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PRENATAL DENTAL CARE IN PRIMARY HEALTH CARE: A NATIONAL CROSS-SECTIONAL STUDY

ASSISTÊNCIA ODONTOLÓGICA PRÉ-NATAL NA ATENÇÃO PRIMÁRIA À SAÚDE: ESTUDO TRANSVERSAL EM NÍVEL NACIONAL

Malu Oliveira Santos[1], Augusto Cesar Souza Raimundo[2], Livia Fernandes Probst[3], Vanessa Pardi[4], Letícia Santos Alves de Melo[5], Elaine Pereira da Silva Tagliaferro[6]*

[1]Dentist, Federal Institute of Education, Science and Technology of Bahia, Valença Campus; [2]PhD, Department of Health Sciences and Pediatric Dentistry, School of Dentistry of Piracicaba, State University of Campinas (UNICAMP), Piracicaba, São Paulo, Brazil; [3]Researcher, Health Technology Assessment Unit, Hospital Alemão Oswaldo Cruz, São Paulo, São Paulo, Brazil; [4]Assistant professor, Department of Foundational Sciences, Division of Dental Public Health, School of Dental Medicine – ECU, Greenville, North Carolina, USA; [5]PhD student, Department of Morphology and Children's Clinic, São Paulo State University (UNESP). School of Dentistry, Araraquara, Brazil; [6]Associate Professor, Department of Community Dentistry, São Paulo State University (UNESP), School of Dentistry, Araraquara, São Paulo, Brazil.

***Corresponding author**: Elaine Pereira da Silva Tagliaferro. **E-mail:** elaine.tagliaferro@unesp.br

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ABSTRACT: Aim: This cross-sectional study aimed to analyze the practice of prenatal dental care (PDC) in Brazilian Primary Health Care (PHC) (CAAE 48183421.9.0000.5416). **Methodology:** Data were collected among 753 oral heath managers (OHM), using a questionnaire specifically developed for this study (n=753) focusing on the outcome measure "practice of PDC in PHC". Descriptive data analyses and logistic regression models were performed (p<0.05). **Results:** The majority of OHM were from the Southeast region (39.0%) with an average age of 40.1 years. Most (68.8%) considered PDC as an established practice. Municipalities that referred pregnant women for dental evaluation at the start of prenatal care (PNC) (OR=11.58) or where PHC dentists participated in health education activities during PNC (OR=9.42) were more likely to recognize PDC as an established practice. **Conclusions:** Most participants considered PDC as an established practice associated with early referral of pregnant women for dental evaluation and active involvement of dentists in health education activities.

KEYWORDS: Oral health; Primary health care; Pregnant women; Prenatal care; Health management.

RESUMO: Objetivo: Este estudo transversal teve como objetivo analisar a prática do pré-natal odontológico (PNO) na Atenção Primária à Saúde (APS) no Brasil (CAAE 48183421.9.0000.5416). **Metodologia:** Os dados foram coletados entre 753 gestores em saúde bucal (GSB), por meio de questionário especificamente desenvolvido para este estudo (n=753) tendo como desfecho "prática de PNO na APS". Foram realizadas análises descritivas dos dados e aplicados modelos de regressão logística, calculando-se o *odds ratio* (p<0,05). **Resultados:** A maioria dos GSB era da região Sudeste (39,0%), com idade média de 40,1 anos. A maioria (68,8%) dos GSB considerou o PNO uma prática estabelecida. Municípios que encaminharam gestantes para avaliação odontológica assim que iniciavam o pré-natal (PN) (OR=11,58) ou cujos dentistas da APS participaram de atividades de educação em saúde durante o PN (OR=9,42) eram mais propensos a ter o PNO como uma prática estabelecida. **Conclusões:** A maioria dos participantes da pesquisa consideram o PNO uma prática estabelecida, associada ao encaminhamento de gestantes para avaliação odontológica no início do PN e à participação do dentista em atividades de educação em saúde.

PALAVRAS-CHAVE: Saúde bucal; Atenção primária à saúde; Gestantes; Cuidado pré-natal; Gestão em saúde.

INTRODUCTION

Pregnancy is a unique period in a woman's life marked by emotional, psychological, behavioral, physiological, and hormonal changes[1]. This period is of particular interest for dental care[1,2], as these changes can increase women's susceptibility to oral disorders, mainly dental caries and periodontal diseases[2-5], causing a significant impact on their quality of life[2, 6].

Within the Brazilian public health system, the National Oral Health Policy[7] and the National Plan to Ensure Prenatal Dental Care (PDC), recommend referring pregnant women for dental appointments as soon as they start prenatal care in Primary Health Care (PHC)[8].

Recognizing dental care during pregnancy as an indicator of the quality of prenatal care, the Ministry of Health has included dental visits for pregnant women as a key metric in the National Program for Improving Access and Quality of Care Basic[9]. More recently, "proportion of pregnant women receiving dental care" was established as a performance indicator within the new PHC financing model[8], the "*Previne Brasil*" Program[10]. This indicator, which tracks prenatal dental visits, aims to improve access to oral health care, prevent conditions that may affect both maternal and pregnancy health, and highlight the importance of oral health for the well-being of both mother and baby[11].

However, despite the acknowledged importance of the gestational period and the existing policies and recommendations, few women receive oral health care as part of routine prenatal services in PHC[12]. It is important to note that many factors can influence the access and adequacy of oral health care during pregnancy. These include individual factors[12] (socioeconomic, cultural, and educational)[2] as well as factors related to the health service organization, as demonstrated by a recent study that evaluated the prevalence of prenatal dental service use and its associated factors, in different Brazilian macro-regions[12]. Public health managers should rethink dental care practices during pregnancy[13] to minimize barriers and facilitate pregnant women's access to oral health care. They should also implement effective care protocols[13] and use strategies to expand dental care coverage for pregnant women in PHC.

Oral health promotion, a social and political process that empowers individuals and communities to gain control over health determinants, enhancing public and personal health[14] is crucial in PHC. However, a systematic review about oral health promotion interventions during pregnancy showed that interventions focused on educating about infant oral health rather than maternal oral care and that few interventions specifically targeted symptoms, hygiene practices, and the potential oral-systemic implications for mothers[15]. Moreover, another systematic review identified prevalent unfavorable beliefs among expectant and new mothers, including concerns about the safety of dental service utilization, misunderstandings regarding the effects of pregnancy on oral health, and doubts about the importance of maintaining oral hygiene while pregnancy. These misconceptions hold significant implications for health promotion efforts[16].

Considering the importance of studying Prenatal Dental Care (PDC) to identify existing gaps and the limited research examining PDC practices at a national level reported by municipal oral health managers—who play a critical role in organizing and implementing oral health care within the public health system—this study aimed to analyze PDC practices in Primary Health Care (PHC) from the perspective of these key managers.

METHODOLOGY

This observational, national cross-sectional study collected data through semi-structured online questionnaire administered via Google Forms™ platform. The questionnaire was distributed to municipal oral health managers and the link was accessible from December 2021 to April 2022. This study followed the guidelines of Resolutions #510, 2016[17], and #466, 2012[18] of the Brazilian Health Council. It was approved by the Research Ethics Committee of the School of Dentistry of Araraquara, São Paulo State University (CAAE 48183421.9.0000.5416) and reported according to the STrengthening the Reporting of OBservational Studies in Epidemiology (STROBE). Participants provided consent through an electronic informed consent form.

The questionnaire was developed following standardized methods and techniques, including a literature review on the topic, definition of the study objectives and target population, construction of items and sections for analysis, expert panel review, organization, and structuring of the data collection instrument, and a pre-test[19]. The pre-test was carried out between September and October 2021 with twelve municipal oral health managers selected based on accessibility criteria to streamline the data collection process. These managers assessed the clarity and difficulty level of questions and answers, which helped refine the questionnaire for the research participants. The final analyses did not include the data collected during the pre-test.

Data related to the characteristics of the municipality (geographic region, Federative Unit, and population), the manager (sex, age, level of education, training, and experience in the position), oral health care in the municipality (planning of actions, care organization, and the presence of a Dental Specialty Center – DSC), and oral health care for pregnant women (existence of a dental care guideline for pregnant women, methods of access to dental care, procedures available to pregnant women, promotion of continuing education on topics related to oral health during pregnancy, dentist participation in health education activities for pregnant women, managers' knowledge about the *"Previne Brasil"* Program, PDC practices in the PHC (outcome) and managers' perception of the importance of PDC were collected. Additionally, Human Development Index (HDI) data were collected from the Institute of Applied Economic Research (IAER) website to characterize the municipalities.

The study was conducted across Brazil's 27 federative units (26 states and the Federal District), covering a total of 5,570 municipalities[20]. The inclusion criterion required participants to authorize their involvement in the research via an electronic informed consent form. Questionnaires with unanswered outcome question were excluded from analysis.

Municipal oral health managers were invited to participate through the municipal health secretaries, whose contact information, publicly available on the Brazilian Council of Municipal Health Secretaries website, was gathered via email addresses listed there. An initial email was sent to the health secretaries in all 5,570 municipalities to inform them about the study and request that they forward the questionnaire access link to their respective oral health managers. Reminders were sent one and two months after data collection began.

To encourage participation, oral health managers who completed the questionnaire and provided their email addresses received follow-up email requesting that they help disseminate the study by forwarding the link to other municipal oral health managers they knew. Social media platforms were also used to promote the survey and the questionnaire link. Responses were counted, and the data were organized in a Microsoft Excel™ spreadsheet. Duplicate entries and responses without completed outcome question were excluded from analysis.

For the statistical analysis, descriptive data first analyzed absolute and relative frequencies for categorical variables and mean, standard deviation, median, and minimum and maximum values for quantitative variables. Simple logistic regression models were then applied for each independent variable and the outcome, which was dichotomized into established and unestablished practice. Variables with p≤0.20 in the logistic analyses were included in a multiple logistic regression model and those with p≤0.05 in the multiple model were retained in the final model. Crude and adjusted odds ratios, as well as 95% confidence intervals, were calculated. All analyses were conducted using R Core Team™ (2022) software.

RESULTS

Our analyses included only the oral health managers (n=753) who agreed to participate in the research and responded to the outcome question on PDC practices in PHC. This represents a 13.5% response rate among Brazil's 5,570 municipalities. However, we cannot ensure that all municipal secretaries accessed or forwarded the survey invitation to their oral health managers.

Table 1 provides a descriptive analysis characterizing the municipalities whose oral health managers completed the questionnaires. Representatives from all Brazilian states and the Federal District participated, with the Southeast region showing the participation (39.0%) and the Midwest region the lowest (6.6%). Most municipalities (73.6%) are small, with populations under 50,000, and have a medium HDI (84.7%).

Table 1. Descriptive analysis of the variables characterizing the municipalities (n=753).

Variable	Category	Frequency	Percentage
Region	Midwest	50	6.6%
	Northeast	168	22.3%
	North	57	7.6%
	Southeast	294	39.0%
	South	184	24.4%
Federative Unit	Acre	6	0.8%
	Alagoas	7	0.9%
	Amapá	1	0.1%
	Amazonas	6	0.8%
	Bahia	59	7.8%
	Ceará	21	2.8%
	Distrito Federal	1	0.1%
	Espírito Santo	12	1.6%
	Goiás	22	2.9%
	Maranhão	2	0.3%
	Mato Grosso	10	1.3%
	Mato Grosso do Sul	17	2.3%
	Minas Gerais	115	15.3%
	Pará	22	2.9%
	Paraíba	15	2.0%
	Paraná	77	10.2%
	Pernambuco	27	3.6%
	Piauí	13	1.7%
	Rio de Janeiro	13	1.7%
	Rio Grande do Norte	14	1.9%
	Rio Grande do Sul	45	6.0%
	Rondônia	6	0.8%
	Roraima	2	0.3%
	Santa Catarina	62	8.2%
	São Paulo	154	20.5%
	Sergipe	10	1.3%
	Tocantins	14	1.9%
Population	Small (<50k)	554	73.6%
	Medium (50k to 100k)	80	10.6%
	Large (>100k)	116	15.4%
	No information	3	0.4%
HDI*	Low (Up to 0.499)	0	0.0%
	Medium (From 0.5 to 0.799)	638	84.7%
	High (From 0.8)	21	2.8%
	No information	94	12.5%

*Human Development Index.

The average age of the managers participating in the survey was 40.1 years, with an average of four years in the role. Most participants were women (69.9%), held a graduate degree (68.9%) and were dentists (84.6%). Additionally, 81.3% reported not having received training for the position, and 63.5% performed public services beyond municipal oral health management (Table 2).

Table 2. Descriptive analysis of the characterization variables of municipal oral health managers (n=753).

Variable	Category	Frequency	Percentage
Sex	Female	526	69.9%
	Male	227	30.1%
Level of education	Complete high school	31	4.1%
	Complete higher education	203	27.0%
	Postgraduate studies	519	68.9%
Area of training (undergraduate)	None	31	4.1%
	Dentistry	637	84.6%
	Other courses (health field)	49	6.5%
	Other courses (other fields)	27	3.6%
	No information	9	1.1%
Area of training (postgraduate)	None	234	31.1%
	Health and/or public health management	231	30.7%
	Other fields	281	37.3%
	No information	7	0.9%
Performs other activities in the public service	No	275	36.5%
	Yes	478	63.5%
Other activities performed in the public service	Dental care	351	46.6%
	Primary Care Coordination	38	5.0%
	Municipal Secretary of Health	22	2.9%
	Oral Health Technician	8	1.1%
	Oral Health Assistant	5	0.7%
	Coordination of the School Health Program	5	0.7%
	Family Health Team Coordination	4	0.5%
	Professor	3	0.4%
	Head of Health Surveillance	3	0.4%
	Dental Regulator	2	0.3%
	DSC* Manager	2	0.3%
	Other activities	31	4.1%
	No information	4	0.5%
	None	275	36.5%
The oral health manager position is institutionalized	No	366	48.6%
	Yes	379	50.3%
	No information	8	1.1%
Receives a bonus for performing the job	No	353	46.9%
	Yes	340	45.2%
	No information	60	8.0%
Received training	No	612	81.3%
	Yes	140	18.6%
	No information	1	0.1%

*Dental Specialty Center.

Table 3 presents a descriptive analysis of the variables characterizing oral health care for general population and for pregnant women in the municipalities. Most managers reported that Oral Health Teams (OHTs) engage in activity planning (87.0%) and that pregnant women are a priority group for dental care (98.5%). A Dental Specialty Center is absent in 69.7% of the surveyed municipalities. In most municipalities, OHTs follow oral health care guidelines during pregnancy (85.1%), with 34.9% developed by the Ministry of Health (MH) and 30.8% by municipal health authorities; however, these guidelines are not publicly accessible. In 96.1% of municipalities, pregnant women are referred for dental

evaluation at the beginning of prenatal care in PHC, where they can receive oral health instructions (98.5%), topical fluoride application (76.9%), prophylaxis (97.7%), scaling (90.2%), restoration (95.2%), extraction (75.8%), and treatment of oral mucosa lesions (69.6%). Additionally, 83.7% of managers stated that their municipalities support dentists' participation in continuing education courses on oral health care for pregnant women, and 52.1% of managers reported that it is an established practice for dentists to participate in health education activities during routine prenatal care.

Table 3. Descriptive analysis of the variables characterizing oral health care and oral health care for pregnant women in the municipalities (n=753).

Variable	Category	Frequency	Percentage
OHTs* perform activities to plan their actions	No	97	12.9%
	Yes	655	87.0%
	No information	1	0.1%
Pregnant women receive priority care from OHTs*	No	11	1.5%
	Yes	742	98.5%
The municipality has a DSC†	No	525	69.7%
	Yes	227	30.1%
	No information	1	0.1%
The OHTs* follow some oral health care guidelines during pregnancy	No	104	13.8%
	Yes	641	85.1%
	No information	8	1.1%
Type of guideline:	Prepared by the Ministry of Health	263	34.9%
	Prepared by the municipal health management and is not available in a public access document	232	30.8%
	Prepared by the municipal health management and is available in a public access document	86	11.4%
	Other guidelines	42	5.7%
	No information	26	3.4%
	No guideline followed	104	13.8%
Dental care access for pregnant women who perform prenatal care in PHC‡	Pregnant women who perform prenatal care in PHC‡ are NOT referred for a dental evaluation	7	0.9%
	Pregnant women are referred for a dental evaluation as soon as they start prenatal care in PHC‡	724	96.1%
	Pregnant women are referred for a dental evaluation only when they complain of an oral problem	14	1.9%
	Other forms	5	0.7%
	No information	3	0.4%
The municipality supports dentist participation in continuing education courses on oral health care for pregnant women	No	84	11.2%
	Yes	630	83.7%
	No information	39	5.2%
Dentists participate in health education activities performed during routine prenatal care in PHC‡	Non-existent	22	2.9%
	Under development/planning	183	24.3%
	Under implementation	151	20.1%
	Established	392	52.1%
	No information	5	0.7%
Knowledge of managers about the "Previne Brasil" Program	Does not know	41	5.4%
	Knows little	147	19.5%
	Does not know or does not know	1	0.1%
	Knows reasonably well	335	44.5%
	Knows a lot	228	30.3%
	No information	1	0.1%

*Oral Health Teams. †Dental Specialty Center. ‡Primary Health Care

In terms of PDC practice, 68.8% of managers reported it as an established practice within the municipality's primary health care, and 90.7% consider it highly relevant (Table 4).

Table 4. Descriptive analysis of PDC variables in the municipalities and relevance according to managers (n=753).

Variable	Category	Frequency	Percentage
PDC* practice in the PHC† of the municipality	Non-existent	3	0.4%
	Under development/planning	96	12.7%
	Under implementation	136	18.1%
	Established	518	68.8%
Relevance of PDC* practice according to municipal oral health managers	Irrelevant	1	0.1%
	Low	2	0.3%
	Moderate	3	0.4%
	Relevant	64	8.5%
	Extremely relevant	683	90.7%

*Prenatal dental care. †Primary Health Care.

Table 5 shows the associations between PDC practices and variables related to oral health managers, oral health care, and oral health care during pregnancy. The individual analysis of the variables (crude analysis) showed that "region", "OHTs performing planning activities", "existence of any oral health care guideline during pregnancy", "dental care access for pregnant women", "participation of PHC dentists in health education activities performed during routine prenatal care", and " manager knowledge of the "Previne Brasil Program" were significantly associated with PDC in the municipality ($p<0.05$). Additionally, the variable for managers' graduate-level education was included in the multiple logistic regression model due to a p-value of <0.20 in the crude analysis. In the combined analysis, only "dental care access for pregnant women" and "PHC dentist participation in health education activities during routine prenatal care" remained in the final model ($p<0.05$). Municipalities that refer pregnant women for dental evaluation at the beginning of prenatal care in PHC are more likely to have established PDC practices (OR=11.58; 95% CI: 1.47-91.08). Additionally, municipalities with dentist participation in health education activities during routine prenatal care are more likely to have established PDC practices (OR=9.42; 95% CI: 3.47-25.56) ($p<0.05$).

Table 5. Analysis (crude and adjusted) of the associations between PDC practice and municipal variables, municipal oral health managers, oral health care, and oral health care for pregnant women (n=753).

Variable	Category	n (%)	PDC† practice		Crude OR (95%CI)	p-value	Adjusted OR (95%CI)	p-value
			Not established	*Established				
			n (%)	n (%)				
General			235 (31.2%)	518 (68.8%)	-	-	-	-
Region	Midwest	50 (6.6%)	20 (40.0%)	30 (60.0%)	Ref		-	-
	Northeast	168 (22.3%)	40 (23.8%)	128 (76.2%)	2.13 (1.09-4.16)	0.0262		
	North	57 (7.6%)	20 (35.1%)	37 (64.9%)	1.23 (0.56-2.70)	0.6004		

Variable	Category	n (%)	PDC† practice		Crude OR (95%CI)	p-value	Adjusted OR (95%CI)	p-value
			Not established	*Established				
			n (%)	n (%)				
	Southeast	294 (39.0 %)	101 (34.4%)	193 (65.6%)	1.27 (0.69-2.36)	0.4402		
	South	184 (24.4 %)	54 (29.3%)	130 (70.7%)	1.60 (0.84-3.07)	0.1528		
Population	Small (<50k)	554 (73.6 %)	171 (30.9%)	383 (69.1%)	Ref		-	-
	Medium (50k to 100k)	80 (10.6 %)	29 (36.3%)	51 (63.8%)	0.78 (0.48-1.28)	0.3335		
	Large (>100k)	116 (15.4 %)	34 (29.3%)	82 (70.7%)	1.08 (0.70-1.67)	0.7409		
	No information	3 (0.4%)	1 (33.3%)	2 (66.7%)	-	-	-	-
HDI‡	Medium (From 0.5 to 0.799)	638 (84.7 %)	199 (31.2%)	439 (68.8%)	Ref			
	High (From 0.8)	21 (2.8%)	4 (19.0%)	17 (81.0%)	1,93 (0.64-5.80)	0.2435	-	-
	No information	94 (12.5 %)	32 (34.0%)	62 (66.0%)	-	-	-	-
Postgraduate studies	No	234 (31.1 %)	81 (34.6%)	153 (65.4%)	Ref			
	Yes	519 (68.9 %)	154 (29.7%)	365 (70.3%)	1.25 (0.90-1.74)	0.1759		
Experience	≤ 2 years (median)	373 (49.5 %)	116 (31.1%)	257 (68.9%)	Ref			
	>2 years	329 (43.7 %)	99 (30.1%)	230 (69.9%)	1.05 (0.76-1.45)	0.7726		
	No information	51 (6.8%)	20 (39.2%)	31 (60.8%)	-	-	-	-
OHTs¶ performing planning activities	No	97 (12.9 %)	40 (41.2%)	57 (58.8%)	Ref			
	Yes	655 (87.0 %)	194 (29.6%)	461 (70.4%)	1.67 (1.08-2.58)	0.0220	-	-
	No information	1 (0.1%)	1 (100.0%)	0 (0.0%)	-	-	-	-

Variable	Category	n (%)	PDC† practice		Crude OR (95%CI)	p-value	Adjusted OR (95%CI)	p-value
			Not established	*Established				
			n (%)	n (%)				
OHTs¶ follow some oral health care guidelines during pregnancy	No	104 (13.8%)	41 (39.4%)	63 (60.6%)	Ref			
	Yes	641 (85.1%)	190 (29.6%)	451 (70.4%)	1.68 (1.08-2.60)	0.0204		
	No information	8 (1.1%)	4 (50.0%)	4 (50.0%)	-	-	-	-
Access to dental care for pregnant women who perform prenatal care in PHC§	Pregnant women who perform prenatal care in PHC§ are NOT referred for a dental evaluation	7 (0.9%)	7 (100.0%)	0 (0.0%)	-	-	-	-
	Pregnant women are referred for a dental evaluation as soon as they start prenatal care in PHC§	724 (96.1%)	213 (29.4%)	511 (70.6%)	31.19 (4.05-239.91)	0.0010	11.58 (1.47-91.08)	0.0199
	Pregnant women are referred for a dental evaluation only when they complain of an oral problem	14 (1.9%)	13 (92.9%)	1 (7.1%)	Ref		Ref	
	Other forms	5 (0.7%)	1 (20.0%)	4 (80.0%)	-	-	-	-
	No information	3 (0.4%)	1 (33.3%)	2 (66.7%)	-	-	-	-
Participation of dentists in health education activities performed during routine prenatal care in PHC§	Non-existent	22 (2.9%)	10 (45.5%)	12 (54.5%)	Ref		Ref	
	Under development/planning	183 (24.3%)	107 (58.5%)	76 (41.5%)	0.59 (0.24-1.44)	0.2477	0.50 (0.19-1.29)	0.1516
	Under implementation	151 (20.1%)	92 (60.9%)	59 (39.1%)	0.53 (0.22-1.32)	0.1727	0.39 (0.15-1.03)	0.0563
	Established	392 (52.1%)	24 (6.1%)	368 (93.9%)	12.78 (5.01-32.55)	<0.0001	9.42 (3.47-25.56)	<0.0001
	No information	5 (0.7%)	2 (40.0%)	3 (60.0%)	-	-	-	-
Knowledge of managers about the “Previne Brasil” Program”	Does not know	41 (5.4%)	18 (43.9%)	23 (56.1%)	Ref		-	-
	Knows little	147 (19.5%)	65 (44.2%)	82 (55.8%)	0.99 (0.49-1.98)	0.9713		
	Does not know or does not know	1 (0.1%)	1 (100.0%)	0 (0.0%)	-	-		

Variable	Category	n (%)	PDC† practice		Crude OR (95%CI)	p-value	Adjusted OR (95%CI)	p-value
			Not established	*Established				
			n (%)	n (%)				
	Knows reasonably well	335 (44.5 %)	107 (31.9%)	228 (68.1%)	1.67 (0.86-3.22)	0.1278		
	Knows a lot	228 (30.3 %)	43 (18.9%)	185 (81.1%)	3.37 (1.67-6.78)	0.0007		
	No information	1 (0.1%)	1 (100.0%)	0 (0.0%)	-	-		
Relevance of PDC† practice according to municipal oral health managers	Irrelevant	1 (0.1%)	1 (100.0%)	0 (0.0%)	-	-	-	-
	Low	2 (0.3%)	1 (50.0%)	1 (50.0%)	Ref			
	Moderate	3 (0.4%)	2 (66.7%)	1 (33.3%)	0.50 (0.01-19.56)	0.7110	-	-
	Relevant	64 (8.5%)	27 (42.2%)	37 (57.8%)	1.37 (0.08-22.90)	0.8264	-	-
	Extremely relevant	683 (90.7 %)	204 (29.9%)	479 (70.1%)	2.35 (0.15-37.72)	0.5468	-	-

*Outcome. Ref: Reference category for independent variables. OR: Odds ratio. CI: Confidence Interval. AIC (empty model) = 930.70. AIC (final model) = 876.3. †Prenatal dental care. ‡Human Development Index. ¶Oral Health Teams. §Primary Health Care.

DISCUSSION

Municipal oral health managers play a crucial role in organizing and establishing oral health care within the Brazilian public health system. Since dental care during pregnancy serves as a quality indicator of prenatal care in PHC[11], it is valuable to examine PDC practices in Brazilian municipalities from the perspective of oral health managers. This approach aims to provide insights for improving service organization and team processes, thereby expanding and firmly establishing PDC practices.

This study analyzed PDC performance in PHC from the perspective of Brazilian municipal oral health managers. Most surveyed managers (68.8%) consider PDC an established practice in PHC. This finding is notable, especially given that the national average dental care coverage for pregnant women was only 19.5% in 2019[21]. It indicates that managers' perceptions of PDC align more closely with the Ministry of Health's target for the “proportion of pregnant women with dental care provided” indicator (60.0%)[11] than with the observed coverage rate[21].

Our study demonstrated that municipalities that refer pregnant women for dental evaluation early in their prenatal care are significantly more likely to have an established prenatal dental care practice (OR=11.58; 95%CI: 1.47-91.08). This strong association may suggest potential selection bias in our sample, as most participants likely represent municipalities that provide consistent dental services for pregnant women and maintain a structured referral process. Nevertheless, facilitating early access to dental care could improve PDC adherence and expand dental care coverage. To support this, the

Ministry of Health recommends early referral, flexible scheduling, and integrated health teams to enhance this indicator's performance, which is also a key metric in the new PHC financing model, *"Previne Brasil"*[10].

The Ministry of Health recommends at least one dental visit to identify the pregnant woman's oral health needs and provide guidance on nutrition habits and oral hygiene for the mother and baby[8]. However, it is important to note that merely identifying a pregnant woman's oral health needs does not ensure effective treatment. Currently, the "*Previne Brasil*" program indicator "proportion of pregnant women with dental care provided" includes all pregnant women who received at least one individual dental service within PHC during prenatal care[11]. Therefore, it is recommended to develop a more robust indicator to assess the quality and effectiveness of oral health care provided during pregnancy.

Early referral of pregnant women for dental evaluation may reflect the effective integration of a multidisciplinary health team, facilitating the identification of potential risk factors for adverse pregnancy outcomes[8], such as premature birth[22], preeclampsia, and low birth weight associated with periodontal diseases during pregnancy[5]. While adverse gestational outcomes may correlate with periodontal disease, current literature does not establish a cause-and-effect relationship between periodontal treatment and reduced complications[8]. Nevertheless, assessing and treating periodontal conditions during pregnancy is recommended, as common risk factors are shared between periodontal disease and adverse pregnancy outcomes[22].

In terms of team integration in prenatal care, there is an association between dental care access for pregnant women and structured planning activities, team meetings, and cases discussion and therapeutic projects[21], emphasizing the importance of comprehensive care, multidisciplinary team collaboration, and organizational strategies to improve dental care access for pregnant women. Planning meetings, case discussions, and ongoing education are crucial for fostering interprofessional collaboration enhancing the effectiveness of healthcare services[23]. Engaging health teams in interprofessional practices can significantly improve care quality for pregnant women[24], access and adherence to the PDC.

Despite PDC being widely considered an established practice in primary health care, its implementation does not guarantee effective care or patient utilization. There remains a gap in oral health care for pregnant women that health managers must address. While many pregnant women recognize the importance of oral health and dental care[25] and search for these services, some still hesitate to undergo certain procedures[3] and delay dental visits until after childbirth. Urgent needs and pain are the primary reasons for dental visits during pregnancy, often overshadowing preventive care[26]. Therefore, incorporating dentists into prenatal programs can support efforts to educate pregnant women on oral health topics[27].

Our findings also indicated an association between PDC practice and dentist involvement in health education activities during routine prenatal care (OR=9.42; 95%CI: 3.47-25.56). Educational activities are essential for promoting health across a woman's life[28], particularly during pregnancy, when women are more receptive to new information for both their health and their baby's[4], aiding in the adoption of healthy habits[29]. Consequently, prenatal health promotion and education activities can help demystify dental care, increase adherence to PDC, encourage oral health-seeking behaviors[30,] and, ultimately raise the proportion of pregnant women receiving dental care. Moreover, a well-coordinated multidisciplinary team can enhance participation of pregnant women in educational activities[28], reinforcing the value of team engagement and integration in prenatal care.

The following considerations may help clarify the discrepancy between managers' perceptions of prenatal dental care (PDC) practices and the actual proportion of pregnant women receiving dental

care nationwide. First, our sample may primarily comprise managers who are especially interested in and actively advocate for PDC as a standard practice. Second, while establishing PDC as a routine practice is important, it may not, on its own, ensure improved access to and coverage of dental care for pregnant women within Primary Health Care (PHC). Finally, individual factors among pregnant women, such as misconceptions or fears about dental care, may deter them from seeking oral health services—even in municipalities where PDC practices are well established. As previous mentioned, negative beliefs among pregnant and new mothers—such as concerns over the safety of dental care, misunderstandings about pregnancy's impact on oral health, and doubts about the importance of oral hygiene—pose challenges for effective health promotion[16].

This study has some limitations. The cross-sectional design does not allow for establishing causal relationships between the variables analyzed, which limits our inferences. Furthermore, our findings are subject to significant biases common in online research, which may result in an unrepresentative sample, and response bias, which may distort participants' interpretation and responses to the survey questions. It is also worth noting that oral health managers were contacted through municipal health secretaries, so we cannot ensure that everyone had access to the questionnaire.

These limitations restrict the generalizability of our results; however, our findings contribute valuable insights, as most research on this topic is conducted at a local level[29] with health professionals and pregnant women as research participants[31]. Our results could encourage discussions around reassessing oral health care practices during pregnancy, with a focus on reducing access barriers and enhancing pregnant women's adherence to oral health care. Furthermore, these insights could support municipal management in making informed decisions to better organize health services and team workflows, ultimately expanding and strengthening Prenatal Dental Care (PDC) practices in Primary Health Care (PHC).

CONCLUSION

Most research participants consider prenatal dental care to be an established practice, associated with the referral of pregnant women for dental evaluations at the start of routine prenatal care and with dentists' involvement in health education activities aimed at pregnant women.

As challenges and perspectives, future studies should facilitate direct contact with oral health managers to achieve a larger sample size for validating our findings. Additionally, oral health policies should be strengthened to address and remove barriers to effective prenatal dental care.

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