Original article

Access to private health insurance in the metropolitan region of Manaus, AM, Brazil, in 2015: a cross-sectional population-based study*

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Abstract

Objective: to analyze the frequency and factors associated with coverage by health insurance in the metropolitan region of Manaus, AM, Brazil. **Method:** a cross-sectional population-based study was conducted in 2015, with data collected through household interviews; prevalence ratios (PR) and confidence intervals (95%CI) were calculated using Poisson regression with robust variance adjusted for sex and age. **Results:** we interviewed 4,001 individuals; 13% (95%CI – 12.0;14.1%) had health insurance; greater insurance coverage was observed among military personnel (PR=3.18 – 95%CI 1.64;6.15), private sector employees (PR=1.91 – 95%CI 1.46;2.52) and public sector employees (PR=1.75 – 95%CI 1.23;2.49); health insurance was lower among poorer people (PR=0.21 – 95%CI 0.13;0.33), and those with less schooling (PR=0.66 – 95%CI 0.46;0.99). **Conclusion:** frequency of health insurance was low and was associated with better purchasing power, schooling, and employment.

Keywords: Prepaid Health Plans; Health Services Accessibility; Quality of Health Care; Cross-Sectional Studies.

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Introduction

As a constitutional right and an obligation of the State in Brazil, the country should provide universal and equal access to over 200 million citizens. In a complementary manner, the country's legislation allows the market to operate in different ways, such as private health plans or insurance, for instance. Although the Brazilian National Health System (SUS) is based on the principles of universality, comprehensiveness, equality, decentralization and social participation, economic, administrative and cultural problems prevent its role from being fully played, despite the huge effort made by society to make one of the world's largest public health systems feasible.[1] As such, in order to overcome the shortcomings left by the government, part of the population sees private health plans and services as a way out that ensures their access to health care.[2]

> *The Northern region of Brazil, the country's poorest and least developed region, has the lowest proportion of private health insurance coverage*

Discrepancies noted in the use of private health insurance prompts investigation.[3] It is important to know how demand arises and its relationship with health service user employment or income. A significant part of health insurance clients is comprised of employees of public or private companies which offer this benefit to their staff through SUS resources.[2] Nevertheless, the proportion of health insurance users is found to expand as purchasing power or socioeconomic level increase.[4]

Growth in health insurance is marked by specific political and institutional situations. Law No. 9656, dated June 3rd 1998, and Law No. 9961, dated January 28th 2000, are also relevant in this context.[5,6] The former provides for private health plans and services, while the latter, enacted later, subordinates such plans and services to inspection and control by the National Supplementary Health Agency (ANS). Evidence is lacking with regard to the expansion of the health market within the scenario of a single and public health system which has universalization as one of its principles. Regional discrepancies in access to health insurance are evident. The Northern region of Brazil, the country's poorest and least developed region, has the lowest proportion of private health insurance coverage.[7]

The objective of this study was to analyze frequency and factors associated with private health insurance coverage in the metropolitan region of Manaus, located in Amazonas state in Northern Brazil.

Methods

This is a cross-sectional population-based study conducted in the metropolitan region of Manaus between May and August 2015. The analysis performed here is derived from a larger study the purpose of which was to evaluate use of health supplies and services in the region.[8]

Created by Complementary Law No. 52, dated May 30th 2007, the metropolitan region of Manaus is comprised of eight municipalities: Manaus, Careiro da Várzea, Iranduba, Itacoatiara, Manacapuru, Novo Airão, Presidente Figueiredo and Rio Preto da Eva.[9] In 2010, taking the eight municipalities as a whole, the metropolitan population totaled 2,106,322 inhabitants, 1,802,014 of whom lived in the state capital Manaus, making it one of the largest urban conglomerations in Brazil's Northern region.[10] Also in 2010, the municipal human development index (HDI-M) for the metropolitan region of Manaus scored 0.720, which was considered to be high:[11] Manaus came in antepenultimate place among the 24 Brazilian metropolitan regions, below the national average HDI; and when taken individually, some of its municipalities had low human development indices.[11]

Adults aged 18 or over were considered to be eligible for this study. We calculated the sample size as being 4,000 people, based on an estimate of 50% use of health supplies and services, taking a 95% confidence interval, 2% absolute precision and a design effect of 1.5; we decided to include a further 10% in the sample to compensate for losses or refusals. The sampling process took place in three stages: (i) random selection of census tracts, (ii) systematic selection of households and (iii) and selection of a study participant from each household based on predefined sex and age quotas.[8]

The study took private health insurance users as its dependent variable. The independent variables were obtained through interviews with individuals comprising the sample:

a) sex (male; female);

b) age range (in years: 18-24, 25-34, 35-44, 45-59, 60 or over);

c) schooling (complete higher education, complete high school education, complete middle school education or below middle school education);

d) ethnicity/skin color, self-reported (white, black, yellow, brown or indigenous);

e) economic classification (A, B1, B2, C1, C2, D-E, where A corresponds to the wealthiest level, and D-E corresponds to the poorest level);

f) place of residence (capital; interior);

g) state of health, self-reported (very good, good, regular, poor, very poor);

h) occupation (does not work, student, retired, domestic worker, military personnel, private sector employee, public sector employee, employer, self-employed, housewife, other);

And with regard to health insurance users:

i) health insurance rating (very good, good, regular, poor, very poor or never used); and

j) health insurance duration (up to 6 months, between 6 months and 1 year, between 1 and 2 years, more than 2 years).

Interviews took place face to face. The questionnaires were filled in and the data were collected and saved on tablets (Tab3 SM-T110 Samsung® Galaxy) using the Survey To Go (Dooblo Ltd., Israel) application platform and were then transmitted to the research server via internet. The Interviews were conducted by 14 interviewers with experience in population surveys who received training for this study.

The outcome was measured through the following question:

"Do you have a private, company or public sector health insurance plan?"

If the answer was yes, the following question was asked:

"For how long have you had this health insurance continuously?"

The options in reply to this question were: up to 6 months; between 6 months and 1 year; between 1 and 2 years; or more than 2 years.

Respondents were also asked to rate their health insurance: very good; good; regular; poor; very poor; or never used.

Respondent economic classification was based on reported durable consumer goods in their household, head of family schooling and level of urbanization at the place where the household was located, according to Brazilian Economic Classification criteria defined by the Brazilian Association of Survey Companies (ABEP).[12]

One hundred and fifty pre-test interviews were conducted to check the degree of respondent understanding of the questionnaire. These were included in the final sample. The place where the interview took place was georeferenced with the aim of ensuring data reliability. Part of the interview was audio recorded and 20% of interviewees were later contacted by telephone so as to be able to audit the interviews. Measurements were based on questions already used in national surveys.

We calculated descriptive statistics, followed by bivariate analysis to estimate the prevalence ratio (PR) of health insurance coverage for each study variable and respective 95% confidence interval (95%CI). In order to assess association between the factors being investigated and the dependent variable, we calculated the PR adjusted for sex and age range, using Poisson regression with robust variance. Each variable was adjusted for sex and age range. The complex sample design was taken into consideration in the analysis (svy command), taking the census tract as the weighting unit; all analysis was performed using the Stata statistical package version 14.2.

The study project was submitted to the Federal University of Amazonas Research Ethics Committee (CEP/UFAM): Report No. 974.428/2015; Certification of Submission for Ethical Appraisal (CAAE) No. 42203615.4.0000.5020. All participants signed a Free and Informed Consent form.

Results

A total of 5410 people were invited to take part, 24.3% of whom refused and 1.8% of whom were ineligible. As such, 4001 participants were included in the study, with a higher frequency of young adults between 25 and 34 years old (Table 1). The majority reported their ethnicity/skin color as being brown (72.2%), followed by white (15.9%). There were slightly more females (52.8%) in the sample. More than half the interviewees fell into economic classifications ranging

from C2 to D-E (62.7%). The majority considered their state of health to be good (54.3%) or regular (27.7%). The majority lived in the state capital (86.9%). The frequency of private health insurance coverage was 13% (95%CI 12.0;14.1%). Health insurance coverage was higher among individuals self-reporting white ethnicity/skin color (16.3%) (Table 1).

After adjusting for sex and age range, having health insurance was less prevalent among individuals with lower socio-economic classification (class D-E: PR=0.21 – 95%CI 0.13;0.33), when compared to those with higher income, as well as being less prevalent among those with less schooling (PR=0.66 – 95%CI 0.46;0.99), when compared to those with higher education qualifications (Table 2). Military personnel (PR=3.18 – 95%CI 1.64;6.15), private sector employees (PR=1.91 – 95%CI 1.46;2.52) and public sector employees (PR=1.75 – 95%CI 1.23;2.49), had more likelihood of having health insurance when compared to those who did not work. Women (PR=1.33 – 95%CI 1.11;1.58) and people with a good state of health (PR=1.32 – 95%CI 1.01;1.71) had more access to health insurance.

Among those who had health insurance, the majority considered its quality to be good (58.0%) e and the majority had had health insurance for more than two years (57.0%) (Table 3).

Table 1 – Sample characteristics and health insurance coverage frequency (n=4001) in the metropolitan region of Manaus, Amazonas, 2015

Variables	Total		Health insurance coverage	
	N	%	N	%
Age range (in years)				
18-24	838	20.9	109	12.8
25-34	1,152	28.8	135	11.7
35-44	843	21.1	131	15.5
45-59	772	19.3	105	13.6
≥60	396	9.9	43	10.8
Sex				
Male	1,888	47.2	243	12.8
Female	2,113	52.8	280	13.2
Economic classification				
A	34	0.9	17	50.1
B1	90	2.2	35	38.9
B2	505	12.6	112	22.1
C1	862	21.5	138	15.9
C2	1,423	35.6	155	10.8
D-E	1,087	27.1	66	6.1
Schooling				
Higher education or above	158	4.0	49	30.8
High school education	1,903	47.5	304	15.9
Elementary school education	649	29.7	67	10.2
Below elementary school education	1,291	18.8	103	8.0
Ethnicity/skin color (self-reported)				
White	636	15.9	104	16.3
Black	300	7.5	41	13.6
Yellow	138	3.5	16	11.5
Brown	2,886	72.2	357	12.3
Indigenous	41	1.0	5	12.0

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Table 1 – Sample characteristics and health insurance coverage frequency (n=4001) in the metropolitan region of Manaus, Amazonas, 2015

Variables	Total		Health insurance coverage	
	N	%	N	%
State of health (self-reported)				
Very good	471	11.9	57	12.0
Good	2,175	54.3	328	15.0
Fair	1,108	27.7	117	10.5
Poor	193	4.9	19	9.8
Very poor	54	1.4	2	3.7
Place of residence				
Capital	3,479	86.9	452	13.0
Interior	522	13.2	71	13.2
Occupation				
Does not work	577	14.4	63	11.2
Student	360	9.0	51	14.1
Retired	315	7.9	33	11.1
Domestic worker	45	1.1	2	4.4
Military personnel	12	0.3	7	58.3
Private sector employee	549	13.7	132	24.6
Public sector employee	164	4.1	50	30.2
Employer	36	0.9	8	22.3
Self-employed	1,104	27.7	81	7.4
Housewife	839	20.9	88	10.5
Other	41	1.0	8	19.5

Discussion

Slightly less than one tenth of the population of the metropolitan region of Manaus had health insurance coverage in 2015. People with little schooling, lower income, with no formal employment and males had less access to supplementary health and depend exclusively on the SUS for their health care, protection and recovery.

Only individuals who agreed to do so took part in the study. It is possible that the opinions and possible answers of people who were not at home and those of people who refused to take part might diverge from the results collected and this increases the risk of selection bias. Despite this hypothesis, the probabilistic sampling process used, with predefined quotas for sex and age, enabled adequate population representativeness. Another limitation of the study lies in measuring the outcome by means of interviewing, without objective evidence. Interviewee understanding of the questions, their assertiveness in answering and their ability to remember must certainly have interfered in measurement of the outcome.

The coverage found for the Northern region is similar to that revealed by the 2013 National Health Survey (PNS) for the same region,[7] although it is lower than the national coverage of 30% found by the same Survey; and it is also lower than coverage estimated by ANS for the year 2015, when 26% of the Brazilian population had private health insurance.[13] Neither of these two surveys captured the changes arising from the economic crisis and, as a consequence, the political system crisis within Brazilian society which deepened with effect from 2016. The Manaus Industrial Complex, an important source of employment in the region, has recorded a fall in the number of jobs available, resulting directly from factory closures and reduced economic activity. The current scenario may possibly be worse owing to increased unemployment, a proportional reduction

Table 2 – Factors associated with health insurance coverage (n=4001) in the metropolitan region of Manaus, Amazonas, 2015

Variables	Crude analysis		Adjusted analysis	
	PR[a] (95%CI[b])	P value[c]	PR[a] (95%CI[b])	P value[c]
Age range (in years)[d]				
18-24	1.00	0.084	1.00	0.005
25-34	0.91 (0.72;1.16)		0.94 (0.74;1.20)	
35-44	1.21 (0.95;1.53)		1.28 (0.99;1.64)	
45-59	1.06 (0.83;1.36)		1.42 (1.08;1.85)	
≥60	0.84 (0.6;1.17)		1.46 (0.98;2.19)	
Sex[e]				
Male	1.00	0.735	1.00	0.002
Female	1.03 (0.88;1.21)		1.33 (1.11;1.58)	
Economic classification[f]				
A	1.00	<0.001	1.00	<0.001
B1	0.78 (0.51;1.19)		0.89 (0.58;1.38)	
B2	0.44 (0.30;0.64)		0.57 (0.38;0.84)	
C1	0.32 (0.22;0.46)		0.45 (0.30;0.66)	
C2	0.22 (0.15;0.31)		0.32 (0.22;0.48)	
D-E	0.12 (0.08;0.18)		0.21 (0.13;0.33)	
Schooling[f]				
Higher education or above	1.00	<0.001	1.00	0.043
High school education	0.52 (0.40;0.67)		0.85 (0.64;1.12)	
Middle school education	0.33 (0.24;0.46)		0.68 (0.47;0.97)	
Below middle school education	0.26 (0.19;0.35)		0.66 (0.46;0.99)	
Ethnicity/skin color (self-reported)[f]				
White	1.00	0.108	1.00	0.474
Black	0.84 (0.60;1.17)		0.92 (0.67;1.28)	
Yellow	0.71 (0.43;1.16)		0.78 (0.49;1.24)	
Brown	0.76 (0.62;0.93)		0.84 (0.69;1.02)	
Indigenous	0.74 (0.32;1.72)		0.82 (0.32;2.10)	
State of health (self-reported)[f]				
Very good	1.00	0.001	1.00	0.011
Good	1.25 (0.96;1.63)		1.32 (1.01;1.71)	
Regular	0.88 (0.65;1.18)		1.00 (0.73;1.36)	
Poor	0.81 (0.50;1.33)		0.97 (0.59;1.60)	
Very poor	0.31 (0.02;1.23)		0.43 (0.11;1.76)	
Place of residence[f]				
Capital	1.00	0.894	1.00	0.743
Interior	1.02 (0.80;1.28)		1.04 (0.81;1.33)	

a) PR: prevalence ratio.
b) 95%CI: 95% confidence interval.
c) Wald's test.
d) adjusted for sex.
e) adjusted for age range.
f) adjusted for sex and age range.

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Table 2 – Factors associated with health insurance coverage (n=4001) in the metropolitan region of Manaus, Amazonas, 2015

Variables	Crude analysis		Adjusted analysis	
	PR[a] (95%CI[b])	P value[c]	PR[a] (95%CI[b])	P value[c]
Occupation[f]				
Does not work	1.00	<0.001	1.00	<0.001
Student	1.27 (0.90;1.79)		1.16 (0.81;1.67)	
Retired	0.95 (0.64;1.42)		0.96 (0.62;1.48)	
Domestic worker	0.41 (0.10;1.63)		0.44 (0.11;1.74)	
Military personnel	5.23 (3.07;8.91)		3.18 (1.64;6.15)	
Private sector employee	2.19 (1.66;2.89)		1.91 (1.46;2.52)	
Public sector employee	2.71 (1.95;3.76)		1.75 (1.23;2.49)	
Employer	2.00 (1.04;3.84)		1.62 (0.87;3.02)	
Self-employed	0.66 (0.48;0.90)		0.63 (0.46;0.86)	
Housewife	0.94 (0.69;1.28)		0.89 (0.65;1.21)	
Other	1.75 (0.90;3.41)		1.44 (0.75;2.77)	

a) PR: prevalence ratio.
b) 95%CI: 95% confidence interval.
c) Wald's test.
d) adjusted for sex.
e) adjusted for age range.
f) adjusted for sex and age range.

in the share of health insurance within the context of health services and consequent reduction in the social protection it represented.[14]

A cohort study conducted with 2143 elderly people in the municipality of São Paulo between 2000 and 2006, found that the elderly who did not have health insurance faced longer waiting lists, had fewer examinations, fewer actions for neoplasm prevention/diagnosis and more episodes of falls.[15] Those who have health insurance are found to have more access to health services and to preventive medicine programs.[16-18] The low coverage found in the region, together with higher demand for care on the SUS and the expenditure limit established for Public Health, represent a risk for this population.[19] The destructuring of Primary Care through policies that reduce the teams working in it, compromises the continuity of care provided to this population by the SUS.[20]

We found no association between age range and having health insurance. Notwithstanding, na evaluative study of health insurance coverage in a population living within a Family Health Strategy catchment area concluded that individuals in the 15 to 24 and 65 and over age groups had more health insurance coverage.[21]

We found higher health insurance coverage among women. This result is similar to that found in Pelotas, RS, in 2007 and 2008.[21] The growing contribution of women to family income and the greater attention paid by them to health issues probably influenced the finding.

Income and schooling were directly proportional to the availability of health insurance. Being in a good state of health, reported by more than half the participants, was also found to be associated with the fact of being able to count on health insurance. These results corroborate those found by the 2013 PNS[7] and reveal greater access to a better state of health among people with more favorable socio-economic conditions. Social inequalities directly affect state of health and use of health services by the population.[22,23] Addressing this must be prioritized in order to improve the health situation of the Brazilian population.

People who were formally employed had higher private health care insurance and this association has historical roots. Prior to the 1988 Federal Constitution, public health services were only available to formally employed workers.[24] Following the institution of the SUS, besides having the right to Public

Table 3 – Evaluation and duration of health insurance by users (n=523) in the metropolitan region of Manaus, Amazonas, 2015

Variables	Frequency (%)
Health insurance rating	
Very good	12.2
Good	58.0
Regular	22.1
Poor	3.8
Very poor	2.7
Never used	1.2
Health insurance duration	
Up to 6 months	15.8
Between 6 months and 1 year	15.5
Between 1 and 2 years	11.7
More than 2 years	57.0

Health guaranteed, employees could also continue to count on the security provided by private health care made available collectively through their employment and funded with SUS resources, by means of tax waivers.[2] Privileges and discrepancies like these have continued to exist.[25]

In conclusion, a small part of the population of the metropolitan region of Manaus had health insurance coverage. Private health coverage was greater among the socially and economically better off.

Authors' contributions

Galvão TF and Silva MT designed the study. Filho DBC and Silva MT analyzed and interpreted the data and drafted the preliminary versions of the manuscript. Galvão TF and Kelles SMB interpreted the data and undertook a relevant critical review of the intellectual content of the manuscript. All the authors have approved the final version and declare themselves to e responsible for all aspects of the work, ensuring its accuracy and integrity.

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Erratum

In the article "**Access to private health insurance in the metropolitan region of Manaus, AM, Brazil, in 2015: a cross-sectional population-based study**", doi: 10.5123/s1679-49742020000100001, published on Epidemiologia e Serviços de Saúde, v. 29(1):1-10, in the page 7:

Original text:

"We found no association between age range and having health insurance. Notwithstanding, na evaluative study of health insurance coverage in a population living within a Family Health Strategy catchment area concluded that individuals in the 15 to 24 and 65 and over age groups had more health insurance coverage.[21]

We found higher health insurance coverage among women. This result is similar to that found in Pelotas, RS, in 2007 and 2008.[21] The growing contribution of women to family income and the greater attention paid by them to health issues probably influenced the finding."

Corrected text:

"Health insurance coverage was higher among individuals aged 45-59 years old. A study on health insurance coverage in a population served by the Family Health Strategy in Pelotas/RS in 2007 and 2008 also observed an association with age, but among the elderly.21 Coverage was also higher among women, differently from what was observed in the Pelotas' study.21 Factors that potentially explain such discrepancies include differences in settings, timeline and population representativeness between studies."