

Continuity of Primary Care in the Brazilian Amazon: A Cross-Sectional Population-Based Study

Abstract

Background: Few studies have evaluated the continuity of primary care in universal health care systems, especially in underserved areas. **Methods:** This was a cross-sectional study with 4,001 adults (≥ 18 years old) living in the Manaus Metropolitan Region in 2015. Interviews were conducted in households selected with probabilistic sampling. City and neighborhood variables were collected from databanks. Prevalence ratios (PR) of the continuity of care (defined as using a primary care service and having been previously registered in the Family Health Strategy program) and 95% confidence intervals (CIs) were calculated with multilevel Poisson regression analysis. **Results:** A total of 20.6% (95%CI 19.4-21.9%) of the participants reported continuity of primary care. Women (PR = 1.38; 95%CI 1.18-1.61), nonwhite individuals (PR = 1.13; 95%CI 1.05-1.21), and poorer people (PR = 1.55; 95%CI 1.19-2.02) had higher levels of continuity, whereas health insurance holders had lower levels of continuity (PR = 0.46; 95%CI 0.34-0.62). Individuals with continuity of care had more physician consultations (PR = 1.06; 95%CI 1.02-1.10), dentist consultations (PR = 1.16; 95%CI 1.05-1.28), fewer depressive (PR = 0.59; 95%CI 0.44-0.79) and anxiety symptoms (PR = 0.64; 95%CI 0.48-0.85), and a higher quality of life ($\beta = 0.033$; 95%CI 0.011-0.054) than those without continuity. **Conclusions:** Continuity of care was attained by two-tenths of the population and the level of continuity was high among socioeconomically disadvantaged people. Good outcomes and health services usage increased with continuity of care.

Keywords: Brazil, continuity of patient care, cross-sectional studies, health services, primary health care

Introduction

Primary care has expanded worldwide, particularly in low- and middle-income countries (LMICs).^[1] Primary care effectiveness depends on its core principles: to provide population accessibility, comprehensive care, and continuity of care.^[2] Continuity of care, defined as a sustained partnership between the patient and the clinician, has been highlighted as being essential to the modification of the outcomes related to chronic noncommunicable diseases, such as hypertension, diabetes, and mental disorders.^[3] It requires communication skills, good patient compliance, and consistency of care and is associated with good patient outcomes and low costs of health care.^[4]

Brazil has a universal health care system since 1988, named the Brazilian Unified Health System (*Sistema Único de Saúde*).

Primary care is the backbone of this health system, and starting in 1994, the Ministry of Health expanded the primary care program, referred to as the Family Health Strategy (FHS) program.^[5] This program aims to administer basic health care through teams of healthcare professionals who directly intervene at the community level and who are responsible for providing health counselling, prevention, education, and advice with regard to common diseases and overall health protection in the community.^[6] As the FHS has been used as a model in other LMICs, Brazil represents a valuable setting in which to investigate the factors associated with improved continuity of care with the aim of providing useful information to policy makers in LMICs.^[5]

Few studies have examined the continuity of primary care in universal health care systems. In more vulnerable areas, such as the Brazilian Amazon, these investigations are especially rare.

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Objectives

Our objectives were to investigate the factors associated with the continuity of primary care and its effects on health service usage and health conditions in a metropolitan area of the Amazon, Brazil.

Methods

This cross-sectional, population-based study was conducted with individuals ≥ 18 years old living in the Manaus Metropolitan Region in 2015. We employed probabilistic sampling in three stages: census tract (random), house (systematic), and dweller (random, based on quotas of sex and age) to representatively include 4,000 adults according to sample size calculation.^[7] The primary outcome was the continuity of primary care, defined as using a primary care service when in need of health care and having been previously registered in the FHS program. This was a proxy for continuity of care, based on the assumption that a previous registration in the FHS program increases the connection of the subject with primary care, as attested by a report of usually seeking a primary healthcare service.^[8] The city variables were the primary care package (*piso da atenção básica*, PAB) per capita in Brazilian Real (BRL), FHS coverage, and the number of physicians. The neighborhood variables included the number of basic health units (BHUs), human development index (HDI), and Gini index. Individual variables included the following: sex (male, female), age (18-24, 25-34, 35-44, 45-59, 60 years old or over), race or skin color (white, black, yellow, brown [Brazilian mixed-race] and Indigenous), educational level (university education or above, high school, elementary school, less than elementary school), health insurance coverage (yes, no), self-reported chronic disease (yes, no), self-reported discrimination in healthcare services (yes, no), self-reported usage of healthcare services in the last year (physician or dentist consultation, hospital

admission – yes, no), self-reported health status (very good, good, fair, bad, very bad), depressive symptoms according to the patient health questionnaire (PHQ-9, present if score ≥ 9), anxiety according to the 7-item generalized anxiety disorder (GAD) scale (present if score ≥ 10), health-related quality of life as assessed by the European Quality of Life 5-Dimensions (EQ-5D, from 0-1), and economic classification according to the Brazilian criteria (A/B [higher], C [middle], D/E [lower]).^[9]

Individuals' data were gathered from face-to-face interviews. PAB per capita, FHS coverage, the number of BHUs, and the number of physicians were obtained from the Ministry of Health.^[10] The HDI and Gini indexes were collected from the Brazilian Human Development Atlas.^[11]

A directed acyclic graph was drawn to identify and adjust for confounding factors [Figure 1]. Contextual variables were considered, assuming that clustered data could provide a better explanation of processes operating at different levels, namely, the individual, the neighborhoods, and the cities. Descriptive statistics were calculated, and the association of variables with the continuity of primary care were tested in a bivariate analysis; those variables significant at $P < 0.20$ were retained in the multivariate model.

We performed a multilevel Poisson regression analysis with random intercepts to assess continuity and variables at the individual, neighborhood, and city levels. In the first step, an empty model was initially used to determine the clustering of continuity by city and neighborhood to obtain the variance. The variables of city and neighborhood that reduced the variance at each level were retained in the final model; those that increased the variance were excluded.^[12] If high collinearity was observed among variables ($r > 0.9$), a latent variable was created by multiplying the variables.

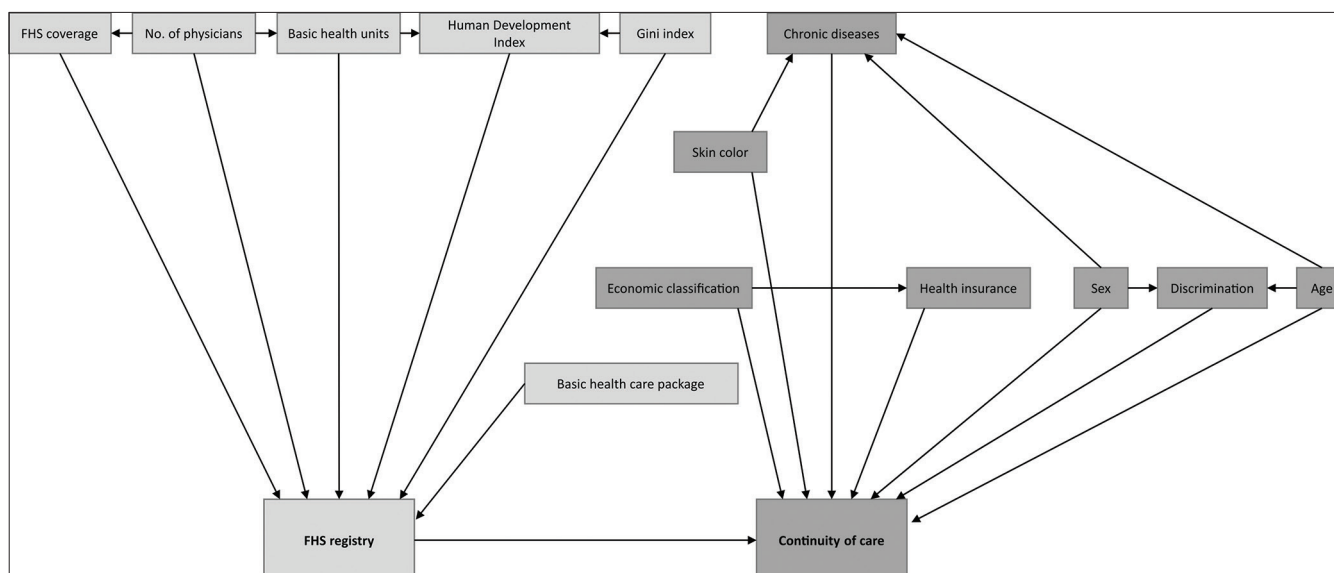


Figure 1: Plan of the analyses to identify and adjust confounding in the study in Manaus Metropolitan Region, 2015 (N = 4,001)

The final model was used to estimate the prevalence ratios (PRs) and 95% confidence intervals (CIs) of continuity based on eligible variables from the city, neighborhood, and individual levels.

To test the influence of continuity on the usage of healthcare services and health situations, we performed unadjusted and adjusted regressions according to the nature of the data (Poisson, ordinal, or Tobit regressions). All analyses were performed with Stata 14.2, with sampling design corrections.

Results

Of the 4,001 participants, 86.9% lived in Manaus, half were women, 57.1% belonged to class C, most were brown, black or Indigenous (range: 62.6-95.1%), and had low health insurance coverage (range: 0.0-37.5%) [Table 1]. Manaus had the lowest PAB per capita (BRL 44.86) and FHS coverage (35.4%). Continuity of primary care was observed in 20.6% (95% CI 19.4-21.9%).

The proportions of individuals with continuity of care were higher among women; black, brown and Indigenous individuals; those with chronic diseases; and lower socioeconomic status ($P \leq 0.021$). Continuity was lower among individuals with health insurance ($P < 0.001$) [Table 2]. Education was not associated with continuity of care in the bivariate analysis and was excluded from the multivariate model; the number of physicians and BHUs, and Gini index increased the variance and were excluded from the multilevel analysis (data not shown). The final multilevel multivariate model was adjusted by latent variables of PAB per capita and FHS coverage at the city level; HDI at the neighborhood level; and age, ethnicity, health insurance, and economic classification at the individual level. Women (PR = 1.38; 95% CI

1.18-1.61); black, brown and Indigenous individuals (PR = 1.13; 95% CI 1.05-1.21); and people with a lower socioeconomic status (PR = 1.55; 95% CI 1.19-2.02) had higher continuity when compared to their reference. Health insurance coverage reduced the continuity of primary care (PR = 0.46; 95% CI 0.34-0.62). Chronic diseases were no longer associated with continuity of care in the multilevel analysis.

Continuity of primary care was associated with more medical consultations (PR = 1.06; 95% CI 1.02-1.10) and dentists (PR = 1.16; 95% CI 1.05-1.28), lower prevalence of depressive (PR = 0.59; 95% CI 0.44-0.79) and GAD symptoms (PR = 0.64; 95% CI 0.48-0.85), and higher utility scores for the health-related quality of life ($\beta = 0.033$; 0.011-0.054) in the multivariate analysis after adjustment by sex, age, ethnicity, economic classification, and healthcare insurance [Table 3].

Discussion

The continuity of primary care was modest—present in one of five adults—in Manaus Metropolitan Region, and was more commonly observed in women, black, brown and Indigenous populations, as well as in people with a lower socioeconomic status. Health insurance holders had lower continuity of primary care. The city's PAB per capita and FHS coverage and the HDI of the neighborhood affected the continuity of care. Individuals with continuity of primary care visited more physicians and dentists in the past year, had a lower prevalence of depressive and anxiety symptoms, and had better quality of life. The positive effects of the continuity of primary care provide a potential mechanism for mitigating health inequalities.

We used a proxy for the continuity of care, reducing it to reporting usually seeking primary care services and

Table 1: Continuity of primary care, variables at the city, neighbourhood and individual levels by municipality and economic classification of the participants from Manaus Metropolitan Region, 2015 (n=4,001)

| Municipality | City | | Neighbourhood (mean±SD) | | | Individuals (%) | | | | | |
|-------------------------|-----------------------------|----------------|-------------------------|-----------|------------|-----------------|-------|------------------------|------------------|------------------|------------|
| | PAB per capita ^a | % FHS coverage | No. of BHU | HDI index | Gini index | Total | Women | Non-white ^b | Health insurance | Chronic diseases | Continuity |
| Manaus | 44.86 | 35.4 | 3.9±2.9 | 0.70±0.08 | 0.48±0.06 | 86.9 | 53.3 | 80.6 | 13.0 | 58.4 | 20.5 |
| Careiro da Varzea | 102.61 | 83.0 | 2.0±0.0 | 0.57±0.00 | 0.57±0.00 | 1.1 | 45.3 | 84.4 | 16.5 | 64.8 | 22.9 |
| Irاندوبا | 190.48 | 100.0 | 12.0±0.0 | 0.60±0.00 | 0.53±0.00 | 1.7 | 47.8 | 62.6 | 7.2 | 36.0 | 3.1 |
| Itacoatiara | 121.94 | 100.0 | 0.5±0.6 | 0.65±0.07 | 0.52±0.05 | 3.8 | 50.0 | 80.1 | 37.5 | 59.0 | 28.5 |
| Manacapuru | 103.84 | 83.3 | 1.1±0.6 | 0.61±0.02 | 0.54±0.05 | 3.5 | 49.7 | 83.6 | 0.0 | 38.9 | 7.1 |
| Novo Airao | 81.28 | 100.0 | 5.0±0.0 | 0.57±0.00 | 0.59±0.00 | 0.6 | 47.4 | 91.7 | 0.0 | 21.6 | 0.0 |
| Presidente Figueiredo | 120.44 | 100.0 | 0.9±0.8 | 0.64±0.01 | 0.53±0.02 | 1.3 | 52.5 | 95.1 | 1.9 | 55.7 | 70.4 |
| Rio Preto da Eva | 133.69 | 100.0 | 4.0±0.0 | 0.61±0.00 | 0.55±0.00 | 1.2 | 47.0 | 75.5 | 0.0 | 61.0 | 19.3 |
| Economic classification | | | | | | | | | | | |
| Higher (A/B) | 56.36 | 42.6 | 4.0±3.3 | 0.68±0.09 | 0.50±0.06 | 15.7 | 41.4 | 73.1 | 26.0 | 51.2 | 12.5 |
| Middle (C) | 54.49 | 42.7 | 3.7±3.0 | 0.69±0.08 | 0.49±0.06 | 57.1 | 52.8 | 80.1 | 12.8 | 55.5 | 19.2 |
| Lower (D/E) | 55.93 | 44.2 | 3.8±3.0 | 0.68±0.08 | 0.48±0.05 | 27.1 | 59.3 | 86.1 | 6.1 | 64.3 | 28.4 |

SD, standard deviation; PAB, primary care package (*piso de atenção básica*); FHS, Family Health Strategy; BHU, basic healthcare units; HDI, Human Development Index. a, in Brazilian Real. b, black, brown and Indigenous (white individuals included yellow skin color)

Table 2: Prevalence ratio (PR) and confidence interval (CI) of continuity of primary care from bivariate, multivariate and multilevel Poisson regression analyses in Manaus Metropolitan Region, 2015 (n=4,001)

| Variables | Bivariate | | Multivariate | | Multilevel multivariate | |
|----------------------------------|------------------|--------|------------------|---------------------|-------------------------|--------------------|
| | PR (95%CI) | P | PR (95%CI) | P | PR (95%CI) | P |
| Sex | | | | | | |
| Men | 1.00 | <0.001 | 1.00 | <0.001 | 1.00 | <0.001 |
| Women | 1.60 (1.41-1.82) | | 1.56 (1.37-1.77) | | 1.38 (1.18-1.61) | |
| Age range (years) | | | | | | |
| 18-24 | 1.00 | 0.020 | 1.00 | 0.417 ^a | 1.00 | 0.916 ^a |
| 25-34 | 1.05 (0.87-1.27) | | 1.01 (0.84-1.21) | | 0.97 (0.79-1.20) | |
| 35-44 | 1.19 (0.98-1.44) | | 1.16 (0.95-1.40) | | 1.06 (0.85-1.32) | |
| 45-59 | 1.18 (0.97-1.44) | | 1.09 (0.89-1.33) | | 0.98 (0.78-1.24) | |
| 60 or over | 1.41 (1.13-1.75) | | 1.16 (0.92-1.45) | | 0.97 (0.74-1.27) | |
| Skin color | | | | | | |
| White and yellow | 1.00 | <0.001 | 1.00 | <0.001 | 1.00 | 0.001 |
| Non-white ^b | 1.22 (1.14-1.30) | | 1.95 (1.58-2.41) | | 1.13 (1.05-1.21) | |
| Health insurance | | | | | | |
| No | 1.00 | <0.001 | 1.00 | <0.001 | 1.00 | <0.001 |
| Yes | 0.45 (0.34-0.58) | | 0.50 (0.38-0.65) | | 0.46 (0.34-0.62) | |
| Self-reported chronic disease | | | | | | |
| No | 1.00 | | 1.00 | | 1.00 | |
| Yes | 1.30 (1.14-1.47) | <0.001 | 1.17 (1.02-1.34) | 0.021 | 1.14 (0.97-1.32) | 0.104 |
| Discrimination in health service | | | | | | |
| No | 1.00 | 0.153 | 1.00 | 0.006 | 1.00 | 0.057 |
| Yes | 0.87 (0.71-1.05) | | 0.77 (0.63-1.93) | | 0.81 (0.65-1.01) | |
| Economic classification | | | | | | |
| Higher (A/B) | 1.00 | <0.001 | 1.00 | <0.001 ^a | 1.00 | 0.002 ^a |
| Middle (C) | 1.53 (1.22-1.91) | | 1.30 (1.04-1.62) | | 1.27 (0.99-1.63) | |
| Lower (D/E) | 2.26 (1.80-2.84) | | 1.71 (1.36-2.15) | | 1.55 (1.19-2.02) | |

a, Wald test. b, black, brown and Indigenous

Table 3: Effect of continuity of primary care on health services usage and health conditions from bivariate and multivariate regression analyses (Manaus Metropolitan Region, 2015; n=4,001)

| Outcome | Bivariate analysis | | Multivariate analysis | |
|--|-----------------------|--------|-----------------------|-------|
| | Effect (95% CI) | P | Effect (95% CI) | P |
| Usage of healthcare services in the last year ^a | | | | |
| Physician consultation | 1.07 (1.03-1.12) | <0.001 | 1.06 (1.02-1.10) | 0.005 |
| Dentist consultation | 1.06 (0.96-1.17) | 0.279 | 1.16 (1.05-1.28) | 0.004 |
| Hospital admission | 1.28 (0.98-1.67) | 0.066 | 1.18 (0.90-1.54) | 0.231 |
| Health condition | | | | |
| Health status ^b | 1.26 (1.11-1.44) | <0.001 | 1.05 (0.92-1.21) | 0.454 |
| Depressive symptoms ^a | 0.75 (0.56-1.01) | 0.060 | 0.59 (0.44-0.79) | 0.001 |
| Generalized anxiety disorder symptoms ^a | 0.77 (0.59-1.02) | 0.070 | 0.64 (0.48-0.85) | 0.002 |
| Health-related quality of life ^c | 0.001 (-0.021; 0.023) | 0.940 | 0.033 (0.011; 0.054) | 0.003 |

CI, confidence interval. a, prevalence ratio (PR) of each outcome by continuity of primary care was calculated by Poisson regression. b, odds ratio (OR) of health status by continuity of primary care was calculated by ordinal regression. c, β coefficient of Health-related quality of life by continuity of primary care was calculated by Tobit regression (bivariate and multivariate analyses) and general linear mixed effect (multilevel analysis)

registration in the FHS program. The concept of continuity of care was simplified in our study, as effective continuity must be relational and informational, which implies mutual confidence and adequate transfer of information from the practitioner to the patient as a result of repeated contacts over time.^[8] Other limitations of our research include the

inability to determine causality due to the cross-sectional design and self-reported data obtained from the interviewed individuals. The multilevel approach considered contextual variables related to primary care investments to provide estimates that consider the influence of the setting.

The proportion of individuals with continuity of care in our sample was lower than that found in Brazil (36%) and northern region (38%) in 2013.^[13] If we expanded our analysis to individuals who reported primary care as a reference, regardless of registration in the FHS, the proportion of individuals with continuity of care would increase to 31%. Our decision to include FHS coverage in the outcome is explained by the type of care offered by this model. Instead of the traditional primary care model, which is designed to deliver outpatient care only based on individual demand, the FHS provides more holistic and person-centered care, aiming to improve both individual and population health.^[14,15]

Economic and racial minorities and individuals with no private health insurance had higher levels of continuity of primary care, a result that reflects the primary care policy in Brazil. The FHS continue to be more present in vulnerable locations, making the aim of improving the population's health and preventing chronic and highly burdensome diseases more difficult to achieve.^[14] Providing a public health system for the poorest strata of the society follows a shallow economic rationale of optimizing the use of resources. This unofficial policy of a 'poor health system for the poor' erodes citizenship and increases inequalities in a country with historical socioeconomic disparities.^[15]

Continuity of primary care increased physician and dental consultations in our study. The austerity agenda installed in Brazil is not captured by previous analyses, and a worse scenario is expected from the reduced public budget in social areas for 20 years starting in 2017.^[16] Following this plan, municipalities are allowed to reallocate primary care budgets to other health initiatives, as well as to reduce the minimum staff of the FHS teams.^[17] Increase in the inequality of access to health care and decrease in the quality of care delivered are expected.

Continuity of primary care was associated with lower proportion of mental health problems. Primary care providers are part of an important strategy to manage common mental disorders and tend to reduce referrals to secondary health services.^[18] Strengthening the continuity of care could be a relevant means of reducing the burden of mental disorders.^[19]

In conclusion, continuity of primary care in the largest metropolitan area of the Amazon is experienced by one fifth of the population, with high levels of continuity in people who are socioeconomically disadvantaged. Ensuring access to primary care for these vulnerable individuals seems to be a policy in the region. Good mental and quality of life outcomes and health services utilization were observed in people with continuity of primary care. Policy makers and stakeholders should prioritize strategies to enhance continuity of primary health care.

Ethics

The project was approved by the Research Ethics Committee of the Federal University of Amazonas with report no. 974,428 on March 3, 2015 (certificate of presentation for ethics approval at Brazil Platform 42203615.4.0000.5020). All subjects signed a written informed consent form for the interview and for the anonymous publication of the research findings.

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Conflicts of interest

There are no conflicts of interest.

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