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## Access to medicines for acute illness in middle income countries in Central America

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Isabel Cristina Martins  
Emmerick<sup>I,II</sup>

Vera Lucia Luiza<sup>II</sup>

Luiz Antonio Bastos Camacho<sup>III</sup>

Dennis Ross-Degnan<sup>IV</sup>

# Access to medicines for acute illness in middle income countries in Central America

## Acesso a medicamentos para doenças agudas em países de renda média da América Central

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### ABSTRACT

**OBJECTIVE:** To analyze the main predictors of access to medicines for persons who experienced acute health conditions

**METHODS:** This was a cross-sectional analytic study, based on data from household surveys. We examined the predictors of: (1) seeking care for acute illness in the formal health care system and (2) obtaining all medicines sought for the acute condition.

**RESULTS:** The significant predictors of seeking health care for acute illnesses were urban geographic location, head of household with secondary school education or above, age under 15, severity of illness perceived by the respondent, and having health insurance. The most important predictor of obtaining full access to medicines was seeking care in the formal health care system. People who sought care in the formal system were three times more likely to receive all the medicines sought (OR 3.0, 95%CI 2.3;4.0). For those who sought care in the formal health system, the strongest predictors of full access to medicines were seeking care in the private sector, having secondary school education or above, and positive perceptions of quality of health care and medicines in public sector health facilities. For patients who did not seek care in the formal health system, full access to medicines was more likely in Honduras or Nicaragua than in Guatemala. Urban geographic location, higher economic status, and male gender were also significant predictors.

**CONCLUSIONS:** A substantial part of the population in these three countries sought and obtained medicines outside of the formal health care system, which may compromise quality of care and pose a risk to patients. Determinants of full access to medicines inside and outside the formal health care system differ, and thus may require different strategies to improve access to medicines.

**DESCRIPTORS:** Pharmaceutical Preparations. Health Services Accessibility. Communicable Disease Control. Health Surveys, utilization. Cross-Sectional Studies.

<sup>I</sup> Department of Population Medicine. Harvard Medical School. Harvard University. Boston, MA, USA

<sup>II</sup> Núcleo de Assistência Farmacêutica. Escola Nacional de Saúde Pública "Sergio Arouca". Fundação "Oswaldo Cruz". Rio de Janeiro, RJ, Brasil

<sup>III</sup> Departamento de Epidemiologia e Métodos Quantitativos em Saúde. Escola Nacional de Saúde Pública "Sergio Arouca". Fundação "Oswaldo Cruz". Rio de Janeiro, RJ, Brasil

<sup>IV</sup> Department of Population Medicine. Harvard Medical School. Harvard University. Boston, MA, USA

#### Correspondence:

Isabel Cristina Martins Emmerick  
Pharmaceutical Policy Research Fellowship  
Department of Population Medicine  
Harvard Medical School & Harvard Pilgrim  
Health Care Institute  
133 Brookline Ave, 6<sup>th</sup> Floor, Boston, MA  
02215, USA  
E-mail: emmerick.isabel@gmail.com

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## RESUMO

**OBJETIVO:** Analisar os principais preditores de acesso a medicamentos em condições agudas de saúde.

**MÉTODOS:** Estudo transversal analítico, baseado em inquérito domiciliar realizado em Nicarágua, Honduras e Guatemala. Foram identificados os preditores de: procurar cuidados para a condição aguda no sistema formal de saúde e obter todos os medicamentos procurados para a condição aguda. Os dados foram analisados com SPSS® v.17, usando estatísticas descritivas e regressão logística multivariada.

**RESULTADOS:** Houve autorrelato de doença aguda em 48,3% dos 2.761 domicílios pesquisados, sendo 59,0% em Nicarágua, 56,2% em Honduras e 30,9% na Guatemala. Indivíduos com doença aguda e pior percepção da gravidade da doença ou menores de 15 anos com seguro saúde tiveram maior chance de procurar cuidado. O acesso a medicamentos está fortemente correlacionado com a busca de cuidado, e a obtenção de todos os medicamentos necessários foi três vezes maior para aqueles que buscaram o sistema formal de saúde (OR 3,0; IC95% 2,3;4,0). Procurar o setor privado, ter alto nível educacional e percepção positiva sobre a qualidade do cuidado e dos medicamentos aumentam a chance de acesso pleno a medicamentos dentro do sistema de saúde. Para os pacientes que não procuraram o setor formal, o acesso pleno aos medicamentos foi mais provável em Honduras ou Nicarágua. Outros importantes preditores incluem localização urbana, maior status econômico e ser do sexo masculino.

**CONCLUSÕES:** Parte da população nos três países obteve medicamentos fora do sistema formal de saúde, o que pode representar risco aos pacientes. Determinantes do acesso pleno a medicamentos, dentro e fora do sistema formal de saúde, foram distintos e assim poderão exigir diferentes estratégias para melhorar o acesso a medicamentos.

**DESCRITORES:** Preparações Farmacêuticas. Acesso aos Serviços de Saúde. Controle de Doenças Transmissíveis. Inquéritos Epidemiológicos, utilização. Estudos Transversais.

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## INTRODUCTION

Acute health conditions are characterized by a sudden onset of symptoms, typical course of illness, and finite duration if the illness is self-limiting or effectively treated.

Patients are more likely to self-treat acute health conditions, especially those that are frequent. The self-treatment may be harmful, since lay people tend to treat symptoms, not diseases.<sup>9</sup> Negative consequences of self-treatment may include masking symptoms, delaying professional health care, incorrect diagnosis, or exposure to unnecessary medications.

Access to medicines – a component of access to health – is considered a fundamental human right by the World Health Organization (WHO) and many

national constitutions. Access to medicines is essential to achieving optimal health outcomes in a broad group of health conditions. If medicines are not used correctly, they may cause adverse events or result in waste of scarce financial resources, leading to problems at individual, social, political, and economic levels.<sup>8,a</sup> The WHO considers equitable access to safe and affordable medicines as vital to attaining the highest possible standard of health for all. Health expenditures are estimated to account for 33.0% of all household expenditures in the Latin America and Caribbean region and most of overall health expenditures is on medicines.<sup>20</sup> High out-of-pocket expenses on medicines and high prices in the region represent important barriers in access to medicines.<sup>20</sup>

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<sup>a</sup> United Nations General Assembly, 55 Section. Millenium declaration. New York: United Nations; 2000. (A/RES/55.2)

The study entitled “*Estudio del impacto de la exclusión de la atención de salud sobre el acceso a medicamentos en Honduras, Guatemala y Nicaragua*”, hereafter referred to as the source study, aimed to investigate how different population groups obtain medicines and to assess the relationship between the exclusion from health care services and access to medicines.

The indigenous group or ethnic community represents an important part of the population in all countries studied<sup>22</sup> and in general have a lack of access to minimal basic infrastructure of services, including health care.<sup>21</sup>

The objective of this article is to analyze the main predictors of access to medicines for persons who experienced acute health conditions.

## METHODS

This was a cross-sectional study, based on data from a household survey using methods developed by the World Health Organization and adapted to study exclusion from health care in Latin America.<sup>19</sup> Data were analyzed with SPSS® v.17 using descriptive statistics and multivariate logistic regression.

The countries studied met the following criteria: presented important challenges to achieving the Millennium Objective goals related to maternal mortality and access to health care; had access to medicine in the country technical cooperation agenda with PAHO/WHO; had public health sectors with limited resources, uncertain service quality, and low coverage of basic public health services; were members of the Central America Free Trade Agreement (CAFTA).

The sample of the source study was considered to estimate the proportions of persons excluded from health care and of those without access to medicines. To estimate the required sample size, a conservative prevalence of these two primary outcomes of 50.0%, with a 95% confidence interval of plus or minus 5%, and a design effect of 2.0 were considered.<sup>8</sup>

The cluster sample was selected in three stages.<sup>8</sup> In the first stage, 50 census tracts were selected, with probability proportional to size, based on the number of houses in each sector. The primary sampling units were stratified according to urban/rural location. In the second stage, 20 houses were selected in each census tract, assuming a 25.0% non-response rate. In the third stage, for multi-household units, one household was selected using a table of random numbers.

The household survey evaluated access to health care and medicines at the household level for three categories of health conditions (acute, chronic, pregnancy) and also for respondents who reported poor health status.

The source study collected data on one case of acute illness per household occurring during the two weeks preceding the survey. If the household reported more than one case, the youngest person experiencing an illness was selected.<sup>18</sup>

The “formal health system” was considered to include the health facilities of the Ministry of Health, the formal private sector (hospitals, private clinic and private physicians), and health facilities supported by the Social Security System.<sup>18</sup> The “informal health system” is described by any other source of care that is not included in the “formal health system”, such as traditional healers or private pharmacies.

The variable “economic level” was defined based on the number of goods in the household and the education level of the head of the household, combined in a composite index.<sup>18</sup> This variable was categorized in three levels: Level A, households scoring more than 13 points; Level B, households scoring between 6 and 12 points; while the remaining households were classified as Level C.

The variable “convenience” of health care was constructed using the respondents’ perceptions of the geographic location of health facilities, opening times of public health care facilities, and opening times of nearby pharmacies. Good convenience was defined as none of these aspects evaluated as bad, considering the closest health care facility.<sup>8</sup> Methods of the source study are detailed elsewhere.<sup>18</sup>

The category “ethnic minority” was created for all three countries by aggregating the categories of indigenous, black, and country-specific ethnic minorities.

The independent variables measured in this study were organized according to Andersen’s access framework.<sup>2</sup> This theoretical approach considers two perspectives: potential access, which is based on features of the external setting, and realized access.

Based on this framework, potential access aspects were translated into predisposing, enabling and need variables, as possible in the source study, measured at community, household and individual level. Predisposing variables were age, gender, education level, Spanish language, literacy and Ethnicity of household head and ill person, and relationship with the household head. Enabling variables included community characteristics (country, geographic accessibility, rural/urban location, distance from a primary care health facility); household level (economic level, income *per capita*; the employment situation of the household head, health insurance coverage, travel time to the health facility, convenience and user’s perceptions concerning health services [geographic accessibility; medicines availability, affordability, quality of health care, and opening times of the health facilities], expenditures, poverty; household density, household

size; access to potable water; own bathroom, and type of energy power supply); and individual level (income, health insurance and employment situation). The need factors comprised: perceived health status; perceived illness severity; and health seeking behavior (e.g., seeking care in the formal health system).

The two primary outcome measures in the current article are: “seeking care in the formal health system” and “having full access to medicines” (defined as obtaining all medicines that were sought for the acute condition of interest), corresponding to realized access.

Results from exploratory analyses indicated that the three countries had a similar profile concerning the most important determinants of seeking care and obtaining access to medicines for acute conditions. Based on these preliminary results, we merged the three country-specific data bases and build one predictive model per outcome variable.

These preliminary analyses also indicated that the variable “seeking care in the formal health system” was the most important predictor of “having full access to medicines”. We thus estimated three different predictive models. In the first model, the dependent variable was “seeking care in the formal health system”. Based on strata of that variable, the second model was split into two separate models of “having full access to medicines”, one including only those who sought care in the formal health system and the other including those who did not. The association between predictor variables and these outcomes were measured by odds ratios (OR).

Multivariate models (logistic regression) included all independent variables that were found to be associated with the outcome variables with  $p < 0.10$  in bivariate analyses. If more than one candidate covariate measured the same attribute, e.g., geographic accessibility (perception) and geographical location (rural/urban), the variable with the strongest association with the outcome variable was included.

To adjust for country-specific differences, country was included as one of the predictor variables in all models. Because of their important theoretical relationships to access, economic level and education level of the head of household were also retained in all final multivariate models, along with all the other predictor variables with adjusted  $p < 0.10$ . OR estimates were presented with 95% confidence intervals (CI).

## RESULTS

In the three countries, a total of 2,761 households were interviewed, and 48.3% (1,342) of them reported an acute health condition in at least one household member in the two weeks preceding the interview. The percentage was 59.0%, 56.2% and 30.9%, respectively

(Table 1). Guatemala had the lowest proportion of households reporting acute condition and the lowest average number of reported recent acute conditions.

The general sociodemographic profile was similar across countries. Few households were overcrowded (defined as 3 or more persons per room), ranging from 5.9% in Guatemala to 18.9% in Nicaragua. Around 50.0% of the households reporting acute health condition were located in urban area in all countries. In general, more than 60.0% of the households had a health facility located less than 30 minutes away, ranging from 62.4% in Nicaragua to 68.8% in Honduras.

In Guatemala, 27.1% of household heads had secondary school education or higher, compared to 17.7% and 17.1% in Nicaragua and Honduras, respectively. Nicaragua had a much higher proportion of female heads of household (68.4%) compared to Honduras (30.6%) or Guatemala (31.7%).

All three countries were found to have poor coverage of health insurance, with only 14.8% to 18.8% of households covered and less than 10.0% of households having health insurance with medicines coverage.

Only about half of households had a positive assessment of the geographic location, opening times, quality of care, or medicine quality in nearby public health facilities. The proportion was somewhat higher in Honduras than in Nicaragua or Guatemala.

Altogether, only 44.5% of persons who had an acute condition sought care in the formal health care system, ranging from 41.3% in Honduras to 47.1% in Nicaragua (Table 2). More than half of the acute cases were children, which is consistent with the decision to select the youngest person experiencing an acute illness in each household. Among those who sought care, 90.0% actually obtained health care. Most (57.4%) individuals who perceived their acute condition as severe sought health care in the formal system. On the other hand, only 36.2% of those whose condition was perceived as non-severe sought formal health care. For both severe and non-severe illness, the percentage of those who sought medicines was high and most persons reported receiving all the medicines they sought. Among those who sought care in the formal health care system for their acute conditions, the percentage who reported full access to medicines ranged from 60.3% in Guatemala to 86.5% in Honduras.

Overall, less than one-third of people received medicines free of charge, ranging from 26.1% in Guatemala to 29.1% in Honduras, and 34.2% in Nicaragua (Table 2).

The three main acute conditions reported were “Cough, runny nose, sore throat, ear ache” (68.1%), “Fever, headache, hot body” (66.6%) and “Pain, aches” (16.9%) in

**Table 1.** Characteristics of Households with acute conditions, selected indicators by country and level of significance in bivariate analysis with the outcome variables in Nicaragua, Honduras and Guatemala, 2010.

Variable	NIC	HON	GUT	Total
Total number of households	957	869	935	2,761
Number (percentage) of households that have an acute condition	565 (59.0)	488 (56.2)	289 (30.9)	1,342 (48.6)
Number of persons that have an acute condition per household [mean(SE)]	1.7 (0.06)	1.9 (0.06)	1.4 (0.09)	1.7 (0.04)
Households located less than 30 min from any health facility (%)	62.4	68.8	68.4	66.0 <sup>b</sup>
Households located in urban region (%)	47.5	52.2	48.4	50.6 <sup>b</sup>
Households with less than 3 persons per room (%) or (Households without overcrowding)	81.8	85.5	94.1	85.8 <sup>b,e,i</sup>
Economic level				
A	21.4	22.7	19.1	21.4
B	42.8	43.0	46.0	43.6
C	35.8	34.4	34.9	35.1
Female head of household (%)	68.4	30.6	31.7	46.8
Head of household that read and write in Spanish (%)	80.2	79.3	85.2	80.9
Age of the head of household [mean (SE)]	45.5 (0.7)	46.6 (0.9)	43.4 (1.2)	45.4 (0.5)
Households not declaring that the mother has ethnic minority (%)	87.6	84.5	76.3	83.0 <sup>c,f</sup>
Personal educational level of head of household				
None or less than primary school (%)	52.1	53.8	59.6	48.2
Primary school (%)	30.2	29.2	13.4	29.6
Secondary school and more (%)	17.7	17.1	27.1	22.2
Head of the household is employed (%)	27.4	35.9	27.6	30.5 <sup>b,i</sup>
Head of the household is retired (%)	4.7	7.0	6.1	5.9 <sup>g</sup>
Household Health insurance (%)	18.7	14.8	18.8	17.3 <sup>a,e,h</sup>
Household Health insurance that covers all medicines (%)	9.0	8.3	8.7	8.6 <sup>a,f,i</sup>
Perceptions (% households)				
The geographic location of public health facility is good (%)	53.2	65.3	50.3	59.5
The opening times of public health facility are good (%)	50.9	64.3	48.3	61.1 <sup>h</sup>
The opening times of the pharmacy at public health facility are good (%)	45.0	63.8	41.7	60.1 <sup>g</sup>
The quality of the health care at public health facility is good (%)	45.8	62.6	37.3	53.2 <sup>g</sup>
The medicine quality at public health facility is good (%)	55.7	67.2	45.4	62.9 <sup>e,g</sup>

Sought health care <sup>a</sup> p < 0.1, <sup>b</sup> p < 0.05, <sup>c</sup> p < 0.01

Full access to medicines (inside health system) <sup>d</sup> p < 0.1, <sup>e</sup> p < 0.05, <sup>f</sup> p < 0.01

Full access to medicines (outside health system) <sup>g</sup> p < 0.1, <sup>h</sup> p < 0.05, <sup>i</sup> p < 0.01

all countries. Consistent with these conditions, the three main medicines categories reported were analgesics, antibiotics, and anti-inflammatory medications.

The most important predictor to “full access to medicines” in bivariate analysis was seeking care in the formal health care system. People who sought care in the formal system were three times more likely to receive all the medicines (OR 3.0, 95%CI 2.3;4.0). Nevertheless, a sizeable proportion of the population also had access to medicines outside of the formal system.

Treating an illness that was perceived to be severe was the strongest predictor of seeking health care (OR 2.6, 95%CI 1.9;3.4), according to the final logistic regression model (Table 2). Other significant predictors included: geographic location less than 30 minutes from a health facility, household head having a secondary school education, patient age under 15, and having health insurance.

Among those who sought health care in the formal system (Table 4), obtaining full access to medicines was more likely in Honduras (OR 2.7, 95%CI 1.1;6.5) and

**Table 2.** Characteristics of individuals with acute conditions, selected indicators by country and level of significance in bivariate analysis with the outcome variables in Nicaragua, Honduras and Guatemala, 2010.

Variable	NIC	HON	GUT	Total
Number of households that have an acute condition	565	488	289	1,342
Person that had an acute condition				
Female (%)	44.2	50.8	60.4	49.3 <sup>g</sup>
Age [mean(SE)]	20.4 (1.0)	22.2 (1.1)	19.4 (1.6)	20.8 (0.6)
Age under 15 (%)	52.9	52.1	52.6	52.6 <sup>a</sup>
Not an ethnic minority (%)	87.5	82.8	83.5	84.9
Read and write in Spanish (%)	84.1	78.6	79.6	81.2 <sup>f</sup>
Relationship with the head of household				
Head of the household or spouse (%)	28.7	31.9	47.7	33.1
Son/ daughter/ grandchild/ stepchild (%)	66.9	63.6	47.0	62.8
Other relative (%)	3.8	3.7	5.2	4.0
Not related (%)	0.5	0.9	-	0.1
Sought Care in the formal health system	47.1	41.3	44.8	
Obtained health care in the Health System	96.6	98.1	92.7	96.3
Sought Care in the Public Sector	33.7	26.8	26.5	29.7 <sup>d</sup>
Sought medicines	87.8	91.3	78.5	87.1
Full access to medicines	75.8	86.5	60.3	
Perceived the acute condition as severe (%)	44.5	39.5	29.8	39.6 <sup>a</sup>
Health insurance (persons with acute condition) (%)	13.7	13.1	7.3	12.2 <sup>a,c,f</sup>
Health insurance covers medicines (persons with acute condition) (%)	5.5	8.7	3.3	6.1 <sup>a,d,g</sup>
Obtained medicines for free (%)	34.2	29.1	26.1	30.8

Sought health care <sup>a</sup>p < 0.01

Full access to medicines (inside health system) <sup>b</sup>p < 0.1, <sup>c</sup>p < 0.05, <sup>d</sup>p < 0.01

Full access to medicines (outside health system) <sup>e</sup>p < 0.1, <sup>f</sup>p < 0.05, <sup>g</sup>p < 0.01

Nicaragua (OR 1.9, 95%CI 1.0;4.2). The other significant predictors of full access to medicines for patients who sought care inside the formal health system were seeking care in the private sector, having secondary school education, and having more positive perceptions of the quality of health care and medicines in public health facilities.

For patients who did not seek care in the formal health care system, living in Honduras (OR 9.5, 95%CI 5.3;16.8) or in Nicaragua (OR 3.6, 95%CI 2.0;6.8) made full access to medicines much more likely than in Guatemala (Table 4). Likewise, urban geographic location, higher economic status, and male gender were also significant predictors. Health insurance was an important bivariate predictor, but was eliminated from the final multivariate logistic regression model, possibly because of small sample size.

In general, the main reasons reported or not obtaining full access to medicines were “do not have money”,

“medicines were not available at the pharmacy or health care facility” and “medicines were not needed” (Table 5).

The reported reason “do not have money” was the most frequent reason for not seeking care in Nicaragua and Honduras, while in Guatemala, the most frequent reason was that “medicines were not needed”. Among those who sought care, “do not have money” was the most common reason for lack of full access to medicines. In Nicaragua, enabling factors such as medicines availability, distance from health care facility, and medicines prices were also reported as important reasons for not having full access.

## DISCUSSION

The proportion of households reporting at least one acute health condition in the previous two weeks (48.3%) was higher than those reported in Espirito Santo, Southeastern Brazil,<sup>b</sup> Ghana<sup>c</sup> and Philippines,<sup>4</sup> (35.6%, 26.0% and 40.0%, respectively), but lower than in Nigeria (57.0%),<sup>d</sup>

<sup>b</sup> Secretaria de Estado da Saúde do Espírito Santo. Diagnóstico da assistência farmacêutica no setor público e a política farmacêutica do Estado do Espírito Santo. Vitória, ES; 2007.

<sup>c</sup> Arhinful DK. Report of the WHO Level II Household Survey to measure access to and use of medicines In Ghana; 2008 May/June; Ghana. Accra: Ministry of Health; 2011.

<sup>d</sup> Nigeria Federal Ministry of Health. Access to and rational use of medicines at the household level. Abuja: Federal Ministry of Health/WHO; 2010.

**Table 3.** Predictors of seeking health care in the formal health system in Nicaragua, Honduras and Guatemala, 2010.

Variable	OR	CI
Country Level		
Nicaragua	1.3	0.9;1.8
Guatemala	1.2	0.8;1.8
Honduras	1.0	–
Household Level		
Household located < 30 min from any Health facility	1.4	1.0;1.9
Economic Level		
A	1.1	0.7;1.9
B	1.0	0.7;1.4
C	1.0	–
Household head education level		
Secondary school	1.5	1.0;2.1
Primary school	1.0	0.7;1.3
None or < primary school	1.0	–
Individual Level		
Under 15 years of age (%)	1.7	1.3;2.2
Perceived high illness severity	2.6	1.9;3.4
Health Insurance (person with the acute condition)	1.5	1.0;2.2

although differences in the study methodologies may partly account for these discrepancies.

Knowledge of the incidence of acute illness was limited in the countries participating in this study. In general, the information that is available in health systems concerns diseases with mandatory notification.<sup>17</sup> Information systems in the region are not well designed to capture information about common illnesses. This study provides useful data about the magnitude of demand for acute illness care that could be helpful in organizing health care strategy.<sup>13</sup>

The access framework proposed by Aday & Andersen<sup>1</sup> provided a useful theoretical underpinning to understand the predictors of access to medicines at the household level in this study. Considering health system characteristics that affect potential access to medicines, out-of-pocket payment for health services and medicines is an important burden, especially affecting the poor.<sup>10,16</sup> Acute health conditions occur in an unexpected way, draining household resources that would ordinarily be allocated for other uses. According to Rosenberg & Anderson,<sup>25</sup> exclusion from social protection in health affects an important proportion of the population in Latin America. Consistent with this finding, a low percentage of households in the present study had access to medicines for free. More than 65.0% of people paid for medicines across the three countries, and in Guatemala this percentage was 74.9%. In a previous study in Rio Grande do Sul, Southern Brazil, this percentage was lower (41.5%) but still substantial.<sup>23</sup>

As an enabling factor, health insurance coverage, including both public and private coverage, was found to be low in all three countries. As elsewhere in the literature,<sup>16</sup> lack of access to risk protection was a barrier to access for both health care and medicines.

Several studies<sup>6,14,27</sup> have shown that positive perceptions concerning geographic location of health facilities and quality of care positively affect health seeking behavior. In this study, only about half of the respondents felt positively about geographic location, and quality of care was rated among the worst of the health system perceptions assessed.

Regarding “need” factors, the health seeking behavior of individuals also depends on whether they consider themselves susceptible to a particular health problem, their perception of the seriousness of the problem and its consequences, and if they believe that the health care available could bring them benefits.<sup>14,28</sup> The proportion of people who define their health status as fair or poor is a powerful predictor of the use of health services.<sup>3,12</sup> In this study, a greater percentage of persons who perceive their condition as severe sought care in the formal health system. A high percentage of persons who sought care for their acute condition actually received care, indicating a general lack of barriers in access once a decision is made to seek care in the formal health system.

Relevant predisposing variables in this study for seeking health care were age under 15 years and educational level. Pinheiro et al<sup>24</sup> reported that individuals aged under 15 years and old adults are more likely to seek care.



**Table 4.** Predictors in the final logistic regression model to full access to medicines according to search for health care in the Health System in Nicaragua, Honduras and Guatemala, 2010.

Variable	OR	CI
Seek care in the formal health care system		
Country		
Honduras	2.7	1.1;6.5
Nicaragua	1.9	1.0;4.2
Guatemala	1.0	–
Household Level		
Economic Level		
A	1.0	0.3;3.2
B	0.9	0.5;1.7
C	1.0	–
Household head education level		
Secondary school	3.0	1.0;9.1
Primary school	1.0	0.6;1.8
None or < primary school	1.0	–
Individual Level		
Sought health care in the private sector	3.2	1.5;7.0
Perceptions		
Medicines quality at public health facility is good	2.0	1.1;3.5
Does not seek care in the formal health care system		
Country		
Honduras	9.5	5.3;16.8
Nicaragua	3.6	2.0;6.8
Guatemala	1.0	–
Household Level		
Household in the urban area		
Household in the urban area	1.3	0.8;2.0
Economic Level		
A	1.9	0.9;3.9
B	1.5	0.9;2.4
C	1.0	–
Household head education level		
Secondary school	1.4	0.7;2.8
Primary school	1.5	0.9;2.4
None or < Primary school	1.0	–
Individual Level		
Male (%)	1.5	1.1;2.1

Appropriate access to medicines can be understood as having clinical need for medicines met at the time and in the place that is appropriate to the patient, with medicines of assured quality and with information necessary for their proper use.<sup>15,29</sup> Information about overall level of access to medicines in a population is important to identify gaps and to design policies that could resolve them. The overall level of access to medicines found in this study was lower than those reported in other Latin American settings, including the Brazilian state of Rio

Grande do Sul (89.6%), a Brazilian primary health care program (96.4%),<sup>5</sup> and in Mexico 97.0%.<sup>11</sup>

The main predictor of access to medicines was seeking care in the formal health care system. This study confirms findings in the literature<sup>5,11,24</sup> concerning higher access among those with higher economic and educational level and male gender.

There were important differences for those who sought care inside and outside of the formal health system.

**Table 5.** Reasons for not having full access to medicines, stratified by whether or not the patient sought care in the formal health system in Nicaragua, Honduras and Guatemala, 2010.

Variable	Nicaragua			Honduras			Guatemala		
	Total	Seek care	Did not seek	Total	Seek care	Did not seek	Total	Seek care	Did not seek
Reasons for not having full access to medicines (n)	136	37	99	62	17	45	100	24	76
Do not have money (%)	62.7	61.8	63.0	62.0	57.7	63.7	24.4	37.6	20.1
Medicines were not available at the pharmacy or health care facility (%)	29.0	59.5	17.5	11.0	32.9	2.4	5.5	16.8	1.9
Place where medicines can be obtained was too far away (%)	26.7	7.8	33.8	10.7	0.0	15.0	1.9	4.0	1.3
Medicines do not have good quality (%)	1.5	2.9	1.0	1.7	0.0	2.4	2.0	0.0	2.6
Medicines were not needed (%)	18.1	0.0	24.9	35.2	19.8	40.9	44.1	9.6	55.2
Prices of medicines are high (%)	13.0	13.4	12.9	6.6	–	9.1	2.1	0.0	2.8
Doctor did not prescribe medicines (%)	–	5.4	–	–	6.3	–	–	14.6	–

For those inside the formal health system, country and household economic level were less important predictors. That is consistent with the finding that access to the formal health system, often public sector facilities, had an important “protective effect” on access to medicines.

Health system characteristics might help to explain some of the observed differences across countries. All countries distribute medicines free of charge for specific populations, e.g., children, women, patients with malaria or HIV. However, for other patients, access to medicines requires copayments.<sup>7</sup> Among high risk populations, geographic location, economic status, and gender were important predictors, pointing to a problem related to inequalities in the distribution of health services and wealth in the population.

Medicines price surveys have previously determined that prices are higher in Guatemala,<sup>19</sup> which might explain the lower rate of access to medicines that we observed in this country. Guatemala is wealthier than Nicaragua and Honduras, which is the reason we expected to find better access to medicines. However, the inequities in the wealth may explain the relative lack of access in Guatemala.

The main reason reported for not having full access to medicines in Guatemala was that the medicines were not needed. We also observed that a lower percentage of people sought health care and that perceptions concerning the quality of health care were poorer than in the other two countries. Perception about illness severity and health status were also different. That might indicate that cultural aspects about illness and beliefs affect health care behavior and access to medicines, especially in Guatemala.

Health insurance coverage was a predictor of full access to medicines, but was not included in the final model because few people with health insurance did

not receive all the medicines they sought. How health insurance affects access to medicines is an area that deserves further research.

Around fifty million indigenous people live in the American region, and in some countries they represent a majority of the population. In general, indigenous populations have lower levels of education, higher unemployment, and poorer health conditions than the entire population.<sup>11</sup> Ethnicity is generally a predictor of access; however, this was not confirmed in this study, possibly due to small sample sizes.<sup>7,17,16,26</sup>

While half of people reporting acute condition sought care in the formal health system, a substantial proportion of the population in these three countries sought and obtained medicines outside of the formal health system, which may compromise quality of care and represent a risk to patients.

Determinants of full access to medicines inside and outside the formal health system differ, and thus may require different strategies to improve access to medicines.

Improving overall access to health care will improve access to medicines, especially for high risk populations.

These findings will contribute to understanding the barriers in access to medicines and may be helpful in developing targeted strategies to improve access to medicines in low and middle income countries in Latin America.

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