# Factors Associated with Health Services Utilization
# A Population-based Study Assessing the Characteristics of People that Visit Doctors in Southern Brazil


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## ABSTRACT

***Objectives:*** To analyze: a) the factors that lead persons to visit a doctor; b) their relative importance; and c) the equity of the system, with the aim of assisting the design of interventions to increase accessibility.

***Methods:*** A cross-sectional study with 1,285 persons aged 15 or more was carried out between January and May 2000 in Rio Grande, Brazil. Demographic, socioeconomic, psychological, health need and regular source of care data were collected. The outcome was visit to a doctor within the previous two months. A hierarchical model approach was used, and data were analyzed using Poisson regression. Adjusted prevalence ratios and 95% confidence intervals were calculated.

***Results:*** Health needs measured as self-reported health was the most important factor. The probability of visiting a doctor was 30% for persons reporting excellent health, compared to those with poor or regular health. Those with inactivity days had a 59% increase in the probability of the outcome. Having a regular doctor improved the likelihood of utilizing health services by 74%; having a regular place for care improved it by 65%. Analysis according to the highest level of need showed that the lowest un-educated socioeconomic group made 62% fewer doctor visits. However, a significant interaction was found between income and education, and each year of schooling increased the likelihood of the outcome by 15%. This probability also improved with a regular source of care and/or a health insurance.

***Conclusions:*** Health need and regular source of care (doctor or place) were the most important factors associated with visiting a doctor. Although there is inequity, years of education modified

the prevalence rates of visit to a doctor in the lowest income group. Specific measures reinforcing the importance of having a regular doctor and/or explaining the health-system structure may therefore improve access for the underserved.

**Key words:** Health Services – Accessibility – Utilization – Equity – Continuity of patient care

## INTRODUCTION

The reasons that lead a person to visit a doctor result from a complex interaction of different factors such as demographic (Kandrack, Grant & Segall, 1991), socioeconomic (Alberts, Sanderman, Eimers & Van den Heuvel, 1997), psychological (Campbell, S., M., & Roland, M., O., 1996), morbidity profiles, and health services availability (Hulka & Wheat, 1985). The effect and the relative importance of each depends on the culture, the health policy and the health care system to which the person belongs.

As the lower socioeconomic groups have a higher burden of disease (Blaxter, 1987; Power, Matthews, & Manor, 1996) and therefore need more health services, equity is at the heart of the entire health care issue. In Brazil, a universal, decentralized, and free of charge health care system was created (Unified Health System - SUS), following the promulgation of the 1988 Federal Constitution. Further reforms have occurred since then, but there is evidence that, despite universal coverage and free access to outpatient and inpatient procedures, distribution of health services utilization among social groups remains unequal (Almeida, Travassos, Porto, & Labra, 2000).

This study presents an analysis of the factors related to health services utilization in Brazil after the implementation of the Unified Health System. The issues addressed are specifically: a) Which factors lead a person to visit a doctor? b) What are the weights and the direction of the effect? c) How do these factors affect the equity of the system?

Measuring access is methodologically difficult, which is why most studies in this area use the variable "utilization" as a proxy. Here it will be defined as the prevalence of visiting a doctor within the previous two months from the date of the interview. Although the Andersen model (Andersen & Aday, 1978) is often used in this kind of study, the conceptual framework used here is based upon the hierarchical level of determination (Victora, Huttly, Fuchs, & Olinto, 1997). With this approach, and in order to observe differences between social groups, the socioeconomic variables are measured first. After the analysis, and after taking into account the other levels' factors, if some part of the effect remains significant, this would mean that a difference persists despite the mediation through other variables.

This type of study and its findings are important. First, it contributes to our understanding of the complicated process that leads a person to visit a doctor. Second, there are few articles that address this issue in Brazil and some variables, such as "regular doctor", have not yet been adequately explored. Third, it will assist in the design of interventions to increase the access of poor groups to the health system. Finally, it deals with certain methodological issues that are important in the theoretical framework surrounding issues of equity and accessibility.

## MATERIAL AND METHODS

*Study design and sample*

A cross-sectional study was carried out from January through May 2000 on a probabilistic sample of the population aged 15 years or more, living in the urban area of Rio Grande, Brazil. This county has 200,000 inhabitants, only 5% of whom live in rural areas, and is located in the southern part of the country.

The sample size was calculated in order to detect a relative risk (RR) of 2 with a power of 80%, a 95% confidence level and a non-exposed/exposed ratio of 1:4, using as a factor of

exposure "lower social class". The total expected prevalence for visiting a doctor over the previous two months was estimated at 16%; among the non-exposed it was estimated at 9%. The original sample size of 811 persons was subsequently increased by 10% in order to compensate potential losses, by 20% for confusion factors, and by an additional 20% for design effect, achieving a final sample of 1,285 persons. The required number of households needed to find the stipulated sample was 518 (1996 census: proportion of persons aged 15 years of more = 73%; average persons by house = 3.4).

Forty-five census tracts were selected from the 242 existing in the urban area of the city (2000 Census). The initial census tract was drawn from the first five. A "jump" of 5.38 was added in order to obtain the other 44. One block from each census tract was randomly selected, as was one of the corners in each of them. Departing from the selected corner, every third household was visited, until 12 houses were completed. A total of 540 households were visited, twenty-two more than the initial estimated number. All persons aged 15 or more and living in these households were eligible for entering the study.

Twelve trained interviewers, using a previously pre-coded and pre-tested questionnaire, interviewed the subjects. An independent interviewer revisited 7% of the sample for quality purposes. Two independent operators entered the information to an EPINFO 6.04b database. Consistency and amplitude errors were searched for by the investigator and corrected. The database was then converted to Stata 6.0 for Windows for the statistical analysis.

*Variables*

The questionnaire used in the interviews included socioeconomic, demographic, social, regular source of care and self-reported health needs questions. The variables studied, and their frequencies, can be seen in **table 1**; a brief definition of each item is given below. Hierarchical positions in relation to the outcome are represented in **figure 1**. Although equity is not

represented in the model, it was assessed in terms of accessibility to health services and defined as an equal rate of utilization between the different socioeconomic groups for the same level of need, defined as "persons with a chronic health problem".

***Definition of variables:***

a) Visit to doctor: Outcome dichotomous variable; if the person had visited a doctor within 2 months of the day of the interview. Used as a proxy for accessibility.

b) Social class: Categorized variable. Classified according to the Market Research Brazilian Association (ABIPEME) criteria. Constructed with years of schooling and type of utilities present in the household, has 5 decreasing categories (A, B, C, D, E).

c) Per capita income: Continuous variable. Family income last month (US$) divided by the number of persons in the household. Categorized by quartiles. Converted into dollars using January 2000 exchange rate of US$1 = R$1.80.

d) Education: Discrete variable. Number of completed school years.

e) Unemployment: Dichotomous variable. No job in the previous month.

f) Age: Continuous variable measured in years and categorized in 4 groups: 15-29, 30-44, 45-64, 65 or more.

g) Gender: Sex of the interviewed.

h) Marital status: Categorized variable. Situation in marital status, classified as married (officially or not officially), single, divorced or separated, and widowed.

i) Race: Dichotomous variable, classified either as white, or black and other races.

j) Family stress: Dichotomous variable. Family dysfunction measured by a questionnaire (Smilkstein, 1979) and scored from 1 to 15. Classified as Present (score 1 to 5) or Absent (score 6-15).

k) Social support: Dichotomous variable. Help that a person would expect from other persons if he/she had a problem (McDowell & Newell, 1996). Measured as No (if never or sometimes expected to obtain help) or Yes (if always or often expected to obtain help).

l) Stressful life events: Categorized variable. Stressful situations, such as robbery, disease or death of someone close, experienced within previous year (Lima, Béria, Tomasi, Conceição, & Mari, 1996). Measured as 0, 1, or 2 events and more.

m) Regular doctor: Dichotomous variable. Assessed by two subsequent questions: "If you had a health problem and decided to see the doctor, is there any physician to whom you would commonly go?" and "What is the doctor's name?" Considered as positive if the person answered "yes" to the first question and then provided the doctor's name.

n) Regular place: Dichotomous variable. The same as the previous question, but it was inquired instead whether the person had a regular place to go for care and asked for that place's name. This question was asked if the interviewee did not have a regular doctor.

o) Health insurance: Dichotomous variable; if the person had any other health insurance beside the SUS insurance.

p) Chronic health problem: Dichotomous variable; if a doctor had informed the person that he/she had some chronic health problem.

q) Inactivity days: Dichotomous variable; if the person had not been capable of carrying out his/her usual activities during the previous two months because of a health problem.

r) Self-perceived health: Categorized variable. Addressed by the question "How has your health been since (*two months prior to the date of the interview*) until today?" Rated as poor, regular, good, or excellent.

s) Minor psychiatric disorder: Dichotomous variable. Non-psychotic disorder assessed by the Self-Report Questionnaire –20 (SRQ-20) (Mari & Williams, 1986). A 5/6 cut-off point was used for men and a 7/8 for women.

t) Smoking: Dichotomous variable; if the person was smoking or had smoked at least one cigarette/day within 6 months of the interview.

u) Alcohol dependence: Dichotomous variable; measured by the Alcohol Use Disorders Identification Test -AUDIT- (Saunders, Aaslang, Babor, De La Fuente, & Grant, 1993), using a 7/8 cut-off point.

*Statistical Analysis*

All statistical analyses were performed with Stata version 6.0 for Windows. A 0.05 significance level was previously fixed. In the bivariate analysis, the Prevalence Rates (PR) and 95% Confidence Intervals (CIs) were calculated and the chi square test was used to assess their significance. Furthermore, linear trends were explored for ordinal categorical data; the differences in the chi square ($x^2$ dif) and in the degrees of freedom (df dif) between the models were taken into account, in order to assess if the trend was complete.

A Poisson model was used in the multivariate analysis. This kind of regression, used for dichotomous outcomes and performed through Stata, gives a measure of PR that is more accurate than the odds ratios (calculated by logistic regression). Conservative CIs were computed using the command "cluster", which takes into account the type of sampling used in the study. A Wald test was used to assess the significance of the variable. If ordinal, a linear hypothesis test was performed with the parameters of the estimation. The variables were entered using a hierarchical

approach, as seen in figure 1. At each level of the model, all the corresponding variables were introduced and a backward regression technique was performed. Variables with a p<= 0.2 and/or a PR>= 1.5 were retained for the next level, because of the possibility of negative confusion.

In the equity analysis, the PR of the socioeconomic groups were studied in persons with chronic health problems. The techniques and procedures used were the same as those explained above. If the PR remained significant, after controlling for demographic, source of care and health insurance factors, it meant that despite mediation through other factors, a difference persisted in the utilization rates.

Interaction terms were introduced when pertinent, and a heterogeneity test was carried out in order to know their significance. The kappa test was used to measure the interrater agreement of categorical data among the quality control group. In order to consider the distance between non-concordant rates for variables with more than two possible rates, a weighted kappa was calculated.

## RESULTS

*Characteristics of the sample*

540 households with 1,348 persons were visited. A total of 1,260 persons answered the questionnaire. Of the 88 (7%) persons that were not included in the study, 57 refused and 31 were not found after three attempts. The kappa results of the quality control interviews were above the 0.7 value.

**Table 1** details the characteristics of the studied sample. The monthly per capita mean income was US$168.30 (SD 225.00), the median income was $92.22 and the $10^{th}$ and $90^{th}$ percentiles were $27.77 and $361.11 respectively. The per capita mean income for the last month in the lowest quartile was $33.60; it was US$443.15 in the upper quartile. The overall rate of

unemployment for the last month was 8.9%; the illiteracy rate was 7%. Among the demographic characteristics, the mean age was 40.3 yrs (SD 17.71). There was a slight majority of women in the sample (54%), and most of the interviewed subjects were white (85%).

In regard to the psychological and social characteristics, 9% of the persons belonged to dysfunctional families, 33% had experienced some kind of stressful event in the last year, and 19% had low social support.

The majority had a regular source of health care: 41% had a regular doctor, and 36% had a regular health facility. Despite universal coverage (SUS), almost 40% had some additional type of health insurance.

The vast majority of persons considered their health to be good or excellent (80%), even though a great number of them had had some symptom in the last two months (63%). A quarter of the interviewees expressed some type of chronic health problem, and 9% had experienced some days of inactivity. The prevalence of minor psychiatric disorders was higher among women (22%) than in men (13%). Eight percent had alcohol use disorders assessed by the AUDIT questionnaire and one-third were smokers. Two-thirds had visited the doctor in the last year (66%) and almost one-third (29%) had done so in the last 2 months.

*Bivariate analysis*

**Table 2** shows the results of the socioeconomic, demographic and social-psychological bivariate analysis**.** None of the socioeconomic factors had any significant association with the outcome at this instance. The PR for the different social class categories were very similar, with a 25% reduction in the PR when compared to the highest class. For income, the second and third quartiles had a 10% reduction in the prevalence of visiting the doctor when compared with the upper quartile, and the lowest quartile had a 20% reduction. For school years explored as a

continuous variable, each year of education decreased by 1% the rate of health services utilization.

As expected, women used almost 60% more health services than men, and the probability of visiting the doctor was higher for persons aged 65 or more. Divorced and single persons showed a significant association with the outcome, but with opposite effects: when compared to the married group, the divorced group had a 39% increase in the PR, while the single group had a 33% reduction. Although the "black and other races" group had a 10% decrease in utilization of health services, no significant difference was found.

A significant association with stressful life events was identified, and persons with two or more of these events had a 40% greater probability of seeing a doctor. The group with one event had a 6% higher likelihood, but this was not significantly different from the reference group (none event). Although there is evidence of a linear trend, it is not complete ($x^2$ dif = 4.8, df dif = 1, p=0.03). No association was found for the two other social and psychological variables, social support and family stress.

As seen in **table 3,** a regular source of care affected utilization. Compared to the group without regular source, having a regular doctor increased the likelihood of the outcome by almost 2.5 times, while having a regular place of care increased it by almost 2 times. Furthermore, there was a significant and complete linear trend between the categories ($x^2$ dif = 0.06, df dif = 1, p = 0.8). Another factor that affected the outcome was health insurance: persons with this characteristic had a 50% greater likelihood of visiting the doctor.

A strong relation between self-reported health and the outcome was found. Persons with excellent self-reported health had 4 times less likelihood of visiting the doctor in comparison to persons with poor health; those with good self-reported health had almost 2 times less probability. The association is almost completely explained by a linear relation ($x^2$ dif = 6.1, df dif = 2 p = 0.05). Persons with inactivity days had twice the likelihood of visiting the doctor in

the previous two months. The other health-need variables had an association with the outcome, but the effects were not so marked. A person with a chronic health problem had a PR of 1.52. If he/she had experienced a symptom in the previous 2 months, the PR of visiting a doctor was 39% higher than a person without any symptoms. Mental health need, measured as the presence of minor psychiatric disorders, increased the rate of utilization, with a higher rate in men (PR=1.75) than in women (PR=1.51). As for risky behaviors, smokers had a 21% significant reduction in the probability of visiting the doctor, while persons with alcohol dependence had a 25% non-significant reduction.

*Multivariate analysis*

The results of the multivariate analysis can be seen in **table 4**. After adjusting for other variables in the first level, women had a greater probability of visiting the doctor in the last two months (PR=1.51). The group aged 65 or more had a non-significant 17% increase in the outcome.

An interaction between education, measured in years, and the variable "income" was found. For the lowest quartile income group, each year of study meant a 9% increase in the PR for visiting a doctor. The increase was 5% for the second lowest quartile, but it was not significant. All the other first level variables (unemployment, marital status, race and social class by ABIPEME classification) were positively confounded and lost their effects after adjustment.

In the second level, after adjusting for the previous significant factors, stressful life events remained significant. Persons with two or more stressful life events had a 45% increase in PR in comparison with the group without stressful events. A person with only one event had a 6% increase; furthermore, there was a linear trend that explained almost all the relation ($x^2$ dif = 3.9, df dif =1, p = 0.05). No association was found with the two other variables, social support and family stress, which were excluded from the model.

In the last level, after adjusting for all other factors that remained in the model, having a regular doctor suffered a reduction in the PR when compared to the bivariate analysis (PR 2.48 and 1.74 respectively); however it maintained an important effect, increasing by more than two-thirds the likelihood of visiting a doctor. The category "regular place" also had its effect reduced, but not as much as "regular doctor" (PR 1.92 and 1.65). Both were positively confounded by health insurance and self-reported health. Both groups reached very similar effects after the adjustment, although with significantly different PR ($p = 0.001$), and the complete linear trend among the categories was transformed to partial ($x^2$ dif = 27.1, df=1, p=0.001).

The presence of health insurance remained significantly associated with the outcome, and persons with this characteristic, after adjusting for the other variables, visited the doctor almost 50% more than persons without it. An interaction between "regular doctor" and "health insurance" was explored without any significant results.

Among the health-need category, there was a significant and total linear trend ($x^2$ dif = 2.5, df dif = 1, $p = 0.1$) between the different categories of self-reported health. Even after the adjustment, persons who said they had good health visited the doctor 50% less than the group with bad or regular health; those who said that their health was excellent visited 2/3 less. Inactivity days were also significantly associated with the outcome, showing almost a 60% greater likelihood of visiting a doctor. Having a chronic health problem, a symptom within the last two months or a minor psychiatric disorder, which in the bivariate analysis were significant, mostly lost their effects when adjusted with self-reported health and were excluded. The variable "symptom in the last two months" had an interaction with female sex and the probability of visiting a doctor doubled if the person had both characteristics (PR 2.04, CI95% 1.05-3.96), showing some difference in health-seeking behaviors when compared to men. Finally, persons who were smokers visited the physician almost 30% less than non-smokers, which also has to do with health-seeking behaviors.

*Equity*

**Table 5** presents the results for the socioeconomic variables analyzed for the group with higher level of need, here represented by those with a chronic health problem. Adjusted for demographic factors (age and sex), the lowest income group without a single year of education had a 62% reduction in the probability of using the services (model A), which points out an important degree of inequity. Because of the significant interaction between income group and schooling, each year of study in this lowest income quartile increased the likelihood of visiting a doctor by 15%. The other groups had a PR not different from one.

After controlling for the variables "regular source of care" and "health insurance", which can affect the utilization rates among the social groups (model B), some changes occurred in the risks. The lowest income group without any year of study reduced the gap but maintained a difference in the utilization rate of 52%. But because of the interaction, each year of study increased by 17% the rate in this level of income. Only the interaction for the lowest income group showed significant risks.

Although there was no difference between the models adjusted separately for regular source of care and health insurance (models C and D in **table 5**; p=0.2), the interaction persisted and the models two were significantly different in comparison to the model adjusted only for demographic factors (model A). Controlled for the first variable and because of the interaction, each year of education for a person in the lowest income group meant a 15% increase in the PR; controlled for the second variable, health insurance, the increase was 17%. Once again, all the other groups of the interaction had non-significant PR.

In the group without chronic health problems (not shown), the PR of the socioeconomic variables were very close to 1 and non-significant. Only female sex showed significance among the socioeconomic and demographic categories, possibly reflecting the reproductive health needs in this group (PR 1.49, CI95% 1.25-1.78).

# DISCUSSION

There are some constraints that could have affected the results. First, it is impossible to discard recall bias. Although some studies have used a period as long as three months, it might have been better to use a shorter period than two months. However, the outcome was measured as a dichotomous variable, and it is reasonable to consider that people could remember whether they had visited the doctor within the last two months. In addition, the questionnaire used in this survey also asked about visits to the doctor in the last year, and the result (66%) was very similar to that arrived at in another study (almost 70%) also conducted in southern Brazil (Costa & Facchini, 1997). Furthermore, a recent review of health services utilization found that the proportion of persons that referred a doctor visit in the last year was extremely similar among the reviewed studies (Mendoza-Sassi & Béria, 2001). All these facts diminish the possibility and magnitude of recall bias.

As for the study design, none of the established associations can be inferred as a cause-effect relation, as the design was cross-sectional. For the same reason, the possibility of reverse causality between the outcome and some independent variables cannot be discarded. This is the case for "regular source of care" and "health services utilization". It could be argued that if a person had made more doctor visits, it would be more likely that he had one doctor that he saw regularly. However, evidence from longitudinal studies has shown that the direction of causality is in the way theorized in this model, and that the presence of a regular doctor can actually increase utilization (Mainous & Gill, 1998).

Another relevant methodological question is whether the sample represents the target population. No significant differences were found between the studied sample and the population, either for gender (Sample vs. Population: male 46.1%/48%; female 53.9%/52%), or age group

(Sample vs. Population: 15-29 yrs: 32.4%/32.0%; 30-49 yrs: 37.8%/41.0%; 50-69 yrs: 23.2%/20.3%; 70 and more yrs: 6.7%/6.6%).

Finally, as data losses were an acceptable 7%, it can be assumed that selection bias was not a true problem. Furthermore, available data from the losses (56 of 88) show that the mean age was not different from the sample mean (losses: 42.06 yrs, SD 17.86; sample: 40.3 yrs, SD 17.71; p = 0.4). However, the proportion of men in the losses was higher than in the sample (69% vs. 46%, p=0.01).

Women and age were associated with a higher utilization of services. However, as there was a greater proportion of men in the losses, this could have introduced a bias. If the men that did not answer the questionnaire were more likely to visit the doctor than those who did, there could have been an overestimation of the effect. Nevertheless this appears improbable, as other studies found a very similar effect (Costa & Facchini, 1997).

It was expected that there would be a higher use in the 65 yrs or more group, but this did not happen. In the bivariate analysis, there was a significant increase in the PR for this category, but after adjustment it was not significant. However, with the outcome measured for the last 12 months (where a higher proportion of persons with this characteristic visited the doctor), the variable preserved its significance, even after adjustment for other factors. This suggests that this study did not have enough power to find a possible difference for this age category in the two-month period.

A person's social and psychological characteristics affect health services utilization, and those who have had two or more stressful life events in the past year were more likely to have visited a doctor. As part of the effect disappeared and became non-significant after the health-need variables were introduced, it can be concluded that this effect is mediated through this category. "Social support" and "familiar stress" did not show any association in this study.

Having a regular doctor and a regular place for care ranked second in importance. As other researchers have found (Lambrew, DeFriese, Carey, Ricketts, & Biddle, 1996), there was a linear trend among the categories. However, following adjustment the trend partially disappeared and the effects became very similar. Furthermore, the variable "health insurance" demonstrated an important effect, and here maintained the same PR, even after adjustment for "health need" and "regular source of care".

The effects of the variables related to health need were the highest, confirming other studies (Fernandez-Mayoralas, Rodriguez, & Rojo, 2000; Mapelli, 1993). Self-reported health was the most important variable and had a linear trend associated with the outcome. The variable "inactivity days" was the second most important variable among the health-need factors. The other variables (chronic health problem, symptom in last 2 months, and minor psychiatric disorders) lost their effects after adjustment, mainly with self-rated health. It could also have been a problem of power for detecting a difference. For chronic health problem, the power to find a 1.5 PR was 97%. With the 1.11 PR found after adjustments, the power descended to 21%. In the case of minor psychiatric disorders, the power to find a 1.5 PR was 93%, but with the 1.10 PR obtained during the analysis, the power fell to 17%. The lack of power for finding a real difference is, therefore, very likely.

The analysis of equity for the higher level of need (persons with a chronic health problem), showed the existence of inequity for the lowest income quartile, which can be modified by means of an interaction with education. In other words, if the poorest group had some years in school, the likelihood of visiting a doctor increased. In addition, after adjustment with "regular source of care" and/or "health insurance", the gap between this group and the wealthier ones reduced more. For the other quartile groups, the terms of interaction were not different from one.

The reduced likelihood of visiting the doctor in smokers, although they would theoretically have more health needs and therefore a higher utilization rate, may be explained by different health-seeking behaviors, but more research is necessary in order to clarify the point.

Finally, Brazilian health policymakers need to be aware that despite the new system's universal coverage and free access, there is still some degree of inequity: the poorest and least educated group still uses the health services to a lesser extent. While this disparity could occur as a result of differences in health-seeking behavior, more research is necessary in order to assess whether the gap in utilization actually relates to this assumption. As education can improve access and diminish the inequity in this underserved group, it may be that the problem is really a lack of knowledge about when or how to access and gain entry to the health system. Therefore, in conjunction with the structural changes needed to improve education, some specific policies and measures can be effective; a public campaign explaining how the system works, for instance. Furthermore, having a regular source of care (doctor or place) must be promoted among the population, as this is one of the most important factors in reducing the health services utilization gap.

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**Table 1. Sample characteristics. Rio Grande, Brazil, 2000.(n=1260)**

| Characteristic | | % (n) |
|---|---|---|
| Social class (ABIPEME) | E | 4.1 (51) |
| | D | 29.4 (370) |
| | C | 39.7 (499) |
| | B | 23.9 (301) |
| | A | 2.9 (37) |
| Monthly per capita income (US$) | 0-56 | 27.7 (344) |
| | 57-92 | 22.4 (279) |
| | 93-194 | 25.6 (318) |
| | 195-max | 24.3 (302) |
| Unemployment | | 8.9 (112) |
| Illiteracy | | 7.0 (88) |
| Schooling (yrs) | 3 or less | 21.2 (267) |
| | 4-7 | 32.4 (408) |
| | 8 – 10 | 21.1 (266) |
| | 11 or more | 25.3 (318) |
| Gender | Male | 46.1 (581) |
| | Female | 53.9 (679) |
| Age groups | 15 – 29 | 32.4 (408) |
| | 30 – 44 | 28.6 (360) |
| | 45 – 64 | 27.8 (351) |
| | 65 or more | 11.2 (141) |
| Race | White | 84.7 (1067) |
| | Black and others | 15.3 (193) |
| Marital status | Married | 61.3 (772) |
| | Divorced | 6.6 (83) |
| | Single | 26.9 (340) |
| | Widowed | 5.2 (65) |
| Family stress | | 9.0 (113) |
| Stressful life events | None | 57.2 (721) |
| | 1 | 31.0 (391) |
| | 2 or more | 11.8 (148) |
| Social support | Never | 9.3 (116) |
| | Sometimes | 10.1 (127) |
| | Many times | 9.6 (121) |
| | Always | 71.0 (892) |
| Health insurance | | 38.4 (484) |
| Regular source of care | | |
| | None | 22.8 (283) |
| | Regular place | 36.3 (452) |
| | Regular doctor | 40.9 (509) |
| Symptom (last 2 mo.) | | 62.7 (790) |
| Chronic health problem | | 25.4 (320) |
| Inactivity days (last 2 mo.) | | 8.8 (111) |
| Self-reported health (last 2 mo.) | Poor | 2.7 (34) |
| | Regular | 17.3 (218) |
| | Good | 56.4 (711) |
| | Excellent | 23.6 (297) |
| Minor psychiatric disorders | Male | 12.7 (74) |
| | Female | 22.1 (150) |
| Alcoholism (AUDIT) | | 7.9 (100) |
| Smoking | | 32.1 (404) |
| Doctor visit within last 2 months | | 28.7 (361) |

**Table 2. Visit to doctor in last two months and crude Prevalence Ratios of some demographic, socioeconomic, and social characteristics. Rio Grande, Brazil, 2000. (n=1257)**

| Characteristic | | Prevalence %(n) | PR (95% CI) | P |
|---|---|---|---|---|
| Social class (ABIPEME) | E | 37.2 (19) | 1 | |
| | D | 28.1 (104) | 0.75 (0.51-1.12) | 0.1 |
| | C | 28.7 (143) | 0.77 (0.52-1.13) | 0.2 |
| | B | 28.2 (85) | 0.76 (0.51-1.13) | 0.2 |
| | A | 27.0 (10) | 0.73 (0.38-1.37) | 0.5 |
| Per capita income/mo. (US$) | 195-max | 31.8 (96) | 1 | |
| | 93-194 | 28.9 (92) | 0.91 (0.69-1.19) | 0.5 |
| | 57-92 | 28.7 (80) | 0.90 (0.67-1.21) | 0.5 |
| | 0-56 | 25.5 (88) | 0.80 (0.64-1.01) | 0.06 |
| Unemployment | No | 28.3 (325) | 1 | |
| | Yes | 32.1 (36) | 1.14 | 0.4 |
| Education | 1 year | | 0.99 (0.96-1.01) | 0.3 |
| Gender | Male | 22.0 (128) | 1 | |
| | Female | 34.3 (233) | 1.56 (1.29-1.87) | 0.001 |
| Age by group | 15 – 29 | 26.0 (106) | 1 | 0.09* |
| | 30 – 44 | 28.9 (104) | 1.11 (0.88-1.40) | |
| | 45 – 64 | 28.5 (100) | 1.10 (0.87-1.38) | |
| | 65 or more | 36.2 (51) | 1.39 (1.06-1.83) | |
| Race | White | 29.1 (310) | 1 | |
| | Black and others | 26.4 (51) | 0.91 (0.71-1.17) | 0.5 |
| Marital status | Married | 29.4 (227) | 1 | |
| | Divorced | 41.0 (34) | 1.39 (1.05-1.84) | 0.02 |
| | Single | 22.6 (77) | 0.77 (0.62-0.96) | 0.04 |
| | Widowed | 35.4 (23) | 1.20 (0.85-1.70) | 0.3 |
| Stressful life events | None | 26.9 (194) | 1 | 0.04* |
| | 1 | 28.4 (111) | 1.06 (0.87-1.29) | 0.6 |
| | 2 or more | 37.8 (56) | 1.41 (1.11-1.79) | 0.01 |
| Social support | No | 29.6 (72) | 1 | |
| | Yes | 28.5 (289) | 0.96 (0.78-1.20) | 0.7 |
| Family stress | No | 28.9 (330) | 1 | |
| | Yes | 27.4 (31) | 0.95 (0.69-1.30) | 0.7 |

*linear trend **total linear trend

**Table 3. Visit to doctor in last two months and crude Prevalence Ratios of some source of care and morbidity characteristics. Rio Grande, Brazil, 2000. (n=1257)**

| Characteristic | | Prevalence (n) | PR (95% CI) | P |
|---|---|---|---|---|
| Regular place for care | None | 14.8% (42) | 1 | 0.001** |
| | Regular place | 28.5% (129) | 1.92 (1.46-2.53) | |
| | Regular doctor | 36.7% (187) | 2.48 (1.90-3.23) | |
| Health insurance | No | 24.1% (187) | 1 | |
| | Yes | 36.0% (174) | 1.49 (1.26-1.77) | 0.001 |
| Symptom (last 2 mo.) | No | 23.0% (108) | 1 | |
| | Yes | 32.0% (253) | 1.39 (1.15-1.69) | 0.001 |
| Chronic health problem | No | 25.3% (238) | 1 | |
| | Yes | 38.4% (123) | 1.52 (1.27-1.81) | 0.001 |
| Inactivity days | No | 26.3% (302) | 1 | |
| | Yes | 53.1 (59) | 2.02 (1.66-2.47) | 0.001 |
| Self-reported health | Poor | 58.8% (20) | 1 | 0.001* |
| | Regular | 52.8% (115) | 0.90 (0.66-1.22) | 0.5 |
| | Good | 25.5% (181) | 0.43 (0.32-0.59) | 0.001 |
| | Excellent | 15.2% (45) | 0.26 (0.17-0.38) | 0.001 |
| SRQ male | No | 20.1% (102) | 1 | |
| | Yes | 35.1% (26) | 1.75 (1.22-2.49) | 0.004 |
| SRQ female | No | 30.9% (163) | 1 | |
| | Yes | 46.7% (70) | 1.51 (1.22-1.87) | 0.001 |
| Smoking | No | 31.8% (272) | 1 | |
| | Yes | 22.0% (89) | 0.69 (0.56-0.86) | 0.001 |
| Alcoholism (AUDIT) | No | 29.2% (339) | 1 | |
| | Yes | 22.0% (22) | 0.75 (0.51-1.10) | 0.1 |

*linear trend **total linear trend

**Table 4. Adjusted Prevalence Ratios for visiting a doctor, and socioeconomic, demographic, social, health services and referred morbidity characteristics. Rio Grande, Brazil, 2000.**

| Characteristic | | PR (CI95%) | P |
|---|---|---|---|
| Age by group[a] | 15 – 29 | 1 | 0.09* |
| | 30 – 44 | 1.12 (0.91-1.40) | 0.3 |
| | 45 – 64 | 1.04 (0.80-1.36) | 0.8 |
| | 65 or more | 1.17 (0.83-1.66) | 0.4 |
| Gender[a] | Male | 1 | |
| | Female | 1.51 (1.27-1.78) | 0.001 |
| Per capita income/mo. (US$)[a] | 195-max | 1 | 0.08* |
| | 93-194 | 0.91 (0.49-1.70) | 0.8 |
| | 57-92 | 0.60 (0.33-1.10) | 0.1 |
| | 0-56 | 0.45 (0.28-0.74) | 0.001 |
| Schooling (yrs)[a] | | 0.95 (0.91-0.99) | 0.05 |
| Income **X** Schooling (yrs)[a] | 195-max | 1 | 0.03*** |
| | 93-194 | 0.99 (0.92-1.07) | |
| | 57-92 | 1.05 (0.98-1.14) | |
| | 0-56 | 1.09 (1.02-1.17) | |
| Stressful life events[b] | None | 1 | 0.03** |
| | 1 | 1.06 (0.86-1.31) | |
| | 2 or more | 1.45 (1.12-1.89) | |
| Regular source of care[c] | | | |
| | None | 1 | 0.002* |
| | Regular place | 1.65 (1.26-2.17) | |
| | Regular doctor | 1.74 (1.30-2.34) | |
| Health insurance[c] | | 1.46 (1.20-1.78) | 0.001 |
| Self-reported health[c] | Poor/regular | 1 | 0.001** |
| | Good | 0.53 (0.43-0.66) | |
| | Excellent | 0.31 (0.23-0.42) | |
| Inactivity days[c] | | 1.59 (1.29-1.95) | 0.001 |
| Smoking[c] | | 0.72 (0.57-0.91) | 0.006 |

*linear trend **total linear trend ***heterogeneity test

[a] First level: age, sex, income, education, income*education (n=1242)

[b] Second level: First level and stressful life events (n=1236)

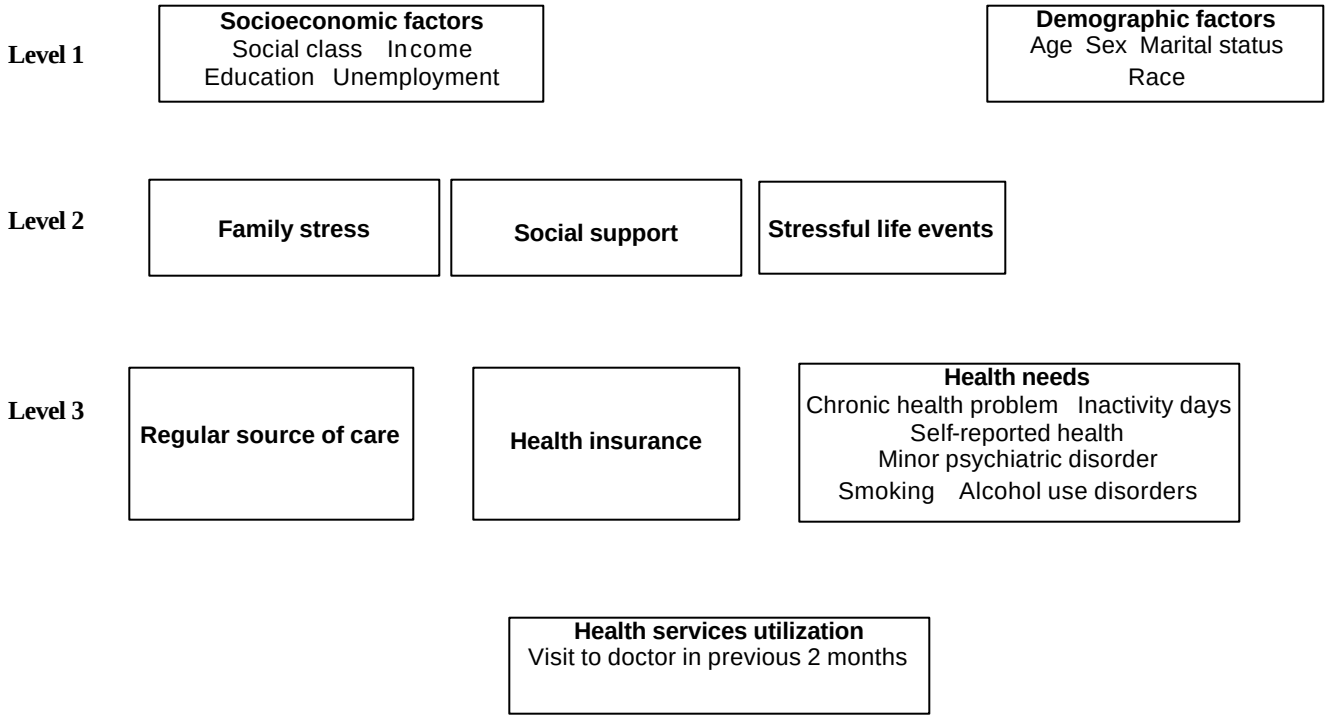
[c] Third level: Second level and regular doctor, regular place, health insurance, self-reported health, inactivity days, smoking (n=1226)

**Table 5. Prevalence Ratios for visiting a doctor in persons with chronic health problems, and socioeconomic factors. Rio Grande, Brazil, 2000.**

| | | Model A[1] | | Model B[2] | | Model C[3] | | Model D[4] | |
|---|---|---|---|---|---|---|---|---|---|
| **Characteristic** | | **PR (CI95%)** | **P** | **PR (CI95%)** | **P** | **PR (CI95%)** | **P** | **PR (CI95%)** | **P** |
| Per capita income/mo | | | | | | | | | |
| (US$) | 195-max | 1 | | 1 | | 1 | | 1 | |
| | 93-194 | 0.88 (0.49-1.58) | 0.7 | 0.97 (0.53-1.71) | 0.9 | 0.91 (0.50-1.64) | 0.6 | 0.94 (0.52-1.68) | 0.8 |
| | 57-92 | 0.60 (0.33-1.09) | 0.09 | 0.68 (0.36-1.28) | 0.2 | 0.66 (0.35-1.23) | 0.6 | 0.63 (0.34-1.14) | 0.1 |
| | 0-56 | 0.38 (0.19-0.77) | 0.007 | 0.48 (0.25-0.90) | 0.02 | 0.44 (0.23-0.85) | 0.003 | 0.43 (0.22-0.85) | 0.02 |
| Schooling (yrs) | | 0.95 (0.91-0.99) | 0.02 | 0.93 (0.89-0.98) | 0.002 | 0.95 (0.90-0.99) | 0.01 | 0.94 (0.90-0.98) | 0.003 |
| Income **X** Schooling (yrs) | | | | | | | | | |
| | 195-max | 1 | 0.02* | 1 | 0.02* | 1 | 0.02* | 1 | 0.02* |
| | 93-194 | 0.97 (0.89-1.06) | | 0.98 (0.89-1.06) | | 0.98 (0.90-1.07) | | 0.97 (0.89-1.06) | |
| | 57-92 | 1.04 (0.93-1.17) | | 1.06 (0.93-1.20) | | 1.04 (0.92-1.17) | | 1.06 (0.94-1.20) | |
| | 0-56 | 1.15 (1.05-1.27) | | 1.17 (1.06-1.29) | | 1.15 (1.05-1.26) | | 1.17 (1.06-1.29) | |

*heterogeneity test
[1] adjusted to age and gender (n=316)
[2] adjusted to age, gender, regular source of care and health insurance (n=315)
[3] adjusted to age, gender, regular source of car (n=315)
[4] adjusted to age, gender, health insurance (n=316)

**Figure 1.**
**Hierarchical analysis model for health services utilization**



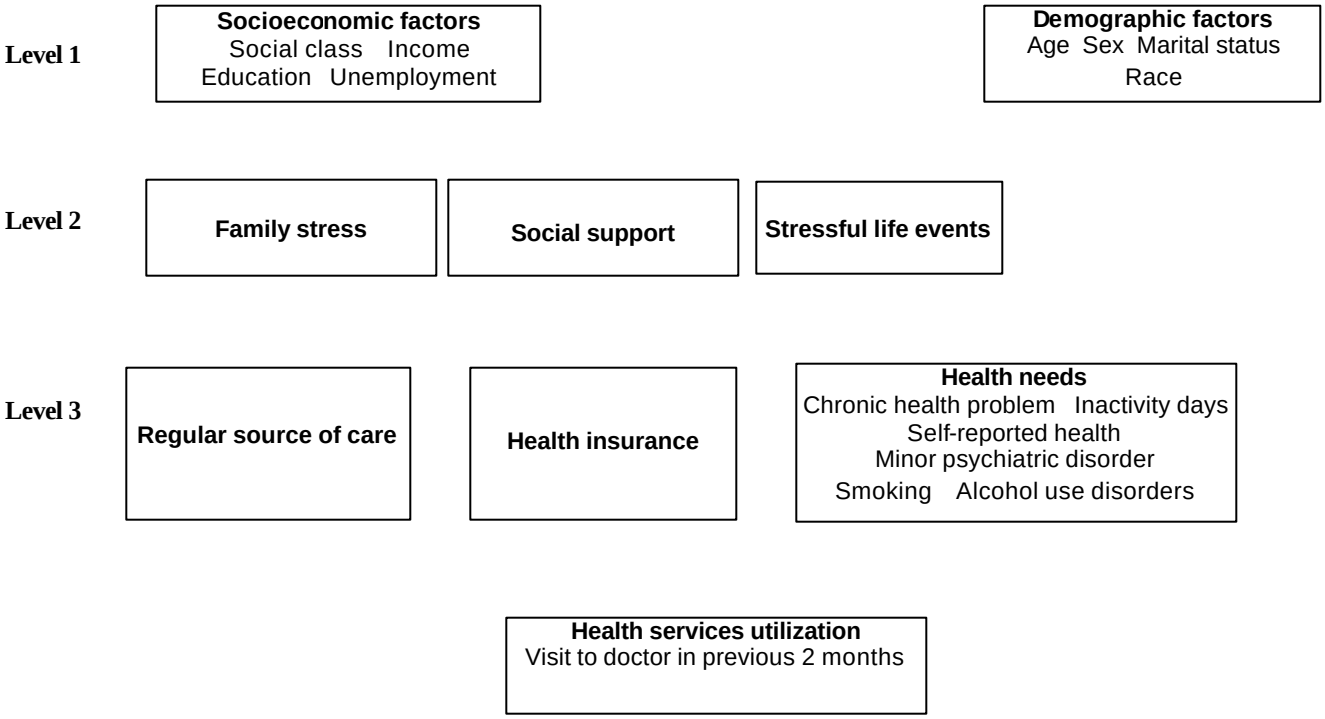

Level 1
Socioeconomic factors
Social class Income
Education Unemployment
Demographic factors
Age Sex Marital status
Race
Level 2
Family stress
Social support
Stressful life events
Level 3
Regular source of care
Health insurance
Health needs
Chronic health problem Inactivity days
Self-reported health
Minor psychiatric disorder
Smoking Alcohol use disorders
Health services utilization
Visit to doctor in previous 2 months

**Figure 1.**
**Hierarchical analysis model for health services utilization**