Primary health care performance in Brazil and its correlation with the *Mais Médicos* physician recruitment program*

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ABSTRACT

Objective.   To assess the performance of primary health care (PHC) in Brazil and its correlation with the More Physicians Program (Programa Mais Médicos, or PMM).

Method.   This nationwide cross-sectional study used the Primary Care Assessment Tool validated for Brazilian Portuguese (PCATool-Brazil) to evaluate PHC performance based on user experience with three categories of physician: Brazilian physicians participating in the PMM, Cuban physicians participating in the PMM, and Brazilian physicians not associated with the PMM. The following PHC scores were calculated: overall PCA score, accessibility (first contact), and longitudinality. Correlations between PHC score, physician category, and other user and physician characteristics were studied using multilevel analysis.

Results.   The overall PCA score for Brazil was 6.78, and the longitudinality score was 7.43. There was no difference in these scores in the three physician categories. The overall accessibility score was 4.24. A small but significant difference (p < 0.001) in the accessibility score was observed between the physician categories: 4.43 for Cuban physicians participating in the PMM (CI: 4.32-4.54), 4.08 for Brazilian physicians participating in the PMM (CI: 3.98-4.18), and 4.20 for Brazilian physicians not associated with the PMM (CI: 4.09-4.32). Multilevel analysis showed that age, socioeconomic level, presence of chronic diseases, and home visits by physicians had a positive effect on the overall PCA score.

Conclusions.   The type of physician did not affect the overall score for PHC attributes in Brazil. PMM participation was associated with higher accessibility scores in more socioeconomically vulnerable areas. Multilevel analysis showed that PCH may be strengthened by the reinforcement of essential physician roles (such as home visits) and by improving access for socioeconomically vulnerable, younger populations or those without chronic diseases.

Keywords   Primary health care; Family Health Strategy; health services research; Unified Health System; health systems; Brazil.

The public health system in Brazil, known as the Unified Health System (*Sistema Único de Saúde* – SUS), has adopted universal coverage as its basic

principle and primary health care (PHC) and as its coordinating point of entry into the health care network (1, 2). Its prevailing PHC model is the Family Health Strategy (*Estratégia Saúde da Família* – ESF), in which a multidisciplinary health team is assigned to the approximately 3,000 users in each health unit (1, 2). As of July 2016, 123 million Brazilians were being served by 40,098 family health teams (3). However, literature on the subject indicates that the structure, supply of physicians, and quality of services provided at the PHC level are inconsistent (4–9). Furthermore, studies using the Primary Health Care Assessment Tool (*Instrumento de Avaliação da Atenção Primária à Saúde* – PCATool-Brazil) show differences in the PHC performance and a limited sense of direction for most of the attributes examined, with the worst results for access and integrality (service delivery) (10–14).

Access challenges in Brazil are reflected in the low number of SUS medical visits (2.77 visits/inhabitant/year) compared with countries with strong PHC systems (7.6 visits/inhabitant/year in Spain; 5.9 visits/inhabitant/year in the United Kingdom; and 7.7 visits/inhabitant/year in Canada) and in the low number of appointment requests for outpatient visits or care in clinical emergencies (15–17). The problem of access is explained in part by the low density of physicians in the SUS (1.95 physicians/1,000 population) compared with countries with strong PHC systems (3.8/1,000 in Spain, 2.85/1,000 in the United Kingdom, and 2.53/1,000 in Canada). It's worth noting that Brazil has three times more physicians in the private supplementary network than in the SUS. Moreover, the distribution of these professionals in Brazil is uneven, ranging from 0.98 per 1,000 inhabitants in the North Region to 2.61 in the Southeast Region (18, 19).

The More Doctors Program (*Programa Mais Médicos* – PMM), established in Brazil in 2013, was created to attract more PHC physicians for the SUS (20, 21). During its first year, 1,834 Brazilian medical graduates registered with the Federal Council of Medicine (*Conselho Federal de Medicina* – CFM), and in addition, the PPM recruited 1,184 individual exchange doctors (foreign and Brazilian physicians trained in foreign institutions whose diplomas were yet to be validated in Brazil) and 11,150 doctors from Cuba

under an international cooperation agreement between the Ministry of Health and the Pan American Health Organization/World Health Organization (PAHO/WHO) (20, 21). As of 2016, a total of 15,205 doctors were actively participating in the PMM, including 4,561 Brazilian doctors registered with the CFM, 1,790 individual exchange doctors, and 8,854 Cuban doctors under the cooperation agreement (22).

The objective of this study was to estimate the PHC performance in terms of user experience, as measured by the PCATool-Brazil, and to determine the correlation with the availability of physicians through the PMM.

MATERIALS AND METHODS

The present nationwide cross-sectional study was conducted with adult users (18 years of age or older) and ESF physicians from each of the country's five regions. The experience of the users, measured with the PCATool-Brazil, was estimated and compared in terms of three categories of physicians: Cuban doctors in the PMM (MMCuba), Brazilian doctors in the PMM (MMBrazil), and Brazilian doctors not affiliated with the PMM (MedESF).

The PCATool-Brazil is a validated instrument for assessing the quality of PHC based on questions that measure the degree of presence of its defining attributes: access on first contact, longitudinality, coordination, integrality, family orientation, community orientation, and cultural competency. The attributes can be assessed individually, based on the score for each attribute, or all together, to determine the overall degree of PHC orientation (overall PHC score) (23). The PCATool-Brazil comes in a short version, validated for users, which has 23 questions to determine the overall PHC score (24).

A sample size was calculated to estimate the degree of PHC orientation (overall PHC score) according to users' experience and compare this result against each of the three groups of physicians. For this purpose, there was assumed to be a 0.3 difference between the overall PHC scores of the three groups (in a score range of 0 to 10), with a standard deviation of 1.7, a statistical power of 80%, a significance level of 5%, and a design effect (DEFF) of 3.4. Based on these parameters, the sample size was

estimated to be 5,161 users. Allowing for a loss of 20%, the sample size was set at 6,193 adult users. This total was distributed equally between the three groups of physicians, and it was decided to interview 12 patients per physician. The effect of patient-doctor dependency was controlled using conglomerate analysis. A systematic sample of the family health units was determined (one physician per health unit) based on a distribution proportional to the presence of physicians in each of the country's regions.

The physicians responded to a questionnaire that asked for their sociodemographic data, years of professional training, and assessment of the PMM. The users provided answers in two different instruments: a questionnaire on their sociodemographic variables, morbidity, and care received under the ESF, and the short version of the PCA-Tool-Brazil plus a few items from the long version to supplement the information on longitudinality and access (23, 24). To qualify for the interview, the physician had to have served on the selected family health team for at least a year. The condition for users to be interviewed was that they had to have had at least two consultations with the selected physician, one of them being on the day of the interview.

Calculation of the overall PHC score was based on the arithmetic mean of the user responses to the items in the short version of the PCATool-Brazil (24). Calculation of the access and longitudinality scores was based on the arithmetic mean of the scores for each of the components mentioned (23). The resulting scores were then plotted on a continuous scale from 0 to 10, where values equal to 6.6 or above were considered "high," based on the cutoff point defined in the instrument validation study (23).

Analysis of variance (ANOVA) and the Bonferroni correction for multiple comparisons were used to compare the access and longitudinality scores and the overall PHC score for the physician groups. The same methodology was considered for comparing these scores by region of Brazil. The chi-square test, followed when necessary by the multiple comparison test, was used to compare the proportions of high scores (6.6 and higher) in the physician groups (25).

The analyses were performed using the PASW Statistics 18 Analysis of Complex Samples module, which made it

possible to incorporate the complex sample structure for the regions of Brazil (strata) and draw a correlation with the user assessments of each physician selected for the study (conglomerates) (25). The selected level of significance was 5%.

This multilevel analysis methodology was applied to study the correlation between each physician group and the overall PHC score, adjusted for sociodemographic characteristics, service attended by the user, and sociodemographic characteristics and training of the physicians. The model had two levels: one for the users, and the other for the physicians. At first, the multivariate model included the characteristics of the users and the physicians who correlated individually with an overall PHC score at $p < 0.20$. Later, characteristics with higher p-values were excluded, so that the final model only took into account the adjusted characteristics associated with the overall PHC score at $p \leq 0.05$. This analysis was carried out using the SAS 9.4 MIXED procedure (26). The results, when they were presented, showed the beta coefficient estimate along with its confidence interval of 95% (CI 95%) and p-value.

The study was approved by the Ethics Committee of the Porto Alegre Clinics Hospital (Decision 1,219,926). All the interviewees signed a free and informed consent form. The questionnaires were administered in the health units by trained interviewers using a tablet. The information was transferred anonymously for purposes of analysis.

RESULTS

Between July and November 2016, interviews were held with a total of 6,160 users (99.5% of the necessary sample size) and 509 physicians in the five regions of Brazil. The characteristics of the users and physicians and their distribution across the three doctor categories are shown in Table 1.

TABLE 1. Sociodemographic, health history, and treatment characteristics of adult users and sociodemographic, educational, and professional background of the Cuban and Brazilian physicians regardless of their participation in the More Doctors Program, Brazil, 2016

Characteristics	n (%) or mean (SE)[a]			
	Total n = 6,160	MMCuba[b] n = 2,087	MMBrazil[b] n = 2,062	MedESF[b] n = 2,011
Sociodemographic characteristics of the users				
Female	4,667 (75.8)	1,613 (77.3)	1,550 (75.2)	1,504 (74.8)
Male	1,493 (24.2)	474 (22.7)	512 (24.8)	507 (25.2)
Age (in years)	47.8 (0.2)	47.0 (0.5)	47.9 (0.4)	48.5 (0.5)
Color or race				
Non-white	4,105 (66.6)	1,366 (65.5)	1,426 (69.2)	1,313 (65.3)
White	2,055 (33.4)	721 (34.5)	636 (30.8)	698 (34.7)
Region of the country in which the health unit is located				
Central-West	375 (6.1)	132 (6.3)	133 (6.4)	110 (5.5)
Northeast	2,194 (35.6)	745 (35.7)	761 (36.9)	688 (34.2)
North	722 (11.7)	252 (12.1)	245 (11.9)	225 (11.2)
Southeast	1,826 (29.7)	597 (28.6)	589 (28.6)	640 (31.8)
South	1,043 (16.9)	361 (17.3)	334 (16.2)	348 (17.3)
Socioeconomic level				
A,B. and C	3,528 (57.3)	1,141 (54.7)	1,177 (57.1)	1,210 (60.2)
D and E	2,632 (42.7)	946 (45.3)	885 (42.9)	801 (39.8)
Health history/experience in the health unit				
Presence of at least one chronic disease				
Yes	3,598 (58.5)	1,197 (57.4)	1,213 (58.9)	1,188 (59.1)
No	2,556 (41.5)	887 (42.6)	848 (41.1)	821 (40.9)
≥ 1 hospital admission in the last year				
Yes	961 (15.6)	320 (15.3)	320 (15.5)	321 (16.0)
No	5,199 (84.4)	1,767 (84.7)	1,742 (84.5)	1,690 (84.0)
Number of medical visits in the health unit in the last year[b]	5.7 (0.1)	5.9 (0.1)	5.7 (0.1)	5.5 (0.1)
Type of visit on the day it occurred				
Scheduled	3,287 (53.4)	1,005 (48.2)	1,210 (58.7)	1,072 (53.3)
Obtained on the same day	2,873 (46.6)	1,082 (51.8)	852 (41.3)	939 (46.7)
Is it difficult for you to see a doctor when you think it's necessary?				
Definitely yes/probably yes	1,785 (29.0)	553 (26.5)	644 (31.3)	588 (29.2)
Definitely not/probably not	4,319 (70.1)	1,518 (72.8)	1,397 (67.7)	1,404 (69.8)
Doesn't know/doesn't remembmer	56 (0.9)	16 (0.7)	21 (1.0)	19 (1.0)

(*Continued*)

TABLE 1. (*Continued*)

Characteristics	n (%) or mean (SE)[a]			
	Total n = 6,160	MMCuba[b] n = 2,087	MMBrazil[b] n = 2,062	MedESF[b] n = 2,011
Is the unit open at least some nights during the working week until 8:00 p.m.?				
Definitely yes/probably yes	466 (7.5)	147 (7.0)	162 (7.8)	158 (7.8)
Definitely not/probably not	4,735 (76.9)	1,644 (78.8)	1,556 (75.5)	1,535 (76.4)
Doesn't know/doesn't remembmer	959 (15.6)	296 (14.2)	345 (16.7)	318 (15.8)
Does the doctor make houses visits?				
Yes	3,777 (61.3)	1,348 (64.6)	1,224 (59.4)	1,205 (59.9)
No/doesn't know	2,383 (38.7)	739 (35.5)	838 (40.6)	806 (40.1)
Characteristics of the doctors	n = 509	n = 174	N=173	n = 162
Age	40.1 (0.5)	41.9 (0.6)	33.5 (0.8)	45.3 (1.1)
Sex				
Female	293 (57.6)	117 (67.2)	90 (52.0)	86 (53.1)
Male	216 (42.4)	57 (32.8)	83 (48.0)	76 (46.9)
Years of medical education	13.9 (0.5)	17.2 (0.6)	6.3 (0.7)	18.4 (1.1)
Medical specialization				
Residency in family and community medicine	158 (31.0)	136 (78.2)	8 (4.6)	14 (8.6)
Specialization in family and community medicine	137 (26.9)	20 (11.5)	103 (59.5)	14 (8.6)
Other residency or specialization	127 (25.0)	17 (9.8)	24 (13.9)	86 (53.1)
No residency or specialization	87 (17.1)	1 (0.6)	38 (22.0)	48 (29.6)
Other employment				
No	294 (57.8)	172 (98.9)	76 (43.9)	46 (28.4)
Yes	215 (42.2)	2 (1.1)	97 (56.1)	116 (71.6)
Years working in the health unit	3.2 (0.1)	2.4 (0.0)	2.2 (0.1)	5.2 (0.3)
Average number of patients seen per 4-hour shift				
12 or fewer	135 (26.5)	52 (29.9)	56 (32.4)	27 (16.7)
13 to 15	139 (27.3)	51 (29.3)	47 (27.2)	41 (25.3)
16 to 18	131 (25.7)	48 (27.6)	45 (26.0)	38 (23.5)
19 or more	103 (20.2)	23 (13.2)	25 (14.5)	55 (34.0)

[a] Results expressed in n (%) or mean (standard error).
[b] MMCuba: Cuban physicians participating in the More Doctors Program; MMBrazil: Brazilian physicians participating in the More Doctors Program; MedESF: Brazilian physicians not affiliated with the More Doctors Program.

Table 2 shows the results of applying the PCATool-Brazil for the country as a whole and each of its regions. The overall score for user perception of PHC in Brazil was 6.78. The overall score for PHC in the MMCuba group was slightly higher than the national mean, with a value of 6.86, but the difference was not statistically significant (*p* = 0.215).

The country had a high score for longitudinality, with a value of 7.43 and an insignificant difference between the groups (Table 2). For the access score, the value for Brazil as a whole was 4.24, which was considered low. This score was significantly higher in the MMCuba physician group (4.43, CI 95%: 4.32 to 4.54) than in the other groups (MMBrazil: 4.08, CI 95%: 3.98 to 4.18; MedESF: 4.20, CI 95%: 4.09 to 4.32) despite the small differences in the values for this score (Table 2). In the Northeast Region,

statistically significant differences between the physician groups were observed in the overall PHC score and the access score. The overall PHC score for the region was higher for the MMCuba group (6.9, CI: 6.72 to 7.09), but still close to the scores for the MMBrazil group (6.55, CI: 6.33 to 6.77) and the MedESF group (6.51, CI: 6.23 to 6.79) (Table 2).

With the overall PHC score, there was no statistically significant difference in the proportions of high and low values for the country as a whole. In the Northeast Region, however, a significant difference (*p* = 0.049) was observed between the physician groups, with a higher proportion of overall PHC score in the MMCuba group (58.8%) compared with the MMBrazil (51.8%) and MedESF (52.1%) groups (Table 3). The proportions of high access scores for Brazil as a whole and for the North, Northeast, and

Central-West regions were higher for the MMCuba group than for the other physician groups (Table 3).

In the univariate analysis, the user variables associated with the overall PHC score were: age, socioeconomic level, presence of chronic diseases, number of visits to the unit, and whether or not the doctor made a home visit.

The physician variables were: sex, years of medical education, and number of visits per 4-hour shift (Table 4). The variables that remained in the multivariate model were: age of the user (divided into tertiles), socioeconomic level, presence of one or more chronic diseases (hypertension, diabetes, depression, or chronic pulmonary disease), whether or not the doctor made a home visit, and the physician's years of medical education (Table 4). The most expressive variable in the model was whether or not the doctor

TABLE 2. Overall score,[a] access score,[a] and longitudinality score[a] according to assessment by adult users of Family Health Strategy facilities attended by Cuban and Brazilian doctors participating in the More Doctors Program, Brazil, 2016

Region	Physician group[b]	Mean (CI 95%)		
		Overall PHC score	Access score	Longitudinality score
Brazil	Total	6.78 (6.71 to 6.84)	4.24 (4.18 to 4.30)	7.43 (7.37 to 7.49)
	MMCuba	6.86 (6.75 to 6.97)	4.43 (4.32 to 4.54)	7.38 (7.27 to 7.50)
	MMBrazil	6.74 (6.63 to 6.85)	4.08 (3.98 to 4.18)[d]	7.43 (7.33 to 7.53)
	MedESF	6.73 (6.60 to 6.86)	4.20 (4.09 to 4.32)[d]	7.48 (7.36 to 7.60)
	p-value[c]	0.215	< 0.001	0.529
North	Total	6.44 (6.23 to 6.65)	3.98 (3.78 to 4.19)	6.99 (6.73 to 7.25)
	MMCuba	6.39 (6.05 to 6.74)	4.31 (3.98 to 4.64)	6.75 (6.25 to 7.25)
	MMBrazil	6.63 (6.36 to 6.90)	3.83 (3.50 to 4.17)	7.17 (6.85 to 7.49)
	MedESF	6.28 (5.82 to 6.74)	3.77 (3.41 to 4.13)	7.07 (6.59 to 7.54)
	p-value[c]	0.33	0.057	0.379
Northeast	Total	6.66 (6.55 to 6.76)	4.20 (4.10 to 4.31)	7.30 (7.20 to 7.39)
	MMCuba	6.90 (6.72 to 7.09)	4.48 (4.26 to 4.71)	7.36 (7.20 to 7.53)
	MMBrazil	6.55 (6.33 to 6.77)[d]	3.94 (3.77 to 4.11)[d]	7.24 (7.08 to 7.41)
	MedESF	6.51 (6.23 to 6.79)[d]	4.20 (3.94 to 4.46)	7.28 (7.01 to 7.55)
	p-value[c]	0.018	0.001	0.601
Southeast	Total	6.85 (6.71 to 6.99)	4.27 (4.14 to 4.40)	7.49 (7.36 to 7.62)
	MMCuba	6.90 (6.56 to 7.24)	4.38 (4.17 to 4.58)	7.48 (7.28 to 7.69)
	MMBrazil	6.72 (6.46 to 6.99)	4.24 (4.01 to 4.47)	7.45 (7.21 to 7.69)
	MedESF	6.84 (6.60 to 7.08)	4.19 (3.97 to 4.42)	7.55 (7.32 to 7.78)
	p-value[c]	0.314	0.449	0.833
South	Total	7.14 (6.95 to 7.32)	4.36 (4.20 to 4.52)	7.89 (7.72 to 8.06)
	MMCuba	6.90 (6.59 to 7.21)	4.42 (4.12 to 4.72)	7.60 (7.28 to 7.92)
	MMBrazil	7.18 (6.87 to 7.49)	4.24 (4.00 to 4.48)	8.04 (7.78 to 8.30)
	MedESF	7.35 (7.05 to 7.64)	4.42 (4.14 to 4.70)	8.04 (7.76 to 8.32)
	p-value[c]	0.146	0.525	0.075
Central-West	Total	6.68 (6.38 to 6.98)	4.35 (4.01 to 4.69)	7.41 (7.11 to 7.70)
	MMCuba	6.71 (6.08 to 7.34)	4.5 (3.76 to 5.25)	7.56 (6.89 to 8.23)
	MMBrazil	6.89 (6.51 to 7.27)	4.14 (3.66 to 4.63)	7.33 (6.87 to 7.78)
	MedESF	6.39 (5.93 to 6.84)	4.41 (4.03 to 4.80)	7.31 (7.07 to 7.55)
	p-value[c]	0.246	0.609	0.777

[a] The overall PHC score was obtained by combining the responses to the short version of the PCATool-Brazil, the access score, the longitudinality score, and the attributes included in the long version of the PCATool-Brazil, ranging from 0 to 10. A score of ≥ 6.6 was considered to be high.
[b] MMCuba: Cuban physicians participating in the More Doctors Program; MMBrazil: Brazilian physicians participating in the More Doctors Program; MedESF: Brazilian physicians not affiliated with the More Doctors Program.
[c] Correlated with an analysis of variance (ANOVA).
[d] P-value < 0.05 in a Bonferroni multiple comparison test using MMCuba as the reference category.

TABLE 3. Proportions of high and low scores according to assessment by adult Family Health Strategy users attended by Cuban and Brazilian doctors, regardless of whether or not they were participating in the More Doctors Program, Brazil, 2016

Region	Physician group[b]	Overall PHC score[a]			Longitudinality score[a]			Access score[a]		
		Low n (%)	High n (%)	p-value[c]	Low n (%)	High n (%)	p-value[c]	Low n (%)	High n (%)	p-value[c]
Brazil	MMCuba	867 (41,7)	1 212 (58,3)	0,643	623 (29,9)	1 463 (70,1)	0,812	1 870 (90,4)	199 (9,6)	0,001
	MMBrazil	894 (43,5)	1 162 (56,5)		601 (29,1)	1 461 (70,9)		1 910 (93,9)	125 (6,1)[d]	
	MedESF	865 (43,1)	1 140 (56,9)		576 (28,6)	1 435 (71,4)		1 859 (93,2)	135 (6,8)[d]	
North	MMCuba	138 (54,8)	114 (45,2)	0,241	119 (47,4)	132 (52,6)	0,110	233 (92,8)	18 (7,2)	0,020
	MMBrazil	110 (45,3)	133 (54,7)		80 (32,7)	165 (67,3)		233 (97,5)	6 (2,5)[d]	
	MedESF	122 (54,2)	103 (45,8)		87 (38,7)	138 (61,3)		216 (97,3)	6 (2,7)[d]	
Northeast	MMCuba	306 (41,2)	436 (58,8)	0,049	220 (29,5)	525 (70,5)	0,233	662 (90,2)	72 (9,8)[e]	0,020
	MMBrazil	366 (48,2)	393 (51,8)[d]		257 (33,8)	504 (66,2)		713 (94,7)	40 (5,3)[d]	
	MedESF	329 (47,9)	358 (52,1)[d]		230 (33,4)	458 (66,6)		629 (91,7)	57 (8,3)[e]	

TABLE 3. (*Continued*)

Region	Physician group[b]	Overall PHC score[a]			Longitudinality score[a]			Access score[a]		
		Low n (%)	High n (%)	*p*-value[c]	Low n (%)	High n (%)	*p*-value[c]	Low n (%)	High n (%)	*p*-value[c]
Southeast	MMCuba	217 (36,4)	379 (63,6)	0,076	154 (25,8)	443 (74,2)	0,471	540 (91,4)	51 (8,6)	0,080
	MMBrazil	259 (44,1)	328 (55,9)		171 (29,0)	418 (71,0)		534 (91,8)	48 (8,2)	
	MedESF	256 (40,2)	381 (59,8)		163 (25,5)	477 (74,5)		600 (94,9)	32 (5,1)	
South	MMCuba	143 (39,6)	218 (60,4)	0,077	93 (25,8)	268 (74,2)	0,044	323 (89,5)	38 (10,5)	0,480
	MMBrazil	109 (32,6)	225 (67,4)		55 (16,5)	279 (83,5)[d]		302 (91,8)	27 (8,2)	
	MedESF	101 (29,2)	245 (70,8)		59 (17,0)	289 (83,0)[d]		310 (89,3)	37 (10,7)	
Central-West	MMCuba	63 (49,2)	65 (50,8)	0,236	37 (28,0)	95 (72,0)	0,708	112 (84,8)	20 (15,2)	0,010
	MMBrazil	50 (37,6)	83 (62,4)		38 (28,6)	95 (71,4)		128 (97,0)	4 (3,0)[d]	
	MedESF	57 (51,8)	53 (48,2)		37 (33,6)	73 (66,4)		104 (97,2)	3 (2,8)[d]	

[a] High: ≥ 6.6 points; low: < 6.6 points.
[b] MMCuba: Cuban physicians participating in the More Doctors Program; MMBrazil: Brazilian physicians participating in the More Doctors Program; MedESF: Brazilian physicians not affiliated with the More Doctors Program.
[c] Correlation with the chi-square statistical test.
[d] *P*-value <0.05, correlated with the multiple comparison using MMCuba as the category of reference.
[e] *P*-value <0.05, correlated with the multiple comparison using MMBrazil as the category of reference.

TABLE 4. Univariate and multivariate models for the characteristics contributing to the overall PHC score for the Family Health Strategy using multilevel analysis, Brazil, 2016

Characteristics	Univariate model		Multivariate model[a]	
	B[b] (CI: 95%)	*p*-value[c]	B[b] (CI: 95%)	*p*-value[c]
Doctor group				
MMCuba	0	-	0	-
MMBrazil	-0,12 (-0,31 a 0,07)	0,195	-0,27 (-0,51 a -0,02)	0,064
MedESF	-0,13 (-0,32 a 0,07)	0,228	-0,09 (-0,28 a 0,10)	0,378
Characteristics of the users				
Sex				
Male	0	0,200		
Female	-0,06 (-0,16 a 0,03)			
Age				
18 to 38 years	0	-	0	-
39 to 57 years	0,19 (0,09 a 0,29)	<0,001	0,15 (0,03 a 0,27)	0,018
58 years and above	0,21 (0,10 a 0,31)	<0,001	0,15 (0,01 a 0,28)	0,031
Color or race				
White	0	0,690		
Non-white	-0,02 (-0,11 a 0,07)			
Socioeconomic level				
D and E	0	0,020	0	0,020
A,B, and C	0,11 (0,02 a 0,20)		0,12 (0,02 a 0,23)	
Presence of ≥ 1 chronic disease				
No	0	<0,001	0	0,002
Yes	0,26 (0,17 a 0,34)		0,17 (0,06 a 0,28)	
No. of consultations in the work unit in the last year				
3 or less	0	-		
4 to 6	0,48 (0,38 a 0,58)	<0,001		
7 or more	0,75 (0,64 a 0,85)	<0,001		
≥ 1 hospitalization in the last year				
No	0	0,180		
Yes	0,08 (-0,04 a 0,20)			
Doctor made a house visit				
No	0	<0,001	0	<0,001
Yes	1,20 (1,06 a 1,34)		1,17 (1,03; 1,31)	

(*Continued*)

TABLE 4. (*Continued*)

Characteristics	Univariate model		Multivariate model[a]	
	B[b] (CI: 95%)	*p*-value[c]	B[b] (CI: 95%)	*p*-value[c]
Characteristics of the doctors Characteristics of the doctors				
Sex				
Male	0	0,002		
Female	0,24 (0,08 a 0,39)			
Years of medical education				
22 or more	0	-	0	-
10 to 21	0,32 (-0,09 a 0,54)	0,004	0,32 (0,11 a 0,54)	0,003
4 to 9	0,21 (0,00 a 0,42)	0,049	0,27 (0,05 a 0,49)	0,016
3 or less	0,18 (-0,04 a 0,40)	0,113	0,19 (-0,08 a 0,46)	0,160
Education				
Graduate specialization	0	-		
Specialization in family & community medicine	-0,02 (-0,22 a 0,19)	0,8761		
Residency or specialization in a field other than & community medicine	-0,22 (-0,43 a -0,01)	0,0588		
No residency or specialization	-0,07 (-0,30 a 0,16)	0,5485		
Other employment affiliation				
No	0	0,023		
Yes	0,18 (0,03 a 0,34)			
Average number of visits per 4-hour shift				
12 or fewer	0	-	0	-
13 to 15	0,01 (-0,21 a 0,20)	0,966	0,04 (-0,17 a 0,25)	0,697
16 to 18	-0,06 (-0,27 a 0,16)	0,607	-0,08 (-0,29 a 0,13)	0,448
19 or more	-0,33 (-0,56 a -0,10)	0,004	-0,34 (-0,57 a -0,11)	0,003
Job satisfaction				
Very satisfied/satisfied	0	0,173		
Dissatisfied/very dissatisfied	-0,11 (-0,27 a 0,05)			

[a] Variables retained in the final model.
[b] B: Beta coefficient for the model.
[c] Random effect associated with the multivariate model.
[d] MMCuba: Cuban physicians participating in the More Doctors Program; MMBrazil: Brazilian physicians participating in the More Doctors Program; MedESF: Brazilian physicians not affiliated with the More Doctors Program.
[e] Hypertension, diabetes mellitus, depression, or chronic pulmonary disease.

made a home visit, which produced a significant increase of 1.17 points in the overall PHC score (Table 4). The variable "number of visits to the health unit in the last 12 months" was removed from the multivariate model because of its collinearity with the variable that identifies the profile of the user's illnesses.

DISCUSSION

The present study shows that the emergency performance of PMM physicians was associated with an increase in the access score as measured using the PCATool-Brazil, with a higher proportion of high scores in regions with greater socioeconomic vulnerability (the North, Northeast, and Central-West). The overall PHC score and its longitudinality component exceeded the cutoff point for a high score, but the actual values were very close to the limit, indicating a significant opportunity for strengthening PHC in the country. It should be noted that the results showed a slight improvement in PHC performance in recent years when compared with the overall score measured with the PCATool-Brazil in earlier local studies (10-14). It was possible to determine that physician performance – i.e., number of consultations and home visits – had a greater impact on the overall score than their specialization. From the user perspective, the presence of chronic diseases, advanced age, and socioeconomic levels A, B, and C had a positive effect on the overall PHC score. It is important to note that the nationality of the physician (whether Cuban or Brazilian) was not strongly associated with the PHC scores measured. Even in the presence of significant differences, such as in the numerical value, it was insignificant.

The strong points of this study included the fact that it was an objective assessment of PHC in Brazil, consistent with its defining attributes, and that it used a large sample (6,160 people interviewed versus a necessary sample size of 6,193). One of its limitations was that the access and longitudinality scores may have been overestimated because the data were collected in a population that was already consulting the health facility (and therefore not subject to other access barriers) and with physicians who had been working in the facility for at least a year (failing to reflect the reality in units that have higher professional turnover). Another limitation has to do with the assessment of the effect of specialization on the overall PHC score, since the medical education systems in Brazil and Cuba are

different and were not examined in detail for this study.

A systematic review of studies conducted with the PCATool-Brazil showed uneven results for PHC outcomes, with a wide range in the amplitude of the overall scores obtained in various municipalities (10). Harzheim et al. and Oliveira et al. identified a major weakness, especially in the access and integrality (service delivery) components (11, 12). Consistent with those results, the present study showed that the access score continued to be low throughout the country. In the North, Northeast, and Central-West regions, which had the greatest socioeconomic vulnerability and shortage of physicians, the proportions of high access scores were higher in the MMCuba group than in the other two groups of doctors. This finding represents a small step forward in achieving equity – the objective of PHC as defined by Starfield (6, 7, 21, 27). The increase in the access score suggests that this attribute has been strengthened in the regions mentioned. However, multivariate analysis showed that users in the D and E economic levels actually saw a reduction in their overall PHC score, a possible indication of ongoing weakness in the care offered to this population profile. PHC in Brazil is facing major challenges in providing real access to users. Studies have shown that the PMM has helped to increase the availability of medical care in the country, as seen in the reduction of municipalities with a shortage of physicians (4, 7). In the present study, the mean number of health unit doctor visits during the year prior to the study was almost double the national mean for visits/inhabitant/year (15). However, this result does not necessarily reflect an increase in access to visits for the entire population; it could be associated with increased consultations by the unit's existing users, such as more frequent checkups by people with stabilized chronic illnesses.

A nationwide study by Fausto et al. identified access difficulties related to scheduling visits: only 28% of users were able to schedule visits whenever they wanted; 30.8% who needed urgent/emergency care obtained tickets and started waiting in line before the unit opened; and 35% of the users did not try to get an appointment because the knew the unit was closed (17). In our study,

almost half the visits had taken place on the day of the interview and the appointment was obtained on the same day. Even so, however, one-third of the users said that it was difficult to obtain care when they needed it, and less than 10% said that their units offered extended treatment hours. In countries with strong PHC, strategies for improving access include extended hours. This is the case in Canada and the United Kingdom, where PHC service is offered 24 hours a day via telehealth plus a telephone line that offers health guidelines. Spain, in turn, has a 21-hour extended schedule (28–30).

We noted that, even though the PMM doctors spent less time in the units, their longitudinality score was no lower than for the other physician groups. The territorial link established with the service may be a factor facilitating this process. Longitudinality is defined as the length of the relationship between health professionals and users of the service, which serves as a reference point regardless of the presence of specific health problems (27). Countries such as Canada, the United Kingdom, and Australia have opted to strengthen longitudinality by letting users choose the family and community physician, not necessarily near their residence, who is responsible for a roster of about 1,500 patients (28, 29, 31). In Brazil, the requirement for users to seek care within their specific area, with each unit responsible for approximately 3,000 individuals, may be impairing longitudinality and access. In the multivariate analysis, the physician's specialty was not shown to significantly affect the overall PHC score. However, it should be noted that the sample was not designed to measure this correlation. Castro et al. and Chomatas et al. both found a positive correlation between specialization in PHC and a high overall PHC score (13, 14). International evidence also points in this direction, showing better health outcomes with larger numbers of family and community physicians per inhabitant compared with other specialists (27, 32). Still, despite the lack of correlation with this specialty, home visits (one of the intrinsic tasks of a PHC physician) were directly correlated with higher overall scores (33–35).

Even though the PMM has increased the number of physicians specialized in PHC, weaknesses in local structures and

the health care network as a whole can reduce the potential efficiency and response capacity of family and community physicians (32). Giovanella et al. identified structural challenges when they studied 38,812 health units in the country: only 4.8% met all the criteria for improving their operations, while 44.1% lacked basic equipment and supplies (4). A study on the infrastructure of the health units that received doctors from the PMM found that 62.5% of the units had average quality infrastructure and 5.8% had poor quality (5). The uneven quality of PHC in Brazil can be attributed, among other factors, to structural and management issues; the turnover of physicians in health units, especially in remote areas; and the small number of physicians with specialized training to work in PHC (7, 18). These three factors undermine the quality of physician care, limiting its potential effectiveness and reducing the clinical response capacity of the teams. Furthermore, the quality of a country's PHC is also affected by structural factors, such as facilities, equipment, and organization of the health care network, which also undermine the processes (defining attributes) and limit health outcomes (29, 32).

CONCLUSIONS

This study shows that the national strategy of recruiting more doctors has increased the access score, especially in regions that are socioeconomically vulnerable and have a shortage of physicians. The type of physician, whether Cuban or Brazilian, did not appear to affect the degree of orientation (overall PHC score) in the country. The overall PHC score and the longitudinality component slightly exceeded the cutoff point established as a high score, suggesting the need for new interventions to strengthen PHC in Brazil, such as reinforcing the fundamental roles of the physician (home visits when necessary) and improving access for socioeconomically vulnerable populations and younger people without defined health problems. It will be important to conduct new studies to assess structurally related elements (technical quality of professionals, availability of equipment, etc.) and processes (analyzing the components of the new expanded version of the PCATool-Brazil), which could affect the quality of PHC in Brazil.

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RESUMO

Qualidade da atenção primária à saúde no Brasil e associação com o Programa Mais Médicos

Objetivo. Avaliar a qualidade da atenção primária à saúde (APS) no Brasil e sua associação com o Programa Mais Médicos (PMM).

Métodos. Este estudo transversal de abrangência nacional utilizou a ferramenta PCATool-Brasil para avaliar a qualidade da APS a partir da experiência dos usuários vinculados a três categorias de médicos: médicos brasileiros do PMM, médicos cubanos do PMM e médicos brasileiros não vinculados ao PMM. Os seguintes escores foram calculados: Escore Geral da APS, Escore de Acesso e Escore de Longitudinalidade. A associação entre o Escore Geral obtido, a categoria do médico e outras características dos usuários e dos profissionais foi investigada por análise multinível.

Resultados. O Escore Geral da APS para o Brasil foi 6,78, e o Escore de Longitudinalidade, 7,43. Não houve diferença entre esses escores para as três categorias de médicos. O Escore de Acesso para o Brasil foi de 4,24, havendo diferença pequena, mas significativa (P-valor < 0,001), entre as categorias de médicos: médicos cubanos do PMM com 4,43 (IC: 4,32 a 4,54), médicos brasileiros do PMM com 4,08 (IC: 3,98 a 4,18) e médicos brasileiros não vinculados ao PMM com 4,20 (IC: 4,09 a 4,32). Na análise multinível, idade, estrato socioeconômico, presença de doenças crônicas e o fato de o médico realizar visita domiciliar influenciaram positivamente o Escore Geral.

Conclusões. O tipo de médico não influenciou o grau de orientação aos atributos da APS (Escore Geral) no Brasil. O PMM associou-se a maiores Escores de Acesso em regiões de maior vulnerabilidade socioeconômica. Com a análise multinível, identificamos que o fortalecimento da APS também pode ser alcançado ao reforçar papéis fundamentais dos médicos que trabalham na APS (como as visitas domiciliares) e aprimorar o acesso das populações de maior vulnerabilidade socioeconômica e de pessoas mais jovens ou sem doenças crônicas.

Palavras-chave Atenção primária à saúde; Estratégia Saúde da Família; pesquisa sobre serviços de saúde; Sistema Único de Saúde; sistemas de saúde; Brasil.

RESUMEN

Calidad de la atención primaria de salud en Brasil y relación con el Programa Más Médicos

Objetivo. Evaluar la calidad de la atención primaria de salud (APS) en Brasil y su relación con el Programa Más Médicos (PMM).

Métodos. Estudio transversal de alcance nacional em el que se utilizó la herramienta PCATool-Brasil para evaluar la calidad de la APS a partir de la experiencia de los usuarios vinculados a tres categorías de médicos: médicos brasileños del PMM, médicos cubanos del PMM y médicos brasileños no vinculados al PMM. Se calcularon los siguientes puntajes: Puntaje general de APS, Puntaje de acceso y Puntaje de longitudinalidad. Se investigaron mediante análisis multinivel la asociación entre el Puntaje general obtenido, la categoría del médico y otras características de los usuarios y los profesionales.

Resultados. El Puntaje general de APS para Brasil fue 6,78, y el Puntaje de longitudinalidad, 7,43. No hubo diferencia entre estos puntajes para las tres categorías de médicos. El Puntaje de acceso para Brasil fue de 4,24 y mostró una diferencia pequeña, pero significativa (p <0,001) entre las categorías de médicos: médicos cubanos del PMM 4,43 (IC: 4,32-4,54), médicos brasileños del PMM 4,08 (IC: 3,98-4,18) y médicos brasileños no vinculados al PMM 4,20 (IC: 4,09-4,32). En el análisis multinivel, la edad, el estrato socioeconómico, la presencia de enfermedades crónicas y el hecho de que el médico realizara visitas domiciliarias influyeron positivamente em el Puntaje general.

Conclusiones. El tipo de médico no influyó en el grado de orientación a los atributos de la APS (Puntaje general) en Brasil. El PMM se asoció com mayores Puntajes de acceso en las regiones de mayor vulnerabilidad socioeconómica. Con el análisis multinivel se identificó que el fortalecimiento de la APS también puede ser alcanzado reforzando los roles fundamentales de los médicos que trabajan en la APS (como las visitas domiciliarias) y mejorando el acceso de las poblaciones de mayor vulnerabilidad socioeconómica y de las personas más jóvenes o sin enfermedades crónicas.

Palabras clave Atención primaria de salud; Estrategia de Salud Familiar; investigación en servicios de salud; Sistema Único de Salud; sistemas de salud; Brasil.