Interface between primary and specialized care in the oral health system of the Brazilian healthcare system

Interface entre a atenção básica e a especializada na rede de saúde bucal do sistema único de saúde brasileiro

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Abstract

The coordination between primary and secondary care is called an interface. Characteristics such as equity, comprehensiveness, efficiency and effectiveness are fundamental among oral health services and are part of the development of an adequate interface between health services. **Objective**: To verify the interface between primary and specialized care in the Unified Health System. **Methods:** This is a nationwide multilevel study that includes 927 specialist centers dentists (CEO), participants of the Access and Quality Improvement Program (PMAQ-AB), considering its 2nd cycle. **Results**: Data were submitted to frequency analysis and multilevel Poisson regression (Stata 11 ©). 52.53% (95% CI 49.31-55.75) of CEOs have a minimal interface and 34.51% (95% CI 31.45-37.58) have a comprehensive interface. In the adjusted analysis in both outcomes, such as South and Southeast, the highest prevalence was blurred, the same occurred for regions with higher HDI. **Conclusion**: Performing scheduled access, enrollment, and security planning increases the minimum probability of the interface by 60%, 30%, and 31%, respectively. Noteworthy are the inequalities between health services and greater investments in the management of health services in Brazil.
Keywords: health services evaluation; primary health care; oral health.

Resumo

A coordenação entre atenção primária e secundária é denominada interface. Características como equidade, integralidade, eficiência e eficácia são fundamentais entre os serviços de saúde bucal e fazem parte do desenvolvimento de uma interface adequada entre os serviços de saúde. **Objetivo:** Verificar a interface entre a atenção básica (AB) e especializada no Sistema Único de Saúde (SUS). **Métodos:** Trata-se de um estudo multinível de abrangência nacional, que incluiu 927 centros de especialidades odontológicas (CEO) participantes do Programa de Melhoria do Acesso e da Qualidade (PMAQ-AB), considerando seu 2º ciclo de coleta.

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Resultados: Os dados foram submetidos as análises das frequências relativas e absolutas, também foi realizado regressão de Poisson Multinível (Stata 11©). Observou-se que 52,53% (IC 95% 49,31-55,75) dos CEO apresentam interface mínima e 34,51% (IC 95% 31,45-37,58) interface abrangente. Na análise ajustada em ambos os desfechos, as regiões Sul e Sudeste apresentaram maior prevalência do desfecho, o mesmo ocorreu para regiões com IDH mais alto. **Conclusão**: Portanto realizar planejamento, receber matriciamento e garantir acesso agendado, aumenta a probabilidade de interface mínima em 60%, 30% e 31%, respectivamente. Ficam evidenciadas as desigualdades existentes entre os serviços de saúde e necessidade de maiores investimentos na gestão dos serviços de saúde no Brasil.
Palavras-chave: avaliação dos serviços de saúde; atenção primária; saúde bucal.

Introduction

Health systems respond to the health needs of the population and can present themselves in several ways, from fragmented systems with isolated points of care, being unable to provide continuous care to the population, to an integrated system of services characterizing a health care system [1,2].

Health services in Brazil are organized as a system, with Primary Care being the preferred way for users to enter the Unified Health System (SUS) [1,3]. Oral health services in the SUS were first proposed as a system by the National Oral Health Policy in 2004. This policy led to the expansion and qualification of oral health in Primary Care and the implementation of specialized care services, the so-called Dental Specialty Centers (CEOs), to offer dental clinical procedures complementary to those offered in primary care [4]. These centers must offer at least the following specialties: periodontics, endodontics, stomatology, surgery, and care for patients with special needs [5]

There was a strong expansion in the access to oral health services and the establishment of a service system with 24,666 oral health teams (ESB) in place and 1,033 CEOs through the national territory in 2016[1]. Thus, studies assessing oral health services and their impact on the health of the Brazilian population are essential.

Morris and Burke have considered the coordination between primary and secondary care as an interface [6]. They describe the ideal interface between oral health services as having the following characteristics: equity, comprehensiveness, efficiency, and effectiveness. An equitable interface considers that all accurately diagnosed patients must be referred to receive specialized care without barriers [6,7]. Comprehensiveness considers that all the necessary treatment must be available and easily accessible at both levels, and the efficiency and effectiveness of the interface occur through appropriate referral and in time with the guaranteed counter-reference of the patient after the treatment is completed. Although there is no ideal interface between services, existing problems must be described and appropriate solutions must be taken [8].

Austregésilo et al. assessed the interface between primary and emergency oral health services and found multiple and complex problems in this interface. They observed a partially disconnected system and that health service professionals had little knowledge of the system, making the promotion of comprehensiveness difficult [7].

In the context of the health care system, the Ministry of Health launched the National Program for the Improvement of Access and Quality in Primary Care (PMAQ-AB) in 2011, as a strategy to induce changes in the means and conditions of operation of the Basic Health Units (UBS) [1,9]. As of 2012, the Family Health Support Centers and a specific module for the Oral Health Teams were included in the assessment, and the Program for Improving Access and Quality of the Dental Specialty Centers was instituted in 2013 (PMAQ-CEO) [9,10].

Considering the importance of articulation and integration among public

oral health services in Brazil and the importance of evaluating them for improving health outcomes in the country [1,11], this study aimed to determine the interface between the basic and specialized care of dental services in Brazil, assessing the relationship of this interface with the regional contexts of Brazil by analyzing the data of the second cycle of the PMAQ-CEO.

Materials and methods

Sample and type of study

This was a multilevel observational cross-sectional study (CEO and municipalities) based on data from the PMAQ-CEO external evaluation. This was a nationwide, multicentric, and integrated study conducted by several teaching and research institutions, and was directly supervised by the Ministry of Health. The teams joined the PMAQ-CEO on a voluntary basis.

Of the 944 CEOs registered with the Ministry of Health, 933 were assessed until PMAQ was contracted, of which three were excluded because they did not want to respond at the time of the visit and three had missing data for the composition of the presence of the interface. Therefore, this study included 927 CEOs at the municipal level.

External assessment, which consisted of the administration of the data collection instrument by the teaching and research institutions, started in February 2014. External dental surgeons were selected for assessment in the fieldwork. The evaluators were uniformly trained using a field manual prepared by the Department of Primary Care (DAB) and the PMAQ partner Teaching and Research Institutions.

Ethical Considerations

This study was submitted to the Research Committee (COMPESQ) of the Dental School of the Federal University of Rio Grande do Sul for approval. However, it should be noted that it is part of the project "External evaluation: National Program for Improving Access and Quality of Dental Specialty Centers (PMAQ-CEO)" (CAEE 23458213.0.0000.5208), approved by the Research Ethics Committee Involving Human subjects at the Health Sciences Center of the Federal University of Pernambuco (Opinion number: 740.874, date of the report: 07/31/2014).

The participants involved in the study were not exposed to risks and their personal data were kept confidential, thereby avoiding embarrassment or damage to the research participants.

Research design

Data were collected using electronics tablets, which contained an application with the standardized and previously tested instrument. After conducting the external evaluation, the collected data were sent via the internet for validation by a Ministry of Health public employee. The data collection instrument of the second cycle of the PMAQ-CEO comprised three modules with items that evaluated aspects related to the structure, the work processes of the health teams, and the satisfaction with the health services, according to the perception of the users of the assessed health units. The present study assessed information from modules one and two of the PMAQ-CEO. Secondary data referring to the Brazilian municipalities participating in the PMAQ-CEO were collected from the Brazilian Institute of Geography and Statistics (IBGE) and Municipal Human Development Index (MHDI) [4,12].

Procedures

The study had two dependent variables that showed the presence of an interface between Primary Care and CEO. The first one, minimal interface, was represented by the presence of reference and counter-reference sheets and protocols for the five specialties, while the second one, comprehensive interface, was

represented by the presence of reference and counter-reference records, protocols for the five specialties, care of patients coming from PC (Primary Care), counter-reference, and contact with PC. These variables were collected by simple "yes" or "no" questions asked to the interviewees, usually the CEO's managers, including the following: Are there reference and counter-reference records in the CEO?; Is there a clinical protocol agreed for the following specialties: Oral Surgery? Endodontics? Patients with Special Needs? Periodontics? Stomatology?; Does the CEO receive patients coming from primary care? Does the CEO apply counter-reference?; Does the CEO have contact with PC?

Two types of independent variables were assessed: municipal contextual variables and variables related to the CEOs. The contextual variables assessed sociodemographic aspects and the health systems of the municipalities assessed in the PMAQ-CEO. Sociodemographic aspects included national macro-region variables and the Human Development Index (HDI). ESB coverage represented the characteristic of the health system in the assessed municipalities.

The following questions related to the service were analyzed to compose the variables related to the CEOs: execution of planning in the past 12 months and matrix-based strategies for PC, and access to the CEO (exclusively scheduled). Access to the CEO was included only in the analysis on the minimum interface. These variables were collected from simple "yes" or "no" questions in which the interviewees, usually the CEO's managers, answered the following questions: Did the CEO executed planning in the past 12 months?; Does the CEO adopt matrix-based strategies for PC?; Is access to the CEO exclusively scheduled?

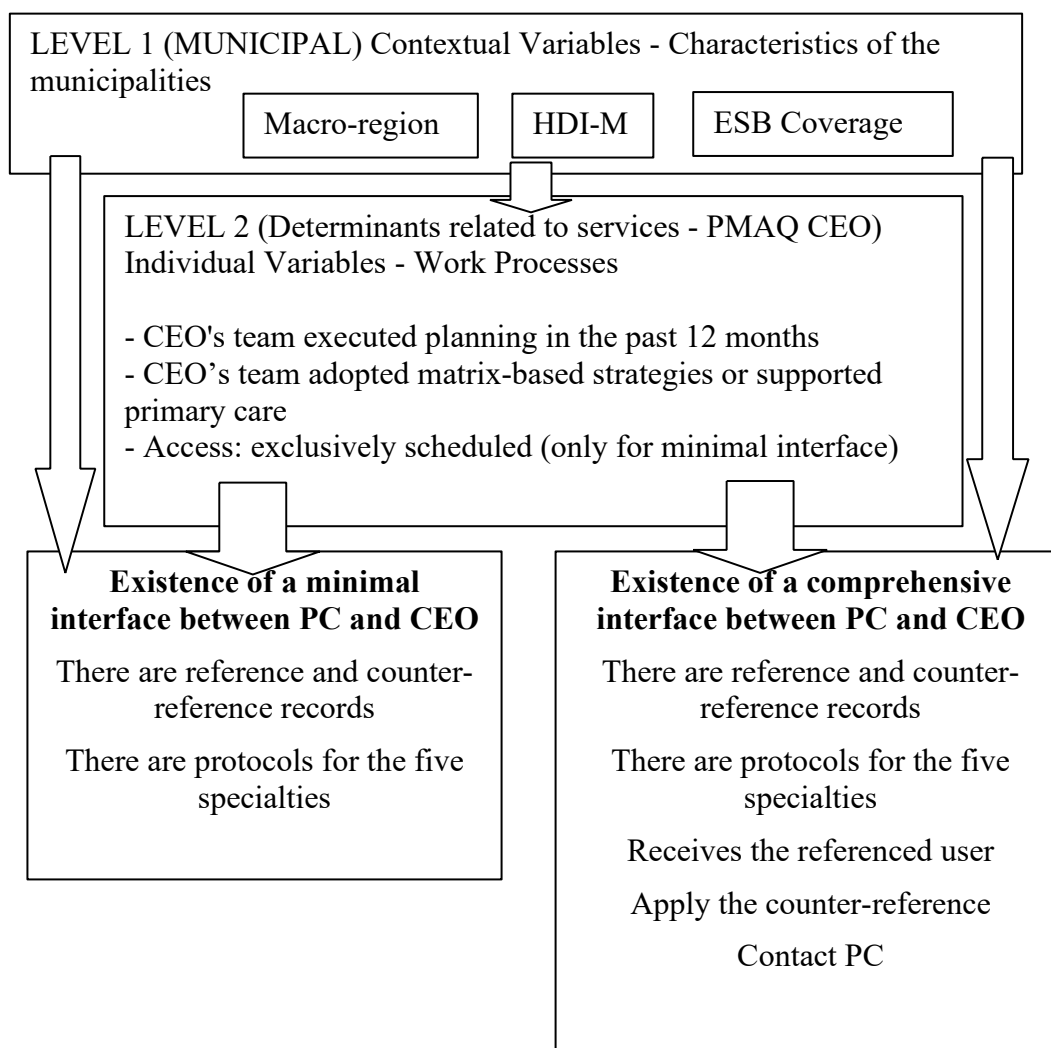The IBGE classification was used for describing the Brazilian macro-regions: northeast, north, central-west, south, and southeast. The municipal HDI was classified into quartiles; 1st quartile: 0-0.6420, 2nd quartile: 0.6421-0.7250, 3rd quartile: 0.7251-0.7640, and 4th quartile: 0.7641-1.0, for the analysis of the minimum interface, and Low: 0.5-0.599, Medium: 0.6-0.699, High: 0.7-0.799, Very high: 0.8-1.0, for the analysis of the comprehensive interface. Oral health coverage was categorized as up to 50% and greater than 50% [13].

Data analysis

The data were analyzed using Stata 11, and the absolute and relative frequencies of the variables were also analyzed. Multilevel (xtpoisson command, with the subcommander for random effects) [16] Poisson Regression [14,15] was used to obtain the raw and adjusted prevalence ratios, with 95% confidence intervals and 5% significance level, respectively. A hierarchical model [17] comprised of two stages was used: Model 1 (including only contextual variables in the adjustment within the block) and Model 2 (including contextual variables with p < 20% of model 1 and the variables related to the health team). Deviance, AIC, and BIC were used to analyze the adjustment of the models.

A theoretical model was used to assess the effect of contextual and individual variables related to the service in the presence of minimal and comprehensive interfaces between PC and CEO, as shown in Figure 1, which shows the municipal variables: HDI-M, macro-region, and ESB coverage, at the first level (contextual) and the variables related to the work process of the services: planning, matrix-based strategies, and access, at the second level (individual), resulting in the dependent variables characterized by the interface between PC and CEO.

Figure 1. Theoretical model to assess the effect of contextual and individual variables

| LEVEL 1 (MUNICIPAL) Contextual Variables - Characteristics of the municipalities |
| Macro-region · HDI-M · ESB Coverage |

LEVEL 2 (Determinants related to services - PMAQ CEO) Individual Variables - Work Processes

- CEO's team executed planning in the past 12 months
- CEO's team adopted matrix-based strategies or supported primary care
- Access: exclusively scheduled (only for minimal interface)

Existence of a minimal interface between PC and CEO

There are reference and counter-reference records

There are protocols for the five specialties

Existence of a comprehensive interface between PC and CEO

There are reference and counter-reference records

There are protocols for the five specialties

Receives the referenced user

Apply the counter-reference

Contact PC

related to the service in the presence of minimal and comprehensive interfaces between PC and CEO.

Results

When observing the prevalence of the minimum interface, represented by the presence of reference and counter-reference records and protocols for the five specialties, 52.53% of the 927 teams of the CEOs (95% CI: 49.31-55.75) had a positive outcome for the interface.

The South (61%) and Southeast (68%) regions had a higher prevalence of the minimal interface when compared to the other regions. The 4th quartile of the HDI had the highest prevalence (71.4%) when compared to the other quartiles. Moreover, a higher prevalence of the outcome was also observed when the CEO team executed planning in the past 12 months (58.5%), when matrix-based strategies were adopted or they supported PC (58.4%), and when access was exclusively scheduled (60.8%), according to Table 1.

Table 1: Description of the sample, prevalence of minimum interface between PC and CEO, and Raw Prevalence Ratio for contextual and individual variables, Brazil, 2014 (n = 927).

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	n (%)	Prevalence of PC interface and CEO (95% CI)	Raw PR (95% CI)	P-value
CONTEXTUAL VARIABLES				
Macro-region				
North	59 (6.36)	30.5 (18.6-42.3)	1	
North East	354 (38.19)	37.5 (32.5-42.6)	1.23 (0.81-1.85)	0.317
Central-West	62 (6.69)	54.8 (42.3-67.3)	1.79 (1.15-2.81)	0.01
South	116 (12.51)	61.2 (52.2-70.1)	2.01 (1.32-3.02)	0.001
Southeast	336 (36.25)	68.7 (63.7-73.7)	2.25 (1.52-3.33)	<0.001
HDI*				
1st quartile	234 (25.24)	32.9 (26.8-38.9)	1	
2nd quartile	231 (24.92)	49.3 (42.8-55.8)	1.51 (1.19-1.87)	<0.001
3rd quartile	231 (24.92)	56.7 (50.2-63.1)	1.72 (1.39-2.13)	<0.001
4th quartile	231 (24.92)	71.4 (65.5-77.2)	2.17 (1.77-2.65)	<0.001
Oral health coverage				
Up to 50%	465 (50.16)	58.9 (54.4-63.4)	1	
More than 50%	462 (49.84)	46.1 (41.5-50.6)	0.78 (0.65-0.93)	0.007
INDIVIDUAL VARIABLES				
Did the CEO's team execute planning in the past 12 months?				
No	205 (22.11)	31.2 (24.8-37.5)	1	
Yes	722 (77.89)	58.5 (54.9-62.1)	1.87 (1.44-2.44)	<0.001
Did the CEO's team adopt matrix-based strategies or supported care?				
No	272 (29.34)	38.2 (32.4-44.1)	1	
Yes	655 (70.66)	58.4 (54.6-62.2)	1.52 (1.23-1.89)	<0.001
Is access exclusively scheduled?				
No	396 (42.72)	41.4 (36.5-46.2)	1	
Yes	531 (57.28)	60.8 (56.6-64.9)	1.47 (1.28-1.68)	<0.001

* 1st quartile: 0-0.6420; 2nd quartile: 0.6421-0.7250; 3rd quartile: 0.7251-0.7640; 4th quartile: 0.7641-1.0

In the adjusted analysis for sociodemographic contextual variables and variables related to health services, the minimum interface outcome was 73% more prevalent in the South than in the North (PR 1.73; 95% CI: 1.01-2.96) and 96% more prevalence in the Southeast than in the North (PR 1.96; 95% CI: 1.19-3.22). The 4th quartile of the HDI had a prevalence of the minimum interface outcome that was 63% higher than the 1st quartile of HDI (PR 1.63; 95% CI: 1.09-2.44). Teams that executed planning in the past 12 months were 60% more likely to have an interface between CEO and PC (PR 1.60; 95% CI: 1.22-2.10), those who adopted matrix-based strategies or supported PC were 30% more likely (PR 1.30; 95% CI: 1.04-1.63), and those who had exclusively scheduled access were 31% more likely (PR 1.31; 95% CI: 1.08-1.59), as shown in Table 2.

Table 2: Prevalence ratios adjusted for contextual and individual variables, for minimum interface between PC and CEO, Brazil, 2014 (n = 927).

	Adjusted PR (95% CI) Model 1	P-value	Adjusted PR (95% CI) Model 2	P-Value
CONTEXTUAL VARIABLES				
Macro-region				
North	1		-	
North East	1.36 (0.82-2.27)	0.230	-	
Central-West	1.58 (0.88-2.84)	0.121	-	
South	1.73 (1.01-2.96)	0.043	-	
Southeast	1.96 (1.19-3.22)	0.008	-	
HDI *				
1st quartile	1		-	
2nd quartile	1.34 (0.97-1.85)	0.074	-	
3rd quartile	1.38 (0.95-2.03)	0.089	-	
4th quartile	1.63 (1.09-2.44)	0.016	-	
Oral health coverage				
Up to 50%	1		-	
More than 50%	1.02 (0.83-1.27)	0.785	-	
INDIVIDUAL VARIABLES				
Did the CEO's team execute planning in the past 12 months?				
No	-		1	
Yes	-		1.60 (1.22-2.10)	0.001
Did the CEO's team adopt matrix-based strategies or supported care?				
No	-		1	
Yes	-		1.30 (1.04-1.63)	0.020
Is access exclusively scheduled?				
No	-		1	
Yes	-		1.31 (1.08-1.59)	0.005

Minimum interface between PC and CEO, Brazil, 2014 (n = 927).
Model 1: contextual variables adjusted to each other.
Model 2: individual variables adjusted for the contextual ones that had p < 0.20 (Macro-region and HDI) in Model 1.

The prevalence of the comprehensive interface, grouped by the presence of reference and counter-reference records, protocols for the five specialties, care of users coming from primary care, application of counter-reference, and contact with primary care, indicates that of the 927 teams of CEO assessed, 34.51% (95% CI: 31.45-37.58) had a positive outcome.

The South region (51.7%) had the highest prevalence of the comprehensive interface when compared to the other regions. HDI had the highest prevalence of this outcome in the presence of a Very High (70.8%) HDI. Teams that executed planning in the past 12 months (38.65%) and teams that adopted matrix-based strategies and supported PC (38.95%) also had a higher prevalence of this outcome (Table 3).

Table 3: Description of the sample, prevalence of comprehensive interface between PC and CEO, and Raw Prevalence Ratio for contextual and individual variables, Brazil, 2014 (n = 927).

	n (%)	Prevalence of PR interface and CEO (95% CI)	Raw PR (95% CI)	P-value
CONTEXTUAL VARIABLES				
Macro-region				
North	59 (6.36)	18.6 (08.8-28.6)	1	
North East	354 (38.19)	20.9 (16.6-25.1)	1.11 (0.59-2.11)	0.728
Central-West	62 (6.69)	43.5 (31.0-56.0)	2.34 (1.15-4.75)	0.018
South	116 (12.51)	51.7 (42.5-60.8)	2.76 (1.44-5.27)	0.002
Southeast	336 (36.25)	44.0 (38.7-49.3)	2.32 (1.25-4.31)	0.007
HDI *				
Low	107 (11.5)	14.9 (8.1-21.7)	1	
Average	264 (28.5)	25.7 (20.4-31.1)	1.72 (0.99-2.96)	0.05
High	477 (51.4)	37.7 (33.3-42.1)	2.52 (1.51-4.21)	<0.001
Very high	79 (8.6)	70.8 (60.7-80.9)	4.74 (2.72-8.26)	<0.001
Oral health coverage				
Up to 50%	465 (50.16)	39.5 (35.1-44.1)	1	
More than 50%	462 (49.84)	29.4 (25.2-33.6)	0.75 (0.61-0.94)	0.015
INDIVIDUAL VARIABLES				
Did the CEO's team execute planning in the past 12 months?				
No	205 (22.11)	20.0 (14.5-25.4)	1	
Yes	722 (77.89)	38.6 (35.1-42.2)	1.91 (1.97-2.66)	<0.001
Did the CEO's team adopt matrix-based strategies or supported care?				
No	272 (29.34)	23.9 (18.8-28.9)	1	
Yes	655 (70.66)	38.9 (35.1-42.6)	1.62 (1.23-2.13)	0.001

* Low: 0.5-0.599; Medium: 0.6-0.699; High: 0.7-0.799; Very high: 0.8-1.0

In the adjusted analysis for the sociodemographic and individual contextual variables of the health services, the outcome in the Southeast region was twice as prevalent as in the North region (PR 2.03; 95% CI: 1.07-3.83), with the South region having a 2.3 times higher prevalence of the outcome than the North region (PR 2.30; 95% CI: 1.17-4.51). Very High HDI had a prevalence of the outcome 2.8 times higher than the Low one (PR 2.81; 95% CI: 1.38-5.72). Teams that executed planning in the past 12 months showed a 54% higher prevalence of the outcome when compared to teams that did not (PR 1.54; 95% CI: 1.10-2.16). Teams that adopted matrix-based strategies or supported PC had a 38% higher prevalence of the outcome (PR 1.38%; 95% CI: 1.05-1.83), as shown in Table 4.

Table 4: Prevalence ratios adjusted for contextual and individual variables of the comprehensive interface between PC and CEO, Brazil, 2014 (n = 927).

	Adjusted PR (95% CI) Model 1	P-value	Adjusted PR (95% CI) Model 2	P-value
CONTEXTUAL VARIABLES				
Macro-region				
North	1		-	
North East	1.16 (0.60-2.22)	0.651	-	
Central-West	1.97 (0.95-4.07)	0.066	-	
South	2.30 (1.17-4.51)	0.015	-	
Southeast	2.03 (1.07-3.83)	0.029	-	
HDI *				
Low	1		-	
Average	1.56 (0.89-2.72)	0.115	-	
High	1.59 (0.84-2.99)	0.148	-	
Very high	2.81 (1.38-5.72)	0.004	-	
Oral health coverage				
Up to 50%	1		-	
More than 50%	1.09 (0.84-1.41)	0.507	-	
INDIVIDUAL VARIABLES				
Did the CEO's team execute planning in the past 12 months?				
No	-		1	
Yes	-		1.54 (1.10-2.16)	0.011
Did the CEO's team adopt matrix-based strategies or supported care?				
No	-		1	
Yes	-		1.38 (1.05-1.83)	0.021
MODEL ADJUSTMENT PARAMETERS				
Log likelihood	-630.63013		-622.62532	
AIC	1281.26		1267.251	
BIC	1329.58		1320.402	

Model 1: contextual variables adjusted to each other.
Model 2: individual variables adjusted to the contextual ones that had p < 0.20 (Macro-region and HDI) in Model 1.

Discussion

The adjustment parameters of the models indicated a reduction in deviance, AIC, and BIC, that is, the final models showed a greater statistical adjustment.

The obtained results allowed us to identify the factors associated with the presence of an interface between primary and specialized care. The execution of planning and the adoption of matrix-based strategies by the teams of the CEOs and the referenced access were observed and analyzed. The findings of this study suggest that the work process is decisive for greater integration in the services and, consequently, the constitution of an oral health system.

Machado et al. concluded that the CEO's performance is influenced by the organization and management of the work process and the contextual characteristics of the places where the services are implemented [17], supporting the results of this study, which concluded that the context and planning influence the interface outcome between PC and CEO.

At the contextual level, the South and Southeast macro-regions remained associated with the outcomes, with a

significantly stronger association being observed in the comprehensive interface. Human Development Index was associated with the interface in both outcomes (minimal and comprehensive), and the higher the HDI, the greater the association with the interface. These associations emphasize the relationship between health inequities, which is explained not only by the total wealth of Brazil, but also by the way this wealth is distributed [18]. Thus, inequalities in income distribution end up being harmful not only to the poorer groups, but to society as a whole [18,19].

A multilevel study conducted with data from the PMAQ-AB also showed inequality between the five Brazilian macro-regions, when it evaluated the performance of curative and preventive procedures in oral health [18], supporting the idea that municipalities that are better structured and have an established health care system have a better interface and provide better care.

The relationship between PC and CEOs translated into an interface results in the provision of more equitable, integral, efficient, and effective care, which agrees with the proposition of Morris and Burke [5] and the principles of SUS [12].

Conclusion

This analytical study contributes to the identification of the municipal characteristics and work processes associated with the presence of an interface, serving as a guide for strategic actions to guide the work processes of municipal, regional, and state managers. Therefore, PMAQ-AB has been an important agent of change, with the potential to improve the quality of services, work processes, and health actions. This study was conducted nationwide analyzing data from almost all CEOs in Brazil and is representative of the national level. In short, changes in work processes, care of the users, and the management of health resources must be implemented, such that PC is qualified and equally distributed throughout the national territory.

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