

Demand for health services or professionals among adolescents: a multilevel study

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Abstract *This study aimed to analyze the demand for health services or professionals by adolescents with individual determinants and contextual variables (school teaching modality and Social Vulnerability Index). Data were collected from March to June 2018, in state public schools in Olinda, Pernambuco, Brazil, through a structured questionnaire with questions from the Youth Risk Behavior Survey (YRBS) and the National School Health Survey (PeNSE). Among the 2,454 adolescents, the proportion of those looking for a health service was higher among women; in adolescents whose mothers had a minimum of nine schooling years; in the physically active; and whose parents did not receive a family aid (Bolsa Família). We observed that the contextual variables did not influence the demand for health services among adolescents. In the third model of the multilevel analysis, which analyzed the individual variables, we observed that only females (OR=1,80), having a mother with schooling greater than or equal to 9 years of study (OR=1,30), not receiving Bolsa Família (OR=1,23), and physically active (OR=1,32) were associated with an increased demand for health services or professionals.*

Key words *Adolescent, Health services accessibility, Adolescent health services, Patient health care acceptance*

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Introduction

Brazil has approximately 45 million adolescents, and many with low social indicators, mainly in the Northeast Region¹. The National Health Survey has shown that this age group least seeks health care, either for prevention or for the recovery of their health². Also, given that adolescents aged 15-19 years have several risk behaviors, such as involvement in external causes, drug abuse, and risky sexual behavior¹.

The use of health services results from an interaction between the individual's behavior in seeking services and the professional providing it within that service. It is then conceptualized as when there is direct contact with services through visits, hospitalizations, and indirect contact through tests, for example³. Brazilian and global studies have investigated the demand and use of health services. However, most analyzed the association only with individual variables, such as gender, income, education, ethnicity/skin color (reference of several studies). Nonetheless, it is also essential to study the association with contextual variables through multilevel analysis.

This multilevel model considers that individuals belonging to the same group, such as neighborhoods, schools, or families, are influenced by similar stimuli. Thus, to analyze human behavior, we should consider individual characteristics and the characteristics of their context. Thus, predictive variables of different levels are considered. The variables should be selected at each level for this analysis, based on a theoretical or empirical model that justifies their participation⁴.

Several theoretical explanatory models have studied the relationship between the use of health services and their determinants. Among them is Andersen's behavioral model, initially developed in 1968, which considers the following as determinant factors in the use of health services: predisposing factors (linked to the fact that the individual is susceptible to the use of health services, which may be the demographic, social structure, and health beliefs factors); enabling factors (related to the possibility of access, encompassing both individual and family factors, and the provision of services); and health needs, which include the health status of individuals, self-perceived or identified by a professional⁵.

Despite the difference between the concepts of use and demand for health services, the determinants of the use of services, described by Andersen's behavioral model, also explain the demand for health services. This is because this

author believes that the concept of access is linked to the individual's initial entry into the health system⁶.

Thus, identifying factors that influence the demand for health services by adolescents is essential for adapting the practice of health professionals and organizing the routine of services according to this audience. Thus, this study aimed to analyze the association of demand for health services or professionals by adolescents with individual determinants (predisposing and enabling factors and health needs) and contextual variables (school regime and Social Vulnerability Index).

Methods

Study design and sampling

This is a cross-sectional, analytical school-based study nested in the integrated project: "*Oral health and modifiable health risk behaviors in adolescence – monitoring in order to prevent*". The study was conducted in Olinda, Pernambuco, Brazil, with adolescent students of both genders, aged 14-19 years and enrolled in public schools in the state.

The sample was calculated using the Epidemiologic Open-Source Statistics for Public Health (OpenEpi 3.02) statistical software. The calculation was performed considering the larger project. Thus, the data from the pilot study was used for the associations between the parameters of poor oral health and risk behaviors or health problems for the adolescent. The highest estimated sample calculated was adopted. The sample was estimated at 1,532, considering a power of 80%, a confidence level of 95%, and an OR of 1.4. A design effect of 1.2 was added to correct cluster sampling, and 20% was added to minimize possible losses. The estimated final sample arrived at 2,206 adolescents.

Olinda had 39 schools in 2018. Of these, eight had only elementary school or night classes. Thus, 31 schools with 269 classes and 9,126 students were eligible for research. A two-step sample selection by conglomerate was planned, drawing schools and classes. However, as students from the schools and classes drawn submitted the Informed Consent Form (ICF) and it turned out insufficient, other schools were drawn within the same Political Administrative Region (PAR), always respecting proportionality. Thus, all 31 schools were visited, and 27 agreed with the

research. ICFs were distributed to 7,255 students who were present on the days of the distribution. Of these, 37% (2,700), distributed in 188 classes, submitted the ICFs signed by them and the parents/guardians (Figure 1).

Data collection

Data were collected from March to June 2018. The questionnaire was applied in a classroom made available by the school, without the presence of teachers, with all students who had the signed informed consent form present on the day of collection. The questionnaire was applied by a previously trained researcher and lasted approximately 30 minutes.

The instrument used in the research was the Youth Risk Behavior Survey (YRBS) validated in Brazil by Guedes and Lopes in 2007⁷, proposed by the Center for Disease Control and Prevention (CDC) in the USA, which is part of a surveillance system that monitors the health-related behaviors. Besides the YRBS, some health-related issues in the questionnaire of the National Student Health Survey (PeNSE)⁸. Were also used. In all, the questionnaire of this research consisted of 119 questions. This study used six questions

related to the socioeconomic and demographic module: age group (14-16/17-19); gender (male/female); maternal schooling (less than nine years of study/more than or equal to nine years of study); ethnicity/skin color (white/non-white); family aid (yes/no); one question about seeking health services or professionals in the last 12 months (yes/no); and one question about self-perceived health (not at all healthy or not very healthy/healthy, very healthy or completely healthy), both present in PeNSE. Health risk behaviors were assessed using the following YRBS questions: binge drinking in the last 30 days (yes/no); tobacco use in the last 30 days (yes/no); number of sexual partners (one or none/two or more); physical activity – 300 minutes per week – (yes/no).

Studied variables

Dependent variable was the demand for health services or professionals in the 12 months before the survey. The independent variables included in the first level were selected based on Andersen's Behavioral Model⁵. The predisposing factors used were demographic (age, gender), social structure (maternal schooling and ethnicity), and health beliefs (alcohol consumption, tobacco use, number of sexual partners, and physical activity). The enabling factors were family aid, a direct cash transfer program targeting impoverished and indigent households nationwide. Indigent households live on a monthly income of up to R\$ 89.00 per person. Impoverished households live on a monthly income ranging from R\$ 89.01 to R\$ 178.00 per person and participate in the program, as long as they include pregnant women and children or adolescents aged 0-17 years.

Health needs were assessed through self-perceived health. The second level consisted of the 27 schools that students attended. Thus, one of the variables in the second level was the education regime, which could be regular (20 weekly hours), semi-full (32 weekly hours), or full (40 weekly hours)⁹.

The school education system was expanded in Pernambuco in 2008 and is part of the Comprehensive Education Program, a public policy to improve secondary education, which considers that the comprehensive regime transcends expanding school time, as it implies developing the different dimensions of the human being⁹.

Besides the school regime, another variable introduced in the second level of the multilevel

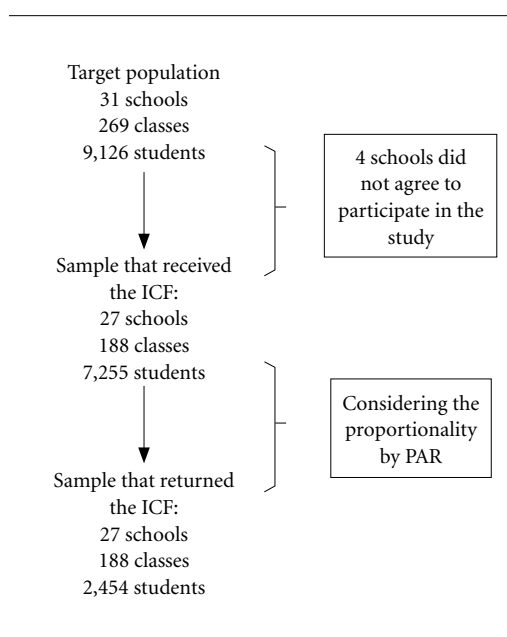


Figure 1. Sampling process flowchart.

Source: The authors.

model was the Social Vulnerability Index (SVI). It is based on the concept of social vulnerability that builds on recognizing that these vulnerabilities derive from broad social processes, of which individuals alone have no means to change, and only the State can do that through public policies¹⁰.

It adopts 16 indicators of the social vulnerability block of the Atlas of Human Development (AHD), subdivided into three dimensions: 1) the urban infrastructure of the territory; 2) human capital of households in this territory; 3) income, access to work and inclusion (formal or not). The SVI has values closer to 1 the higher the social vulnerability in a given territory. Values closer to 0 indicate low or nonexistent vulnerability¹⁰. Thus, the SVI of the Human Development Unit (HDU) in which each school was part was located through the map of the Institute for Applied Economic Research¹⁰ (IPEA).

Statistical analysis

The data were double-entered in EpiData 3.1. The analyses were performed using the Stata 15.1 software package. Absolute and relative frequencies were used to describe the study participants. A Chi-square test was employed to assess bivariate associations between independent variables and the demand for health services. A multilevel, mixed, logistic analysis (fixed effect with random intercept) to test the association of individual and contextual variables with the demand for health services. The multilevel logistical models were adjusted, with individuals at the first level and schools at the second level. The models were adjusted first without the inclusion of independent variables (empty model) to test the initial variance attributable to schools. Next, models were adjusted with the contextual variables and then with the individual ones with a p-value less than or equal to 0.05 in the bivariate analysis. The association between individual and contextual variables was tested simultaneously in the fourth and last model.

The heterogeneity between schools was calculated, in all models, using the Median Odds Ratio (MOR)¹¹. Proportional changes in variance (PCV)¹² were also calculated. The larger project was submitted and approved by the Research Ethics Committee of the University of Pernambuco, as recommended by the National Research Ethics Commission (CONEP) through Resolution of the National Health Council N° 466/2012.

Results

The total sample consisted of 2,454 adolescents and 47 were excluded – 46 because they did not answer the question corresponding to the dependent variable of this research and one because they were outside the 14-19 years age group. Most were female (55.87%) and in the 14-16 years age group (52.70%), and most mothers had less than nine schooling years. When asked about their skin color, 16.70% of the adolescents reported being white. Few adolescents reported tobacco use (10.83%). On the other hand, 32.04% assumed binge drinking, and more than half had two or more sexual partners. Most adolescents did not seek health services (57.21%). The prevalence of adolescents looking for a health service was higher: a) among women; b) in adolescents whose mothers had a minimum education of nine years; c) in physically active adolescents; d) in adolescents whose parents did not receive a family aid (Table 1).

The multilevel analysis revealed that the contextual variables (school teaching modality and the SVI) did not influence the demand for health services among adolescents in the second model (Table 2). In the third model, which analyzed the individual variables, only being female (OR=1.80), having a mother with nine years of schooling and over (OR=1.30), not receiving a family aid (OR=1.23), and being physically active (OR=1.32), were associated with a greater demand for services or health professionals. In the fourth and last model, the contextual variables continued to show no significant association with the demand for services, and the same individual variables that showed an association in the third model were also associated in the latter.

Although the variables binge drinking and self-perceived health did not show a significant association in the bivariate analysis, we opted to include them in the multilevel model due to the importance of these variables considering the health beliefs and the health needs of Andersen's behavioral theory. Heterogeneity between schools decreased as we added more variables to the model, reaching a MOR of 1.

Discussion

Studies carried out in different countries have shown percentages of demand and use of health services different from each other¹³⁻¹⁶. Besides the

specificity of services, the differences between countries are also evident because while in a survey conducted with a national sample in Brazil, only 48% sought some health service or professional to attend to their health, in the United States, this percentage reached 94%^{13,14}.

It is also essential to consider the differences between health systems in different countries. In the U.S., for example, public health protection programs target only those most in need. Thus, those with insufficient income but not poor are not part of public programs or private health plans¹⁷. In this study, 42.79% of the adolescents sought some health service or professional in the 12 months before the survey, showing similarity with the Brazilian data and that actions are required to bring the adolescent closer to the services and professionals to prevent health problems.

The prevalence of demand for services was higher among female adolescents, as reported in

other studies^{13,18-20}. In general, women, not just adolescents, look more for health services. This may be because there is a belief that the man is stronger and does not get sick, but also because the services themselves do not include males in their work routine. For example, the PHC service agendas contain days for prenatal care and the oncotic cytology to prevent cervical cancer so that the man does not see himself within these services²¹.

Regarding the socioeconomic conditions of the adolescents, this study showed that those who did not receive family aid were more likely to have looked for a health service or professional. Other studies also show the influence of these conditions on the demand and use of health services. In Brazil, students from private schools were more likely to seek services than those from public schools^{13,19}. At the same time, another study also carried out in Brazil in Rio de Janeiro reported greater difficulty in scheduling gynecological

Table 1. Bivariate association of independent variables and demand for health services by adolescents from public schools – Olinda, Pernambuco, Brazil.

Variables	Categories	Demand for health services				Total	p
		No		Yes			
		n	%	n	%		
Gender	Female	696	52.02	642	47.98	1,338	0.000
	Male	675	63.92	381	36.08	1,056	
Age	14-16	732	56.74	558	43.26	1,290	0.539
	17-19	665	57.98	482	42.02	1,147	
Maternal schooling	< 9 years of study	434	60.11	288	39.89	722	0.001
	≥ 9 years of study	662	52.58	597	47.42	1,259	
Ethnicity	White	214	53.50	186	46.50	400	0.127
	Non-white	1,163	57.63	855	42.37	2,018	
<i>Binge drinking</i>	No	961	58.17	691	41.83	1,652	0.125
	Yes	423	54.86	348	45.14	771	
Tobacco use	No	1,231	57.31	917	42.69	2,148	0.839
	Yes	149	56.65	114	43.35	263	
Physical Activity	Active	245	52.69	220	47.31	465	0.030
	Inactive	1,147	58.22	823	41.78	1,970	
Number of sexual partners	One or none	249	57.77	182	42.23	431	0.569
	Two and over	447	56.09	350	43.91	797	
Monthly income	More than one minimum wage	324	48.87	339	51.13	663	0.000
	Up to one minimum wage	539	58.14	388	41.86	927	
“Bolsa Família” (Family Aid)	Yes	658	60.70	426	39.30	1,084	0.001
	No	695	53.75	598	46.25	1,293	
Self-perceived health	Not at all healthy / Not very healthy	441	57.65	324	42.35	765	0.797
	Healthy / Very healthy / Completely healthy	962	57.09	723	42.91	1,685	

Source: Author's elaboration.

Table 2. Results of the multilevel analysis model for the demand for health services by adolescents from public schools. Olinda, Pernambuco, Brazil.

	Empty Model (Model 1)	Random intercept. fixed-effect contextual variables (Model 2)	Random intercept. fixed-effect individual variables (Model 3)	Random intercept. fixed-effect (individual + contextual) variables (Model 4)
Fixed part	0.74*** [0.66-0.84]	0.64* [0.41-1.00]	0.36*** [0.27-0.48]	1.07 [0.66-1.76]
Individual factors				
Constant				
Female vs. Male			1.80*** [1.48-2.19]	0.56*** [0.46-0.68]
Maternal schooling ≥ 9 years of study vs. < 9 years			1.30* [1.06-1.59]	0.79* [0.64-0.96]
Bolsa Família (No vs. Yes)			1.23* [1.02-1.49]	1.21* [1.00-1.47]
Binge drinking (Yes vs. No)			1.08 [0.88-1.32]	1.08 [0.89-1.32]
Physical activity (Active vs. Inactive)			1.32* [1.04-1.68]	0.76* [0.60-0.96]
Self-perceived health (Healthy/ Very healthy/ Completely healthy vs. Not at all healthy/Not very healthy)			1.19 [0.97-1.46]	0.84 [0.68-1.03]
Contextual factors (Schooling level)				
Semi-full period/Full period vs. Regular period		0.81 [0.66-1.00]		0.88 [0.72-1.06]
Neighborhood social vulnerability index (high/very high vs. medium/low/very low)		2.31 [0.66-8.05]		2.29 [0.71- 7.41]
Random part				
Variation in the area (Random intercept)	0.22 [0.13-0.38]	0.16 [0.07-0.37]	0.07 [0.002- 3.17]	2.91e-08
PCV*		- 27.3%	- 68.2%	- 99.9%
Median Odds Ratio	MOR = 1.23420	MOR = 1.16792	MOR = 1.07166	MOR = 1
Observations	2,454	2,454	1,842	1,842

Exponentiated coefficients; 95% Confidence Intervals between brackets * p < 0.05 ** p < 0.01 *** p < 0.001; & = proportional change in variance.

Source: Author's elaboration.

logical visits for adolescent public state school students when compared to students from private or federal schools²².

The probable explanation for this is the lower level of access to healthcare with someone depending exclusively on the public system. In this study, while public and private school students were not compared, receiving family aid was considered a proxy for income, which confirms

the previous statement that economic conditions directly interfere in access to health services.

Other studies in the U.S. and Oceania showed that adolescents whose parents could not pay for visits were less likely to visit a health professional^{23,24}. As previously mentioned, Brazil and the U.S. have very different health systems. In Brazil, the Unified Health System (SUS) principle of universality must ensure access to health services

for the entire population. However, in Olinda, only 49.44% of the population lived in an area covered by PHC in 2018. Thus, there is still a long way to go to ensure universal access to health.

In this study and others already conducted, adolescents who had mothers with a higher level of education sought more health service or professional than those with mothers with a lower education level. This data suggests that mothers with higher schooling levels can positively influence children's attitude towards their health^{13,19,23}.

Physically active adolescents were more likely to seek a health service or professional than inactive ones, as physical activity is an essential factor in health promotion and disease prevention. Individuals who engage in it can be more attentive and concerned with their health, seeking guidance and regular care with professionals. A study carried out with Brazilian adolescents showed that the demand for health services was lower among those who did nothing about their body weight, which corroborates these data¹⁹.

No statistically significant differences were found in the association between the age group, ethnicity/skin color, tobacco use, the number of sexual partners, and self-perceived health with the demand for health services among adolescents in this study.

We analyzed the school regime, comparing students from schools with full, semi-full, and regular schemes, and found no statistically significant differences. Furthermore, the school context analyzed through the SVI was not rele-

vant to explain the demand for health services. In this research, SVI refers to the school's location, which is not necessarily where the student resides, which may explain the non-association with the demand for services. On the other hand, a study carried out in the metropolitan region of São Paulo showed that the place of residence was not associated with the use of health services by the population and was not a significant obstacle²⁵.

One limitation of the study is specific to the type of cross-sectional design, in which the exposure and outcome variables are researched in the same period, corresponding to the data collection. Thus, it is impossible to infer the causal relationship between the variables. Moreover, the study sample was not selected considering the contextual analysis and, therefore, the same neighborhood had more than one school; that is, three neighborhoods had two or three schools, when there should be only one. We had 27 schools and 22 neighborhoods. Thus, further studies are required to analyze the association between the demand for health services or professionals with the adolescent's social context.

We can also mention that a memory bias may have occurred since some responses were conditioned to the adolescents' memory of facts occurring in one year. Besides this bias, the response bias may also have been the case due to the embarrassment and fear that some individuals concerning information confidentiality, although the researchers had assured this confidentiality.

Collaborations

AMCL Peixoto, TQ Melo e LAA Ferraz contributed to the acquisition, analysis, and interpretation of data and the writing of the manuscript; CFBB Santos, F Godoy, PAM Valença, VA Menezes, and V Colares contributed to the preparation and design of the study, data analysis and interpretation, and review of the manuscript.

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