








ORIGINAL ARTICLE

User satisfaction with the secondary dental care services: Is there an association between structure and work process?

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Abstract

Objective: To assess the association between user satisfaction in relation to secondary dental care services and the structure and process of Brazilian Dental Specialty Centers (CEO, in Portuguese).

Methods: This study used nationwide secondary data from two CEO evaluation cycles. Ten users from each CEO answered questions on the self-perception of health-care quality and satisfaction with health services. Latent class analysis (LCA) was performed to identify subgroups of satisfied and dissatisfied users (outcome). The CEO structure included equipment, supplies, instruments, ambience and type of CEO (type I, II or III, according to the number of dental chairs and dental professionals). The work process referred to the planning/monitoring of actions, collaborative care, characteristics of the demand for medical care /the organization of scheduling, and continuing education for employees. Covariables concerned user profiles. A multilevel logistic regression model was used (p -value $<.05$).

Results: Seven thousand nine hundred and ninety-seven users in 794 CEOs, together with 10056 users in 911 CEOs, participated in the 1st and 2nd evaluation cycles, and satisfied users corresponded to 85.3% and 87.1%, respectively. In both cycles, the CEO's structural characteristics explained most of the variance in satisfaction. CEOs with more favourable structural characteristics showed higher satisfaction. Users from CEOs, type II and III, and those who received dental care where there was an interruption of services due to a lack of equipment or instruments reported a lower level of satisfaction. CEOs that organize their demand through referrals received from primary care dentists who have participated in continuing education actions for dental professionals presented a higher frequency of satisfied users.

Conclusions: Characteristics of the process and structure were associated with user satisfaction, but a quality of care was perceived by users, mainly due to structural characteristics.

KEYWORDS

health Policy, health services research, public Health Dentistry, quality of Health Care

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1 | INTRODUCTION

The organization of health services should always consider the evaluation process of the condition in which health care is provided. This evaluation enables the identification of problems, and their results can guide healthcare managers and workers in their decision-making in an attempt to improve the quality of the provided care. This process can take place through the use of monitoring indicators and evaluation research. All of the actors involved in the healthcare process should participate in the evaluation research, including service users.¹⁻³

The evaluation of health services from the perspective of the user, in addition to including social participation in the planning and decision-making processes, enables the identification of problems and the obtaining of information from the viewpoint of those who truly take advantage of health care and those for which the service is intended.^{4,5} Within the realm of oral health, user satisfaction has been a widely used measure of results in studies on healthcare quality at the primary^{6,7} and secondary care levels.^{5,8,9} Factors related to the sociodemographic profile of the user, such as factors related to the organization of the service, infrastructure, management, access, continuation of care^{6,8,10} and communication of the dental professional with the patient^{10,11} have been associated with user satisfaction. In the context of the expansion of oral healthcare services in Brazil, the monitoring and evaluation of the quality and determining factors are essential in order to improve actions and services. In Brazil, secondary care is provided at Dental Specialty Centers (CEO, in Portuguese), established in the guidelines set forth by the National Oral Health Policy.¹² Considering the Donabedian model, the most well-structured CEO, different conditions through which to seek out services, and user access, as well as the organization of the healthcare teams' work process, may well aid in determining different levels of user satisfaction regarding the services provided by the CEO. This study, therefore, investigated the association between user satisfaction with the services provided by the CEO in relation to the CEO's structure and work processes.

2 | METHOD

The evaluation of the CEO is conducted by the National Program for the Improvement of Access to and Quality of Dental Specialty Centers (PMAQ-CEO, in Portuguese). The PMAQ-CEO was set up in 2014 by the Ministry of Health in an attempt to evaluate the quality of the public healthcare services specialized in oral health.¹³

The PMAQ-CEO adopted the Donabedian theoretical model, considering the dimensions of structure, process and result in evaluating the quality of services provided by the CEO.¹⁴⁻¹⁶ The structure corresponds to the material resources, human resources and organizational structure. The process denotes how the user searches for health care and how this process takes place. The result represents the effects of care on one's state of health, including the level of knowledge, behaviour and user satisfaction.^{14,15} Although

many studies that evaluate oral healthcare services refer to the Donabedian conceptual model,^{2,17,18} few evaluate the three dimensions of quality and their relationships with user satisfaction.¹⁹⁻²¹

The conceptual theoretical model of this study was based on Donabedian¹⁵ and Swan et al.,²² considering the process, structure and result in the assessment of the quality of health services (Figure 1).¹⁵

This nationwide study is based on secondary data from two evaluation cycles of all Brazilian CEOs, conducted in 2014 (cycle 1) and 2018 (cycle 2).

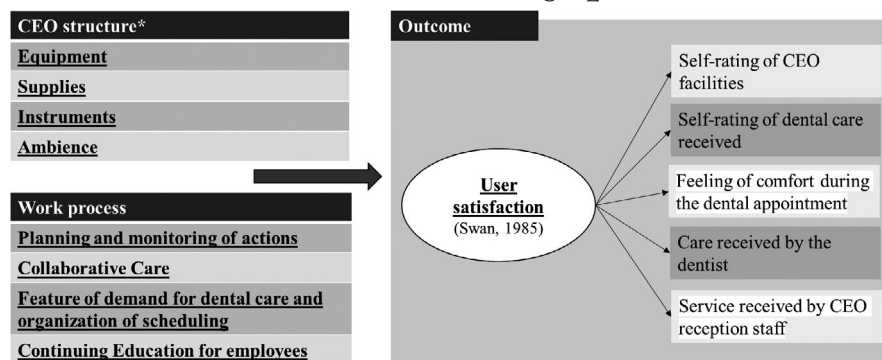
In both evaluation cycles, data collection was conducted through a questionnaire divided into three modules: model I—observation of the structure of the CEO, model II—interview with managers or dentist to collect information about work processes and the organization of services and model III—interview with users to assess the self-perception of healthcare quality and satisfaction with secondary dental care services.¹⁴ The interviews and observations were conducted by a team of 85 evaluators without a link to the service, which had previously undergone training at education and research institutions through qualification training and instructive manuals. The interviews were conducted in a silent and calm location, according to the reality of each evaluated CEO. The managers were obliged to answer the interview questions, and the dentists that were available on the day of the evaluation were selected to participate in the study.

For each CEO, ten users were interviewed. This sample of users was defined by convenience, considering the feasibility of finding the service user during data collection. The users should be over 18 years of age, be undergoing treatment at the CEO and be present on the day of the evaluation. The interviewed individuals were not identified by name in order to preserve confidentiality.

2.1 | Outcome measure

The outcome measure was user satisfaction, which was analysed based on the four-stage model proposed by Swan,²² which comes close to the quality standards adopted in the PMAQ-CEO. According to this model, satisfaction is defined by the following constructs: perception of service performance, confirmation of expectations regarding performance and perception of treatment, and overall satisfaction. Five quality standards were selected to evaluate user satisfaction: self-rating of CEO facilities, self-rating of dental care received, feeling of comfort during the dental appointment, satisfaction with care received by the dentist and satisfaction with the service rendered by the reception staff. The answer scale for the three first variables was 'very good', 'good', 'regular', 'bad', 'very bad', dichotomized into positive (very good + good) and negative (regular, bad + very bad) evaluations, considering the low frequency of dissatisfaction regarding these variables (Table S1). For the other two variables, each user rated their satisfaction with care received by the dentist and with the service rendered by the reception staff, assigning a grade from 0 (zero) to 10 (ten). This scale was dichotomized by

FIGURE 1 Theoretical model of analysis based on Donabedian¹⁵ and Swan et al.²² *Equipment, Supplies, Instruments, and Ambience items were shown in the Tables S6–S8. Source: Adapted from Donabedian¹⁵ and Swan et al.²²



the cut-off point 8, and users with grades 9 and 10 were considered satisfied. The definition of this cut-off point was based on the distribution of this variable in the sample and in the reasonable grouping. Most CEO users scored very high on these two questions (Figures S1 and S2). Consequently, the cut-off 8 intended to discriminate those groups that gave the highest scores, that is, very high satisfaction, from those with the lowest level of satisfaction. This same cut-off was used in a previous study that evaluated user satisfaction with primary oral healthcare services.⁶

The identification of homogenous subgroups with similar outcomes was performed using the latent class analysis (LCA). LCA is a mixed model that postulates the existence of an unobserved (latent) categorical variable that divides a population into mutually exclusive and complete classes. The participation of individuals in the categories (classes) is unknown, but it can be inferred from the measurement of a set of items.²³ This analysis method was chosen, as the latent variable may represent a complex construct (user satisfaction) defined by a combination of measured variables. The purpose of LCA is to define the latent variable in order to identify a number of classes that describe the underlying scoring patterns in the data, estimate the prevalence of the classes, and estimate each individual probability of belonging to each class.²⁴ The LCA helps to identify the response patterns that provide the best balance between considering all users to belong to the same subgroup and considering all existing patterns to be a relevant class on their own.

A sequence of models for the observed set of variables, containing one to three classes, was tested to determine the best fit based on the minimum value of Bayesian information criterion (BIC) and Akaike information criterion (AIC). Users who have a pattern that fits well with a certain class have a high probability (close to 1) of belonging to that group. Next, the probability of each user belonging to a subgroup (class) was estimated. From the maximum value of probability, the distribution of users in the classes was defined. The findings of LCA were shown as a supplementary file (Tables S2–S5, Figures S3 and S4), and the two-class model was chosen for both PMAQ cycles. For purposes of interpretation, the classes represent satisfied and dissatisfied with the specialized oral health service provided by the CEO. The LCA was performed using a *generalized structural equation model* with the logit function, considering that all observed variables were binary.

2.2 | Structure

The CEO structure was evaluated considering dimensions necessary for the provision of services: equipment, supplies, instruments and ambience. The variables in each dimension were presented in Tables S6–S8. The sum of the number of items with adequate conditions of use from each dimension was obtained.²⁵ According to the Brazilian Ordinance number 599/GM/MS, from 23 March 2006,²⁶ which describes CEOs, the structure variables include (1) the type of CEO according to the number of dental chairs and number of oral health professionals [Type I (3 chairs; minimum of 3 dentists and 1 oral health assistant), II (4–6 chairs; minimum of 4 dentists and 1 oral health assistant) and III (7 or more chairs; minimum of 7 dentists and 1 oral health assistant)]; (2) if the CEO is a university; (3) if it also provides other specialties beyond the minimum, which correspond to the specialties of stomatology, specialized periodontics, minor oral surgeries, endodontics and dental care provided to disabled individuals; (4) if the dentist had interrupted any appointments in the last year due to the lack of supplies or instruments; (5) if dental services were interrupted in the last year due to non-working equipment; (6) the presence of the manager in the CEO; (7) manager of the CEO has complementary training; and (8) the existence of a career plan for CEO workers.

2.3 | Process

The process was evaluated by variables related to the work processes described in Table 1.

2.4 | Covariates

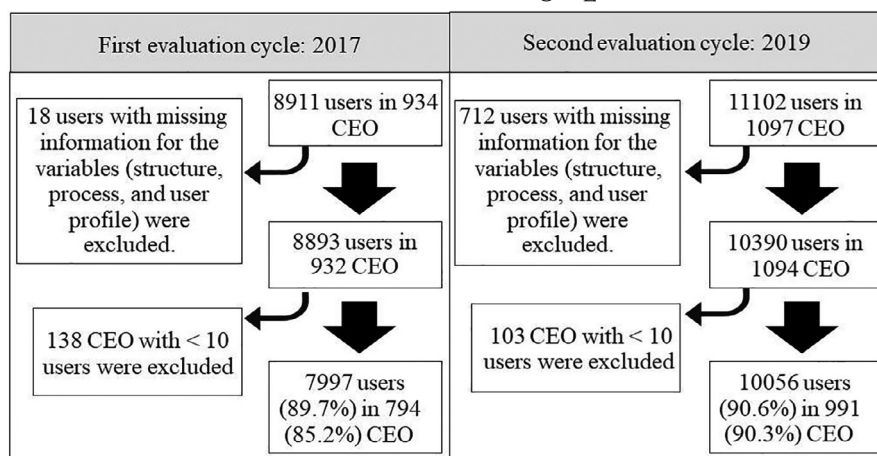
The covariates were sociodemographic user profile variables: sex, age, self-reported skin colour, years of education, family income, whether the user has a paid job or beneficiary of the Brazilian Family Grant Program, location of residence (users live in the CEO municipality), and household covered by the Family Health Strategy. The Brazilian Family Grant Program is a national income transfer program. The supplementary material shows details on sociodemographic variables (Tables S9 and S10).

TABLE 1 Variables for evaluation of the work processes in the CEOs, Brazil, 2014^a and 2018

Variables	Type of answer
Planning and monitoring of actions	
The actions developed by the CEO are the result of periodic evaluations and planning	No, Yes
Over the last 12 months, the dentist participated in the CEO's planning	No, Yes
The CEO team plans/programs its activities considering information from the outpatient information system (SIA/SUS)	No, Yes
The CEO team plans/programs its activities considering the information from the local epidemiological survey	No, Yes
The CEO team plans/programs its activities considering the aims of each specialty, established by the Ministry of Health	No, Yes
The CEO team plans/programs its activities considering the challenges pointed out through self-assessment	No, Yes
The CEO team plans/programs its activities considering the involvement of community organizations (partnership and agreements with the community)	No, Yes
The CEO team evaluates planned/scheduled actions	No, Yes
The CEO conducts team meetings	No, Yes
The CEO performs the monitoring of the goals established for each specialty provided by the CEO	No, Yes
The CEO team performs self-assessment processes periodically	No, Yes
Collaborative care	
The CEO team receives support from other professionals to aid in the resolution of complex cases ^a	No, Yes
The CEO team support the Oral Health teams from Primary Care to resolve complex cases	No, Yes
Feature of demand for dental care and organization of scheduling	
The CEO organizes its demand through referrals received from primary care dentists or attends to spontaneous and mixed demand	Spontaneous/ Mixed or Referred by a primary care dentist
The CEO opens at lunchtime	No, Yes
The CEO schedules appointments on Saturday or Monday	No, Yes
The Basic Health Unit schedules the appointment in the CEO	No, Yes
The patient in the specialized consultation centre schedules the appointment	No, Yes
The patient himself who receives the form/referral from the Basic Health Unit schedules the appointment	No, Yes
Participation, social control, and channels of communication with users	
The CEO provides a mechanism to measure user satisfaction	No, Yes
The CEO provides communication channels that allow users to express their demands, complaints, and/or suggestions	No, Yes
Continuing Education for employees	
The CEO team uses Telehealth for second formative opinion, telediagnosis, teleconsulting or tele-education	No, Yes
The municipality promotes continuing education actions which include CEO professionals	No, Yes

^aIn the first evaluation cycle, this question was evaluated with three answer options "yes, no, and never needed." For correspondence between cycles, the category "never needed" was grouped with the category "yes".

FIGURE 2 Flowchart showing inclusion and exclusion of participants in the first and second evaluation cycles, Brazil, PMAQ-CEO, 2014, 2018



2.5 | Data analysis

The data present an organization at two levels: CEO level (structure and process) and individual level (outcome and user profile). The databases were linked by the variable National Register of Health Facilities (CNES, in Portuguese), which identified the CEOs in the data collection instruments of the three modules in both evaluation cycles. The association between user satisfaction and variables related to the structure and work process was investigated through a multilevel logistic regression model of fixed effects and random intercepts. Initially, the variance in user satisfaction among CEOs was estimated by an empty model. A significant random intercept variance indicates the presence of unexplained differences in user satisfaction among CEOs. The Wald test evaluated the significance of random intercept, and the median rate ratio (MRR) measured the heterogeneity among CEOs, according to Austin et al.²⁷ No variation was found among CEOs when the MRR is 1.0. However, the higher the MRR, the greater the area-level variation. The intraclass correlation coefficient (ICC) was also estimated to quantify the degree of homogeneity of the outcome within Brazilian regions. The ICC represents the proportion of the between-cluster variation (in this case: the between-CEO variation of user satisfaction) in the total variation (in this case: the between-CEO plus the within-CEO variation of user satisfaction). The adjustment of models was performed for each set of variables, referring to the structure, work process and covariables. Those statistically significant variables ($p < .05$) in each set were included in the sequential modelling adjustment: models 1 and 2 included variables measured at the contextual level (CEO) and sequential variables of structure and process, while model 3 (final model) added the user profile variables. The proportional change in variance (PCV) was calculated according to Merlo et al.,²⁸ using the following formula: $PCV = (\text{variance model 1} - \text{variance model 2}) / \text{variance model 1}$. As the CEOs are nested in different Brazilian regions, the regression model was tested, including a level 3 (region) in the model. However, for both evaluation cycles, the between-cluster variation of the outcome (user satisfaction) was low [cycle 1 $\text{region}(\text{var}(\text{const})) = 0.0979753$; cycle 2 $\text{region}(\text{var}(\text{const})) = 0.0448261$], meaning that the variation in user satisfaction was low between the regions of Brazil. In this case, it is not justified to include

an additional level in the model structure or to consider explanatory variables for user satisfaction at the regional level. Additionally, the ICC values were close to zero (cycle 1 $ICC = 0.0289197$; cycle 2 $ICC = 0.0134423$). For these reasons, level 3 (Brazilian Region) was not included in the multilevel regression model, opting for the most parsimonious model, with two levels.

All of the participants of the study signed a free and informed consent form, printed in two copies. This study was submitted to and approved by the Ethics Committee for Human Research of Universidade Federal de Pernambuco (logged under protocol number 23458213.0.1001.5208).

3 | RESULTS

A total of 7997 users were interviewed in 794 CEOs, and 10056 users in 911 CEOs participated in the first and second evaluation cycles, respectively. In both evaluation cycles, users who belonged to a CEO that did not have information about the structure and work process, or those who had incomplete information regarding the sociodemographic profile, were excluded. The CEOs with fewer than 10 respondents were also excluded. The flowchart of the inclusion of users and CEOs is presented in Figure 2. For most CEOs, 10 users were interviewed in the first cycle (85.2%) and in the second evaluation cycle (90.3%).

The sociodemographic profile of users was similar in both evaluation cycles. In the second cycle, there was a higher percentage of beneficiaries of the Brazilian Family Grant Program and residents in areas covered by the Family Health Strategy. The mean age of the users was 41.9 (SD: 15.0) and 42.6 (SD: 15.0) years in the first and second evaluation cycles, respectively. The full results of the sociodemographic profile of the users were presented in the Table S11.

The LCA resulted in two classes. The percentage of users who were more satisfied with the CEO was 85.3% in the first and 87.1% in the second evaluation cycle.

The results of the variables included in the LCA were shown in Table 2. The percentage of users who rated the facilities, dental care received and the feeling of comfort as “very good” or “good” and who attributed grades 9 or 10 to satisfaction with the care received

by the dentist, as well as satisfaction with the service rendered by the reception staff, was above 88.5% among those belonging to the same latent class defined as satisfied.

The findings of the simple regression analysis and the adjustment steps of the multilevel regression models were presented in the Tables S12–S15. In both evaluation cycles, structure variables were associated with user satisfaction. Regardless of the user profile, those from CEOs with more favourable structure characteristics (largest amount of equipment, items of ambience and presence of management) showed a higher satisfaction. Users of type II CEO presented a lower frequency of satisfaction. In the first evaluation

cycle, a similar finding was also observed when users were from CEO type III (Tables 3 and 4). Users from CEOs with managers presented a greater satisfaction with the service.

Users from CEOs that organize their demand through referrals received from primary care dentists and those from CEOs located in a municipality that promotes continuing education for professionals showed a higher satisfaction. In the second evaluation cycle, work process variables were not associated with user satisfaction (Tables 3 and 4).

In both evaluation cycles, the structure variables explained the highest percentage of user satisfaction variance among the CEOs

TABLE 2 Distribution of satisfied and dissatisfied users according to the variables of the self-rating of Dental Specialty Center facilities, self-rating of dental care received, the feeling of comfort during the dental appointment, satisfaction with care received by the dentist and satisfaction with the service rendered by the reception staff. 2014, 2018

	Class 1 Dissatisfied		Class 2 Satisfied	
	<i>n</i>	%	<i>n</i>	%
First evaluation cycle – 2014				
Self-rating of Dental Specialty Center facilities				
Regular + bad + very bad	667	46.4	770	53.6
Very good + good	510	7.8	6050	92.2
Self-rating of dental care received				
Regular + bad + very bad	360	100.0	0	0.0
Very good + good	817	10.7	6820	89.3
Feeling of comfort during the dental appointment				
Regular + bad + very bad	325	53.8	279	46.2
Very good + good	852	11.5	6541	88.5
Satisfaction with care received by the dentist				
Grade 0–8	801	81.5	182	18.5
Grade ≥ 9	376	5.4	6638	94.6
Satisfaction with the service rendered by the reception staff				
Grade 0–8	953	66.0	492	34.0
Grade ≥ 9	224	3.4	6328	96.6
Second evaluation cycle – 2018				
Self-rating of Dental Specialty Center facilities				
Regular + bad + very bad	754	51.8	703	48.2
Very good + good	532	6.2	8008	93.8
Self-rating of dental care received				
Regular + bad + very bad	283	85.2	49	14.8
Very good + good	1003	10.4	8662	89.6
Feeling of comfort during the dental appointment				
Regular + bad + very bad	372	73.2	136	26.8
Very good + good	914	9.6	8575	90.4
Satisfaction with care received by the dentist				
Grade 0–8	827	78.1	232	21.9
Grade ≥ 9	459	5.1	8479	94.9
Satisfaction with the service rendered by the reception staff				
Grade 0–8	1010	62.4	609	37.6
Grade ≥ 9	276	3.3	8102	96.7

Note: The bold values are the percentage of users who rated the facilities, dental care received and the feeling of comfort as “very good” or “good” and who attributed grades 9 or 10 to satisfaction with the care received by the dentist, as well as satisfaction with the service rendered by the reception staff.

(19.0% and 14.3%). The decrease in the MRR value among the models indicates that the included variables in the model explain part of the variation among CEOs (Tables 3 and 4).

The user profile variables associated with higher satisfaction in the two evaluation cycles were as follows: age, living in areas covered by the Family Health Strategy and years of education. The increase in age was associated with higher satisfaction, and users who studied more years had a lower frequency of satisfaction with the CEO. Satisfaction was more frequent among users who had a paid job in the second evaluation cycle and was less frequent among beneficiaries of the Brazilian Family Grant Program. In the second evaluation cycle, female users reported a higher frequency of satisfaction (Tables 3 and 4).

4 | DISCUSSION

This study showed a high prevalence of user satisfaction with the public secondary dental care services in both evaluation cycles of CEOs (2014 and 2018), with CEO structural characteristics explaining most of the variation in user satisfaction. A significant portion of these users, in the first and second cycles, belong to individuals of a lower socioeconomic status, which seems to indicate that unfavourable social conditions can be associated with a more positive evaluation of health services.⁶

The models adjusted in both cycles were very similar, demonstrating greater participation of the CEO structure variables in determining user satisfaction. A manager in the CEO and type III CEO was significantly associated with user satisfaction only in 2004. In cycle 2, no work process variables were significantly associated with user satisfaction, unlike cycle 1, in which there was higher user satisfaction among users from CEOs that perform self-assessment processes periodically, who organize their demand through referrals received from primary care dentists, and who are located in municipalities that promote continuing education actions that include CEO professionals. Changes in CEO structure, management and work processes of the professionals over the period, which may have been induced by the evaluation process, can explain these differences between the models obtained in each evaluation cycle. However, this hypothesis must be investigated by comparing the same CEO between cycles, which should be the object of future research.

The findings showed that users were satisfied with the services in the presence of better conditions of the structure, considering the availability of a greater amount of equipment and items of ambience. Although oral health service is not restricted to the structural component, several studies have demonstrated a positive relationship among the amount of equipment, the dental appointments provided and the problem-solving capacity of the CEO.^{21,29,30} As previously observed, in this study, user satisfaction was associated with the existence of a higher number of items of equipment in conditions of use in CEOs,³¹ which was similar regarding the presence of items of ambience that constituted safe and welcoming spaces.^{5,29,32} Environments with these characteristics can favour the relationships between professionals and users, making health care more welcoming, resolute

and human.³³ Although a positive evaluation was expected in relation to CEO Types II and III, which have a greater number of dental chairs and, consequently, a greater service capacity, this study showed a dissatisfaction of users attending these CEOs, which may result from a greater difficulty in embracement and creating bonds. In addition, the CEO with a large number of chairs, professionals and coverage may present greater complexity in management.

Users reported greater satisfaction when the CEO organizes their demand through referrals received from primary care dentists. This finding highlights the importance of the referral and counter-reference management system to the integrality of health care, as well as the role of primary care to coordinate the care networks.^{5,8,9} Furthermore, the greater satisfaction among users from CEOs that promote continuing education for professionals indicates that this action has contributed to the consolidation and qualification of the work process,¹⁸ with effects on user satisfaction.⁹ Continuing education promotes professional qualification in service based on demands for professional training that emerge from practice. Training based on this principle can become effective in responding to the needs of the population. The findings from this study concerning demand management and continuing education actions are consistent with the association found between satisfied users and CEOs with managers. The existence of management positively affects the organization of the work process.³⁴ The results illustrate a positive association, in evaluation cycle 1, between user satisfaction and CEOs that conducted periodic self-evaluations, suggesting that performing self-evaluation leads to a better organization of the work process and, consequently, to greater user satisfaction.¹⁰

In the two evaluation cycles, the following characteristics of the users were associated with greater satisfaction: age, a lower level of education and living in areas covered by the Family Health Strategy. The association with the age variable may indicate that the medical advice of the services provided by the CEO meets the demands of this life cycle, differently from what occurred in the study by Macarevich et al.,³⁵ which revealed the dissatisfaction in adolescents with the services, probably due to a lack of specific strategies directed towards that age group. Regarding education, the inverse relationship between years of study and satisfaction may indicate that individuals with a higher level of education can present a better understanding of issues related to health problems; they know their rights and have a more critical analysis of the quality of health services.^{6,36} However, the low level of education of the population and the adequate reference and counter-reference management system, which guaranteed equality in access to secondary dental care services for users of the CEO in the state of Pernambuco, Brazil, resulted in different findings from the present study, given that there was no association between user satisfaction and the level of education or living in an area covered by the Family Health Strategy.⁵

One finding that stood out was the lower satisfaction among user beneficiaries of the Brazilian Family Grant Program. It is worth mentioning that, although income transfer programs are considered palliative care, they represent a possibility for many families to improve their living conditions.^{37,38} The Brazilian Family Grant Program "has contributed to

TABLE 3 Multilevel regression model of the association between the CEO features (structure and work process) and user satisfaction with secondary dental care services 2014

Variables	Empty model	Model 1 (Inclusion of structure + management variables)	Model 2 (Inclusion of structure + management + work process variables)	Model 3 (Inclusion of structure, management, work process, and user profile variables)
		OR (95% CI)	OR (95% CI)	OR (95% CI)
Contextual variables (CEO)				
CEO structure				
Number of pieces of equipment		1.06 (1.03; 1.10)	1.04 (1.01; 1.08)	1.05 (1.01; 1.08)
CEO Ambience		1.18 (1.10; 1.26)	1.15 (1.08; 1.23)	1.14 (1.07; 1.22)
CEO type				
Type I		1	1	1
Type II		0.73 (0.61; 0.89)	0.71 (0.59; 0.86)	0.70 (0.60; 0.85)
Type III		0.68 (0.50; 0.91)	0.67 (0.50; 0.90)	0.64 (0.48; 0.87)
Service interrupted due to non-working equipment		0.67 (0.57; 0.80)	0.67 (0.56; 0.79)	0.67 (0.56; 0.81)
Manager with complementary training		1.09 (0.88; 1.33)	1.01 (0.82; 1.24)	1.04 (0.84; 1.28)
CEO with manager		1.49 (1.09; 2.02)	1.42 (1.05; 1.92)	1.41 (1.03; 1.92)
Work process				
The CEO team performs self-assessment processes periodically			1.32 (1.08; 1.60)	1.26 (1.03; 1.54)
CEO organizes their demand through referrals received from primary care dentists			1.24 (1.04; 1.47)	1.20 (1.01; 1.43)
The patient himself who receives the form/referral from the Basic Health Unit schedules the appointment			0.83 (0.67; 1.01)	0.86 (0.70; 1.06)
The municipality promotes continuing education actions that include CEO professionals			1.20 (1.01; 1.42)	1.19 (1.01; 1.41)
Individual variables				
User profile				
Sex (female)				1.03 (0.89; 1.20)
Age				1.02 (1.01; 1.02)
Years of education				
Illiterate or functional illiterate				1
1–8 years of education				0.79 (0.57; 1.10)
9–11 years of education				0.57 (0.41; 0.80)
>=12 years of education				0.68 (0.47; 0.98)
The user lives in the CEO municipality				0.78 (0.57; 1.06)
The Family Health Strategy covers user household				1.20 (1.02; 1.43)
Random parameter				
Var (_cons[newid])	2.1 (1.8; 2.6)	1.7 (1.5; 2.0)	1.6 (1.4; 1.9)	1.6 (1.4; 1.9)
PCV	-	19.0%	5.9%	0.0%
ICC	18.6	14.0	12.8	12.9
MRR	2.3	2.0	1.9	1.9
n	7997	7987	7987	7675

Note: Bold OR was statistically significant with p -value $< .05$.

Abbreviation: Odds Ratio (95% Confidence Interval).

TABLE 4 Multilevel regression model of the association between the CEO features (structure and work process) and user satisfaction with secondary dental care services 2018

Variables	Empty model	Model 1 (Inclusion of structure + management variables) OR (95% CI)	Model 2 (Inclusion of structure + management + work process variables) OR (95% CI)	Model 3 (Inclusion of structure, management, work process, and user profile variables) OR (95% CI)
Contextual variables (CEO)				
CEO structure				
Equipment		1.07 (1.04; 1.10)	1.05 (1.02; 1.08)	1.05 (1.02; 1.09)
Ambience		1.19 (1.11; 1.28)	1.19 (1.11; 1.27)	1.18 (1.09; 1.26)
CEO type				
Type I		1	1	1
Type II		0.77 (0.65; 0.92)	0.78 (0.66; 0.93)	0.81 (0.68; 0.97)
Type III		0.84 (0.64; 1.09)	0.85 (0.66; 1.11)	0.84 (0.64; 1.10)
Service interrupted due to non-working equipment		0.74 (0.62; 0.88)	0.76 (0.64; 0.90)	0.76 (0.63; 0.91)
Manager with complementary training		1.22 (1.02; 1.45)	1.19 (1.01; 1.43)	1.15 (0.96; 1.39)
Work process				
Appointment scheduled by the patient, who receives the form/referral from the Basic Health Unit			0.81 (0.67; 0.97)	0.87 (0.71; 1.05)
The CEO provides a mechanism to measure user satisfaction			1.21 (0.98; 1.47)	1.21 (0.99; 1.49)
The CEO team uses Telehealth for second formative opinion, tediagnosis, teleconsulting or tele-education.			1.20 (0.95; 1.48)	1.20 (0.95; 1.50)
Individual variables				
User profile				
Female				1.28 (1.11; 1.49)
Age				1.01 (1.01; 1.02)
Years of education				
Illiterate or functional illiterate				1
1–8 years of education				0.64 (0.45; 0.90)
9–11 years of education				0.51 (0.36; 0.73)
≥12 years of education				0.47 (0.32; 0.70)
The user has a paid job				1.37 (1.19; 1.58)
The user is a beneficiary of the Brazilian Family Grant Program				0.79 (0.68; 0.92)
The user lives in the CEO municipality				
The Family Health Strategy covers user household				0.76 (0.57; 1.02)
				1.21 (1.01; 1.44)
Random parameter				
Var (_cons(newid))	2.1 (1.8; 2.5)	1.8 (1.6; 2.1)	1.8 (1.5; 2.1)	1.7 (1.4; 2.0)
n	9997	9997	9997	9037
PCV	-	14,3%	0.0%	5.6%
ICC	18.5	15.4	15.1	14.0
MRR	2.3	2.1	2.1	2.0

Note: Bold OR was statistically significant with p -value $< .05$.

Abbreviation: Odds Ratio (95% Confidence Interval).

increasing the autonomy of beneficiary subjects to promote the development of their capacities, allowing them to overcome important forms of deprivation, and thus build a life closer to what they want and value.³⁸ From this perspective, it is possible to suggest that these users have a clearer perception of their rights, becoming more critical and demanding in the evaluation of secondary dental care services. Nonetheless, this is a hypothesis that would need to be studied in depth.

The results of this study reaffirm the Donabedian conceptual model¹⁵ and its use in the evaluation of healthcare services since the dimensions of structure and process were consistent in the evaluation of the services rendered by the CEOs from the point of view of user satisfaction results. Therefore, this healthcare evaluation model can be used in other contexts that are not Brazilian. The dimensions adopted by Donabedian and used in this study allow for the evaluation of healthcare services from the public and private sectors.

This study illustrates that the CEOs with a good structure and a more well-organized work process offer services that lead to greater user satisfaction, which can indicate the rendering of services that attend to community demands. The results of this study reinforce the importance of the participation of the population in the service evaluation processes, the need for an effective policy for the continuing education of healthcare professionals, and the importance of the non-continuance of the service evaluation processes.

However, the present study's findings should be considered in light of some limitations. The findings of the evaluation are considered for the classification of the performance of the CEO, connected to the financial resource received. This condition can lead to positive outcomes, resulting in more favourable responses by managers and users, as they know, beforehand, that it is an evaluation process.^{17,39} The user sample was non-probabilistic since users were selected from among those who were undergoing dental treatment at the CEO. Therefore, the inferences obtained cannot be extrapolated to Brazilian CEO users. Another limitation related to this sample strategy is gratitude bias, which can occur due to the fact that the interviewees were able to receive medical care from the CEO.⁵ In addition, this gratitude bias may have been reinforced because the interview occurred in the same environment where user care was conducted. The variables that composed the answer (user satisfaction) from the LCA were previously categorized using a conservative cut-off point (8 for scales from 0 to 10 and the regular answers included in negative evaluation) which may underestimate the prevalence of satisfaction. Issues regarding the patient-professional relationship were not present in the evaluation instruments used in the two evaluation cycles of the PMAQ-CEO. For this reason, this variable was not studied. However, the patient-professional relationship should be considered in future studies, as it is an important dimension for improvements in the quality of health services.

5 | CONCLUSION

The work process and structure variables were associated with user satisfaction. In the two evaluation cycles of the CEOs, the users

perceived the quality of secondary care, especially due to the structural components included in the health services provided by the CEO.

CONFLICT OF INTEREST

There was no conflict of interest that might undermine this article.

AUTHOR CONTRIBUTIONS

Amaral, J. H. L.; Vasconcelos, M.; Gomes, V. E.; Werneck, M. A. F.; Gaspar, G. S; and Ferreira, R. C. made substantial contributions to the concept and design, analysis and interpretation of data, drafting the article, revising it critically for important intellectual content and final approval of the version to be published. Lopes, A. L. and Pinheiro, E. L. revised the final manuscript critically for important intellectual content and final approval of the version for publication.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are openly available in the Ministry of Health at <http://aps.saude.gov.br/ape/pmaq/ciclo2ceo/>.⁴⁰

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SUPPORTING INFORMATION

Additional supporting information may be found in the online version of the article at the publisher's website.

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