

Prevalence of health care use and associated factors in the Metropolitan Area of Manaus: transversal study of population basis

**Introduction:** The study of health service usage in order to identify and propose measures to combat inequality has involved several countries, including Brazil. Our objective is to estimate the prevalence of health service use and associated factors in the Metropolitan Area of Manaus.

**Methods:** A survey of populacional basis, with probabilistic sampling in three stages, stratified by quotas of sex and age was conducted with adults of  $\geq 18$  years of age between May and August, 2015, considering medical or dental consultation, as well as hospitalization in the last year as primary outcome. The associated factors were investigated through the calculation of prevalence rates (PR) obtained by hierarchical Poisson regression modeling.

**Results:** 4,001 adults were included in the study, 53% women. Around half of the individuals reported using tertiary health care when in need of assistance. The self referred prevalence of medical consultation was 77% (confidence interval [IC]95%:75-77%), dental 36% (IC95%:34-37%) and hospitalization 7% (IC95%:6-7%). Medical consultation was associated with women (PR=1.18; IC95%:1.14-1.23), elderly (PR=1.18;IC 95%:1.10-1.26) and people with health insurance (PR=1.14; IC95%: 1.10-1.19). Dental consultations reduced with advanced age (PR=0.38;IC95%:0.30-0.49), lower educational level (PR=0.62;IC95%:0.51-0.74) and lower economic class (PR=0.65;IC95%:0.57-0.75). Hospital interment associated twice as much in women than men, and three times as much among those who reported very poor health status.

**Conclusion:** There was high use of medical consultation. Lower proportion of the population consulted with a dentist, mainly the poorest and least educated. Organization policies and service offer are necessary

to increase equity in health services of the region.

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In the last few years, special attention has been provided to usage estimates and access to health services in Brazil and in the world, with the perspective of identifying and proposing measures to reduce inequality (1). The use of care services is a result of the process that involves individuals in need and health service with its infrastructure, that include technology, inputs and professionals (2, 3).

The population basis inquiries intend to evaluate the health of the population. When analyzing its relation with medical services, they also enable the identification of inequality among groups and the distribution of risk factors in the population (4). Information extracted from these studies supports planning, organization and monitoring of health actions (5-8).

In 2013, a Brazilian inquiry nationwide assessed health care usage in the previous year for medical consultation (61% to 75%), dental consultation (34% to 52%), and hospitalization (5.7 to 7.5%), among regions through self-referred answers (9).

Manaus, capital city of Amazonas state, is located in the northern region and its metropolitan area is the second to last in the human development index among the 20 existing in Brazil (10). Amazonas has the greater territorial extension and the lowest population density of Brazil: over 60% of its population is concentrated in the Metropolitan Area of Manaus (11). The inter-municipal transportation system is typically waterway and there is great distance between the cities and the capital, which is the greatest provider of health care.

Such characteristics influence the availability and access to health assistance in the region and, consequently, the use of such services. Evidence regarding the profile of health assistance chain access and usage will subsidize policies in the sector.

The objective of the present research is to analyze the prevalence and the factors associated to the use of health services on adults who dwell on Manaus' metropolitan region.

It is a trans-sectional study, of a populational basis. The primary outcomes were constituted by

medical consult, dental and hospitalization over the last 12 months.

The interviews were held from May to August of 2015, at the cities in Manaus' metropolitan region: Manaus, Careiro da Várzea, Iranduba, Itacoatiara, Manacapuru, Novo Airão, Presidente Figueiredo e Rio Preto da Eva.

Adult individuals  $\geq 18$  years old were eligible to the study. We performed probabilistic sampling in three stages, stratified by quota of sex and age with base on official data in order to enhance representativeness (12). On the first stage, 400 primary sectors were drawn, and 20 second among the 2,647 urban census sectors of Manaus' metropolitan region (11). The second stage was based on a systematic procedure, which included 10 dwellings in each of the selected sectors. A number between 1 and 20 was drawn to define the first house to be visited. Then, the 20th following dwelling was identified until 10 interviews per census sector were achieved. In case of unavailability, the house on the immediate right was addressed; the same procedure was conducted in case of unavailability of the latter. On the third stage, all the local residents  $\geq 18$  years old present on the domicile were registered, and one was drawn to be interviewed, using pre-defined age and sex quotas, according to the official census.

The independent variables were established by: gender (masculine and feminine), age (18–24, 25–34, 35–44, 45–59,  $\geq 60$  years old), marital status (single, married, separated and widowed), skin color, self declared (white and yellow, black, brown-skinned and indigenous), education (post-graduated, high school, elementary school, or less), social rank (A, B, C, D, E) (12), line of work (formal or informal job, retired, student, homemaker, doesn't work). Health care plan

(yes or no), self-perception of health (very good, good, regular, poor, very poor), attendance place (capital and countryside) and whether or not looks for the same health service (yes or no). The variables used to explain the outcome were: service or professional sought to aid on personal health on the last 15 days, success on the first trial, reason for lack of assistance, how many returns, main health procedure received and reason why didn't look for health service in the past two weeks.

The primary outcome was measured by three questions: "*when did you last see a doctor?*", "*when did you last see your dentist?*" (Possible answer: "in the last 12 months", "from 2 to less than 1 year", "from 2 to less than 3 years", "3 years or more", "never went to the doctor") and "*on the last 12 months, how many times have you been admitted to a hospital for 24 hours or more?*" (possible answer: number of times, categorized for yes or no).

The data was collected using a mobile electronic device (Samsung® Galaxy Tab3 SM-T110) by 14 interviewers, trained and experienced on population survey. The records of the interviews were transmitted via internet and stored using the software Survey ToGo (Dooblo Ltd, Israel). The comprehension of the instrument was performed by a pre-test with 150 interviews.

To minimize the risk of information bias, a phone audit was held with 20% of the interviewed. To guarantee the reliability of the data, the place was georeferenced, and part of the interview was recorded.

**The size of the sample was calculated by an estimative of 50% of usage of health services prevalence, considering the trust level 95%, accuracy 2% and design effect 1,5 (13). From the estimated population, informed by official sources, of 2,106,322 residents  $\geq 18$  years old on the region (11), the sample was 3,598 individuals. To this number, 10% was added to compensate losses or refusals.**

Initially, the descriptive statistics of the variables measured in the study were obtained by calculating the frequency and its stratification by the use of medical, dental and hospitalization consultations. In this step, any differences between the proportions were identified by the Pearson chi-

square calculation. Subsequently, bivariate analyzes were performed between all independent and dependent variables, to calculate the prevalence ratio (PR).

In order to identify the factors associated with the use of these services, PRs were adjusted in a hierarchical model (14) and calculated together with a 95% confidence interval (95% CI) using Poisson regression with robust variance (15-17) .

Thus, a hierarchical model of three blocks was constituted: (1) demographic variables (gender, age, race, marital status); (2nd) socioeconomic variables (income, schooling and occupation); And (3) health (health plan, perception of health status, reference by the same health service, place of care). From the first block, the variables for the next step were maintained if they presented  $p \leq 0.05$ . The multicollinearity between the independent variables was investigated through Variance Inflation Factors (18).

Data analysis was carried out in Stata 14.2. In all the calculations, the complex sampling design was weighted, by incorporation of sample weights (svy command).

The research project was approved by the Research Ethics Committee of the Federal University of Amazonas, through statement no. 974.428, of March, 2015. All the individuals who agreed to participate signed a free and informed consent term.

Figure 1 shows the recruitment process. A total of 4,001 adult individuals  $\geq 18$  years of age were interviewed, with 24% of refusals. The sample consisted of 53% of women (Table 1). Most reported brown skin color (72.2%) and 1% as indigenous. Half of the subjects were between the ages of 18 and 34, were single and had completed high school. The predominant

economic class was C (57%), about one third were in informal work (autonomous and domestic), most reported being in good health (54%).

The prevalence of medical consultation in the last year was 77% (95% CI: 75-77%). Women, the elderly, widows, individuals with lower levels of education than primary school, retirees, individuals who do not work and who report poor health status are the majority (over 80%) of respondents who have consulted in the last 12 months (Table 1).

Table 2 shows the adjusted analyzes. The variables that remained positively associated with statistical significance after adjusting for the demographic block were female (PR = 1.18, 95% CI: 1.14-1.23) and elderly individuals (PR = 1.18, 95% CI: 1, 10-1, 26). In the socioeconomic block, education levels did not influence the consultations. Minor prevalence ratios were observed in extracts C, D and E (PR = 0.94, 95% CI: 0.89-0.98) and in non-working individuals. The health plan holders (RP = 1.14, 95% CI: 1.10-1.19), different health perceptions of "very good" were factors associated with medical consultation in the last block.

The interviewees reported 36% (95% CI: 34-37%) of dental appointments in the last year (Table 1). Approximately 50% of these consultations were carried out by young individuals with full higher education, in income class A and B, who had formal work and health insurance. The lower the educational level (RP = 0.62, 95% CI: 0.51-0.74) and income (RP = 0.65, 95% CI: 0.57-0.75), and higher age ROP = 0.38, 95% CI: 0.30-0.49), the lower the frequency of consultation with the dentist. On the other hand, married individuals (RP = 1.15, 95% CI: 1.05-1.26), health plan holders (PR = 1.25, 95% CI: 1.13-1.38), and those with a poor perception of health (PR = 1.44, 95% CI: 1.13-1.83) had more consultations, Table 2.

The frequency of hospitalization in the last year was of 7% (IC95%:6-7%). Women declared interment approximately three times as much as men. Poor individuals, students and/or housewives and the ones that reported very bad health status were hospitalized more.

After adjustment, women were twice more associated with hospital interment than men. Declare

bad health status was three times more associated than very good health.

Table 3 presents the reasons for the demand and lack of access to health care in the previous 15 days; 48% of respondents reported seeking tertiary service when in need of consultation and 76% had their last consultation with a general practitioner. One fifth sought care in the previous 15 days and had a disease as motivation. Eight in ten respondents were seen on first attempt. Among the individuals that did not get consulted in the two weeks, 57% reported lack of places and 14% reported lack of doctors. The majority of these people (77%) sought service again, seeking  $1.4 \pm 1.2$  in the following two weeks.

Around eight out of ten interviewees went to a doctor in the past year. Women, the elderly, retirees, people with health insurance and the ones that reported bad health, were the ones that were consulted the most. About one third of the interviewees used dental care in the period. Greater use occurred among the individuals with a higher income, schooling, workers with formal employment and health insurance holders. Seven out of 100 interviewees were hospitalized in the previous year. Hospitalizations were associated to women, students and/or housewives and people with a very bad perception of their health status. Tertiary health care was the most sought one, and the majority had their last consultation with a general practitioner. Diseases were the main motivations for seeking health care in the past 15 days. The difficulty of access was attributed to the lack of places and doctors.

The study presents common limitations to cross-sectional design. The outcomes were measured in a single point in time, making it impossible to establish causality. Other limitations are related to memory bias, since people tend to recall to a greater or lesser degree past activities, depending on how important they have been in their lives (19). The absence of a pattern between the available surveys (recall periods, age range) makes comparability at both national and international levels difficult.

The prevalence of medical consultation in this study was similar to inquiries conducted in other areas of Brazil. In Rio Grande do Sul, Lajes, Pelotas and Porto Alegre, variations of 66% to 76% in prevalence rates were found in the last year (20-23). With a 90-day recall period, other national research identified prevalence of 60%, 42% and 35% (21, 24, 25).

In European Union countries, the use of medical consultation in the last 12 months ranged from 63% to 94% between Sweden and Spain (26). In Latin America, the prevalence in the last 30 days was 41% among individuals who use public services and 39% were private insurance holders, in a study conducted in Peru (27).

More than 80% of the women attended the medical appointment in the last year. In addition to factors inherent to prevention care, it is a young population of reproductive age, which requires greater use of health services. This prevalence is similar to other studies in the Brazilian context (82% to 86%) (20, 28) and international, where the frequency of consultations by women was (84%) compared to men (74%) and less difference regarding hospitalization, women (12%) and men (11%) are data from the Norwegian survey conducted in 2008 (29).

Regarding the dental consultation, our findings were compatible with data from the National Health Survey (NHS), referring to the North Region, where 34% had consultations in the last year (9). A Canadian population-based survey of 5,600 individuals conducted in 2012 found that 75% of respondents had consulted a dentist in the previous year. Despite the high utilization, the survey reports that 34% needed dental treatment (30).

The low prevalence of use of dental services is related to access problems in the public health system, since the greater use was concentrated in individuals with higher income, schooling, employees and health plan holders. Thus, negative outcomes in oral health are more observed in the most vulnerable population.

With regard to hospital admission, we found a lower prevalence when compared to surveys conducted in the Midwest and South regions, which varied from 9% to 15% (23, 24, 31). There are no previous reports of hospitalizations in the Metropolitan Region of Manaus for comparison. The NHS 2013 revealed a prevalence of 5.8% of hospitalizations for the North Region and the National Survey by Household Sample of 2008 indicated 7.7% (9). More than 70% of hospitalizations in the Northern Region are financed by the Unified Health System (9).

The availability of hospital beds in the study region and (1.9 beds per 1,000 inhabitants in 2009) may be contributing to the low prevalence, compared to Rio Grande do Sul, state with a higher percentage of hospitalization, the density is 5.27: 1000 (32). The supply of beds in Brazil (2.3: 1,000) is low compared to countries of the Organization for Economic Cooperation and Development, 4.8 beds per 1,000 inhabitants (33). On the other hand, it can also be justified by a majority of the population being young (34), younger than 30 years of age, who require fewer hospitalizations compared to the elderly (35).

Despite the low prevalence of hospitalization, there is a high search for tertiary services in the occurrence of illness, overloading care and causing higher expenses to the sector than if demand was organized through primary health care (36).

An American study reported that 51% of non-critically ill adults admitted to the emergency indicated non-medical factors in the use of the service (lack of information, 23%, inadequate access to specialized outpatient care, 14%, need for diagnostic examination, 12%, inadequate access to primary care, 10%) (37).

Regarding the access issues, we identified that the lack of vacancy for care reported by more than half the individuals who went to the health service in the last 15 days was superior to a study carried out in 2012 in the city of Pelotas (38). Studies of inequalities in the use and access to health services are carried out in various parts of the world in order to identify and point out the gaps in health systems for decision makers (39-42). We consider that there are potential inequalities in income, education, and health insurance statements related to the use of dental services.

In conclusion, medical consultation is frequent among the residents, whereas there are limitations in the use of dental care, with a higher usage rate in elevated economic and educational strata. Tertiary service is the most sought for first consultation and hospitalization was inferior in comparison to other areas of Brazil. The findings require organization actions and service offer in order to achieve equity and enhance orientation of treatment flow.