Cameroon is in its first phase of developing universal health coverage, unfortunately, oral health care is not integrated into the package of health care covered by the national universal health coverage [23].

In this study, there was a specificity in the direct out of pocket payment of oral health care; in fact, dental patients used savings and/or a social support network (49%) to facilitate their financing of dental care. Savings came mainly from tontines while the family was generally the support safety network on which patients could rely for unforeseen health care payments (79%). A one-off hand-raising could also be organized by colleagues and friends to help a dental patient when the health care need arose (21%). Hence, in Cameroon, the universal health coverage is largely, publicly financed mechanisms which have been restricted to specific groups of diseases, health services and health conditions excluded oral health services as well as targeted groups of people with the general population left to cover the costs of dental care services either out of pocket or through private health insurance or social network safety arrangements. In this context, the use of oral health services increases with income, rather than need for care, where the predominant form of remuneration, fee for-service, rewards providers for delivering services to clients as opposed to meeting the needs of populations [4]. Hence, the configurations of health financing and provider payment mechanisms fail to support the use of resources in accordance with relative need for oral health care in the population [5,6]. Given the absence of any consideration of oral health care in the universal health coverage planning strategy, oral health care is unlikely to be a priority in future health care financing reform in Cameroon. These findings are also consistent with a study conducted in the USA which showed that in oral health, social support, specifically financial support, is of great importance, because dental visits depend partly on the number of close friends and family members [14]. In addition, a general observation was made on the total absence of associative social support networks such as the relief fund, the aid fund and the health fund; this denotes the taking lightly of oral health problems either by lack of declaration by the members, or by lack of consideration when establishing the statutes of the association. These findings are consistent with a research carried out within the associations of the Biyem Assi district which showed that, in general, health is not the subject of very important benefits in the associations; because, the relief and health or sickness funds convened in case of illness, also serve to help finance deaths and joyful events such as parties organized by the members, which reduces the capacity for intervention in health matters [15]. Furthermore, the aid paid mainly comes in the form of lump sums, regardless of the severity of the illness, and therefore does not often provide substantial coverage of medical or hospital costs. However, it is possible for members affected by the illness to take out a loan from the association with interest [17]. These findings indicate in line with the international literature that in many countries regardless of income level, lower socioeconomic and vulnerable groups of the population are more susceptible to the risk factors of dental diseases. Indeed, these risk factors lead to socioeconomic inequality in oral health in countries without publicly funded oral health services with health disadvantages, socially and economically deprived individuals and communities tend to visit the dentist less often, but when low socioeconomic status people go to dental clinics they tend to seek curative care due to pain in general, rather than for preventive oral care [24, 25, 26]. In Cameroon, like in other low and middle income countries, oral health care received little political and resource commitment toward achieving universal health coverage, thereby requiring the need for urgent action to mobilize financial and human resources, and integrate preventive and public health-based interventions [2]. In the study settings, only some individual dental patients used a social support network for financing their dental health care, while the majority did not call upon one and bore the expense imposed by oral therapy alone. Thus, the policy strategy for universal health coverage is for improving access to high quality and affordable dental care services, in particular access to preventive dental care (e.g. fluoride treatments) for vulnerable and low-

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income groups, as well as for the general population, is a major public health challenge in Cameroon.

CONCLUSION

This study aimed to analyze the financing of dental care in Yaoundé, through the description of the pathological profile of dental conditions, the evaluation of the costs of their management and the analysis of the local financial resources mobilized. The results indicate that the pathological profile was dominated by carious disease, followed by plupathia and periapical diseases, edentulism, and periodontal disease. These pathologies could be isolated or associated, with a high tendency for associations of two and three pathologies. The treatment of isolated dental caries was the least expensive, and the cost of the disease increased with the presence of multiple edentulism. In Cameroon, oral health care is financed to a greater extent by private (out-of pocket) patient payments than other areas of health care due to restricted service packages for dental care, except for some school aged children in few school based clinics over the country. Thus, direct out of pocket payment was the main source of financing for oral health care in Yaounde, Cameroon, while only a small proportion benefited from health insurance that covered dental care at a given percentage and ceiling. The financing of the dental care was mainly done by direct out of pocket payment, with recourse to savings, a social support safety network, or insurance. Following the analysis, it can be stated that oral health financing is solely dependent on direct out of pocket payments and family and friendly support that is put in place around the patient.

Although, it is worthy for assessing and contextualizing oral health care financing by looking at per capita spending which includes spending by government and compulsory health insurance (social health insurance schemes and compulsory private insurance schemes), voluntary health insurance and private spending such as households' out-of-pocket payments, NGOs and private corporations. In Cameroon, individual dental patients benefit very little from health insurance schemes because it is reserved for a certain high status social classes. State or public health financing is non-existent for private dental health care and no oral health policy is yet effective to ensure the financial health protection desired by the WHO by 2030. The policy strategy for universal health coverage for improving access to high quality and affordable dental care services remains a major public health challenge in Cameroon.

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Authors' Contribution

All authors contributed to the definition of the subject, drafting of the article (introduction, methodology, results, discussion and conclusion), proofreading, and revision of the manuscript.

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Conflict of Interest

The authors report no conflict of interest

Ethical Considerations

Ethical clearance was obtained from the ethics Committee of the Faculty of Medicine and Biomedical Sciences, University of Yaoundé I.

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