Access to, use of and satisfaction with health services among adults enrolled in Brazil's Family Health Strategy: evidence from the 2008 National Household Survey

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Abstract

OBJECTIVE   To assess the effects of participation in Brazil's primary healthcare programme (the Family Health Strategy or FHS) on access, use and satisfaction with health services among adults.

METHODS   Data are from the 2008 National Household Survey (PNAD) on 264 754 adults. This cross-sectional analysis compares FHS enrollees to both non-enrollees and those with private health plans. We calculated predicted probabilities of each outcome stratified by household wealth quintile, rural⁄urban location and sex using robust Poisson regression. We performed propensity score analysis to assess the differences in access among FHS enrollees and the rest of the population, once relevant socio-demographic characteristics and other determinants of access were balanced.

RESULTS   Compared to families with neither FHS enrolment nor private health plans, adult FHS enrollees were generally more likely to have a usual source of care, to have visited a doctor or dentist in the past 12 months, to have access to needed medications and to be satisfied with the care they received. The FHS effect was largest among urban dwellers and the poorest.

CONCLUSIONS   The FHS appears to be associated with enhanced access to and utilization of health services in Brazil. However, it has not yet been able to match levels of access experienced by those with private health plans, perhaps because the population served by the FHS is among the poorest, most rural and least healthy in the country.

keywords Brazil, primary health care, access, Family Health Strategy

Introduction

Strengthening the primary health care has been a priority of the Brazilian government (Escorel *et al.* 2007), but to contribute to health improvements, primary health care must be accessible, appropriate and of good quality. It must serve as the point of first contact for each new health need and attain other core functions, such as providing person-focused care over time, caring for the population's most common health problems, providing care within the context of family and community, and coordinating health care provided elsewhere (Starfield 1998).

The Brazilian Family Health Strategy (FHS) was launched in 1994 as an integral part of Brazil's universal national health system (known as the *Sistema Unico de Saúde* or SUS). The FHS was intended to improve upon existing 'traditional' health posts and centres in the country with a model of care explicitly designed to achieve the core functions of primary care as outlined above. In the FHS, multi-professional health teams (composed of a physician, a nurse, a nurse assistant and 4–6 community health workers) are organized by geographic regions to provide primary care to approximately 1000 families (or about 3500 people). FHS enrolment is not based on individual choice; it is determined by whether a person's residence is within the FHS team's catchment area. In heavily populated areas, there may be more than one FHS team per health facility, but each team is assigned a specific territory and has a list of which families it serves. As with other services delivered by the SUS, there are no user fees for services and most medications are delivered free of charge (Paim *et al.* 2011).

Between 1998 and 2008, the number of FHS teams increased from 4000 to over 29 000, expanding enrolment from 10.6 to 93.2 million people or nearly 50% of the Brazilian population. FHS expansion proceeded unevenly throughout the country, but is now present in over 90% of Brazil's 5565 municipalities. Still, not all municipalities

(especially more populous and urban ones) have enough teams to provide 100% FHS coverage to all residents, although the goal is to continue to expand FHS coverage (Escorel *et al.* 2007; Ministry of Health of Brazil Departamento de Atenção Básica 2010). In 2004, the FHS was joined by oral health teams, of which there were 17 807 in 2009. Access to these teams is also growing.

Although there is evidence that the rapid scale-up of the FHS has been associated with better health in Brazil, to date, most of this evidence has relied on ecological-level studies, which cannot determine how individuals enrolled in the programme might differ from those who are not (Macinko *et al.* 2007; Aquino *et al.* 2009; Rasella *et al.* 2010). This study is the first to use nationally representative individual-level data to assess how the FHS compares with other alternatives in enhancing access to, use of and satisfaction with primary care services in Brazil.

Methods

This study uses data from the National Household Health Survey (the *Pesquisa Nacional por Amostra de Domicilios* or PNAD) carried out 2008 by the Brazilian Institute for Geography and Statistics (IBGE) in collaboration with the Ministry of Health. The PNAD uses a three-stage complex probabilistic sample and is representative of the national, regional and state levels (Brazilian Institute of Geography and Statistics (IBGE) 2008). In 2008, information on all 391 868 people from 150 591 sampled households was obtained by means of interviews; it relies on self-reporting.

Our key exposure variable was composed of the three main types of healthcare coverage available in the country: (i) whether the respondent's household was registered as enrolled in the FHS; (ii) whether the respondent reported having a private health plan that payed for health services in the private or non-profit sector (health plan); or (iii) whether the person had neither a private health plan nor FHS enrolment (neither). In this third group, people in the lowest income groups will likely use the public (SUS) services (the 'traditional' model of primary care delivered at SUS health posts and centres), while those in the highest income groups will most likely use the private sector for primary care and pay out of pocket (Travassos *et al.* 2002).

Outcome variables measure access, utilization and satisfaction with primary care services and include the following: the presence of a usual source of care (Do you usually seek the same place, doctor, or health service when you need care?), healthcare utilization (any doctor visit or dental care visit in the past 12 months), user satisfaction (very good∕good *vs.* fine∕poor∕very poor) with any health care received in the previous 2 weeks and (among adults who reported the need for medications) whether the

respondent was able to obtain all needed medications for free.

Because an individual's access, use and satisfaction with health care will depend on many factors, we control for individual-level variables derived from Andersen's access model, including the following: (i) predisposing factors such as sex, age (measured in categories of 19–29, and 30–39, 40–49, 50–59, 60–69, and 70 years and over), education level (<3 completed years, 4–7 years, 8–10, 11–14, and 15 years or more); (ii) health needs including self-rated health (measured as excellent∕very good *vs.* fair∕poor∕very poor), any mobility limitation, and previous medical diagnosis of any of the following conditions: arthritis, cancer, diabetes, bronchitis∕asthma, hypertension, heart disease, kidney failure, depression, tuberculosis, cirrhosis and∕or tendinitis; and (iii) characteristics of the respondent's residence including access to indoor water supply and geographic region.

To take into account the differences among those in urban *vs.* rural areas and between different income levels, we stratified analyses into four groups: urban poor, urban non-poor, rural poor and rural non-poor. Within each stratum, we calculated adjusted prevalence ratios for each outcome and compared FHS enrollees, private health plans holders, and those with neither FHS nor private health plan coverage, after controlling for relevant individual-level factors as described above. We used robust Poisson regression to estimate all models because all outcomes had a prevalence >10% (Robbins *et al.* 2002).

Rural∕urban location is defined in PNAD and we create a household wealth index composed of principal component analysis of the sum of the following household goods (water filter, cell phone, fixed phone, radio, colour TV, refrigerator, freezer, washing machine, computer, motorcycle and car) (Vyas & Kumaranayake 2006). We extracted the first principal component, divided the resulting score into quintiles and compared two groups: those in the lowest two quintiles (poor) and those in the highest three quintiles (non-poor).

Finally, we conducted propensity score analyses to determine the average treatment effect of FHS enrolment. This technique approximates what would be observed if FHS enrollees and non-enrollees had the same individual characteristics. We constructed a set of matching variables based on nested logistic regression of FHS enrolment, including all variables that significantly improved model fit (all independent variables listed above in addition to employment status, health plan coverage, rural location, and state of residence). We then used STATA's *psmatch2* program to perform propensity score analyses (Leuven & Sianesi 2003). Data were sorted randomly and matched using nearest neighbour matching without replacement.

Covariates were then tested for balance, and matched propensity scores were used to estimate the average treatment effect of FHS enrolment for each outcome (Guo & Fraser 2010).

Fewer than 0.5% of cases were missing any data. Of these, nearly 1000 individuals had no data for household characteristics and were excluded from analyses, making the total sample size of adults equal to 264 095. All analyses were adjusted for the sample design, included individual probability weights and were carried out using STATA Version 11's procedures for complex samples (StataCorp 2009).

Results

Table 1 presents the characteristics of FHS households, those with health plans and those with neither FHS nor health plan coverage. Adults in FHS-enrolled households constituted 42% of the weighted sample. The average age of the sample was 42 years. Slightly more women were

interviewed than men, and about 3% more women than men participated in health plans. FHS households were more likely to be in rural areas than other households, although urbanization was high for all groups. The mean family income in FHS households was 40% lower than the national average and nearly 70% lower than that of families with a private health plan. There is a similar gradient in education: FHS household members are 1.4 times more likely to have 3 years or less of formal education than families with no coverage and 4.4 times more likely than those with a private health plan. FHS enrollees had poorer access to indoor water and were also in worse health than any other group: they were more likely than any other group to rate their own health as poor or very poor and to have a mobility limitation.

Figure 1 presents the study population, by healthcare coverage and wealth quintile. The figure shows a clear gradient among FHS and health plan households: greater wealth is associated with lower FHS coverage and higher likelihood of having a private health plan. The households

Table I Demographic, socioeconomic and health characteristics, by health coverage, Brazilian adults

	Neither FHS nor health plan	FHS only	Private health plan	Total
Female (%)	50.7*	50.7*	53.2*	51.3
(95% CI)	(50.4, 51.0)	(50.5, 51.0)	(52.9, 53.5)	(51.2, 51.5)
Urban residence (%)	86.5*	75.9*	96.0*	83.8
(95% CI)	(85.1, 88.1)	(74.1, 77.8)	(95.5, 96.6)	(82.7, 84.8)
≤3 years schooling (%)	23.2	32.8*	7.54*	22.6
(95% CI)	(22.5, 23.9)	(32.0, 33.6)	(7.20, 7.89)	(22.1, 23.0)
Mean age (years)	41.5	41.8	42.9	42.0
(95% CI)	(41.4, 41.8)	(41.6, 41.9)	(42.7, 43.2)	(41.9, 42.1)
Mean family income (reais)	1616.0*	1250.8*	3842.6*	2086.8
(95% CI)	(1580.5, 1651.6)	(1229.5, 1271.9)	(3739.2, 3946.1)	(2044.9, 2128.6)
Poor/very poor self-rated health (%)	29.1	35.3*	20.1*	29.2
(95% CI)	(28.5, 29.7)	(34.7, 35.9)	(20.0, 21.0)	(28.9, 29.5)
No indoor water (%)	7.4	13.9*	6.5	8.4
(95% CI)	(6.5, 8.4)	(12.6, 15.3)	(5.3, 7.7)	(7.7, 9.1)
One or more mobility limitation (%)	17.2	21.2*	14.8*	18.1
(95% CI)	(16.8, 17.8)	(21.0, 21.8)	(14.4, 15.2)	(17.8, 18.5)
Usual source of care (%)	67.3*	75.3*	76.1*	72.9
(95% CI)	(66.2, 68.3)	(74.2, 76.5)	(75.2, 76.9)	(72.2, 73.7)
Doctor visit in past year (%)	63.7*	67.2*	81.9*	70.2
(95% CI)	(63.1, 64.4)	(66.7, 67.8)	(81.4, 82.3)	(69.8, 70.6)
Dental visit in past year (%)	31.5*	32.8*	55.4*	38.8
(95% CI)	(30.9, 32.2)	(32.2, 33.4)	(54.8, 56.1)	(38.3, 39.2)
Good quality of care received (%)	80.3*	83.6*	92.8*	86.1
(95% CI)	(79.3, 81.4)	(82.8, 84.3)	(92.3, 93.3)	(85.6, 86.6)
Access to medications (%)	36.8*	46.5*	13.3*	32.6
(95% CI)	(35.8, 37.9)	(45.5, 47.6)	(12.7, 13.9)	(31.9, 33.2)
N (weighted proportion)	86 338 (31.9%)	105 769 (42.2%)	71 998 (25.9%)	264 095 (100%)

FHS, Family Health Strategy.
Source: PNAD (2008).
*Significantly different from 'total' (reference) category; $P < 0.05$.
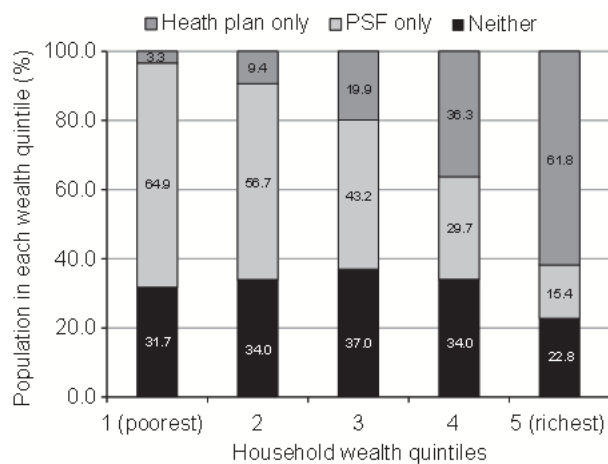
Figure 1 Health coverage by household wealth quintile, Brazilian adults, 2008.

with neither FHS nor health plans constituted about a third of each wealth quintile, except the highest one where they represented nearly a quarter of the richest population.

Table 2 presents five panels: predicted probabilities of reporting that the user had a doctor visit in the past 12 months, had a dental visit in the past 12 months, has a usual source of care, was able to obtain needed medications and rated quality of care received in the past 2 weeks as good or very good. Each panel is stratified by rural location, wealth quintile and health coverage. In the top panel, rural residents in the lowest income quintiles report consistently lower probabilities of having seen a doctor in the past year than do richer rural residents. There is a clear gradient whereby those enrolled in the FHS are more likely to have seen a doctor than those in the 'neither' category, but less likely than those with a private health plan. Among urban residents in both income categories, FHS users and those with a health plan were more likely to report having seen a doctor in the past year. A similar situation was observed for dental visits: FHS enrollees, despite being the poorest group, have better access to dental care than those in the 'neither' category, although not as good as that of those with health plans. Note that the maximum probability observed is only 47% among rich urban health plan holders, suggesting an overall low level of access to dental care in Brazil.

Family Health Strategy families were more likely to have a usual source of medical care than any other group, except the richest urban dwellers with private health plans, and in that case the difference between the FHS and health plan probabilities was not statistically significant. FHS enrollees also had a higher probability of being able to access all

medications of regular use free of charge than all categories of private health plan holders, and within urban settings, than those families in the 'neither' category.

About 80% of respondents reported they were highly satisfied with the quality of health care received in the past 2 weeks. This proportion reached or exceeded 90% among private health plan holders and was generally higher among FHS enrollees than among those with neither private health plans nor FHS coverage.

Table 3 presents propensity score estimates of each outcome for adults, based on balanced matching of covariates, which included demographic and socioeconomic characteristics, having health insurance, rural residence and geographic region. The results show that the overall effects of FHS enrolment are positive, statistically significant, and of a generally similar magnitude as those presented in the stratified analysis in Table 2.

Discussion

This study found that after controlling for predisposing, facilitating and need factors, adults living in households enrolled in the FHS were more likely than individuals living in non-enrolled households to have a usual source of care, to have had a doctor and dental visit in the past 12 months, to have obtained needed medications (in urban areas) and to report satisfaction with care received. In a few cases (usual source of care, access to medication), FHS performance was equal or even superior to that of private health plans. These effects were generally most pronounced among the poorest households, but were also important for some better-off populations, suggesting that the FHS may be both equity-enhancing and becoming increasingly universal.

Our results are consistent with previous studies showing increased access to and use of health care in Brazil, although levels have still not reached those of Organization for Economic Cooperation and Development countries. In 2007, 81.5% of Americans reported having a usual source of health care, vs. 74% in Brazil (National Center for Health Statistics 2010). In 1998, 54.6% of Brazilians had seen a doctor at least once in the past year; in 2003, 62.8% had, and in 2008, 67.8% (Travassos & Viacava 2007). As a comparison, in the United States in 2007, 85.7% of the population had made at least one doctor visit during the past 12 months (National Center for Health Statistics 2010). Access to yearly dental care also expanded from 33% to 40% between 1998 and 2008 (Brazilian Institute of Geography and Statistics (IBGE) 2010). In the United States, this number was 65.3% in 2008.

We found that greater wealth and urban location were associated with increased use of health services, a finding

Table 2 Predicted probabilities of outcomes, by wealth quintile, urban or rural location, and health program coverage, Brazilian adults

	Rural residence			Urban residence		
	Neither	FHS	Health plan	Neither	FHS	Health plan
Doctor visit, past 12 months						
Wealth quintiles 1–2 (poorest)	57.5	61.7*	72.2*,**	61.0	64.6*	75.6*,**
(95% CI)	(55.2, 59.8)	(60.1, 63.3)	(66.8, 77.5)	(59.9, 62.0)	(63.7, 65.5)	(74.1, 77.0)
Wealth quintiles 3–5 (richest)	62.8	66.3	75.4*,**	64.0	67.2*	80.3*,**
(95% CI)	(60.4, 65.1)	(64.4, 68.3)	(72.6, 78.1)	(63.3, 64.7)	(66.5, 68.0)	(79.6, 81.1)
Dental visit, past 12 months						
Wealth quintiles 1–2 (poorest)	19.72	28.14*	31.42*	25.54	29.8*	39.17*,**
(95% CI)	(17.9, 21.6)	(26.6, 29.7)	(26.3, 36.6)	(24.7, 26.4)	(28.9, 30.7)	(37.5, 40.9)
Wealth quintiles 3–5 (richest)	31.87	36.11	44.39*,**	33.27	36.21*	46.19*,**
(95% CI)	(29.3, 34.5)	(34.5, 37.9)	(41.0, 47.8)	(32.4, 34.1)	(35.4, 37.1)	(45.2, 47.2)
Has a usual source of care						
Wealth quintiles 1–2 (poorest)	66.5	75.9*	73.1	66.3	75.0*	72.8*
(95% CI)	(62.0, 71.0)	(73.3, 78.5)	(68.4, 77.8)	(64.7, 67.8)	(73.4, 76.5)	(71.2, 74.4)
Wealth quintiles 3–5 (richest)	72.08	77.57	75.8	66.69	74.42*	75.66*
(95% CI)	(68.2, 75.9)	(75.1, 80.1)	(72.3, 79.4)	(65.4, 68.0)	(73.3, 75.5)	(74.5, 76.9)
Able to obtain all needed medications free of charge						
Wealth quintiles 1–2 (poorest)	42.4	44.8	10.0*,**	39.2	47.0*	24.3*,**
(95% CI)	(34.8, 50.0)	(40.1, 49.5)	(4.6, 15.5)	(35.8, 42.7)	(44.1, 50.0)	(20.3, 28.4)
Wealth quintiles 3–5 (richest)	29.5	36.0	10.3*,**	29.0	35.1*	13.1*,**
(95% CI)	(22.2, 36.8)	(30.4, 41.5)	(5.5, 15.0)	(27.2, 30.7)	(33.0, 37.2)	(11.8, 14.5)
Quality of care received in past 2 weeks was good/very good						
Wealth quintiles 1–2 (poorest)	85.1	89.61		76.95	83.47*	90.39*,**
(95% CI)	(81.8, 88.4)	(87.0, 92.2)	–	(73.7, 80.2)	(81.6, 85.3)	(88.4, 92.4)
Wealth quintiles 3–5 (richest)	81.3	88.5	94.1*	82.8	85.5	92.5*,**
(95% CI)	(74.8, 87.9)	(85.3, 91.7)	(91.1, 97.1)	(81.1, 84.5)	(84.1, 86.9)	(91.2, 93.8)

FHS, Family Health Strategy.
*Statistically significant difference (P < 0.05) from 'neither' category.
**Statistically significant difference (P < 0.05) from 'FHS only' category.
 Quintiles refer to the ranking using a household wealth index.
 Cell size too small to estimate.
Numbers are predicted probabilities and 95% confidence intervals (in parentheses) from Poisson regression of the outcome, controlling for sex, age, schooling, indoor water, self-rated health and chronic conditions, all set at subpopulation means. Results control for complex sample design and include population weights.

Table 3 Propensity score estimates of average treatment effect, Brazilian adults

Variable	Treated (FHS)	Controls (non-FHS)	Difference (treated) controls)	T-stat	Bootstrapped difference
Usual source of care	75.54	68.55	6.99	28.63*	6.70 (6.22, 7.13)
Doctor visit (past 12 months)	66.95	64.77	2.18	8.66*	2.03 (1.62, 2.53)
Dental visit (past 12 months)	38.55	34.97	3.58	13.75*	2.94 (2.53, 3.23)
Quality of care (past 2 weeks)	85.51	82.36	3.15	6.80*	2.89 (2.43, 3.43)
Free medication access	40.63	33.93	6.70	6.82*	7.02 (5.08, 9.75)

FHS, Family Health Strategy.
Numbers are estimated percent reporting each outcome, adjusted for propensity score matching on sex, health plan coverage, employment, income, education, indoor water, self-rated health, mobility limitation, chronic conditions, rural location, and region and state of residence.
*P < 0.001
 Bootstrapped estimate and 95% confidence intervals based on 500 replications.

consistent with prior studies (Travassos *et al.* 2002; Szwarcwald *et al.* 2010). Prior studies had also emphasized the importance of organizational barriers to care, such as waiting times as an important determinant of user satisfaction (Gouveia *et al.* 2005). However, it appears that access has improved: the proportion of Brazilians saying the care they received was good quality has been fairly stable since 1998 at about 86% (Brazilian Institute of Geography and Statistics (IBGE) 2005). This proportion is similar to that found in the United States and Canada (Lebrun & Dubay 2010).

Comparison of FHS enrollees with those with private health plans is not meant to imply that such plans should be considered a gold standard, although health plan holders do appear to have higher levels of access to and use of healthcare services. In Brazil, private health plans are available to people working for specific employers or those able to purchase a plan on the open market. The availability and quality of health plans varies by geographic region and the amount of premium paid. As shown here, private health plans enrol a healthier, wealthier, better educated, more urban clientele than the general Brazilian population, and this may explain much of their 'access advantage'. Private health plans are not conceived of as an alternative to the national health system in Brazil, because they rely on public subsidies: by letting the national health system cover some high-cost procedures and through tax-deductions for many premiums. These plans are also quite expensive: in 2009, they reported revenues of nearly R$63 billion (about US$27 billion), consuming nearly 50% of all spending on health in Brazil. But they provide care to less than a quarter of the population (Paim *et al.* 2011).

The results of the propensity score analysis confirm these findings by demonstrating that once important differences in socioeconomic conditions, health status, demographic characteristics and residential features (such as rural location and geographic region) were balanced among FHS enrollees and the rest of the population, FHS enrolment was unambiguously associated with enhanced access to, use of and satisfaction with health services.

Although this study has the advantage of using national-level data on over 250 000 individuals, there are several limitations. First, all the outcomes are based on self-report and subject to recall bias. Second, we do not know whether individuals from different regions or social classes have different expectations regarding quality of care. To adjust for this, we stratified analyses to compare groups that are more similar in terms of income and residential location. Third, our treatment variables (FHS and health plan coverage) are also based on self-report. The Brazilian government reports 50% of the population as being enrolled in the FHS in 2009, a figure somewhat higher than that reported in the survey, most likely because we included only adults in this analysis (Ministry of Health of Brazil Departamento de Atenção Básica 2010). Fourth, there is the possibility of endogeneity. That is, there may be unmeasured factors which determine whether someone was enrolled in the FHS or had a private health plan. However, individuals do not choose to enrol their household in the FHS; this is decided by one's residential location, and municipal health authorities determine which geographic areas to cover first. We addressed this limitation by stratifying results by the most important municipal-level determinants of FHS enrolment (rural location and income level), including controls for individual-level factors, and performing propensity score analysis to assess the unequal distribution of other observed differences such as health status – an important determinant of health service use and also of private health plan enrolment. Finally, although it appears that the FHS has been important in expanding access, this study could not determine whether the care delivered was of good quality. Indeed, others have noted that the FHS needs to improve the technical quality of care and to enhance other primary care functions such as continuity and coordination of diagnostic and specialty care (Facchini *et al.* 2008).

In conclusion, this study has shown that the FHS is associated with improved access to, use of and satisfaction with primary healthcare services in Brazil. Because any health benefits resulting from FHS expansion depend on it being accessible, this study supports previous work documenting the programme's impact on health outcomes (Aquino *et al.* 2009; Dourado *et al.* 2011) and suggests areas where further improvement will be necessary.

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