Evaluation of the quality of Prenatal Care in Brazil

Avaliação da qualidade da Atenção Pré-Natal no Brasil

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ABSTRACT The aim of the study was to investigate the characteristics of the structure of the health units and the management and assistance processes of Prenatal Care (PNC) within the scope of Primary Health Care (PHC) in Brazil, in municipalities that joined the National Program for Access and Quality Improvement in Primary Care (PMAQ-AB). This is a normative evaluation with data from 16.566 family health teams that joined the PMAQ-AB. A logical model of the PNC components was elaborated, composed of the analysis, management and care dimensions, and 42 criteria of structure and process and their respective standards. The structure of the basic units and the actions provided by the teams did not comply with the majority of the standards, highlighting the existence of structural barriers, unavailability of medicines and essential tests, problems in the provision of the cast of assistance actions, involving individual attention and clinical care, as well as health promotion and collective and domiciliary actions offered. It is concluded that, despite the high coverage of PNC and its institutionalization in PHC services, problems persist that must be addressed by governmental initiatives that guarantee comprehensive attention and quality in the pregnancy-puerperal cycle and that have repercussions on the improvement of health indicators of maternal and child health.

KEYWORDS Health evaluation. Primary Health Care. Family Health Strategy. Prenatal care. Maternal and child health.

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RESUMO *O objetivo do estudo foi investigar características da estrutura das unidades de saúde e dos processos gerenciais e assistenciais da Atenção Pré-Natal (APN) no âmbito da Atenção Primária à Saúde (APS) no Brasil, em municípios que aderiram ao Programa Nacional de Melhoria do Acesso e da Qualidade da Atenção Básica (PMAQ-AB). Trata-se de avaliação normativa com dados de 16.566 equipes de saúde da família que aderiram ao PMAQ-AB. Foi elaborado um modelo lógico dos componentes da APN, composto pelas dimensões de análise, gerencial e assistencial, e de 42 critérios de estrutura e processo e seus respectivos padrões. A estrutura das unidades básicas e as ações prestadas pelas equipes não obedeciam à maioria dos padrões, destacando-se a existência de barreiras estruturais, indisponibilidade de medicamentos e exames essenciais, problemas na oferta do elenco de ações assistenciais, envolvendo a atenção individual e o cuidado clínico, bem como de promoção da saúde e ações coletivas e domiciliares ofertadas. Conclui-se que, apesar da alta cobertura da APN e da sua institucionalização nos serviços de APS, persistem problemas que devem ser alvo de iniciativas governamentais que garantam atenção integral e de qualidade no ciclo gravídico-puerperal e que repercutam na melhoria dos indicadores de saúde materno-infantil.*

PALAVRAS-CHAVE *Avaliação em saúde. Atenção Primária à Saúde. Estratégia Saúde da Família. Cuidado pré-natal. Saúde materno-infantil.*

Introduction

Prenatal Care (PNC) is fundamental for achieving good results in the outcome of pregnancy, and its quality is related to the availability of resources in the managerial and care scope, as well as to the development of actions routinely, obeying technical-scientific standards of quality. To be effective, it is recommended that prenatal care be initiated at the beginning of pregnancy[1] and be constituted by a set of actions established by care protocols that guide the conditions and procedures necessary for the care of pregnant women[2,3].

Several studies have demonstrated the association of PNC with the prevention of risks in pregnancy, reduction of complications in childbirth and puerperium[4] and of perinatal complications[5]; better health conditions of the conceived, with better intrauterine growth[6], lower incidence of low birth weight[7], reduction of maternal-infant mortality[2,3,8] and neonatal and perinatal morbidity and mortality[9].

In Brazil, the notable advances about the expansion of PNC coverage observed in recent years[10] have not been homogeneously distributed in the national territory, with great inequalities persisting. Several studies have demonstrated access difficulties for women with lower schooling, without partners and multiparous women[11] and pregnant women[12]; highlighting the maintenance of social and racial disparities, especially, in rural areas and indigenous areas of the North Region[11].

In recent years, several initiatives have been implemented to improve the quality of PNC[2] and Primary Health Care (PHC)[13,14], and the National Program for Access and Quality Improvement in Primary Care (PMAQ-AB) is one of the most recent and relevant strategies. This Program, created in 2011, was adhered to in the first cycle by 3.935 municipalities and by 17.202 health teams. In addition, all the Basic Health Units (BHU) of the 5.543 municipalities of the Country were registered through observation in the unit. It should be noted that the census took place independently of the accession of the municipal manager[15].

The aim of PMAQ-AB is to increase PHC access, as well as to guarantee quality standards in the development of care and managerial actions at this level of attention[13,14]. It consists of four phases (voluntary accession and contractualization; development; external evaluation and re-contractualization), and the external evaluation, in short, aims to evaluate the conditions of the units infrastructure, availability of inputs, aspects of the work process, managerial and organizational health services, with a view to certifying the health teams that voluntarily joined the Program[13-15].

The PMAQ-AB external evaluation data allow the identification, at a national level, of aspects related to prenatal and puerperium care, which can subsidize planning, monitoring and evaluation practices. In addition, they are sources for the development of research, minimizing knowledge gaps, given the incipience of evaluative studies that consider the aspects of structure and process, at a national level, that go beyond the number of consultations.

Thus, the objective of this study was to investigate the characteristics of the structure of the health units and of the management and assistance processes of PNC in the scope of PHC in Brazil, in municipalities that joined the PMAQ-AB.

Methods

This is a normative evaluation study with secondary data related to Family Health Teams (FHT) from PMAQ-AB, in 2012, in Brazil[13-15].

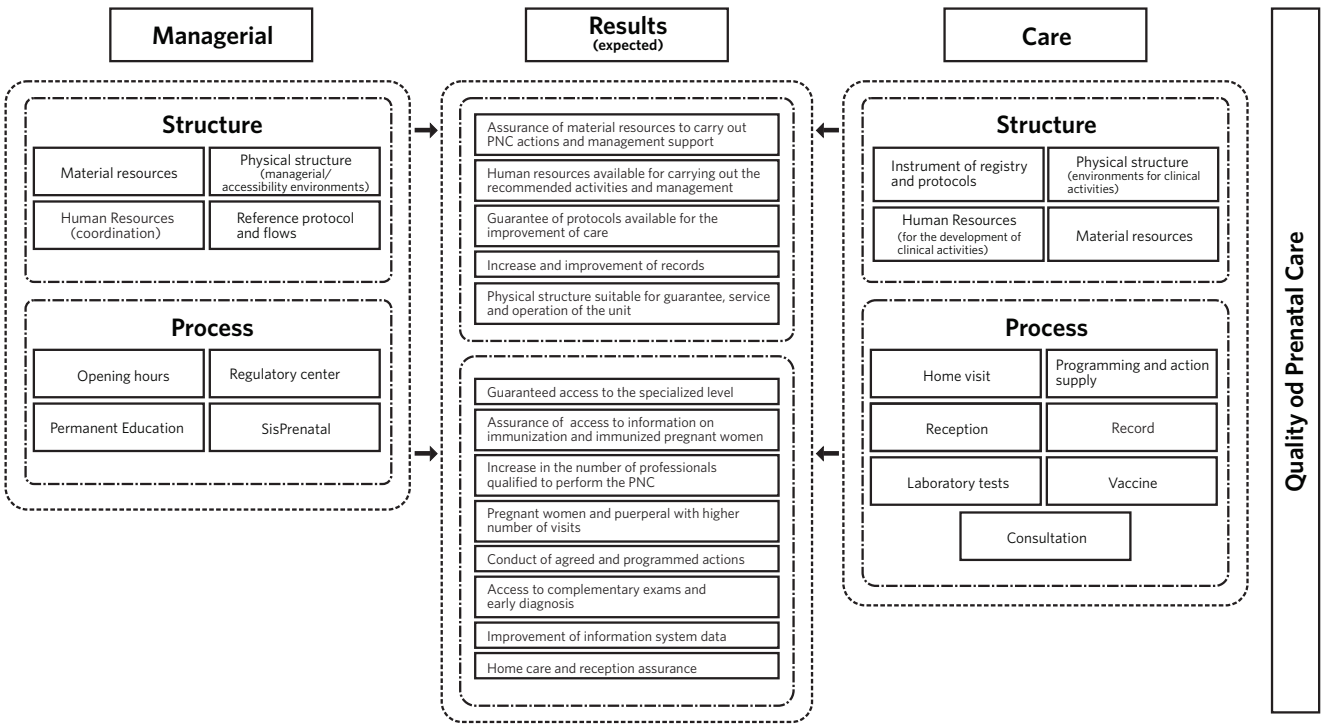
Logical model

The first stage of this study was the elaboration of the model. The theoretical framework of Donabedian[16] was adopted for its construction and it was sought to represent the

components of the PNC and their relations with each other, being formulated two dimensions of analysis, managerial and care, composed by attributes of structure and process.

The logic model was elaborated from the norms and laws that regulate the PNC, whose contents were extracted from two manuals elaborated by the Ministry of Health: the 'Primary Care Notebook – Attention to the Low Risk Prenatal'[2] and the 'Manual of Physical Structure of the BHU'[17], essential for the elaboration of the present logical model *(figure 1)*.

Figure 1. Logical model of quality of Prenatal Care



Population and sample

This study used baseline data from the PMAQ-AB – which refers to the first cycle of the external evaluation of the Program, including the BHU census, in Brazil, carried out in 2012[14], which covered 38.812 establishments. Of the total number of Brazilian municipalities, 3.935 (70.7%) joined the PMAQ-AB, and 17.202 (51.0%) health teams participated in the evaluation, with the lowest accession among teams in the Northeast Region (23.2%) and higher among the South and Southeast Regions (37.9%, respectively). Among the federated units, the percentage ranged from 3.1% (Maranhão) to 47.9% (Santa Catarina).

Within the scope of primary care, there are different modalities of health teams. Primary care teams are considered family health teams and parametrized primary care teams, oral health team and family health centers. Although the Family Health Strategy (FHS) is the basic option for the organization of PHC services in Brazil, there are basic care teams that organize differently

from the FHS. In these cases, for the correspondence of the workload between the teams of the two modalities, an equivalence of teams of primary care was proposed by means of the sum of the minimum hours of doctors and nurses, given that, after the equivalence of the workload, the number of these workloads may correspond to one, two or three FHT[18].

Of the total number of participating teams, 70% were of the FHT type with oral health, 26% of FHT without oral health and less than 4% of primary care teams of other type or parametrized. The sample, after exclusion of the primary care teams from another modality, was constituted by 16.566 FHT that joined the PMAQ-AB and that participated in the census of the BHU, corresponding to 49.6% of the teams implanted in 2012, covering 69.3% of brazilian municipalities.

Description of the criteria and patterns

The analysis matrix used for evaluation contains two dimensions of analysis, managerial and care, each one composed of structure and process attributes, deployed in 20 subdimensions and 42 criteria, with their respective standards *(chart 1)*.

In the managerial dimension, the structure attributes include the criteria: physical structure, material resources, human resources and reference protocol and flows. The attributes of the process are constituted by the following criteria: operating hours, regulatory center, permanent education and Prenatal, Childbirth, Puerperium and Child Monitoring and Evaluation System (SisPreNatal). In the care dimension, the attributes of structure include the criteria: physical structure; material resources; human resources, instruments of registration and protocols. The process attributes include the following criteria: home visit, laboratory tests, vaccination, record (use of the pregnant woman's booklet and record of information regarding prenatal care) and programming and offer of actions related to consultation, health promotion and risk classification. The criteria are described in detail in *chart 1*.

Each criterion was constructed, most of the times, by aggregating aspects from more than one issue of the PMAQ-AB[18] instruments, dichotomizing the yes and no response alternatives. In the case of equipment, instruments, inputs, quick test, vaccines and printed material, it was considered as an affirmative answer the cases in which the items were in conditions of use, were in sufficient quantity, always available, or available when necessary, in the case of vehicles. For the questions related to the actions developed by the health professionals, it was considered as an affirmative answer only the cases in which the action was reported with the presentation of documentary confirmation.

Finally, the 'never available/sometimes available', 'do not know/did not answer' and 'not applicable' response options were classified as 'no'.

Each criterion was categorized as 'inadequate', 'intermediate' and 'adequate', based on the adopted standards, constructed according to the adopted norms. The frameworks of the above categories can be found in *chart 1*.

Chart 1. Criteria and Standards of the managerial and care dimensions, sub-dimensions, attributes of structure and process of the PNC and categorization of the criteria

Managerial dimension: Structure attributes			
Sub*	**Criterion**	**Pattern**	**Categorization of criteria**
Sub-dimension Physical structure	Administrative and support environments	Adequate physical structure with reception, sanitary (normal and adapted), purge, garbage dump, waiting room for 15 to 75 people (depending on the number of FHT).	**Adequate:** 7 structures and adequate team number; **intermediate**: between 4 and 6 environments; **inadequate:** with more than 5 teams, or less than 3 structures.
	Structural characteristics	Structural features with air circulation (windows, exhaust fans), lighting and privacy in the offices.	**Adequate:** with all the characteristics; **Inadequate:** without at least one of the structural characteristics.
	Accessibility: wheelchair user or with difficulty of locomotion	Suitable structural features: support bars, entrance walkway in good condition, doors adapted for wheelchair, access ramp, handrail, adapted troughs, regular floor, firm and non-slip.	**Adequate:** with all items; **Inadequate:** all other situations.
	Accessibility: visual or auditory difficulty	Suitable structural features: texts or figures, characters or figures in relief, braille and auditory resources.	**Adequate:** with all items; **intermediate:** with at least one of the resources; **inadequate**: all other situations.
	External signaling	External identification visible as a plaque on the facade, suitable external totem or other form of signaling.	**Adequate:** with at least one form of external identification; **inadequate**: without any form of external identification.
Material resources	Computer equipment and internet access	Computer equipment (computer, printer, stabilizer) with internet access, under conditions of use.	**Adequate:** with all the equipment in conditions of use and access to the internet; **inadequate**: all other situations.
	Audiovisual equipment	Existence of television and sound box in conditions of use.	**Adequate:** with television and sound box; **inadequate**: without one of the equipment.
	Vehicle	Existence of vehicle that meets the needs of the team	**Adequate:** with vehicle that meets the needs; **intermediate:** does not meet the needs; **inadequate**: without vehicle.
Human Resources	Team coordinator	Have a coordinator in the team for the management of the health unit.	**Adequate:** with coordinator; **inadequate**: without coordinator.
Reference protocols and flows	Documents with references and flows	Have a defined flow for serological tests for syphilis, anti-HIV, glucose, urine culture or urine summary (type 1), ultrasonography (USG) and place of delivery, with proof.	**Adequate:** with documents containing references and flows related to prenatal care; **intermediate:** only for the calls of users of the team territory; **inadequate**: all other situations.
Managerial dimension: Structure attributes			
	Criterion	**Pattern**	**Categorization of criteria**
Opening Hours	Operation of the unit	The health unit should operate in two shifts and at lunch time (12 a.m. to 2 p.m.).	**Adequate:** work in two shifts and at lunch time; **inadequate:** all other situations.
Regulatory Center	Regulatory center	Regulatory Center (RC) available with referral for specialized appointment marking, examinations and beds.	**Adequate:** with link to RC for appointment of specialized consultation, examinations and beds; **intermediate:** only with RC; **inadequate:** all other situations.
Information system	Feeding of the SisPreNatal	SisPreNatal regularly fed by health professionals, with proof.	**Adequate:** regularly feeds SisPreNatal and proves it; **inadequate:** does not power the system or does not prove it.
Permanent education	Actions of permanent education	Existence of permanent education actions in the municipality and that has guaranteed the participation of the team in the last year in at least one of the actions.	**Adequate:** with permanent education actions in the municipality and has participated in at least one in the last year; **intermediate:** without participation in the actions; **inadequate:** all other situations.

Chart 1. (cont.)

Care dimension: Structure attributes			
	Criterion	**Pattern**	**Categorization of criteria**
Physical structure	Clinical assistance environments	Physical structure suitable to the number of teams with: pharmacy, nursing or doctor's office, dental office (If FHT with Oral Health (OH), meeting/ education rooms, procedures, vaccine, nebulization and dressing	**Adequate**: with 7 rooms suitable to the team number; **intermediate**: with 4 to 6 rooms; **inadequate**: with more than 5 FHT, or less than 3 rooms, or with OH without a dental office.
Material resources	Instrumental	Have: adult pressure device, adult scale of 150 kg or 200 kg, adult stethoscope, light focus and table for gynecological (or clinical) examination, sonar or stethoscope of pine, under conditions of use.	**Adequate**: dispose of all instruments in conditions of use; **intermediate**: >04 to <05 instrumental; and **inadequate**: <03 instrumental.
	Equipment at the pharmacy	Have a specific refrigerator and air-conditioning for pharmacy	**Adequate**: which have a refrigerator and air-conditioning in the pharmacy; **inadequate**: without one of the equipment.
	Equipment in the vaccine room	Provide room-specific refrigerator and air-conditioning	**Adequate**: own refrigerator and air conditioning in the vaccine room; **inadequate**: without at least one of the equipment.
	Inputs: general population	Input sufficiency: tongue depressor; disposable needles; bandages; measuring tape; PPE - gloves, goggles, masks, aprons, burrows; speculum; serum equipment; disposable syringes; hard containers for sharps disposal; gauze; plastic bottle with lid; tape/ micropore tape and others; and thermal boxes for vaccines.	**Adequate**: with all inputs; **intermediate**: with 8 to 13 inputs; **inadequate**: with less than 7 inputs.
	Inputs: women's health	Sufficiency of inputs directed to WH: reagent strips of capillary glycaemia measurement; glass blade with matte side; blade holder; blade fastener; ayres spatula	**Adequate**: with all the inputs; **intermediate**: with 3 inputs; **inadequate**: with less than 2 inputs.
	Essential medicines	Sufficiency of medicines by groups: analgesics, antipyretics, antidiabetics, antibacterial, antihypertensive, antiparasitic, anti-asthmatics, antacids, antiemetics, vitamins, multivitamins, minerals, contraceptives and sex hormones.	**Adequate**: with all groups of medicines; **intermediate**: with 4 to 8 groups of medicines; **inadequate** with only 3 groups.
	Controlle30 d medicines	Sufficiency of medicines controlled at the BHU or dispensed at the central level by the municipality	**Adequate**: with at least one of the medicines controlled at the BHU or dispensed by the municipality; **inadequate**: without controlled or non-dispensed medicine at central level.
	Quick test	Existence of rapid tests syphilis, HIV, pregnancy	**Adequate:** with all quick tests; **inadequate**: without one of the tests.
	Vaccines for pregnant women	Sufficiency of dT, seasonal influenza and hepatitis B vaccines	**Adequate**: with all the vaccines in BHU; **inadequate**: without one of the vaccines.
Human Resources	Basic care team	Primary care team consisting of: 1 doctor, 1 nurse, 1 dental surgeon (if with OH), 1 technician. or aux. of nursing,> 4 CHW (Community Health Agents), 1 technician or aux. in OH (if with OH).	**Adequate**: with all professionals; **inadequate**: with at least one of the professionals or < CHW.
Functioning of BHU	Operation of the unit	Work in two shifts and have the services available: medical consultation, nursing, dental, vaccination, reception and dispensing of medicines.	**Adequate**: works in two shifts, with all the services; **inadequate**: all other situations

Chart 1. (cont.)

Instrument of registry and protocol	Material printed on the unit	Have: pregnant booklet, vaccination card, files: BGES of the Primary Care Information System (Siab), PNC and referral.	**Adequate**: with all record instruments; **inadequate**: without at least one of the instruments.
	Record	Record with legible, identifiable handwriting, with diagnostic hypothesis, requested exams and proof.	**Adequate**: that complies with the requirements and verifies them; **inadequate**: without complying with one of the requirements or dos not prove them.
	Electronic record	Have an electronic medical record integrated with the other points of the attention network, with proof.	**Adequate**: with electronic medical record, integrated and proven; **intermediate**: with medical record, but not integrated; **inadequate**: no electronic medical record or unproven.
	Protocol: prenatal and essential exams.	Protocols with definition for prenatal care and essential tests (fasting blood glucose, serology for syphilis, HIV, hepatitis B and urine culture or urine summary type 1)	**Adequate**: with all protocols; **intermediate**: with 4 to 5 protocols; **inadequate**: with less than three protocols.
	Protocols: welcoming spontaneous demand	Protocols with definition for the reception of spontaneous demand and urgency, which considers the early capture of pregnant women and the most frequent complaints.	**Adequate**: with all protocols (3); **intermediate**: with 2 protocols; **inadequate**: with only 1 or no protocol
	Protocol: home visit	Protocols with definition of priority situations to carry out a home visit, with proof.	**Adequate**: with protocol and proof; **inadequate**: without protocol and without proof
Care dimension: Process attributes			
	Criterion	**Pattern**	**Categorization of criteria**
Home visit	Home care	Home care performed by a doctor or nurse with survey/mapping of the users, organization of the agenda, risk assessment and vulnerability for HV periodicity, and scheduling the visits of the CHW according to the priorities of the team.	**Adequate**: meets all conditions **Inadequate**: all other situations.
	Capture of pregnant and puerperal women	Active search of pregnant women who are absent from prenatal care (by CHW), and fetal discharge from the visit of a team member or CHW.	**Adequate**: meets all conditions **Inadequate**: does not perform at least one of the actions.
Reception	Reception	Reception on five or more days per week, in two shifts, with risk evaluation and vulnerability, performed by a higher level professional, and depending on the risk identified the response is defined.	**Adequate**: meets all conditions **Inadequate**: all other situations.
Laboratory tests	Accomplishment, collection and receipt of exams	Collect material for laboratory tests, performs syphilis tests; toxoplasmosis; anti-HIV, and hepatitis B, as well as urine culture or urine summary, hemoglobin and hematocrit, glucose test, with proof, and receive the results in a timely manner.	**Adequate**: meets all conditions **Inadequate**: all other situations.
	Waiting time for specialized care	Guarantee for pregnant women at high risk: specialized waiting time of up to 15 days (gynecology and obstetrical consultations) and up to 30 days of USG exams, diagnosis of HIV and syphilis.	**Adequate**: meets all conditions **Inadequate**: all other situations.
Vaccine	Vaccine situation	Provide basic calendar vaccines, with proven and prenatal guidance on the importance of tetanus vaccine.	**Adequate**: meets all conditions **Inadequate**: all other situations.
Record	Use of the booklet and record	Use the pregnant woman's booklet with proof and have records of: responsible professional, dental consultation, collection of cytopathological examination, up to date vaccination and number of high-risk pregnant women in the territory.	**Adequate**: meets all conditions **Inadequate**: all other situations.

Chart 1. (cont.)

Schedule and offer of actions	Schedule and offer of actions	Schedule consultations and actions and for prenatal and for users who are part of priority programs or groups, who need continued care, with proof.	**Adequate**: meets all conditions **Inadequate**: all other situations.
	Organization of the agenda and promotion of health	Organize an agenda for the offer of health promotion in the community and educational actions directed to pregnant and puerperal women (breastfeeding), with proof.	**Adequate**: complies with all actions and proves; **inadequate**: all other situations
	Organization, offer and risk classification	Organize the offer of service and referral of consultations and examinations of pregnant women based on the evaluation and classification of risk and vulnerability, with proof.	**Adequate**: complies with all actions and proves; **inadequate**: does not meet the criteria or does not prove it.
Consultation	Consultation puerperium	Carry out consultation with nurse or doctor on any day and time of the week for puerperal care of up to ten days, with proof	**Adequate**: complies with all actions and proves; **inadequate**: does not comply with actions or does not prove it.
	Referral of users	Scheduling of the consultation at the specialized level after attending the BHU: patient leaves with the scheduled appointment, consultation marked by the BHU and the date is informed later to the patient.	**Adequate**: guarantees appointment of the consultation or the patient leaves with scheduled appointment; **Inadequate**: all other situations.

*Sub-dimension.

Data processing and analysis

Initially, for the construction of the database of the present study, a deterministic linkage was performed which consists of the connection of two or more databases that have common variables, and which allows the establishment of a single database. The linking procedure was performed in the Stata software through the merge, corresponding to the linking of the unit census database (module I) and the external evaluation of the health teams that joined the PMAQ-AB (module II), from of the variable 'CNES', common between the two databases. For 295 (1.78%) units, there was inconsistency in the information on the number of teams between the two databases, which was corrected from the external evaluation information.

Simple and relative frequencies were calculated from the number of teams that reached the appropriate level for each criterion alone and by group of criteria, presented in the form of graphs, according to macro-regions and Brazil. Data were processed and analyzed using the Stata 12.0® software.

The research project was approved by the Research Ethics Committee of the Institute of Collective Health of the Federal University of Bahia and received Opinion nº 021-12.

Results

For the managerial dimension, in the structure attributes, the highest adequacy percentages presented by the FHT were for the coordinator availability criteria (98%, ranging from 97.0%, Northeast Region, to 99.5%, North Region) and for external signaling in the units (84.4% in Brazil, ranging from 80.4%, North Region, to 86.5%, Central-West Region). On the other hand, less than half of the FHT were considered

adequate for vehicle availability criteria (48.9% of FHT, ranging from 30.8%, in the North Region, to 60.5%, in the South Region), computer equipment with internet access (38.75% of the FHT, ranging from 16.2% in the Northeast Region, to 61.8%, in the South Region), and documents with references and flows for laboratory exams, obstetrical and local ultrasonography for the delivery (33.2% of FHT, ranging from 23.9%, in the Center-West Region, to 41.4%, in the Southeast Region) *(table 1)*.

Still on this dimension, only about 5% or less of the teams reported developing managerial actions in units with all physical administrative and support structures present (5.1% of the FHT, ranging from 7.1%, in the South Region, to 21% 1%, North Region), accessible to users who cannot read, with visual or auditory deficiency (4.5% of FHT, ranging from 21.1%, Central-west, to 6.4%, South Region) and for those with difficulty of locomotion or wheelchair users (1.4% of FHT, ranging from 0.1%, in the Center-West Region, to 2.8%, in the Southeast Region), reaching the lowest levels of adequacy *(table 1)*.

Table 1. Adequacy of the attributes of structure and process, managerial dimension, according to Regions. Brazil, 2012

STRUTCTURE	BR	N	NE	CO	SE	S
Coordinator	98,0	99,5	97,0	99,2	98,3	98,1
External Signaling	84,4	80,4	83,8	86,5	84,6	85,7
Structural characteristics	57,4	43,8	51,9	45,8	61,7	67,0
Vehicle	48,9	30,8	56,5	42,2	41,2	60,5
Computer and internet access	38,7	20,4	16,2	41,5	49,4	61,8
References and flows	33,2	24,8	27,2	23,9	41,4	32,3
Audiovisual resources	22,8	10,8	6,8	20,7	34,8	30,9
Administrative environments	5,1	2,1	2,9	4,0	6,7	7,1
Visual/hearing Accessibility	4,8	2,4	3,2	2,1	6,3	6,4
Wheelchair user accessibility	1,4	0,9	0,4	0,1	2,8	0,8
PROCESS						
SisPreNatal Feeding	87,4	86,9	90,9	86,3	87,0	82,2
Operation of the unit	45,4	43,2	29,2	39,4	67,8	28,8
Link to regulatory unit	25,7	24,4	21,5	30,6	23,3	37,6
Permanent education	23,9	15,1	8,1	25,6	35,6	30,0

Regarding the process attributes of the managerial dimension, the SisPreNatal regular feeding criterion (75%, ranging from 82.2%, South Region, to 90.9%, Northeast Region) was for the criterion that the teams presented the best percentages of adequacy. On the other hand, less than 50% of the teams were classified as adequate for the two-shift operation criteria and from 12pm to 14pm (45.4%, ranging from 28.8%, South Region, to 67.8%, Southeast Region), link to the regulatory center (25.7%, ranging from 21.5%, in the Northeast Region, to 37.6%, in the South Region) and permanent education

actions in the municipality (23.9%, ranging from 8% 1%, Northeast Region, to 35.6%, Southeast Region) *(table 1)*.

Regarding the care dimension, for the structural criteria, more than 75% of the teams were classified as adequate because they had a complete primary care team (84.5%, ranging from 79.0%, South Region, to 86.3%, Northeastern Region) and by having instruments (sonar etc.), under conditions of use (83.3%, ranging from 71.2%, North Region, to 88.6%, South Region). In this dimension, adequacy was found between 50% and 75% of the teams for protocols criteria with a prenatal definition and essential laboratory tests (71.5%, ranging from 60.7%, Central-West Region, to 80.5%, Southeast Region), inputs for women's health (always have a glass blade, etc.) (67.0%, ranging from 55.1%, in the Northeast Region, to 85.3%, in the South Region) and printed material (booklet of the pregnant woman, etc.) (59.6%, ranging from 52.2%, in the Northeast Region, to 68.1%, in the North Region).

It was also observed that less than 50% of the teams had vaccines (seasonal influenza, hepatitis B and adult type dT) (43.5%, ranging from 32.6%, South Region, to 48.8%, North Region) inputs (tongue depressor etc) (28.1%, ranging from 14.3%, in the Northeast Region, to 40.3%, in the South Region) and essential medicines (at least one type of medicine in each group, for example, analgesics, etc.) in sufficient quantity (28.3%, ranging from 10.3%, North Region, to 43.7%, South Region). The worst results, however, were verified for the physical structure criteria for clinical care (offices, etc. present) (8.8%, ranging from 2.8%, North Region, to 13.2%, Southeast Region) and quick test for diagnosis of syphilis, HIV and pregnancy (1.6%, ranging from 0.9%, Northeast Region, to 3.7%, North Region) *(table 2)*.

In the care dimension, for the process attributes, the highest percentages of adequacy were observed only for the criteria collection of failing puerperal and pregnant women (89.6%, ranging from 83.9%, Central-West Region, to 91.2% , Northeastern Region) and guidance on the importance of the dT vaccine and the availability of basic calendar vaccines (78.6%, ranging from 74.2%, South Region, to 83.2%, Northeast Region), for which more than 75% of the teams achieved the best results *(table 2)*.

Table 2. Adequacy of the attributes of structure and process, care dimension, according to Regions. Brazil, 2012

STRUCTURE	BR	N	NE	CO	SE	S
Minimum team	84,5	84,9	86,3	79,5	86,2	79,0
Instruments	83,3	71,2	80,6	83,9	85,0	88,6
Controlled medicines	82,5	67,1	81,3	73,3	83,5	91,3
PNC protocols and exams	71,5	61,1	64,5	60,7	80,5	72,1
Women's health supplies	67,0	61,1	55,1	71,0	68,9	85,3
Printed material	59,6	68,1	52,2	56,7	64,0	61,9
Physical record	58,7	68,6	55,0	52,5	61,3	58,7
Works with services	51,6	38,9	49,4	40,1	52,4	62,8
Equipment: vaccine	47,8	91,8	44,4	72,1	28,4	70,3
Basic vaccines	43,5	48,8	46,2	35,4	46,6	32,6
Home visit protocol	35,0	32,9	30,3	25,9	41,7	33,1
Medicines	28,3	11,6	16,5	10,3	37,0	43,7

Table 2. (cont.)

Inputs: population	28,1	18,3	14,7	28,2	35,4	40,3
Reception protocol	28,0	14,6	17,7	15,0	41,8	26,1
Equipment: pharmacy	16,9	16,8	11,0	19,1	16,9	26,9
Electronic records	10,9	1,8	0,9	17,6	13,4	24,4
Clinical environment	8,8	2,8	3,0	9,5	13,2	11,7
Quick tests	1,6	3,7	0,9	3,1	1,9	1,2
PROCESS						
Capture pregnant woman and puerperal	89,6	87,4	91,2	83,9	90,9	86,9
Vaccine situation and supply	78,6	82,4	83,2	75,6	76,6	74,2
Program, consultations and actions	73,4	70,9	76,8	69,5	72,4	71,7
Risk classification offer	67,5	64,8	64,9	64,0	71,7	65,1
Agenda/health promotion offer	51,7	48,2	47,5	48,4	57,2	49,7
Specialized assistance	46,3	45,2	48,7	42,8	46,2	42,3
Home care	42,2	31,8	36,2	30,0	49,3	18,7
User referral	39,1	34,8	23,0	35,9	51,6	44,0
Exams	37,3	29,6	19,3	45,6	52,9	36,0
Reception	34,3	22,5	20,0	25,3	48,6	36,4
Pregnant's booklet	30,6	28,7	32,1	26,3	34,2	32,5
Puerperium consultation	27,1	20,7	32,1	15,0	29,1	20,2

It was also observed that between 50% and 75% of the teams reported scheduling consultations and actions for users of priority programs or groups, of continued care and PNC (73.4%, ranging from 69.5%, Central-West Region, to 76.8%, Northeastern Region), offer services, send pregnant women for consultations and examinations based on the evaluation and classification of risk and vulnerability (67.5%, ranging from 64.0% in the Central-West Region, to 71.7%, Southeast Region), and to organize an agenda for the offer of health promotion activities on breastfeeding (51.7%, ranging from 47.5%, in the Northeast Region, to 57.2%, in the Southeast Region). On the other hand, the most unfavorable results, smaller than 50% of the attribute, were for the domiciliary care criterion by the fulfillment of social and clinical criteria (42.2%, ranging from 18.7%, South Region, to 49.3%, Southeast Region), perform, collect and receive test results in a timely manner (37.3%, ranging from 19.3%, Northeast Region, to 52.9%, Southeast Region), use the pregnant woman's booklet and have the number of high-risk pregnant women in the territory (30.6%, ranging from 26.3%, Central-West Region, to 34.2%, Southeast Region), and conduct consultation on any day and time of the week to ensure puerperium care for up to ten days after delivery (27.1%, ranging from 15.0%, Center-West Region, to 32.1%, Northeast Region) *(table 2)*.

Discussion

Evidences found in the present study on the evaluation of PNC in the Family Health Strategy demonstrated that the structure of

the BHU and the processes in the development of the actions provided did not meet most of the standards established in national protocols, both in the managerial dimension and in the care dimension, revealing low quality of PNC and the puerperium in Brazil. These problems referred to several spheres, from the accessibility to actions and services to the accomplishment of health promotion actions and the quality of clinical care, involving not only the individual attention, but also the collective and domiciliary actions offered.

In Brazil, most of the studies related to PNC have focused their analysis on classical criteria of adequacy. The use of data from the PMAQ-AB allowed to reveal, in the light of the Donnabedian approach, the conditions of the family health units and the development of the actions of the FHT in the scope of the PHC, being, therefore, a study that, from the theoretical and methodological point of view, extended the scope of the analyzes related to PNC in the Country.

Initially, it should be noted that several national scope studies have shown that care for pregnant women is universal in Brazil, with persistent social inequalities and inadequacy of care[11,12]. A recent study with data from the external evaluation of PMAQ-AB with users linked to BHU also found inadequacy of care[12], which is corroborated by the low percentages among the dimensions analyzed.

It has also been evaluated the infrastructure of the basic units in the Country[19] that support the results of the study on architectural barriers for people with some special need, highlighting the structural precariousness and the lack of basic adaptations for the attendance of users in these conditions in the family health units in Brazil.

Contrary to the expansion of the opening hours of the unit, which can guarantee greater accession to PNC and scheduled visits, increase the satisfaction of pregnant women and favor the continuity of prenatal care[20], the results showed weaknesses in their functioning. In addition, frailties were found in reception, a situation described in an integrative review[21].

The percentage of teams with material resources available for the resolubility of prenatal care in the units was quite inexpressive, being consistent with evidence found in the literature regarding the lack of medicines in the units[22]; difficulties in performing exams[23], or the low application of existing HIV and syphilis tests, with a high percentage of units with material expired[24]; documents and flows agreed by municipal management[25]; and, moreover, absence of several structures in the units investigated in a study of local coverage[26].

One of the most encouraging findings, in summary, was the presence of coordinators for the management of the units and health professionals of various categories for the development of clinical activities and health promotion, in addition, the development of actions such as the capture of puerperal and pregnant women for early start of care, guidance on vaccination status and offering of basic calendar vaccine, as well as feeding of the SisPreNatal.

Health promotion actions have a positive impact on the achievement of breastfeeding and on birth weight[27]. However, in this study, only the organization of agendas of the teams to offer such actions was investigated, and it is not possible to measure if they are, in fact, carried out. The incipience of actions to promote health in the context of PHC, in general[28], and, specifically, aimed at breastfeeding in pregnant and puerperal women[29] has been described in other studies.

The international literature has highlighted problems related to the quality of PNC in several countries of different continents, which reinforces the relevance of studies on the subject. In Europe, a recent systematic review has shown that although maternal care systems are well implemented across the continent, inequalities persist in Central and Eastern European countries, which suffer from barriers to maternal care,

obsolete material resources, lack of medicines and protocols inadequate and outdated, among others[30]. A study carried out in a more populous and developed region of Asia pointed out that the quality of the PNC was extremely inadequate, especially due to factors such as inadequacy and low coverage at managerial and care levels, especially regarding the distance of the units, facilities deficiency and time of work and availability of human resources, among others[31]. In a Latin American context, in Mexico, it was evidenced low referral of pregnant women to educational activities[32], and, specifically in Brazil, low quality of the PNC has been commonly described[12,33].

As a limitation of the study, the use of secondary data can be highlighted due to possible data quality problems, such as, for example, the information bias. In the case of PMAQ, as the coordinators of the units were responsible for the information provided, there could be an overestimation of the activities carried out by the teams. In addition, the diversity of institutions involved in data collection could have compromised the standardization of procedures. However, this study revealed several weaknesses in the units and the managerial and care processes of the teams, which does not reinforce the hypothesis of masking the problems by the coordinators. Moreover, even with the possibility of attenuating the structural and care problems of the teams, it is necessary to emphasize that, in all the sub-dimensions studied, although some percentage variations between the regions were observed, it was evidenced that the problems were present in all the national territory, with very similar regional standards, which reinforces the reliability of the data and the speech in favor of the robustness of the presented results.

As main potentiality of the study, the use of a vast amount of information on the characteristics of the structure of the family health units and the actions carried out by health professionals in the PNC is highlighted, covering a large number of municipalities, allowing a delineation of a current situation in Brazil with a broader scope of analysis related to PNC in the Country. Another positive fact was the use of a theoretical-logical model, based on theoretical reference on the use of structure and process attributes in the quality evaluation[15], considering base normative and legal provisions on PNC.

Finally, the results presented in this study demonstrate that, despite the high coverage of the PNC and its institutionalization for many years, on standards and protocols, in Brazil, there are still problems of many natures, with potential damages to maternal and child health. These findings are fundamental for the understanding of the current situation of large public health problems, such as maternal mortality, which remains at levels above what was established in international pacts, and the increase in the incidence of congenital syphilis, which evidences limits in the effectiveness in PNC[34-36].

Collaborators

Luz LA and Aquino R were responsible for the conception, planning, analyzing, interpretation of data, elaboration of the draft, critical review of the content and approval of the final version of the manuscript. Medina MG was responsible for elaboration of the draft, critical review of the content and approval of the final version of the manuscript. ■

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