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Coordination between Primary Care Teams and Family Health Support Units and influence on Primary Care delivery

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Abstract *This article aims to compare the implementation of coordinated actions by family health/primary care (FH/PC) teams and extended family health and primary care units (NASF-ABs) in the Northeast and rest of Brazil, and the influence of implementation on collaborative working. The independent variables were 19 coordinated actions assessed by Module II of the 3rd Cycle of the National Program for Improving Primary Care Access and Quality (PMAQ-AB). The three collaborative working outcomes were "FH/PC team readiness to work jointly with the NASF-AB", "support received by the FH/PC team from the NASF-AB", and "The NASF-AB's contribution to resolving patients" needs. The implementation of coordinated actions by the Northeast and at national level was compared using the two-proportions z-test and the influence of these actions on the outcomes was assessed using hierarchical linear regression models: The Northeast implemented more actions that at national level ($p<0.05$). The implemented actions that had the most positive influence on the three outcomes were "Case conferences", "Joint development of singular therapy plans for complex cases", "Shared appointments" and "Results monitoring". The Northeast implemented more actions and the implemented actions had a positive influence on collaborative working.*

Key words *Primary Health Care, Patient Care Team, Cooperative Behavior, Brazil*

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Introduction

Despite successes, the process of organizing and operating Brazil's national health service, *o Sistema Único de Saúde* (SUS) or Unified Health System, presents significant challenges[1]. One of the strategies for consolidating the SUS with the aim of achieving universal coverage and reorienting practices through primary health care (PHC), the Family Health Program – later renamed the Family Health Strategy (FHS) – was created in 1994. Since its creation, the FHS has been the preferred model of PHC in Brazil[2], although other operating models may receive federal funds as long as they do not compromise FHS coverage[3].

The number of family health teams (FHTs) has grown considerably across the country's five regions[4]. In the Northeast, the number teams expanded rapidly between 1998 and 2005. In 2010, 100% of the region's municipalities had at least one team, highlighting the importance of the FHS for the organization of the SUS in this region[5]. According to the Ministry of Health's E-Gestor platform, there were 43,363 registered FHTs across the country in November 2020, representing a coverage of 63.73% of national population, while the Northeast had 16,275 teams, representing a coverage of 82.31% of the region's population[6].

The expansion of access to PHC services through the FHS was accompanied by the identification of multiple health needs in the context of deep social inequality like that of the Northeast of Brazil[5]. In 2008, with the aim of broadening the scope of FHS actions and improving the responsiveness of services, the family health support unit (NASF, acronym in Portuguese) was created, renamed the extended family health and primary care unit (NASF-AB, acronym in Portuguese) in 2017[7,8].

NASF-ABs are interprofessional teams that work in an integrated manner with FHTs and primary care teams, providing support through the provision of joint services in FHS catchment areas. The team's composition is defined by the local health authority using priority criteria based on local health needs and staff availability in different areas[7,8]. Due to their composition and operational characteristics, the work of NASF-ABs is underpinned by matrix support and an interprofessional approach aimed at integrating care and responsiveness within the FHS[5].

NASF-ABs have been widely implemented, especially in smaller municipalities, with the number of teams jumping from 2,767 in 2013 to 5,221 in 2017[9]. In 2010, the Northeast was the region with the largest number of functioning teams, illustrating the importance of PHC in this region, especially in poorer municipalities[10].

The creation of the National Primary Care Policy in 2017[8] and expansion of the primary care funding program "*Previne Brasil*"[3] constituted a setback for the implementation of NASF-ABs, before Technical Note No. 3/2020, issued by the Ministry of Health's Department of Family Health[11], eventually suspended federal government funding of NASF-AB teams in 2020. Since then, the hiring of professionals for these teams has been down to local health authorities, posing a major threat to the continuity of a model that serves to enhance PHC delivery.

Coordination and cooperation between FHTs and NASF-ABs has always been a challenge. Identifying challenges to collaboration between FHTs and NASF-ABs, and between these two PHC teams and the rest of the health care network, can be useful for strengthening integrated work processes[9] and attempting to curb the effects of the dismantling of NASF-ABs on the comprehensiveness of care. Analyses using public data from the National Program for Improving Primary Care Access and Quality (PMAQ-AB, acronym in Portuguese), a federal government initiative aimed at institutionalizing the evaluation of PHC, can contribute to advancing discussions on the integration of NASF-ABs and FH/PC teams, especially in the current context. The results of the PMAQ-AB have informed improvement planning, which encompasses team work processes[12]. The PMAQ-AB has been replaced by the Primary Care Assessment Tool (PCATool), a widely recognized instrument for assessing primary care[13].

In light of the above, the aim of this study was to compare coordination between FH/PC teams and NASF-ABs in the Northeast and at national level, and determine whether the implementation of coordinated actions in this region positively influences the rating of the following outcomes: (a) FH/PC team readiness to work jointly with the NASF-AB; (b) support received by the FH/PC team from the NASF-AB; and (c) the NASF-AB's contribution to resolving patients' needs.

Methodology

We conducted a cross-sectional study using data from Module II of the 3rd Cycle of the PMAQ-AB, undertaken by the Ministry of Health in

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5,324 municipalities (95.6%) across Brazil's 27 states. In 2017 and 2018, an external evaluation of the 3rd cycle of the PMAQ-AB was performed with the voluntary participation of 5,324 municipalities (95.6%) and 38,865 (93.9%) FH/PC teams. Module II addressed work processes using questions answered by a FH/PC team member. For the purposes of this study, we used the results from the questions referring to coordination between the FH/PC team and NASF-AB.

The data were collected by researchers from Brazilian universities and research institutions in coordination with Ministry of Health. The data collection team (state coordinators, supervisors and interviewers) received prior training using validated instruments and had accumulated experience from the first cycle of the PMAQ-AB. We used anonymized data from a public database on the Ministry of Health's website (https://PHC.saude.gov.br/ape/pmaq/cycle3/).

The sample analyzed by this study was made up of FH/PC teams whose members reported receiving support from the NASF-AB. Block II.35 of the questionnaire used in Module II consists of 19 dichotomous questions ("yes" or "no") assessing coordination between the FH/PC team and NASF-AB. We compared the percentage of "yes" answers for each question in the Northeast and at national level. For analysis purposes, two researchers independently organized the questions into five thematic groups (blocks) based on the content of Appendix 1 of Ministerial Order No. 154/2008, which created the NASF-AB[7]. Any disagreement over the inclusion of questions in the blocks was resolved by a third researcher.

Block 1 – "Coordination with other points of care" – addressed the aspects "Coordination with the health care network, intersectorality and public participation". The questions included the following aspects: a) actions/meetings with other health services (e.g. psychosocial care centers - PSCC, polyclinics); b) actions/meetings with other sectors (e.g. social assistance referral centers - SARCs, specialized social assistance referral centers - SSARCs, school, etc.); and c) participation in local health council meetings or other spaces for public participation. Block 2 – "Organization of demand" – consisted of questions about: a) Organization of demand for individual appointments; b) organization of demand for home appointments; c) management of referrals and/or specialist appointment waiting lists; d) definition of access criteria, case prioritization, staff roles and responsibilities; and e) analysis of requests for support, identifying main demands.

Block 3 – "Improving care quality" – included questions about the following aspects: a) case conferences; b) joint development of singular therapy plans for complex cases; and c) analysis of concluded cases treated by the NASF-AB. Block 4 – "Care delivery" – consists of questions designed to assess the following: a) shared appointments with professionals from the NASF-AB and FH/PC team; b) shared appointments with professionals from the NASF-AB; c) health education activities; d) therapy groups; and e) health surveillance. Block 5 – "Improving work processes" – included questions assessing the following: a) Continuing education for FH/PC teams; b) discussions about FH/PC team work processes; and c) results monitoring.

For the Northeast, we assessed whether the implementation of each of the coordinated actions referred to by the 19 questions influenced the rating of the following outcomes from Block II.36: II.36.1, FH/PC team readiness to work jointly with the NASF-AB; II.36.3; support received by the FH/PC team from the NASF-AB; and II.36.2, NASF-AB's contribution to resolving users' problems. The outcomes were scored by the FH/PC team respondents on a scale of zero to 10.

The percentage of "yes" answers to the questions from Block II.35 was calculated based on the total number of affirmative answers as a percentage of the total number of answered questions. Differences in the percentage of "yes" answers between the Northeast and Brazil were compared using the two-proportions z-test, adopting a significance level of $p<0.05$.

To determine the individual association between each block and the scores for the outcomes from Block II.36 mentioned above, we ran a linear regression model for each individual Block, calculating beta (β) values and corresponding p-values. The variable (=1) was the "yes" category of the independent variable and the result was interpreted according to magnitude and βvalue. A positive value indicated that the implementation of the coordination action resulted in higher outcome scores, while a negative βvalue indicated that the action reduced the score.

Hierarchical linear regression models were then run for each outcome, adding each Block in a sequence. Four models were run for each outcome: Model 1: Block 1 + 2; Model 2: Block 1 + 2 + 3; Model 3: Block 1 + 2 + 3 + 4; and Model 4: Block 1 + 2 + 3 + 4 + 5. In each model, we calculated the variance inflation factor (VIF) of the variables to detect multicollinearity. Variables

with VIF<10 were maintained in the regression model.

For each model, including the adjusted models, we calculated the adjusted R-squared to determine the explanatory power of the actions coordinated between FH/PC teams and NASF-AB in explaining the variability of the ratings of the outcomes. All analyses were performed using R 64.4.0.0 (https://www.r-project.org/) adopting a significance level of 0.05.

Results

Of the 13,609 teams that participated in the PMAQ-AB in the Northeast and 36,547 at national level, 11,643 (85.5%) and 27,213 (74.5%), respectively, received NASF-AB support and were therefore included in the study. The findings show a significant difference in the percentage of "yes" answers between the Northeast and at national level for most of the coordinated actions ($p<0.05$) (Table 1).

The crude linear regression models were run for each block and each of the three outcomes. All the actions showed an association, indicating that their implementation resulted in a higher rating for each of the three outcomes (Table 2).

The results of the final complete hierarchical regression model to determine the association between the implementation of coordinated actions and rating of the outcome 'FH/PC team readiness to work jointly with the NASF-AB' show that case conferences ($\beta=0.23$) and shared appointments ($\beta=0.26$) were the actions that most influenced the scores for this outcome (Table 3).

Table 4 presents the results of the hierarchical models for the outcome "Support received by the FH/PC team from the NASF-AB", showing that all the coordinated actions influenced scores, especially the questions in Block 3 ("Improving care quality"). In the most adjusted models, the joint "Definition of access criteria" and "Analysis of requests for support" by the FH/PC team and NASF-AB team had a negative effect, reducing the score for this outcome.

The results of the hierarchical models show that the actions that most influenced the scores for the outcome 'NASF-AB's contribution to resolving users' problems' were those in Block 3 ('Improving care quality'), especially case conferences, while the actions within Block 4 ('Care delivery') had only a limited influence (Table 5).

Discussion

Our findings show that the proportion of coordinated actions implemented by FH/PC and NASF-AB teams was higher in the Northeast than in the rest of the country and that some of the actions implemented in this region were associated with higher ratings for the three outcomes. Studying the joint actions of PHC teams is important as evidence shows that PHC is the most effective and efficient approach to addressing the global burden of disease and improving access to health services[14], thus reinforcing the importance of understanding team work processes.

In Brazil, PHC is also expected to spur a care paradigm shift, which implies new ways of organizing the dynamics of work, breaking with the uniprofessional and fragmented model of care[15]. To this end, the National Primary Care Policy envisages that the professionals who make up FH/PC teams and NASF-ABs should work together and with other sectors and points of care in the health care network[8]. The proposal to improve coordination between FH/PC teams and NASF-ABs also encompasses the concept of collaborative working. This approach constitutes a tool for overcoming the problems inherent in the fragmented care model[16].

The data from the 3rd Cycle of the PMAQ-AB show that the level of PHC team/NASF-AB integration was higher in the Northeast than at national level.

Within this new logic of care, integration between health team workers serves to enhance the delivery of patient-centered care[17], achieving better outcomes. It is recognized that integrative and collaborative practices lead to improvements in the quality of care, resulting in extended, comprehensive and cost-effective patient-centered care that is more effective than the traditional approach. Collaborative practices are anchored in the collective construction of care processes that involve horizontal communication and decision-making and enable the materialization of professionals' skills and competencies through joint care[18-22].

The implementation of the coordinated actions in Block 1 ("Coordination with other points of care"), especially participation in local health council meetings or other spaces of public participation, influenced the scores of the three outcomes in the crude models. From a patient/family-centered and community-based care perspective, it is essential to consider dem-

Table 1. Percentage of "yes" answers to questions in five thematic blocks referring to "Coordination between FH/PC teams and NASF-ABs" in the Northeast and rest of Brazil.

Questions	Northeast "Yes" N (%)	Brazil "Yes" N(%)	p
Block 1: Coordination with other points of care			
Actions/meetings with other health services (e.g. PSCC, polyclinics)	7,704 (66.2)	18,100 (66.5)	0.518
Actions/meetings with other sectors (e.g. SARC, SSARC, school)	9,384 (80.5)	21,484 (78.9)	0.000*
Participation in local health council meetings or other spaces of public participation	7,132 (61.2)	15,490 (56.9)	<0.000*
Block 2: Organization of demand			
Organization of demand for individual appointments	10,631 (91.3)	24,412 (89.7)	0.001*
Organization of demand for home appointments	10,777 (92.5)	24,967 (91.7)	0.007*
Management of referrals and/or specialist appointment waiting lists	8,343 (71.6)	18,415 (67.6)	<0.000*
Definition of access criteria, case prioritization, staff roles and responsibilities	9,707 (83.3)	21,901 (80.4)	<0.000*
Analysis of requests for support, identifying main demands	9,834 (84.4)	22,344 (82.1)	<0.000*
Block 3: Improving care quality			
Case conferences	10,802 (92.7)	25,429 (93.4)	0.017*
Joint construction of singular therapy plans for complex cases	8,066 (69.2)	18,229 (66.9)	0.001*
Analysis of concluded cases treated by the NASF	9,593 (82.3)	21,729 (79.8)	<0.000*
Block 4: Care delivery			
Shared appointments with professionals from the NASF and FH/PC teams	10,382 (89.1)	23,923 (87.9)	0.000*
Shared appointments with professionals from the NASF team	9,967 (85.6)	22,548 (82.8)	<0.000*
Health education activities	11,095 (95.2)	25,319 (93.0)	<0.000*
Therapy groups	9,106 (78.2)	21,374 (78.5)	0.472
Health surveillance	9,452 (81.8)	20,964 (77.0)	<0.000*
Block 5: Improving work processes			
Continuing education for FH/PC teams	9,809 (84.2)	21,904 (80.4)	<0.000*
Discussions about FH/PC team work process	9,638 (82.7)	21,436 (78.7)	<0.000*
Results monitoring	9,398 (80.7)	20,608 (75.7)	<0.000*

*Significant.

Source: Micro data from the 3rd cycle of the PMAQ-AB.

ocratic spaces and public participation – which are enshrined in the Constitution and an underlying principle of the SUS – such as local health councils and meetings with community leaders, groups and the community as a whole. The agendas developed in these spaces help build pathways to improvement in health center catchment areas, clarifying individual and collective roles in health services and in conjunction with other sectors, improving transprofessional teamwork and promoting the delivery of effective care tailored to reality. This movement is important and signals that practice is not necessarily limited to health professionals, but also encompasses the subjects involved in this discussion process[19,21,22].

The results of the crude models show that Block 2 ("Organization of demand") had a significant influence on the rating of "FH/PC team readiness to work jointly with the NASF-AB" overall, followed by "Support received by the FH/PC team from the NASF-AB" and "The NASF-AB's contribution to resolving patients' needs". The individual action "Organization of demand for individual appointments" improved the rating of the three outcomes.

A previous study reported that FH/PC teams use a diverse range of criteria (formal and spontaneous) to identify which complex cases should be discussed with the NASF-AB. These criteria include the principle of equity, which encompasses

Table 2. Results of the crude linear regression models to determine the association between coordinated actions and ratings for the outcome "FH/PC team readiness to work jointly with the NASF-AB" (n=11,643).

Collaborative working	Readiness[1]		Support[2]		Resolvability[3]	
Mean (±standard deviation)	**9.15(±1.34)**		**9.03 (±1.02)**		**8.79 (±2.33)**	
Coordinated actions	**Beta**	**p**	**Beta**	**p**	**Beta**	**p**
Block 1: Coordination with other points of care						
Intercept	8.65	<0.000	8.20	<0.000	8.03	<0.000
Actions/meetings with other health services (e.g. PSCC, polyclinics)	0.19	<0.000	0.23	<0.000	0.23	<0.000
Actions/meetings with other sectors (e.g. SARC, SSARC, school)	0.29	<0.000	0.58	<0.000	0.48	<0.000
Participation in local health council meetings or other spaces of public participation	0.22	<0.000	0.33	<0.000	0.33	<0.000
Adjusted R-squared	5.4%		10.5%		9.3%	
Block 2: Organization of demand						
Intercept	8.17	<0.000	7.33	<0.000	7.32	<0.000
Organization of demand for individual appointments	0.25	<0.000	0.55	<0.000	0.47	<0.000
Organization of demand for home appointments	0.36	<0.000	0.61	<0.000	0.50	<0.000
Management of referrals and/or specialist appointment waiting lists	0.25	<0.000	0.33	<0.000	0.34	<0.000
Definition of access criteria, case prioritization, staff roles and responsibilities	0.18	<0.000	0.17	<0.000	0.15	0.009
Analysis of requests for support, identifying main demands	0.08	0.011	0.28	<0.000	0.22	<0.000
Adjusted R-squared	7.1%		14.3%		11.6%	
Block 3: Improving care quality						
Intercept	8.21	<0.000	7.41	<0.000	7.45	<0.000
Case conferences	0.46	<0.000	0.87	<0.000	0.65	<0.000
Joint construction of singular therapy plans for complex cases	0.36	<0.000	0.46	<0.000	0.44	<0.000
Analysis of concluded cases treated by the NASF	0.30	<0.000	0.59	<0.000	0.51	<0.000
Adjusted R-squared	8.7%		16.9%		12.9%	
Block 4: Care delivery						
Intercept	8.09	<0.000	7.16	<0.000	7.26	<0.000
Shared appointments with professionals from the NASF and FH/PC teams	0.40	<0.000	0.65	<0.000	0.49	<0.000
Shared appointments with professionals from the NASF team	0.13	0.003	0.30	<0.000	0.27	<0.000
Health education activities	0.17	0.000	0.40	<0.000	0.24	0.005
Therapy groups	0.29	<0.000	0.36	<0.000	0.33	<0.000
Health surveillance	0.22	<0.000	0.45	<0.000	0.42	<0.000
Adjusted R-squared	8.2%		17.2%		13.4%	
Block 5: Improving work processes						
Intercept	0.38	<0.000	7.72	<0.000	7.66	<0.000
Continuing education for FH/PC teams	0.25	<0.000	0.48	<0.000	0.40	<0.000
Discussions about FH/PC team work process	0.27	<0.000	0.49	<0.000	0.35	<0.000
Results monitoring	0.39	<0.000	0.61	<0.000	0.59	<0.000
Adjusted R-squared	7.7%		16.0%		12.58%	

[1]"What score would you give your own team for readiness to work jointly with the NASF-AB?"; [2]"What score would you give for the support your team received from the NASF-AB?"; [3]"What score would you give to the NASF-AB's contribution to resolving patients' needs?".

Source: Micro data from the 3rd cycle of the PMAQ-AB.

Table 3. Results of the hierarchical linear regression models to determine the association between coordinated actions and ratings for the outcome "Readiness to work jointly with the NASF-AB" (n=11,643).

Intercept	Model 1 Beta (p)	Model 2 Beta (p)	Model 3 Beta (p)	Model 4 Beta (p)
	8.13 (<0.000)	**7.96 (<0.000)**	**7.86 (<0.000)**	**7.88 (<0.000)**
Block 1: Coordination with other points of care				
Actions/meetings with other health services (e.g. PSCC. polyclinics)	0.12 (<0.000)	0.09 (0.004)	0.08 (0.000)	0.07 (0.000)
Actions/meetings with other sectors (e.g. SARC. SSARC. school)	0.12 (0.005)	0.07 (0.014)	0.04 (0.184)	0.03 (0.310)
Participation in local health council meetings or other spaces of public participation	0.14 (<0.000)	0.09 (<0.000)	0.08 (0.007)	0.07 (0.000)
Block 2: Organization of demand				
Organization of demand for individual appointments	0.22 (<0.000)	0.15 (0.000)	0.11 (0.003)	0.09 (0.013)
Organization of demand for home appointments	0.33 (<0.000)	0.20 (<0.000)	0.13 (0.002)	0.12 (0.005)
Management of referrals and/or specialist appointment waiting lists	0.17 (<0.000)	0.12 (<0.000)	0.11 (<0.000)	0.09 (0.000)
Definition of access criteria. case prioritization. staff roles and responsibilities	0.11 (0.001)	0.05 (0.150)	0.03 (0.363)	0.01 (0.606)
Analysis of requests for support. identifying main demands	0.02 (0.524)	-0.09 (0.008)	-0.12 (0.001)	-0.14 (0.000)
Block 3: Improving care quality				
Case conferences		0.36 (<0.000)	0.29 (<0.000)	0.26 (<0.000)
Joint construction of singular therapy plans for complex cases		0.25 (<0.000)	0.20 (<0.000)	0.19 (<0.000)
Analysis of concluded cases treated by the NASF		0.13 (0.004)	0.10 (0.001)	0.02 (0.401)
Block 4: care delivery				
Shared appointments with professionals from the NASF and FH/PC teams			0.24 (<0.000)	0.23 (<0.000)
Shared appointments with professionals from the NASF team			0.00 (0.902)	-0.01 (0.748)
Health education activities			0.06 (0.174)	0.04 (0.390)
Therapy groups			0.11 (0.001)	0.10 (<0.000)
Health surveillance			0.04 (0.159)	0.01 (0.630)
Block 5: Improving work processes				
Continuing education for FH/PC teams				0.06 (0.064)
Discussions about FH/PC team work process				0.04 (0.130)
Results monitoring				0.16 (<0.000)
Adjusted R-squared	8.2%	10.3%	10.9%	11.1%
VIF*	<10	<10	<10	<10

*Variance Inflaction Factor.

Source: Micro data from the 3rd cycle of the PMAQ-AB.

the social and subjective vulnerability inherent in the challenges FH/PC team members face in coping with the specific demands of certain cases[23]. Within the matrix approach to care, the organization of demand is important for work processes and essential to ensuring coordination between FH/PC teams and NASF-ABs. NASF-ABs provide support in a number of ways, including joint actions, specific treatment in their area of professional knowledge, case discussions, and the

Table 4. Results of the hierarchical linear regression models to determine the association between coordinated actions and ratings for the outcome "Support received by the FH/PC team from the NASF-AB" (n=11,643).

Intercept	Model 1 Beta(p)	Model 2 Beta(p)	Model 3 Beta(p)	Model 4 Beta(p)
	7.25 (<0.000)	**6.93 (<0.000)**	**6.71 (<0.000)**	**6.75 (<0.000)**
Block 1: Coordination with other points of care				
Actions/meetings with other health services (e.g. PSCC, polyclinics)	0.12 (<0.000)	0.08 (0.000)	0.06 (0.011)	0.05 (0.030)
Actions/meetings with other sectors (e.g. SARC, SSARC, school)	0.30 (<0.000)	0.22 (<0.0000)	0.15 (0.000)	0.13 (0.006)
Participation in local health council meetings or other spaces of public participation	0.21 (<0.000)	0.14 (<0.000)	0.12 (0.000)	0.10 (0.001)
Block 2: Organization of demand				
Organization of demand for individual appointments	0.50 (<0.000)	0.38 (<0.000)	0.29 (<0.000)	0.26 (<0.000)
Organization of demand for home appointments	0.56 (<0.0000)	0.34 (<0.000)	0.20 (0.004)	0.17 (0.000)
Management of referrals and/or specialist appointment waiting lists	0.20 (<0.000)	0.13 (0.000)	0.09 (0.000)	0.07 (0.011)
Definition of access criteria, case prioritization, staff roles and responsibilities	0.05 (0.139)	-0.05 (0.181)	-0.09 (0.012)	-0.12 (0.001)
Analysis of requests for support, identifying main demands	0.17 (<0.000)	-0.04 (0.327)	-0.10 (0.012)	-0.13 (0.000)
Block 3: Improving care quality				
Case conferences		0.67 (<0.000)	0.54 (<0.000)	0.50 (<0.000)
Joint construction of singular therapy plans for complex cases		0.30 (<0.000)	0.22 (<0.000)	0.19 (<0.000)
Analysis of concluded cases treated by the NASF		0.30 (<0.000)	0.23 (<0.000)	0.12 (0.001)
Block 4: Care delivery				
Shared appointments with professionals from the NASF and FH/PC teams			0.39 (<0.000)	0.37 (<0.000)
Shared appointments with professionals from the NASF team			0.07 (0.033)	0.06 (0.0890)
Health education activities			0.19 (0.000)	0.13 (0.013)
Therapy groups			0.12 (0.003)	0.10 (0.000)
Health surveillance			0.18 (0.000)	0.13 (0.009)
Block 5: Improving work processes				
Continuing education for FH/PC teams				0.16 (0.000)
Discussions about FH/PC team work process				0.10 (0.005)
Results monitoring				0.23 (<0.000)
Adjusted R-squared	16.4%	20.2%	21.7%	22.2%
VIF*	<10	<10	<10	<10

* Variance Inflaction Factor.

Source: Micro data from the 3rd cycle of the PMAQ-AB.

Table 5. Results of the hierarchical linear regression models to determine the association between coordinated actions and ratings for the outcome "The NASF-AB's contribution to resolving users' problems" (n=11,643).

Intercept	Model 1 Beta (p)	Model 2 Beta (p)	Model 3 Beta (p)	Model 4 Beta (p)
	7.25 (<0.000)	**7.02 (<0.000)**	**6.91 (<0.000)**	**6.94 (<0.000)**
Block 1: Coordination with other points of care				
Actions/meetings with other health services (e.g. PSCC, polyclinics)	0.14 (<0.000)	0.10 (0.002)	0.09 (0.000)	0.08 (0.001)
Actions/meetings with other sectors (e.g. SARC, SSARC, school)	0.25 (<0.000)	0.19 (<0.000)	0.13 (0.007)	0.11 (0.000)
Participation in local health council meetings or other spaces of public participation	0.22 (<0.000)	0.16 (<0.000)	0.15 (<0.000)	0.13 (<0.000)
Block 2: Organization of demand				
Organization of demand for individual appointments	0.43 (<0.000)	0.33 (<0.000)	0.27 (<0.000)	0.25 (<0.000)
Organization of demand for home appointments	0.45 (<0.000)	0.28 (<0.000)	0.18 (0.000)	0.17 (0.000)
Management of referrals and/or specialist appointment waiting lists	0.21 (<0.000)	0.16 (<0.0000)	0.13 (0.000)	0.10 (0.000)
Definition of access criteria, case prioritization, staff roles and responsibilities	0.04 (0.296)	-0.04 (0.225)	-0.08 (0.035)	-0.10 (0.009)
Analysis of requests for support, identifying main demands	0.11 (0.004)	-0.05 (0.163)	-0.10 (0.011)	-0.13 (0.000)
Block 3: Improving care quality				
Case conferences		0.47 (<0.000)	0.38 (<0.000)	0.35 (<0.000)
Joint construction of singular therapy plans for complex cases		0.28 (<0.000)	0.21 (<0.000)	0.19 (<0.000)
Analysis of concluded cases treated by the NASF		0.23 (<0.000)	0.18 (<0.0000)	0.07 (0.067)
Block 4: Care delivery				
Shared appointments with professionals from the NASF and FH/PC teams			0.27 (<0.000)	0.25 (<0.000)
Shared appointments with professionals from the NASF team			0.06 (0.073)	0.05 (0.114)
Health education activities			0.07 (0.202)	0.03 (0.551)
Therapy groups			0.11 (0.009)	0.09 (0.000)
Health surveillance			0.16 (0.000)	0.13 (0.000)
Block 5: Improving work processes				
Continuing education for FH/PC teams				0.12 (0.000)
Discussions about FH/PC team work process				0.02 (0.554)
Results monitoring				0.26 (<0.000)
Adjusted R-squared	13.6%	16.15%	16.99%	17.4%
VIF*	<10	<10	<10	<10

*Variance Inflaction Factor.

Source: Micro data from the 3rd cycle of the PMAQ-AB.

development of singular therapy plans, all at the request of the FH/PC team, thus fulfilling a technical and pedagogical support role and helping to organize patient flow.

The results of the crude models show that case conferences (Block 3, "Improving care quality") influenced the ratings of the three outcomes. A previous study showed that teams that performed better in PMAQ-AB cycles 1 and 2 promoted case conferences as part of a matrix approach to care[24]. The discussion of complex cases is a collaborative patient-centered practice

that involves information sharing and interprofessional collaboration, valuing team members' roles, skills and knowledge with the aim of developing a joint plan to address the question at hand.

The results of the adjusted models show that Blocks 1 and 2 influenced the ratings of all three outcomes. The actions "Case conferences" and "Joint construction of singular therapy plans for complex cases" (Block 3, "Improving care quality") also improved the ratings of the three outcomes.

The joint management of the political and social commitments stemming from this process of knowledge sharing, shifting powers, and affections can take place in a number of different ways, but should always be based on dialogue and relationship building. Collaborative work arrangements require interprofessional team members to be open to the encounter with the other and building horizontal professional relationships based on trust and a sense of belonging among the team, which has a sole objective: to deliver effective patient-centered care and mobilize specific, common and collaborative competencies. This process has the potential to break away from the hegemony of the biomedical model of care that is typical of many health services[25].

Also with regard to case conferences, it is important to highlight the importance of good interprofessional communication, which constitutes part of one of the four dimensions of team climate. Good communication ensures that all participate, promotes interaction between subjects and provides a sense of security and trust, which are important for effective case conferences[21,25].

With regard to the joint construction of singular therapy plans for complex cases, NASF-AB support is essential for effectively responding to patients' needs and delivering safe, quality care underpinned by the concept of joint responsibility and knowledge sharing[26]. Finally, the analysis of concluded cases treated by the NASF-AB is necessary for the follow-up of the evolution of outcomes and goals[26].

It is important to underline that, despite major advances in health education and training, collaborative practices remain a challenge both from a training and practical point of view. Thus, expanding the types of professionals working in PHC through the NASF-AB may not be sufficient to encourage collaborative working. There is a concern that, when disjointed from the FH/PC team, the care delivered by NASF-ABs mischaracterizes the approach. The FH/PC team's work with the NASF-AB should therefore reinforce the patient-centered approach and promote a shift in work processes, bringing interprofessional teams together and improving collaborative working[27,28].

To this end, it is important to rethink continuing health education to help NASF-AB team members incorporate collaborative behavior into their working practices. The scope of NASF-AB and FH/PC teams should be expanded to include new professional practices and give precedence to new forms of care delivery, such as interprofessional collaboration and dialogue within a patient-centered approach. It is worth noting however, that, despite the importance of continuing health education, this item within Block 5 ("Improving work processes") was not the aspect that most influenced the rating of the outcomes investigated by this study[29].

It is interesting to note that in the final adjusted models, the implementation of the coordinated actions "Definition of access criteria, case prioritization" and "Analysis of requests for support, identifying main demands" (Block 2, "Organization of demand"), resulted in poorer outcome ratings. Data from the 2nd cycle of the PMAQ-AB have shown that organization of demand can pose a barrier to FH/PC team/NASF-AB integration, often due to referrals made without consultation and problems related to the sharing of care tasks among teams[30]. Our results reinforce this evidence, indicating that little progress has been made in the organization of access among teams and task sharing for the organization of work processes.

The crude models show that the combined actions in Block 4 ("Care delivery") explained 8.2% of the variability of the rating for the outcome "FH/PC team readiness to work jointly with the NASF-AB", 17.2% of the variability of the rating for "Support received by the FH/PC team from the NASF-AB", and 13.4% of the variability of the rating for "The NASF-AB's contribution to resolving users' problems". Previous studies have shown lack of communication and knowledge sharing between team members and failure to formalize routine institutional care actions. These shortcomings need to be addressed in order to increase the influence of these actions on the delivery of patient-centered care and outcome ratings[31].

The action in Block 4 that had the most positive influence on the three outcomes was "Shared appointments with professionals from the NASF-

AB and FH/PC team". This result highlights the importance of strengthening matrix actions as the core pillar of the NASF-AB. However, this approach is lost within paternalism and the emphasis on specialized professional training, which often mean that NASF-AB members encounter difficulties in performing the general FH/PC team support activities designed to enhance care[27]. An evaluation of matrix support and the provision of joint care found that FH/PC team members found it difficult to understand activities[32], corroborating the findings of the present study, as when this type of support was incorporated into the care delivery process FH/PC team members rated team integration better.

In addition, "Health education activities" were only capable of influencing the outcome "Support received by the FH/PC team from the NASF-AB", and not "FH/PC team readiness to work jointly with the NASF-AB" and "The NASF-AB's contribution to resolving patients' needs". A national study with physical education professionals working in NASF-ABs found that health education activities in the Northeast were limited to individual activities developed by professionals for specific population groups and involved a low level of interprofessional collaboration[33]. This helps to explain why the implementation of health education activities had such a small impact on the rating for the outcomes "FH/PC team readiness to work jointly with the NASF-AB" and "The NASF-AB's contribution to resolving patients' needs".

In the crude models, Block 5 ("Improving work processes") had a significant influence on the rating of "Support received by the FH/PC team from the NASF-AB" (16.0%), followed by "The NASF-AB's contribution to resolving patients' needs" (12.5%) and "FH/PC team readiness to work jointly with the NASF-AB" (7.7%). The findings of the present study are consistent with those of the international literature and a study conducted in a PHC setting in Brazil that reported that participation led to the institutionalization of performance assessment and that reflective processes were more effective in teams with a more positive team climate[34,35].

The combined coordinated actions assessed in Block 5 improved each of the three outcome ratings. Each of the three actions had a similar influence on "Support received by the FH/PC team from the NASF-AB", while "Continuing education for FH/PC teams" had only a limited influence on "FH/PC team readiness to work jointly with the NASF-AB" and "The NASF-AB's contribution to resolving patients' needs". With regard to the development of continuing education activities between FH/PC teams, a study in six municipalities in the state of Bahia found a lack of continuing education policies in PHC services and that NASF-ABs played a limited role in these activities with FH/PC teams[36]. Continuing education can have a positive impact on FH/PC team ratings and contribute to the effective implementation of the pedagogical dimension of the work of NASF-ABs with a view to broadening the scope of care actions and enhancing work process.

It is important to mention that, although considerable progress has been made, the Northeast still faces a shortage of NASF-ABs in relation to FH/PC teams. It should be stressed that strong demand places a heavy burden on the work of NASF-AB teams[5] and that health care, especially, PHC, is diversified and dynamic[37]. Understanding FH/PC team/NASF-AB integration can therefore provide important insights to inform discussions on how to strengthen this level of care.

This study has strengths and limitations. One of the strengths is that it was conducted using the database from a nationwide survey of PHC with high take-up by FH/PC teams. In addition, the data collection instrument used standardized procedures, ensuring internal validity. Limitations include the lack of triangulation of the evaluation of the NASF-ABs (Module IV), which could have offered a broader panorama of the relationship between the FH/PC and NASF-AB teams. Furthermore, the fact that the final scores of the PMAQ-AB are associated with FH/PC team member performance incentives may have led to information bias, especially in relation to pointing out limitations of coordination.

Conclusion

A large proportion of NASF-AB teams in the Northeast worked in coordination with FH/PC teams. In general, the implementation of coordinated actions, especially "Case conferences", "Shared appointments" and "Results monitoring", had an important positive impact on the three outcomes: "FH/PC team readiness to work jointly with the NASF-AB"; "Support received by the FH/PC team from the NASF-AB"; and "The NASF-AB's contribution to resolving patients' needs".

The proposal to promote coordination between FH/PC teams and NASF-ABs therefore

presents a number of strengths and weaknesses when it comes to strengthening PHC work processes. It is important to identify factors at the macro and micro level that contribute to the recognition of the value of the work of health professionals, provision of suitable working conditions, formulation of effective health policies, and adoption of a patient-centered approach to health care.

It is also necessary to invest in work process management, collaborative practices and interprofessional collaboration, through continuing health education involving a diverse range of actors aimed at improving the quality of care and promoting the delivery of responsive, comprehensive patient-centered primary care in coordination with the rest of the health care network. Given the recent implementation of NASF-ABs, it is important to promote PHC evaluation processes that include the ongoing involvement of FH/PC and NASF-AB teams in the identification of strengths, weakness and challenges.

Considering that the integration of health professionals and teams is a complex process influenced by factors such team composition, work management processes and relational aspects, further mixed methods studies should be conducted to provide robust evidence to inform discussions on how to strengthen collaborative working in PHC in Brazil.

Collaborations

GEG Brito participated in the conception and design of the study, organization of data, and participation of the discussion of the study's results; critical revision of its contents; approving the manuscript's final version. FDS Forte participated in the conception and design of the study and participation of the discussion of the study's results; critical revision of its contents; approving the manuscript's final version. JCG Freire participated in the discussion of the study's results; critical revision of its contents; approving the manuscript's final version. LB Moreira participated in the discussion of the study's results; critical revision of its contents; approving the manuscript's final version. SO Paredes participated in the discussion of the study's results; critical revision of its contents; approving the manuscript's final version. SLA Silva participated in the conception and design of the study, organization of data, statistical analysis, and participation of the discussion of the study's results; critical revision of its contents; approving the manuscript's final version.

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