

BARRIERS OF ACCESS BETWEEN CARE LEVELS: A CROSS-SECTIONAL STUDY IN PUBLIC HEALTHCARE NETWORKS OF LATIN AMERICA

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I. INTRODUCTION

Fragmentation of health systems in Latin America, is considered one of the most important obstacles to achieve quality healthcare in the region and results in limited coordination of health services (1). The epidemiological transition and a growing number of patients with chronic conditions, who require healthcare during longer periods by different health services and in different healthcare levels (2), pose a challenge for health systems. These patients, some of them with multiple morbidities, require an adequate exchange of clinical information between care levels to agree on treatments and adequate accessibility between care levels to avoid any type of interruption during care (3).

Studies have been carried out to analyse healthcare coordination in Latin America (4), the result of care coordination in continuity of care (5) and barriers in access to healthcare (6). However, there are no available studies to date in the region that analyse barriers of access between care levels in a complete and comparative way.

FRAMEWORK OF ANALYSIS

Care coordination, continuity of care and care integration are terms that have been used indiscriminately to refer to the general idea of the connection of the health care that patients receive from different care levels (7). care coordination is the harmonious connection of the different services needed to provide care to a patient along the care continuum in order to achieve a common objective without conflicts (8). It focuses on the interaction between providers. Continuity of care, on the other hand, is the result of care coordination experienced by patients (9). This thesis focuses its analysis on the latter concept.

CONTINUITY OF CARE

This study adopts the theoretical framework for continuity of care based on Reid et al. (9), who define it as one patient experiencing care over time as connected and coherent with his or her health needs and personal circumstances. Differential attributes of continuity of care are the patient's perspective and the temporality element (9). Based on this, the analysis made in this study stands on the patients' experiences when using the healthcare services. Reid defines three types of continuity of care: 1) *continuity of information*, or the patient's perception that information on past events and personal circumstances is shared and used by the different healthcare providers; 2) *continuity of clinical management*, which is patient's perception that they receive the different services in a coherent way that is responsive to their changing needs; and 3) *relational continuity*, or the patient's perception of an ongoing therapeutic relationship with one or more providers (9). This thesis approaches accessibility across care levels (from primary to secondary care and vice versa) which is a dimension of continuity of clinical management, together with consistency of care and flexibility.

ACCESS AND ACCESSIBILITY TO HEALTH SERVICES AND NEED FOR HEALTHCARE

A lack of a clear definition of access and accessibility has been pointed out by authors like Frenk (10), who proposes to analyse the scope or domain of each one through the *narrow domain*, from the moment patient seeks care to the moment care is first received; the *intermediate domain* includes not only the first contact with the services but all contacts through the episode; and the *broad domain*, from perceiving the need for healthcare through to the use of services, including all contact throughout the episode. Some authors extend the latter to include satisfaction with the care received and incorporate aspects of quality and health outcomes (11). According to Frenk, accessibility is a characteristic of the healthcare services and is located in the *intermediate domain* (10). Barriers of access between care levels would be then within the intermediate domain.

Access to health services, in its broad domain, starts from the user's desire to receive healthcare, the search for healthcare and the real access to health services and the continued contact with health services throughout an episode (10). So, access can be understood as a dynamic process in which various factors intervene in the exchange between the search for healthcare by the individual and the delivery of care by the health system (12). An approach increasingly used to improve the evaluation of access to health services is the measurement of unmet healthcare needs proposed by Allin et al. (12). An *unmet need* is defined as that need that remains because adequate healthcare is not received (12). From the measurement of these *unmet needs* one can identify the specific barriers to which users must be confronted at different moments of the trajectory through the health services to obtain healthcare that meets their needs (13). Measurement of *unmet needs* also allows to analyse other dimensions such as quality and adequacy of healthcare received (14).

Five types of unmet needs have been proposed: 1) not perceived *unmet need*, when individuals do not perceive that they need healthcare; 2) *chosen unmet need* (subjective), which occurs in the search for attention when individuals perceive they need healthcare but choose not to resort to the health services; 3) *not chosen unmet need* (subjective), occurring in the entry to health services when individuals perceive they need healthcare, they resort to the health services, but they do not receive healthcare; 4) *clinically validated unmet need*, which takes place during the use of healthcare services when individuals perceive they need healthcare, they resort to the health services but they do not receive the treatment that the doctor would consider appropriate; and 5) *Unmet expectation*, taking place also during the use of health services when individuals perceive they need healthcare, they resort to the health services but perceive that they do not receive the most appropriate treatment (12). In this thesis, barriers of access between care levels are identified in different moments of the trajectory of use of healthcare services.

BEHAVIOURAL MODEL OF HEALTH SERVICES USE

To understand the pathway through the healthcare services, Aday and Andersen proposed the *behavioural model of health services use* seeking to study the causes and patterns of use of health services (15). The model distinguishes between access made, or use of services, and potential access, or analysis of its determinants, and divides them in individual factors (predisposing, enabling and need factors) and health services' factors (16).

Figure 1 schematizes the model of Aday and Andersen considering five components of access: health policies, characteristics of health services, population characteristics, the use of services and satisfaction with the received healthcare (17). This model starts from a certain organization of the health services influenced by health, financing, human resources policies, etc. that seek to modify susceptible characteristics of the population such as health education and information about the health services. These policies also influence access to health services, the health services offer and some characteristics of the population (6).

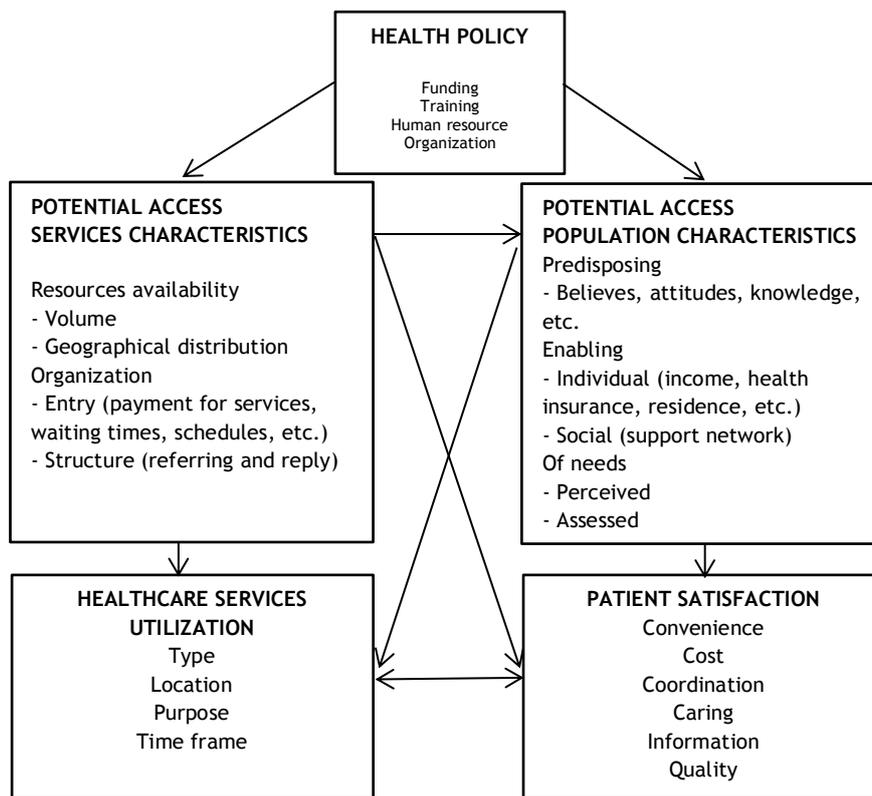


Figure 1. Behavioural Model of Health Services Use. Adapted from García-Subirats (17) and Aday & Andersen (15).

The analysis of potential access includes characteristics of the health services and the population. Health services characteristics include, on the one hand, the availability of resources. On the other hand, it includes the organization, that is, how health services use those resources to give attention through two components: the entry point and the organization. The entry refers to the process of "entering" or "accessing" health services including the barriers that must be

overcome to receive healthcare. The organization is related to aspects of the health services that determine what happens with the patient once he has entered to the health services (15). The characteristics of the population include several factors that influence the use of health services, which are grouped in: 1) predisposing factors to the use of health services, such as beliefs and attitudes about health, knowledge of the functioning of health services, sociodemographic characteristics; 2) factors that enable to the use of services, which can be individual factors like income, type of insurance, residence or origin and community factors such as support network, organization of health services in the territory; and 3) the healthcare needs of the population, such as perceived needs or needs assessed by the healthcare providers (15).

This model identifies the relationship between all the factors mentioned above and argues that the characteristics of the healthcare offer affect directly to the patterns of utilization of the health services (real access) and to the users' satisfaction with the received healthcare. Also, the characteristics of the population may affect the *real access* and the satisfaction with the received healthcare regardless of the characteristics of the healthcare offer. Finally, the two-way relationship between the use and the satisfaction with the received healthcare proposes that, over time, the use of health services influences the satisfaction with healthcare and vice versa (17).

In this thesis, a first approach of the associated factors to barriers of access between care levels is made following the proposed grouping in the behavioural model of health services use by Aday and Andersen.

EVALUATION OF CONTINUITY OF CARE AND ACCESS BETWEEN CARE LEVELS IN LATIN AMERICA

Studies about continuity of care exist in high income countries and they focus on factors related to the individuals (18-20). In Latin America, other existing studies, mainly conducted in Brazil, analyse continuity of care as part of the evaluation of healthcare quality and focus on relational continuity with the primary care physician and access to primary care (21-24). Some of these studies identify gaps in the continuity of care between care levels, mainly in the transfer of clinical information between primary care and specialized care (21, 24), but other important issues like continuity of clinical management or the determinants of continuity are not explored (23). Regarding access barriers from primary care to specialised care, only few studies with a qualitative approach have been carried out in Brazil (24) and in Colombia (25) and they point out structural barriers of access to specialised care such as poor infrastructure, lack of supplies and human resources and waiting times.

As part of the Equity-LA project, studies evaluated the three types of continuity of care in public healthcare networks in Brazil and Colombia (5). Other studies analysed factors that affect access to health services in the same two countries (6). These were the first approaches to assess barriers of access comparing health care systems. Later, as part of the Equity-LA II study (26), an analysis of the levels of continuity of care of patients with chronic conditions and

comparing public healthcare networks of six Latin American countries was carried out (23). Another study about coordination of care has also been developed from the experience of professionals, where it was sought to determine the level of clinical coordination between primary care and specialized care experienced by doctors of these same levels who interacted with each other (through a referral and counter-referral system for example), and explore associated factors in public health networks of the same six countries (4). However, no study was found up to today in Latin America that analyses access between care levels as part of continuity of care, nor based on chronic patients, nor comparing countries within the region.

STUDY CONTEXT

This study is part of the phase I quantitative baseline study of the EQUITY-LA II project, which adopts an innovative participatory action research approach with a controlled before and after quasi-experimental design and seeks to evaluate the effectiveness of a participatory shared care strategy in improving coordination across care levels and related care quality, in health services networks in healthcare systems of Argentina, Brazil, Chile, Colombia, Mexico and Uruguay (26).

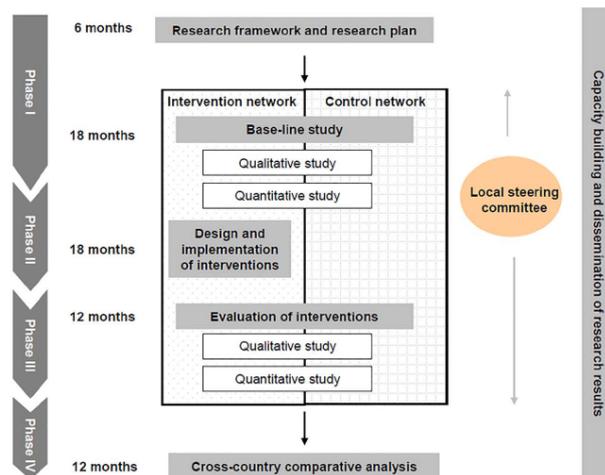


Figure 2. Equity-LA II phases and methods (26).

The countries of study, classified as high-income countries (Argentina, Chile and Uruguay) and high middle income (Brazil, Colombia and Mexico) in the region, have great socioeconomic inequalities. Except for Uruguay (US\$1027), all countries have low public spending on health per capita: US\$335 in Argentina, US\$ 436 in Brazil, US\$563 in Chile, US\$428 in Colombia, and US\$351 in Mexico (4). Also, number of physicians per 1000 people is low (Brazil 1,9; Chile 1; Colombia 1,8; Mexico 2,2) except in Argentina (3,9) and Uruguay (3,7) (27).

Health systems have some differences in every country of study. In Argentina, the system has three sectors: public, social security and private. The public sector includes the national and provincial ministries as well as the network of public hospitals and primary health care units which provide care to the poor and

uninsured population. This sector is financed with taxes and payments made by social security beneficiaries that use public health care facilities (28). Brazilian health system, which includes a public sector covering almost 75% of the population and an expanding private sector offering health services to the rest of the population. The public sector is organized around the Sistema Único de Saúde (SUS) and it is financed with general taxes and social contributions collected by the three levels of government (federal, state and municipal). SUS provides health care through a decentralized network of clinics, hospitals and other establishments, as well as through contracts with private providers (29). Chilean health system also has two sectors, public and private. The public sector comprises all the organisms that constitute the National System of Health Services, which covers 70% of the population, including the rural and urban poor, the low middle-class, the retired, and the self-employed professionals and technicians. This population is provided healthcare by the Fondo Nacional de Salud (FONASA) through the Sistema Nacional de Servicios de Salud (SNSS) and its network of 29 regional health services, as well as the Primary Care Municipal System. Funding comes from general taxes, municipal funding and copayments made by FONASA affiliates (30). Colombian health system is formed by the Sistema General de la Seguridad Social en Salud (SGSSS). Provision of healthcare is divided between private and public insurers known as Empresas Promotoras de Salud (ESP) who affiliate users to the system and also private and public providers known as Instituciones Prestadoras de Servicios (IPS) who provide health care services to the population. Funding comes from sources including contributions made by employers and by employed and independent working population, national funding and municipal funding (31). The Mexican health system is formed by two sectors, public and private. Public sector includes Social security institutions like the Mexican Social Security Institute and institutions and programs that cover population without social security such as Secretaría de Salud, Servicios Estatales de Salud (SESA), IMSS-Oportunidades program (IMSS-O) and Seguro Popular de Salud (SPS). Funding comes from contributions made by employer, employees and federal and state funding, as well as payments made by the population when receiving health services. This payment is waived for the poorest population (32). Finally, in Uruguay the integrated national health system is also formed by a public and a private sector. Provision is made by the Administración de Servicios de Salud del Estado (ASSE), Hospital de Clínicas and the Institutos de Medicina Altamente Especializada (IMAE). Funding is made by Fondo Nacional de Salud (FONASA) which is financed by mandatory contributions of employees and employers, and National transfers (33).

Health systems in all six countries have models segmented for groups of population according to socioeconomic criteria or employment status, with at least a public and a private subsystem. The public healthcare is financed with contributions to the social security and/or taxes. It covers at least one subsystem dependent on the ministry of health, which is decentralized to different governmental levels (departments/provinces and/or municipalities) and is generally aimed at population of lower income and/or people with no social security coverage. The Equity-LA II focuses on this public healthcare

subsystem (26). The proportion of covered population by the public health subsystem, estimated from the figures of the affiliates in the public or private subsystems, varies by country: it is high in Chile (FONASA) and Brazil (SUS), with 73% and 75% respectively; in Mexico (Department of Health / Insurance public health) 58.4%; in Uruguay (ASSE) 36%; in Argentina (departments of provincial and municipal health) 36%; and in Colombia 53.7%, taking into account that these health services provide care to the uninsured population and those enrolled in the subsidized scheme (4).

Public health subsystems in the countries of study have significant similarities. They have national policies or programs that encourage integrated healthcare networks, differing in aims and specific approaches (26). The delivery of healthcare services is organized in providers networks, mostly public (except in Colombia), but also private (except in Mexico). In all six countries, healthcare is organized by levels of complexity with primary care as the point of entry to health services and the coordinator of patients' care and specialized care with a supporting function, which requires a referral from primary care to access to the doctors (4).

JUSTIFICATION

Nowadays Latin American health systems face the important challenge of improving coordination and continuity of care, especially for the users with chronic diseases who are increasing and contribute to the disease burden in these countries (34). This problem does not allow a comprehensive and quality healthcare to happen. In addition, these patients, due to the complexity of their conditions, require health services from different care levels, involving different healthcare professionals and requiring an important coordination of care (2). Due to the above, this population is more exposed to experience barriers of access, not only to entry to the health services, but also between care levels.

Studies on continuity of care exist mainly in high-income countries and focus on factors related to the individuals (18-20), but in Latin America, studies on this field are scarce, existing only some in Colombia and Brazil (5, 6). More recently, and as part of the Equity-LA II project (26), studies have been conducted with the objective of analysing clinical coordination experienced by doctors in public networks of six Latin American countries (4), as well as studies to analyse chronic patients' perceived continuity of care (23). Further research is needed on barriers of access between care levels (Accessibility) and taking in account the patient's perspective, the present study as part of the baseline study of the Equity-LA II project (26).

This study aims to provide an analysis, from the intermediate domain of access to health services proposed by Frenk of the barriers of access between care levels in six Latin American countries (10). Barriers will be analysed in the framework of access between care levels being a part of continuity of clinical management according to Reid et al. (9), and associated factors to these barriers are grouped according to the behavioural model of health services use of Aday and Andersen (15). This type of analysis will allow to obtain exhaustive

information based on scientific evidence, useful to identify tackling points for improvement of healthcare delivery in the studied countries and its comparative approach will allow to identify health systems characteristics that might affect barriers of access between care levels.

II. HYPOTHESIS AND OBJECTIVES

HYPOTHESIS

- Barriers of access between care levels exist and their prevalence is different in each studied country.
- Types of barriers of access between care levels are different in every studied country.

OBJECTIVES

GENERAL

To identify the barriers of access between care levels in chronic patients of public healthcare networks in Argentina, Brazil, Chile, Colombia, Mexico and Uruguay in 2015 and explore the associated factors.

SPECIFIC

- To describe, in a comparative way, the presence of and types of barriers of access between care levels in the six studied countries.
- To describe the perceived impact on patients' health of access barriers between care levels.
- To explore the reasons to resort to health services outside the public network and factors likely associated to barriers of access between care levels.

III. ARTICLE

Barriers in access between care levels: results of a cross-sectional study in public healthcare networks of Argentina, Brazil, Chile, Colombia, Mexico and Uruguay in 2015.

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ABSTRACT

Introduction/Background: Fragmentation of healthcare systems results in limited coordination between care levels, prevalent in Latin America. This affects continuity of care, particularly of chronic patients, which are increasing in the region. Continuity involves uninterrupted access between care levels. While access to care has been the focus of research, accessibility between care levels has been rarely studied, especially in Latin America. This study analyses barriers of access between care levels of chronic patients from public networks in six countries. **Methods:** Cross-sectional study applying the CCAENA© questionnaire to users of public healthcare networks. A random sample of patients with at least one chronic condition was calculated in 392 patients per network ($\beta=0.20$, $\alpha=0.05$). Response variables: a) existence and type of access barriers when referred to other care level to i) seeking healthcare ii) doctors' consultation ii) procedures/treatments. b) reasons for attending outside the network. c) barriers' impact on their health. Explanatory variables: sex, age, education; time of residence, income, health plan, regular source of care, consistency of doctors, chronic conditions and self-rated-health. **Findings:** Prevalence of barriers to seeking healthcare varied from 5.9% in Uruguay to 27% in Mexico and were related to inability to get to health services, referral-letters-related-problems. Barriers to doctor's consultation varied from 5.3% (Uruguay) to 17.5% (Brazil) and were lack of doctors in all countries and long waiting times in Brazil (8.6%), Argentina (16.2%) and Mexico (21.5%); also administrative-related issues in Chile (10.5%), Uruguay (13.6%) and Colombia (36%). Most prevalent barrier to procedures/treatments was long waiting, except in Mexico (medication/supplies shortfalls, 72%) and in Colombia (insurers-related, 26.8%). Resorting to healthcare outside the network varied from 3.8% in Uruguay to 54% in Mexico and reasons included waiting times, not covered services and dissatisfaction with public healthcare. In all six countries interviewees perceived that barriers had an impact on their health. **Conclusion:** Access barriers between care levels were present in all six countries and more prevalent in Mexico and Brazil, with differences related to the context. These results highlight critical points to be approached by public policy and contribute to the understanding of the relationship between health system models and accessibility between care levels.

Keywords: Barriers of access, health services accessibility, continuity of care, Latin America, care levels.

1. INTRODUCTION/BACKGROUND:

Fragmentation of health systems in Latin America, is considered one of the most important obstacles to achieve quality healthcare (1). The epidemiological transition and a growing number of patients with chronic conditions, who require healthcare during longer periods by different health services and in different healthcare levels (2), pose a challenge for health systems. These patients, some of them with multi-morbidities, require an adequate exchange of clinical information between care levels to agree on treatments and adequate accessibility between care levels to avoid any type of interruption during care (3).

This study adopts the theoretical framework for continuity of care developed by Reid et al. (4), who define it as one patient experiencing care over time as connected and coherent with his or her health needs and personal circumstances. Differential attributes of continuity of care are the patient's perspective and the temporality element (4). Three types of continuity of care are defined: *continuity of information* or the patient's perception that information on past events and personal circumstances is shared and used by the different healthcare providers; *continuity of clinical management* which is patient's perception that they receive the different services in a coherent way that is responsive to their changing needs; and *relational continuity*, the patient's perception of an ongoing therapeutic relationship with one or more providers (4). This study analyses accessibility across care levels (from primary to specialised care and vice versa) is a dimension of continuity of clinical management, together with consistency of care and flexibility.

Access between care levels is approached in this research taking into account the *intermediate domain* proposed by Frenk, includes not only the first contact with the services but all contacts through the episode (5). Also, the *behavioural model of health services use* proposed by Aday and Andersen (6) was used in this study to first approach factors likely associated to barriers of access between care levels. It divides determinants of access in 1) predisposing factors to the use of health services, such as beliefs and attitudes about health, knowledge of the functioning of health services, sociodemographic characteristics; 2) factors that enable to the use of services, which can be individual factors like income, type of insurance, residence or origin and community factors such as support network, organization of health services in the area; and 3) the healthcare needs of the population, such as perceived needs or needs assessed by the healthcare providers (6).

In Latin America, other existing studies, mainly conducted in Brazil, analyse continuity of care as part of the evaluation of healthcare quality and focus on relational continuity with the primary care physician and access to primary care (7)(8)(9)(10). Some of these studies identify gaps in the continuity of care between care levels, mainly in the transfer of clinical information between primary care and specialized care (7)(10), but other important issues like continuity of clinical management or the determinants of continuity are not explored (11). Regarding barriers of access from primary care to specialised care, only few studies with a qualitative approach have been carried out in Brazil (12) and in Colombia (13) and they point out structural barriers of access to specialised care such as poor infrastructure, lack of supplies and human resources and waiting times. However, there are no available studies that analyse barriers of access between care levels in a comprehensive and comparative way.

This study is part of a wider research project to analyse barriers of access between care levels in the public healthcare networks of six Latin American countries: Argentina, Brazil, Chile, Colombia, Mexico and Uruguay (14). Previous studies analysed the levels of continuity of care perceived by patients with chronic conditions (11) and studied coordination of care from the experience of healthcare professionals exploring associated factors (15).

The aim of this research is to analyse the barriers of access between care levels experienced by patients with chronic conditions when using public healthcare networks in six Latin American countries. This is the first study of this field in the region.

2. METHODS:

2.1. STUDY DESIGN AND STUDY AREAS

As part of the baseline study of the Equity-LA II project, a cross-sectional study was carried out based on a population survey using the CCAENA® questionnaire in the six participating countries. Using a participatory action research approach, a steering committee in each country selected two public healthcare networks under the following selection criteria seeking similar characteristics and comparability: a) provision of a continuum of services including at least primary care and specialised care; b) provision of care to a defined population; c) mainly in urban areas of low or medium-low socioeconomic status (taking into account the defined population reside in poor neighbourhoods and are affiliated to public healthcare) ; d) willingness to participate; and d) leadership with local authority to implement designed strategies resulting in the frame of the Equity-LA II project. The selected networks were: Argentina, south/south-western and north/north-western districts of Rosario; Brazil, Districts III and VII in Recife and the urban area of Caruaru; Chile, the southern and northern networks of Santiago,

encompassing three districts; Colombia, south-western and southern district networks of Bogotá D.C.; Mexico, state networks of Xalapa and Veracruz; Uruguay, two networks of the western region, encompassing seven districts. None of the contacted networks refused to participate (14).

2.2. *STUDY POPULATION AND SAMPLE*

The study population were residents of the study areas, over 18 years of age, who had at least one chronic condition and had been attended to two care levels (primary care and specialized outpatient care or emergency services) in the six months prior to the survey for the same health condition (either chronic or acute) (14). A sample size of 392 patients per network in each country was estimated in order to detect a difference of 15% in a bilateral contrast and calculated based on 80% power ($\beta = 0.20$) and 95% confidence level ($\alpha = 0.05$). The final sample size was 4,821.

2.3. *QUESTIONNAIRE*

To study barriers of access between care levels, the CCAENA© questionnaire (Cuestionario de Continuidad Asistencial Entre Niveles de Atención, in Spanish) (16) was applied, previously adapted to and validated in the health systems of Colombia and Brazil (17). The content was adapted to the context and language variants of each participating country and translated into Portuguese for Brazil. In each country, two pre-tests were conducted, followed by a pilot test. The final questionnaire is divided into eleven sections: 1) patient's health conditions; sections 2, 3, 4 and 5) collect recent experiences in the transition between primary care and outpatient specialized care or emergency services; 6) accessibility between health care levels (the focus of this research) identifying if the patients experienced barriers to access from one care level to another; 7) perception of continuity of care across care levels; 8) perception of relational continuity of care with primary care and specialized care doctors; 9) Insurance affiliation (section non-existent for Argentina and Brazil); and sections 10 and 11) collecting sociodemographic data.

2.4. DATA COLLECTION

Data were collected by means of face-to-face interviews conducted by specifically trained interviewers in each country from May to December 2015, except in Argentina (until April 2016) and Uruguay (February 2016). The survey was conducted in the primary care centres and patients were selected by simple random sampling. As patient registers were unavailable in some of the networks studied, selection of patients was made in doctors' waiting rooms, reception and clinical laboratory areas of the primary care centres in each network. Since the flow of patients in such centres is relatively low (14), all the users in the mentioned facilities of each centre in the network were approached, and only patients meeting the inclusion criteria were interviewed. Participation in the study was voluntary and informed consent sheet was signed after informing the patient and before the interview. Strategies to ensure the quality and consistency of data included the supervision of interviewers in the field, the review of all questionnaires, the re-interviewing of 20% of randomly selected participants, and the double-entry method to control inconsistencies during data entry.

2.5. VARIABLES

Identification of barriers of access from one care level to another experienced by chronic patients in the last 6 months was made by detecting such barriers in three points of the trajectory of use of healthcare services with three dichotomous (yes/no) *response variables*:

- a) The existence and types of barriers when referred to another care level, which were elicited using the following questions:
 - i) Seeking healthcare. *Have you been referred to any physician of any of the centres within the network and you could not go? And the open-ended question: Why couldn't you go?*
 - ii) Doctors' consultation. *Have you been referred to any physician of any of the centres within the network and you were not attended to? And the open-ended question: Why were you not attended to?*
 - iii) Procedures/treatments. *Have you had any difficulty continuing with a treatment or having a test prescribed by the doctors in the network? And the open-ended question: What difficulties?*
- b) Reasons for attending healthcare services outside the public networks. Analysed through the dichotomous (yes/no) question: *In the last 6 months, have you attended to doctors' consultation in a healthcare*

centre outside the network? And the open-ended question: Why didn't you attend to healthcare in the public healthcare network you're enrolled to?

- c) Barriers' impact on patients' health was measured by the open-ended question: *How do you think it affected your health?* Applied to every category.

Following the Aday & Anderson model (6) to analyse possible factors associated to barriers of access between care levels three groups of explanatory variables were taken into account:

- a) Predisposing factors: sex (male/female), age, education level (none, primary education and secondary or higher education).
- b) Enabling factors: time of residence in the neighbourhood (1 year or less, between 1 and 5 years, more than 5 years), per capita income (minimum wage or less, between 1 and 2 minimum wages, more than 2 minimum wages), having a health plan (yes/no) , having a regular source of care (yes/no) and consistency of doctors in primary care and in specialized care analysed through the question *"when you attend to primary care/specialised care, are you treated by the same doctor?"* (grouped into always/almost always and hardly ever, never).
- c) Need factors: number of chronic conditions according to O'Halloran's classification (18) and self-rated-health, which was assessed using the question *"How do you define your health?"*, and the results were grouped into good (very good or good) and poor (regular, poor or very poor).

2.6. STATISTICAL ANALYSIS

Firstly, a univariate analysis was performed to describe the existence of barriers of access when referred to another care level to seeking healthcare, to doctors' consultation, to treatments/procedures and all explanatory variables for each country. For all open-ended questions exploring the types of barriers, barriers' impact on patients' health and reasons for attending private healthcare services, a content analysis as well as a codification and unification was carried out for all six countries. An analysis of missing data was performed. No imputation was performed. Multivariate analysis was carried out including all response variables except private health plan due to collinearity with all the response variables. Creation of models was made including first predisposing factors, then enabling factors and finally need factors to each model. Crude odds ratio and then adjusted odds ratio was calculated with 95% confidence interval and p value. Statistical

analyses were performed using Data Analysis and Statistical Software (STATA), version 13.

3. RESULTS:

3.1. SAMPLE CHARACTERISTICS

The sample of users of public healthcare networks in the study areas is predominantly female (from 73.5% in Chile to 86.1% in Brazil), of primary or lower educational level (except in Chile, where 41.4% are of secondary or higher education level) and between 40 and 64 years old, except in Chile (50.5%) and Colombia (48.3%), where the predominant age group is over 65 years old. The majority reported a per capita income between 1 and 2 minimum wages (44.9% in Colombia to 64.4% in Brazil and Uruguay), except in Argentina, where 43.1% declared income lower than a minimum wage per month. The majority had been residing for more than 5 years in the neighbourhood and have a regular source of healthcare. More than 90% of users, except in Chile (55.57%) and Colombia (68.85%) were consistently attended to by the same primary care physician and slightly to a lesser extent by the same specialized care physician, except in Colombia (46.28%). Only a small proportion of users have private health plan (21.9% in Uruguay to 0% in Colombia). Regarding morbidity, more than half of users rated their health status as bad, except in Argentina (44.74%) and Uruguay (42.29%). The majority of the interviewees had 1 to 2 chronic conditions (66.1% in Brazil to 83.8% in Mexico and Uruguay), except in Chile, where half of them had 3 or more (view Table 1).

Insert Table 1

3.2. *BARRIERS OF ACCESS WHEN REFERRED TO ANOTHER CARE LEVEL TO:*

3.2.1. SEEKING HEALTHCARE

The proportion of referred patients that reported not having resort to the other level after referral varied between 5.9% in Uruguay, 7.7% in Colombia and 27% in Mexico and 16.7% in Brazil. Most of the patients that experienced barriers to seeking healthcare in other care level had been referred to specialized care (including outpatient, inpatient and emergency room), except in Chile and Mexico, where more than a half of the patients were referred to primary care (62.2% and 60.1%, respectively). The main reasons for not seeking care when referred to other care level were related to inability to get to health services (Argentina 48.2%, Colombia 39.3%, Uruguay 30.6% and Mexico 39%), which includes not having someone to accompany them, no means of transportation, having to take care of

someone or not having money to go to the health services. Other prevalent reasons included own decision, not considering it a serious condition or forgetfulness (17.7% in Argentina and 39.9% in Mexico); bad health condition (25.8% in Brazil, 20.4% in Uruguay); conflict between working and appointment schedules (29.9% in Chile) and administrative-related issues (27.9% in Colombia) such as loss of/expiration of referral letter and other centres scheduling conflicts (view Table 2).

Insert Table 2

3.2.2. DOCTORS' CONSULTATION

The proportion of patients that reported not being attended by the doctor after a referral varied from 3.2% in Colombia and 4.7% in Argentina to 13.6% in Mexico and 17.5% in Brazil. In all six countries most of the patients were referred from primary care (Argentina 73%, Brazil 74.8%, Chile 63.2%, Colombia 80%, Mexico 58.9% and Uruguay 59.1%); while the proportion of patients that were referred to specialised care was: Argentina 81.1%, Brazil 72.7%, Colombia 64%, Mexico 50.5% and Uruguay 63.6%, except in Chile, where more than half of the interviewees had been referred to primary care (52.6%). For all countries, most frequent reason for not being attended to was lack of healthcare professionals (70.3% in Argentina, 76.3% in Brazil, 56.8% in Chile, 56% in Colombia, 39.3% in Mexico and 54.6% in Uruguay). Other relevant reasons were waiting times (16.2% in Argentina, 8.6% in Brazil, 10.5% in Chile and 21.5% in Mexico); facility issues including equipment failures, energy breakdowns (10.5% in Chile); other appointment-related issues (10.5% in Chile and 13.6% in Uruguay); administrative-related issues such as referral letter problems, changes in insurers' providers, clinical record/software failures (24% in Colombia) and missed appointment (13.6%) (view Table 3).

Insert Table 3

3.2.3. TREATMENTS/PROCEDURES

The proportion of patients that reported difficulties in accessing treatments/procedures in other care levels (view Table 4) varied from 5% in Uruguay and 12.6% in Argentina to 37.3% in Brazil and 48% in Mexico. Main reasons were related to waiting times (36.4% in Argentina, 70.3% in Brazil, 31%

in Chile and 33.3% in Uruguay) and medication/supplies shortfalls (27.4% in Colombia and 72% in Mexico). Other reasons included personal reasons including missed appointments, forgetfulness in following treatments, no confidence in the treatments (23.2% in Argentina); lack of healthcare professionals (14.2% in Brazil); economic problems (26.3% in Chile and 20.8% in Mexico); insurers-related issues such as changes in insurers' providers, delay or denial of authorization, expiration of authorization or referral letters, having to appeal/sue insurers to receive treatments/procedures (26.8% in Colombia); No effect or adverse effects of treatments/procedures (23.8% in Uruguay).

Insert Table 4

3.2.4. REASONS FOR SEEKING CARE OUTSIDE OF PUBLIC NETWORKS

The proportion of users that sought care outside public networks varied from 3.8% in Uruguay and 6.1% in Colombia to 28.9% in Chile and 54% in Mexico. Most frequent reasons were related to waiting times in public networks (65.6% in Brazil, 34.3% in Chile and 27.8% in Mexico); insurers enrolment issues in public healthcare networks (19.9% in Argentina); dissatisfaction with public healthcare (33.3% in Colombia) and needed service not covered by public healthcare (29.6% in Uruguay). Other reasons included lack of healthcare professionals/medication/supplies in public networks (11.5% in Brazil, 18.1% in Chile and 29.2% in Colombia); long distance to public network facilities (15.7% in Argentina and 18.5% in Uruguay) and Conflict between work and appointment schedules in public networks (17.7% in Mexico) (view Table 5).

Insert Table 5

3.2.5. BARRIERS' IMPACT ON PATIENTS' HEALTH

The most frequent impact on patients' health resulting from not seeking healthcare when referred to another care level (view Table 2) included that their health conditions persisted or worsened (30.3% in Brazil, 40.3% in Chile, 32.8% in Colombia) and that it created delays or interruptions in treatments and follow ups (31.2% in Colombia). However, a 32.9% in Argentina, 32.4% in Mexico and 31.3% in Uruguay reported that their health conditions were not affected. Differences between countries were also observed in the perceived health impact of not being treated when referred to another care level (view Table 3). The most

common impact declared by the patients were health conditions persisted or worsened (29.7% in Argentina, 32.4% in Brazil, 42.1% in Chile, 50% in Colombia and 47.7% in Mexico), and delays or interruptions in treatments/follow ups (20.8% in Colombia) and additional paperwork in order to receive care (25% in Uruguay) while 29.6% in Uruguay reported that their health conditions were not affected. As for health impact of experiencing difficulties to treatments/procedures in other care level (view Table 4), interviewees reported their health conditions persisted or worsened (34.3% in Argentina, 36% in Chile, 62.9% in Colombia and 46.8% in Mexico); it created delays or interruptions in treatments/follow ups (20.2% in Argentina, 23.4% in Colombia and 18.3% in Mexico) and that it created uncertainty about health conditions (22% in Chile). Nevertheless, 93.6% of the patients in Brazil declared their health conditions were not affected.

4. DISCUSSION

This study, conducted in six Latin American countries, provides evidence of a little explored phenomenon in the region, barriers of access between care levels for patients with chronic conditions in public healthcare networks. Results showed prevalence of access barriers between care levels in all the studied networks, with differences among countries. Brazil and Mexico were there most affected countries by barriers of access to another care level and barriers to treatments/procedures were the most frequent in the trajectory of the utilization of health services in all countries, except in Uruguay where access barriers to seeking care were the most prevalent. Uruguay also highlights as the country where prevalence of barriers was lower than in the rest of studied countries.

4.1. COMMON BARRIERS OF ACCESS BETWEEN CARE LEVELS IN THE STUDIED NETWORKS

Despite barriers of access to seeking healthcare were more prevalent in Mexico and Brazil and less prevalent in Uruguay, common barriers to most of the studied networks were found. Personal inability to get to health services when not having anyone to accompany them, not having anyone with who to leave family members they have to take care of, not having money to pay for transportation or not being physically able to go to the healthcare facilities were high prevalent barriers in Argentina, Colombia, Mexico and Uruguay. In Brazil and Chile, on the other hand, appointment scheduling conflicts showed up as main barriers. The interviewed patients in Argentina, Mexico and Uruguay perceived these barriers not to have modified their health conditions, except in Colombia, where

interviewees perceived these barriers not only to have made their conditions to persist or worsen, but to cause interruptions in their treatments and follow ups. Moreover, in Uruguay, interviewed patients also declared these barriers to have made them to follow additional paperwork in order to receive care.

Regarding barriers of access to doctors' consultations, Brazil and Mexico were again the countries with higher prevalence, the lack of healthcare professionals was found to be a common and remarkably high prevalent barrier in all six countries, altogether with the following long waiting times to receive care. Other appointment-related issues such as appointment changes or errors showed up as prevalent barriers, although in a lower proportion, in Chile, Colombia and Uruguay. This supports the evidence that organization-specific factors contribute to access barriers and that health services should try to adapt to the population's needs for care (19). Interviewees in all countries perceived these barriers to have made their conditions to persist or worsen, except in Uruguay, where they declared barriers did not modify their conditions, but they did make them to follow additional paperwork in order to receive care. However, waiting times and lack of doctors were the main reasons to resort to healthcare outside the public networks in Brazil, Chile, Mexico and Uruguay, pointing them out as an important determinant of the interruption of the continuity of care in those Countries.

Respecting barriers of access to treatments/procedures in other care level, where again Mexico and Brazil had higher prevalence, waiting times was a common barrier in Argentina, Brazil, Chile and Uruguay, being notably higher in Brazil. The lack of medication and supplies was a barrier shown in Colombia and Mexico, being remarkably higher in the later. In Argentina, Chile, Colombia and Mexico, patients perceived these barriers to have made their health conditions to persist or worsen, being remarkable the high proportion in Colombia. Besides, in Argentina, Colombia and Mexico, another high proportion of the interviewees perceived these barriers to have caused interruptions in their treatments.

4.2. DIFFERENTIAL BARRIERS OF ACCESS BETWEEN CARE LEVELS IN COLOMBIA

Some differential barriers of access from one care level to other were found in some of the studied networks. In the first place, healthcare networks in Colombia showed to have some specific barriers that were not found in the rest of the studied networks. In Colombia health insurers control access to health services through authorizations for most of specialised care services (20), and this has been shown by a high proportion of interviewees who experienced barriers related to denial of/expiration of/loss of authorizations, as well as interruptions in

health services providers or clinical record not available. These barriers are related to the organization of the health system and the health services, where intermediaries appear and influence not only the entry to the health services (21), but also the continuity of care between care levels. Given the relatively low prevalence of barriers between care levels in the networks in Colombia, it is not possible to confirm the hypothesis that barriers imposed by insurers are within the services rather than at point of entry (22). However, that prevalence not being remarkably high could be explained by the fact that a high proportion of individuals in Colombia decide not to seek care in order to avoid being rejected at the entry point to the health services (21). Something definitely remarkable is that patients' perceived impact of barriers of access between care levels in Colombia was in a majority that they made their health conditions to persist or worsen, interrupted their treatments/follow ups and resulted in dissatisfaction with public healthcare as main reason to resort to care outside the public networks.

5. LIMITATIONS AND STRENGTHS

As a cross-sectional study based on information collected by a questionnaire, risk of bias is present in different points of the methodological execution. First, in selection of participants, assurance that all study population had the same probability of entering the study had to be guaranteed. We encountered that a liable record of chronic patients was not available in all study networks to select and contact participants. However, since all chronic patients would need to attend to primary care periodically, we decided to approach all patients attending to the centres and include those who were eligible. In order to facilitate participation in the study, patients were interviewed in the centres. Interviewing in the healthcare facilities might affect patients' answers. Nevertheless, other studies have shown that continuity of care does not appear to be a controversial subject for patients and no difference between the answers of those interviewed in the healthcare facilities and those interviewed in their home has been found (23). Second, when collecting data some bias related to information collected and ways of collection must be avoided. In this study we applied the same validated questionnaire in all six countries but adapting it to language variations and healthcare system and performing pilot test. This allowed us to collect accurate and comparable information from six different healthcare systems and contexts. Besides, specific and coordinated training to interviewers in all six countries was performed to ensure collection of data was done in a uniform way. Finally, risk of recall bias is another limitation to be considered as well as the impossibility of stablishing causal associations. On the other hand, this is the first study, in our knowledge, that describes barriers of access between care levels in Latin America, as well as the first one in the region to do it in a comprehensive and comparative way.

The use of the CCAENA questionnaire allows to obtain an accurate assessment of the of the continuity of care taking into account all the components of its definition, and the comparison of six different healthcare systems allows us to highlight barriers that might be related to a specific healthcare model and to identify common problems in different contexts.

6. CONCLUSION

Barriers of access between care levels were present and they showed to be different in all the six countries. Brazil and Mexico appear to be the countries more affected and barriers relate to the same cause in both countries, underfunding of the public health system, but resulting in multiple barriers (lack of doctors in both countries, together with waiting times in Brazil and lack of medication/supplies in Mexico) and being the main reason to resort to care outside the public networks, especially in Mexico, and therefore interrupting continuity of care. Colombia showed differences, expected according to its health system model, showing additional barriers that were related to insurers, but that did not highlight in proportion to other types of barriers within the country nor comparing with the other countries, but resulting in a negative perceived impact on patients' health and being the main reason to seek care outside the network. Argentina and Chile showed prevalence of access barriers between care levels that stayed in the middle when comparing with the other countries and were related to waiting times and lack of doctors (and infrastructure problems in Chile), suggesting also an underfunding problem in their public health systems and resulting in persistent or worsened health conditions as well as resorting to care outside the network, especially in Chile. Uruguay, on the other hand, was the country with lower prevalence of barriers of access between care levels, but when presented, lack of doctors and waiting times were also the most prevalent barriers, although interviewees' perception is that those barriers do not modify their health conditions but causes them to follow additional paperwork in order to receive care.

Finally, this study highlights critical points in access between care levels that must be tackled by public policy in all six countries, as well as certain elements that contribute to the debate on health system models and their relationship with access between care levels and provides evidence for future research on the subject, in order to improve our understanding of the problem in Latin America.

7. DECLARATIONS

7.1. *ETHICS APPROVAL AND CONSENT TO PARTICIPATE*

The execution of this research fully complies with all current international conventions and declarations, EU legislation, national legislation, ethical regulations, data protection laws and the professional code of conduct of all the countries involved. Conditions of study procedure, risk and benefit evaluation, confidence and privacy and informed consent were approved by the ethical committees in the participating countries. In addition, confidentiality agreements were signed with all participating institutions. Free and informed consent was obtained from every interviewee, after being informed that participation was voluntary and that they were free to refuse to participate without any negative consequence. Data was coded and processed in such a way that the individual origin couldn't be identified, and appropriately stored. As part of the Equity-LA II, the data processing complies with the European Union Data Protection Legislation and national legislation (14).

7.2. *AVAILABILITY OF DATA AND MATERIAL*

The datasets generated and/or analysed during the current study are not publicly available but are available from the corresponding author on reasonable request.

7.3. *COMPETING INTERESTS*

The authors declare that they have no competing interests.

7.4. *FUNDING*

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7.5. *AUTHORS CONTRIBUTIONS*

J-MC-G unified the datasets of all six countries, performed the statistical analysis of the dataset with the help of VE-F, and with the help of M-LV and IV interpreted the results and wrote the first version of the manuscript. M-LV and IV are in charge of the Project, they designed the study. M-LV, IV and VE-F supervised all phases of its development, contributed to the interpretation of the results and to write the manuscript. AM, PE, IS, JL, DA and FB coordinated the field work and the creation of the dataset, reviewed the results and contributed to the introduction and discussion. All authors reviewed and approved the final version of the manuscript.

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Table 1. Sociodemographic, healthcare services utilization and morbidity characteristics of the sample of patients in the study areas.

	Argentina n= (789)	Brazil n= (792)	Chile n= (876)	Colombia n= (793)	México n= (734)	Uruguay n= (837)
	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)
Sex						
Male	150 (19.0)	110 (13.9)	232 (26.5)	182 (23.0)	180 (24.5)	215 (25.7)
Female	639 (81.0)	682 (86.1)	644 (73.5)	611 (77.0)	554 (75.5)	622 (74.3)
Age						
18 to 39 years old	161 (20.4)	112 (14.1)	37 (4.2)	30 (3.8)	68 (9.3)	40 (4.8)
40 to 64 years old	570 (72.2)	480 (60.6)	395 (45.1)	380 (47.9)	430 (58.6)	406 (48.5)
65 years old or more	58 (7.4)	198 (25.0)	444 (50.7)	383 (48.3)	236 (32.1)	387 (46.2)
Level of education						
None/incomplete primary	136 (17.2)	298 (37.6)	244 (27.9)	368 (46.6)	316 (43.0)	215 (25.7)
Primary	458 (58.0)	353 (44.6)	261 (29.8)	278 (35.0)	190 (25.9)	511 (61.1)
Secondary or university	195 (24.7)	138 (17.4)	362 (41.3)	146 (18.4)	228 (31.1)	108 (12.9)
Time of residence in the neighbourhood						
1 year or less	18 (2.3)	19 (2.4)	34 (3.9)	32 (4.0)	20 (2.7)	12 (1.4)
Between 1 and 5 years	54 (6.8)	57 (7.2)	25 (2.8)	82 (10.3)	24 (3.3)	20 (2.4)
More than 5 years	717 (90.9)	712 (89.9)	817 (93.3)	679 (85.6)	690 (94.0)	804 (96.1)
Income per capita*						
Less than 1 MW	340 (43.1)	183 (23.1)	173 (19.8)	324 (40.9)	97 (13.2)	81 (9.7)
Between 1 y 2 times the MW	302 (38.3)	512 (64.7)	497 (56.7)	356 (44.9)	345 (47.0)	539 (64.4)
3 or more times the MW	31 (3.9)	73 (9.2)	83 (9.5)	32 (4.0)	188 (25.6)	148 (17.7)
Health plan						
Yes	90 (11.4)	28 (3.5)	35 (4.0)	0 (0.0)	4 (0.6)	180 (21.5)
No	699 (88.6)	764 (96.5)	837 (95.6)	793 (100.0)	729 (99.3)	654 (78.1)
Regular source of healthcare						
Yes	747 (94.7)	715 (90.3)	844 (96.4)	725 (91.4)	660 (89.9)	761 (90.9)
No	41 (5.2)	75 (9.5)	31 (3.5)	68 (8.6)	70 (9.5)	35 (4.2)
Treated by the same PC doctor						
Always/frequently	770 (97.6)	747 (94.3)	487 (55.6)	546 (68.9)	664 (90.5)	771 (92.1)
Hardly ever/never	19 (2.4)	44 (5.6)	383 (43.7)	245 (30.9)	59 (8.0)	51 (6.1)
Treated by the same SC doctor						
Always/frequently	690 (87.5)	577 (72.9)	483 (55.1)	367 (46.3)	403 (54.9)	785 (93.8)
Hardly ever/never	78 (9.9)	189 (23.9)	325 (37.1)	399 (50.3)	258 (35.2)	37 (4.4)
Self-rated-health						
Good	433 (54.9)	124 (15.7)	209 (23.9)	243 (30.6)	191 (26.0)	465 (55.6)
Bad	353 (44.7)	666 (84.0)	667 (76.1)	550 (69.4)	537 (73.2)	354 (42.3)

Number of chronic conditions						
1	411 (52.1)	275 (34.7)	158 (18.0)	294 (37.0)	372 (47.2)	431 (51.5)
2	244 (30.9)	249 (31.4)	276 (31.4)	309 (39.0)	289 (36.6)	266 (31.8)
3 or more	134 (17.0)	268 (33.8)	442 (50.2)	190 (24.0)	73 (9.3)	140 (16.7)

*Calculated from dividing home income by number of people living in the house.

MW: Minimum Wage; PC: Primary Care; SC: Specialized Care.

Table 2. Access barriers to seeking healthcare when referred to other care level and patients' perceived impact on their health by country.

	Argentina n= (789)	Brazil n= (792)	Chile n= (876)	Colombia n= (793)	México n= (734)	Uruguay n= (837)
	<i>n (%)</i>	<i>n (%)</i>	<i>n (%)</i>	<i>n (%)</i>	<i>n (%)</i>	<i>n (%)</i>
Patients that were referred to another care level and did not go	85 (10.8)	132 (16.7)	135 (15.4)	61 (7.7)	205 (27.9)	49 (5.9)
Care level they were referred to						
Primary Care	14 (16.5)	37 (28.0)	84 (62.2)	28 (45.9)	128 (60.1)	12 (24.5)
Specialized Care*	71 (83.5)	94 (71.2)	51 (37.8)	33 (54.1)	85 (39.9)	36 (73.5)
Reasons why they did not attend						
Own decision, not considering it a serious condition, forgetfulness	15 (17.7)	22 (16.7)	20 (14.9)	11 (18.0)	85 (39.9)	5 (10.2)
Conflict between work and appointment schedules	12 (14.1)	41 (31.1)	40 (29.9)	2 (3.3)	22 (10.3)	9 (18.4)
(Personal) Inability to get to health services	41 (48.2)	18 (13.6)	24 (17.9)	24 (39.3)	83 (39.0)	15 (30.6)
Bad health condition	14 (16.5)	34 (25.8)	42 (31.3)	7 (11.5)	2 (0.9)	10 (20.4)
Administrative-related issues	3 (3.5)	14 (10.6)	4 (3.0)	17 (27.9)	17 (8.0)	5 (10.2)
Patients' perceived impact of access barriers to seeking healthcare on their health						
Negative						
Created uncertainty about health conditions	6 (7.1%)	4 (3.0%)	17 (12.7%)	(0.0%)	(0.0%)	3 (6.3%)
Health conditions persisted or worsened	24 (28.2%)	40 (30.3%)	54 (40.3%)	20 (32.8%)	56 (26.3%)	6 (12.5%)
Created delays or interruptions in treatments/follow ups	15 (17.7%)	15 (11.4%)	18 (13.4%)	19 (31.2%)	16 (7.5%)	4 (8.3%)
Required additional paperwork in order to receive care	9 (10.6%)	12 (9.1%)	0 (0.0%)	0 (0.0%)	4 (1.9%)	12 (25.0%)
Did not affect						
Health conditions were not affected	28 (32.9%)	37 (28.0%)	42 (31.3%)	15 (24.6%)	69 (32.4%)	15 (31.3%)
Achieved to continue treatments/follow ups by other means	0 (0.0%)	19 (14.4%)	0 (0.0%)	7 (11.5%)	53 (24.9%)	0 (0.0%)

*Includes outpatient, inpatient and emergency services

Table 3. Access barriers to doctors' consultation when referred to other care level and patients' perceived impact on their health by country.

	Argentina n= (789)	Brazil n= (792)	Chile n= (876)	Colombia n= (793)	México n= (734)	Uruguay n= (837)
	<i>n (%)</i>	<i>n (%)</i>	<i>n (%)</i>	<i>n (%)</i>	<i>n (%)</i>	<i>n (%)</i>
Patients that were referred to another care level and were not attended to Care level they were referred to	37 (4.7)	139 (17.6)	95 (10.8)	25 (3.2)	100 (13.6)	44 (5.3)
Primary Care	7 (18.9)	38 (27.3)	50 (52.6)	8 (32.0)	53 (49.5)	15 (34.1)
Specialized Care	30 (81.1)	101 (72.7)	45 (47.4)	16 (64.0)	54 (50.5)	28 (63.6)
Care level they were referred from						
Primary Care	27 (73.0)	104 (74.8)	60 (63.2)	20 (80.0)	63 (58.9)	26 (59.1)
Specialized Care*	9 (24.3)	31 (22.3)	34 (35.8)	5 (20.0)	27 (25.2)	12 (27.3)
Reasons why they were not attended to						
Lack of healthcare professionals	26 (70.3)	106 (76.3)	54 (56.8)	14 (56.0)	42 (39.3)	24 (54.6)
Infrastructure issues	2 (5.4)	4 (2.9)	10 (10.5)	0 (0.0)	0 (0.0)	0 (0.0)
Other appointment-related issues	0 (0.0)	9 (6.5)	10 (10.5)	3 (12.0)	3 (2.8)	6 (13.6)
Waiting times	6 (16.2)	12 (8.6)	10 (10.5)	0 (0.0)	23 (21.5)	2 (4.5)
Missed appointment	0 (0.0)	0 (0.0)	4 (4.2)	0 (0.0)	4 (3.7)	6 (13.6)
Inadequate attitude from healthcare givers	2 (5.4)	6 (4.3)	6 (6.3)	1 (4.0)	22 (20.6)	3 (6.8)
administrative-related issues	0 (0.0)	2 (1.4)	0 (0.0)	6 (24.0)	8 (7.5)	0 (0.0)
Patients' perceived impact of access barriers to doctors' consultation on their health						
Negative						
Created uncertainty about health conditions	4 (10.8)	4 (2.9)	6 (6.3)	4 (16.8)	0 (0.0)	2 (4.6)
Health conditions persisted or worsened	11 (29.7)	44 (32.4)	40 (42.1)	12 (50.0)	51 (47.7)	9 (20.5)
Created delays or interruptions in treatments/follow ups	3 (8.1)	22 (16.2)	18 (19.0)	5 (20.8)	13 (12.2)	3 (6.8)
Required additional paperwork in order to receive care	8 (21.6)	12 (8.8)	2 (2.1)	0 (0.0)	1 (0.9)	11 (25.0)
Did not affect						
Health conditions were not affected	10 (27.0)	39 (28.7)	29 (30.5)	0 (0.0)	19 (17.8)	13 (29.6)
Achieved to continue treatments/follow ups by other means	0 (0.0)	15 (11.0)	0 (0.0)	3 (12.5)	14 (13.1)	0(0.0)

* Includes outpatient, inpatient and emergency services

Table 4. Access barriers to treatments/procedures when referred to other care level by country.

	Argentina n= (789)	Brazil n= (792)	Chile n= (876)	Colombia n= (793)	México n= (734)	Uruguay n= (837)
	<i>n (%)</i>	<i>n (%)</i>	<i>n (%)</i>	<i>n (%)</i>	<i>n (%)</i>	<i>n (%)</i>
Patients who experienced any difficulties to continue treatments/procedures	99 (12.6)	296 (37.4)	170 (19.4)	169 (21.3)	357 (48.6)	42 (5.0)
Difficulties declared by the patients						
Lack of healthcare professionals	15 (15.2)	42 (14.2)	2 (1.2)	1 (0.6)	0 (0.0)	0 (0.0)
Medication/supplies shortfalls	19 (19.2)	14 (4.7)	19 (11.1)	46 (27.4)	273(72.0)	0 (0.0)
Forgetfulness to follow treatments, no confidence in the treatments	23 (23.2)	0 (0.0)	24 (14.0)	17 (10.1)	1 (0.3)	6 (14.3)
Conflict between work and appointment schedules, inability to get to health services	0 (0.0)	17 (5.7)	12 (7.0)	2 (1.2)	2 (0.5)	3 (7.1)
Waiting times	36 (36.4)	208 (70.3)	53 (31.0)	43 (25.6)	6 (1.6)	14 (33.3)
Economic problems	4 (4.0)	8 (2.7)	45 (26.3)	7 (4.2)	79 (20.8)	6 (14.3)
Technical errors	2 (2.0)	2 (0.7)	11 (6.4)	7 (4.2)	3 (0.8)	0 (0.0)
Adverse effects	0 (0.0)	0 (0.0)	5 (2.9)	0 (0.0)	2 (0.5)	10 (23.8)
Insurers-related issues	0 (0.0)	0 (0.0)	0 (0.0)	45 (26.8)	12 (3.2)	0 (0.0)
Patients' perceived impact of access barriers to treatments/procedures on their health						
Negative						
Created uncertainty about health conditions	13 (13.1%)	0 (0.0%)	36 (22.0%)	7 (4.2%)	0 (0.0%)	1 (2.6%)
Health conditions persisted or worsened	34 (34.3%)	0 (0.0%)	59 (36.0%)	105 (62.9%)	177 (46.8%)	7 (19.0%)
Created delays or interruptions in treatments/follow ups	20 (20.2%)	0 (0.0%)	33 (20.1%)	39 (23.4%)	69 (18.3%)	4 (10.3%)
Required additional paperwork in order to receive care	14 (14.1%)	0 (0.0%)	11 (6.7%)	0 (0.0%)	8 (2.1%)	14 (35.9%)
Did not affect						
Health conditions were not affected	10 (10.1%)	277 (93.6%)	23 (14.0%)	12 (7.2%)	33 (8.7%)	4 (10.7%)
Achieved to continue treatments/follow ups by other means	0 (0.0%)	3 (1.0%)	0 (0.0%)	4 (2.4%)	69 (18.3%)	0 (0.0%)

Table 5. Reasons for attending care in private health services by country.

	Argentina n= (789)	Brazil n= (792)	Chile n= (876)	Colombia n= (793)	México n= (734)	Uruguay n= (837)
	<i>n (%)</i>	<i>n (%)</i>	<i>n (%)</i>	<i>n (%)</i>	<i>n (%)</i>	<i>n (%)</i>
Patients that attended to healthcare outside the public healthcare networks	166 (21.0)	96 (12.1)	253 (28.9)	48 (6.1)	396 (54.0)	32 (3.8)
Reasons declared by the patients to attend healthcare outside public networks						
Waiting times in public networks	21 (12.7)	63 (65.6)	87 (34.3)	11 (22.9)	118 (27.8)	5 (18.5)
Conflict between work and appointment schedules in public networks	7 (4.2)	0 (0.0)	12 (4.7)	1 (2.1)	75 (17.7)	0 (0.0)
Lack of healthcare professionals/medication/supplies in public networks	7 (4.2)	11 (11.5)	46 (18.1)	14 (29.2)	54 (12.7)	0 (0.0)
Dissatisfaction with public healthcare	7 (4.2)	10 (10.4)	43 (16.9)	16 (33.3)	38 (9.0)	3 (11.1)
Own decision	0 (0.0)	1 (1.0)	0 (0.0)	0 (0.0)	33 (7.8)	1 (3.7)
Inconvenient location of public network facilities	26 (15.7)	0 (0.0)	0 (0.0)	2 (4.2)	33 (7.8)	5 (18.5)
Needed service not covered by public healthcare	21 (12.7)	1 (1.0)	12 (4.7)	2 (4.2)	33 (7.8)	8 (29.6)
Emergency situation	24 (14.5)	0 (0.0)	20 (7.9)	0 (0.0)	9 (2.1)	0 (0.0)
To ask for a second opinion	18 (10.8)	3 (3.1)	29 (11.4)	0 (0.0)	8 (1.9)	0 (0.0)
Enrolment issues in public healthcare	33 (19.9)	0 (0.0)	3 (1.2)	2 (4.2)	13 (3.1)	1 (3.7)

V. APPENDIX

APPENDIX 1. CCAENA-LA© QUESTIONNAIRE

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APPENDIX 2. ADJUSTED ODDS RATIO FOR LIKELY ASSOCIATED FACTORS TO BARRIERS OF ACCESS BETWEEN CARE LEVELS

This is the first study carried out in Latin America analysing barriers of access between care levels. Main objective of this thesis is to describe the existence and types of barriers in the studied countries. Results obtained allowed a first approach to factors likely associated to those barriers and a first adjusted odds ratio is presented in the supplementary tables 1, 2 and 3.

Supplementary table 1. Odds Ratio and adjusted Odds Ratio with 95% confidence interval for barriers of access to seeking healthcare in other care level by country.

		Argentina		Brazil		Chile		Colombia		Mexico		Uruguay	
		OR (95% CI)	aOR (95% CI)	OR (95% CI)	aOR (95% CI)	OR (95% CI)	aOR (95% CI)	OR (95% CI)	aOR (95% CI)	OR (95% CI)	aOR (95% CI)	OR (95% CI)	aOR (95% CI)
Sex													
Male		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Female		0.85 (0.49-1.48)	1.21 (0.66-2.25)	0.96 (0.57-1.65)	1.22 (0.66-2.25)	1.07 (0.70-1.64)	0.99 (0.61-1.63)	1.24 (0.64-2.38)	1.09 (0.52-2.30)	1.19 (0.81-1.75)	1.17 (0.75-1.81)	1.84 (0.85-3.99)	2.12 (0.79-5.70)
age													
18-39		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
40-64		0.38 (0.23-0.62)	1.25 (0.67-2.34)	1.07 (0.62-1.82)	1.25 (0.67-2.34)	0.57 (0.26-1.27)	0.73 (0.28-1.88)	1.33 (0.30-5.84)	1.26 (0.27-5.79)	1.29 (0.71-2.35)	1.22 (0.59-2.52)	1.59 (0.37-6.89)	1.39 (0.27-7.14)
>65		0.41 (0.15-1.07)	0.86 (0.40-1.82)	0.60 (0.32-1.17)	0.86 (0.40-1.82)	0.54 (0.25-1.21)	0.68 (0.25-1.86)	1.02 (0.23-4.52)	0.94 (0.20-4.52)	1.28 (0.68-2.40)	1.26 (0.57-2.78)	0.83 (0.18-3.74)	0.71 (0.13-3.92)
Education level													
none or incomplete primary		1.08 (0.53-2.19)	1.11 (0.55-2.21)	1.15 (0.62-2.14)	1.11 (0.55-2.21)	0.85 (0.54-1.34)	0.93 (0.53-1.62)	1.03 (0.51-2.06)	1.02 (0.46-2.24)	0.99 (0.68-1.46)	0.82 (0.51-1.32)	1.02 (0.37-2.81)	1.49 (0.42-5.29)
completed primary		1.05 (0.61-1.82)	2.08 (1.12-3.89)	2.11 (1.18-3.76)	2.08 (1.12-3.89)	0.89 (0.58-1.39)	0.99 (0.59-1.67)	0.77 (0.36-1.65)	0.81 (0.36-1.81)	1.17 (0.76-1.78)	1.18 (0.72-1.93)	1.11 (0.45-2.72)	1.49 (0.49-4.48)
secondary or higher		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Time of residence in the neighbourhood*													

1 year or less	2.60 (0.82-8.17)	1.24 (0.33-4.63)	0.97 (0.28-3.40)	1.24 (0.33-4.63)	0.72 (0.25-2.08)	0.63 (0.18-2.22)	0.80 (0.19-3.46)	0.56 (0.07-4.33)	-	-	1.52 (0.19-12.01)	2.18 (0.24-19.87)
between 1 and 5 years	1.57 (0.71-3.47)	2.54 (1.28-5.06)	1.95 (1.04-3.64)	2.54 (1.28-5.06)	1.35 (0.50-3.67)	1.40 (0.42-4.64)	1.13 (0.49-2.57)	1.33 (0.56-3.19)	-	-	2.95 (0.83-10.42)	3.68 (0.91-14.85)
5 years or more	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	-	-	1.00	1.00
house income per capita												
1 MW or less	0.54 (0.19-1.50)	1.09 (0.49-2.43)	0.95 (0.47-1.94)	1.09 (0.49-2.43)	1.67 (0.78-3.59)	1.84 (0.79-4.29)	2.59 (0.34-19.79)	2.59 (0.33-20.49)	1.40 (0.82-2.41)	1.47 (0.78-2.70)	0.68 (0.18-2.64)	0.55 (0.13-2.39)
between 1 and 2 MW	0.52 (0.18-1.48)	1.08 (0.53-2.21)	0.85 (0.44-1.62)	1.08 (0.53-2.21)	1.27 (0.63-2.58)	1.29 (0.60-2.78)	2.85 (0.38-21.64)	2.68 (0.34-21.14)	1.16 (0.78-1.74)	1.31 (0.84-2.03)	1.10 (0.49-2.42)	0.81 (0.33-1.98)
more than 2 MW	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Regular source of care+												
yes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	-	-
no	0.99 (0.34-2.86)	1.35 (0.70-2.58)	1.15 (0.62-2.12)	1.35 (0.70-2.58)	1.05 (0.40-2.79)	0.62 (0.14-2.86)	1.43 (0.62-3.27)	1.71 (0.71-4.11)	0.71 (0.39-1.30)	1.06 (0.53-2.12)	-	-
Consistency of PC doctors												
always/frequently	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
hardly ever/never	2.5 (0.80-7.86)	0.86 (0.34-2.19)	1.10 (0.50-2.43)	0.86 (0.34-2.19)	1.28 (0.88-1.85)	1.30 (0.84-1.99)	1.28 (0.74-2.21)	1.37 (0.76-2.49)	0.84 (0.45-1.54)	0.77 (0.37-1.59)	3.29 (1.45-7.44)	1.61 (0.46-5.63)
Consistency of SC doctors												
always/frequently	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
hardly ever/never	2.08 (1.10-3.92)	0.92 (0.56-1.49)	1.07 (0.69-1.66)	0.92 (0.57-1.49)	1.16 (0.79-1.71)	1.04 (0.67-1.62)	1.73 (1.00-3.01)	2.07 (1.11-3.86)	1.09 (0.77-1.54)	1.18 (0.80-1.74)	2.61 (0.97-7.03)	1.89 (0.55-6.53)

Number of chronic conditions

1	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
2	0.74 (0.43-1.28)	0.88 (0.52-1.47)	0.90 (0.56-1.43)	0.88 (0.52-1.47)	1.10 (0.63-1.92)	0.82 (0.44-1.56)	1.23 (0.65-2.34)	1.08 (0.55-2.12)	1.21 (0.86-1.71)	1.20 (0.80-1.81)	2.31 (1.19-4.49)	2.56 (1.18-5.54)
3 or more	1.34 (0.75-2.39)	0.99 (0.59-1.65)	1.01 (0.64-1.57)	0.99 (0.59-1.65)	1.15 (0.69-1.94)	1.06 (0.58-1.91)	1.80 (0.92-3.51)	1.28 (0.60-2.72)	1.49 (0.87-2.54)	1.23 (0.65-2.31)	2.20 (0.99-4.85)	1.78 (0.65-4.90)

Self-rated-health

Good	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Bad	1.34 (0.86-2.11)	1.49 (0.79-2.82)	1.41 (0.81-2.48)	1.49 (0.79-2.82)	1.37 (0.87-2.18)	1.09 (0.61-1.63)	0.90 (0.51-1.57)	0.74 (0.39-1.38)	1.04 (0.72-1.51)	0.92 (0.60-1.41)	2.02 (1.09-3.73)	1.72 (0.85-3.50)

OR: Odds Ratio; CI: Confidence Interval; aOR: adjusted Odds Ratio; PC: Primary Care; SC: Specialized Care.

Odds ratio adjusted by sex, age, education level, house income per capita, consistency of PC and SC doctors, number of chronic conditions and self-rated health. Results statistically significant shown in bold.

* Variable not included in model for Mexico due to collinearity.

+ Variable not included in model for Uruguay due to collinearity.

Supplementary table 2. Odds Ratio and adjusted Odds Ratio with 95% confidence interval for barriers of access to Doctors' consultation in other care level by country.

	Argentina		Brazil		Chile		Colombia		Mexico		Uruguay	
	OR (95% CI)	aOR (95% CI)	OR (95% CI)	aOR (95% CI)	OR (95% CI)	aOR (95% CI)	OR (95% CI)	aOR (95% CI)	OR (95% CI)	aOR (95% CI)	OR (95% CI)	aOR (95% CI)
Sex												
Male	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Female	0.85 (0.49-1.48)	1.12 (0.45-2.77)	0.96 (0.57-1.65)	0.89 (0.52-1.52)	1.07 (0.70-1.64)	1.14 (0.68-1.93)	1.24 (0.64-2.38)	1.09 (0.39-3.05)	1.19 (0.81-1.75)	1.42 (0.80-2.51)	1.84 (0.94-5.44)	1.84 (0.75-4.49)
age												
18-39	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
40-64	0.70 (0.33-1.49)	0.65 (0.29-1.45)	0.71 (0.43-1.17)	0.75 (0.44-1.28)	0.67 (0.28-1.60)	0.61 (0.24-1.52)	0.31 (0.08-1.18)	0.27 (0.06-1.09)	0.35 (0.20-0.62)	0.27 (0.14-0.51)	0.66 (0.22-2.00)	0.63 (0.20-1.94)
>65	0.27 (0.03-2.18)	0.26 (0.03-2.22)	0.57 (0.31-1.02)	0.65 (0.34-1.24)	0.42 (0.17-1.03)	0.40 (0.15-1.05)	0.21 (0.05-0.84)	0.25 (0.05-1.11)	0.34 (0.18-0.62)	0.25 (0.12-0.53)	0.28 (0.08-0.94)	0.33 (0.09-1.13)
Education level												
none or incomplete primary	0.55 (0.17-1.81)	0.50 (0.17-1.95)	0.52 (0.31-0.85)	0.56 (0.32-0.96)	1.10 (0.65-1.86)	1.33 (0.75-2.35)	0.33 (0.11-0.93)	0.36 (0.12-1.11)	0.79 (0.48-1.27)	0.97 (0.56-1.67)	0.42 (0.14-1.19)	0.57 (0.19-1.70)
completed primary	0.96 (0.44-2.06)	0.91 (0.42-2.01)	0.58 (0.36-0.93)	0.60 (0.36-0.98)	1.19 (0.72-1.99)	1.24 (0.73-2.09)	0.64 (0.24-1.66)	0.67 (0.25-1.78)	0.96 (0.57-1.64)	0.99 (0.55-1.77)	0.75 (0.33-1.69)	0.80 (0.35-1.82)
secondary or higher	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Number of chronic conditions												
1	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

2	1.38 (0.66-2.84)	1.45 (0.68-3.09)	0.83 (0.53-1.32)	0.91 (0.56-1.46)	0.80 (0.43-1.47)	0.83 (0.45-1.55)	1.44 (0.58-3.58)	1.71 (0.65-4.47)	1.22 (0.77-1.94)	1.36 (0.84-2.21)	1.40 (0.72-2.74)	1.41 (0.71-2.97)
3 or more	1.08 (0.41-2.80)	1.12 (0.41-3.02)	0.95 (0.61-1.48)	1.13 (0.70-1.82)	0.78 (0.45-1.37)	0.81 (0.45-1.47)	0.96 (0.31-2.99)	1.12 (0.34-3.61)	2.28 (1.21-4.27)	2.46 (1.26-4.82)	1.08 (0.44-2.61)	1.11 (0.44-2.80)
Self-rated-health												
Good	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Bad	1.82 (0.93-3.58)	1.81 (0.91-3.61)	1.21 (0.71-2.06)	1.18 (0.69-2.04)	1.76 (0.99-3.13)	1.59 (0.88-2.88)	1.41 (0.55-3.58)	1.27 (0.49-3.27)	1.88 (1.11-3.17)	1.68 (0.96-2.92)	1.77 (0.96-3.28)	1.63 (0.86-3.08)

OR: Odds Ratio; CI: Confidence Interval; aOR: adjusted Odds Ratio; PC: Primary Care; SC: Specialized Care.

Odds ratio adjusted by sex, age, education level, number of chronic conditions and self-rated health. Results statistically significant shown in bold.

Supplementary table 3. Odds Ratio and adjusted Odds Ratio with 95% confidence interval for barriers of access to treatments/procedures in other care level by country.

	Argentina		Brazil		Chile		Colombia		Mexico		Uruguay	
	OR (95% CI)	aOR (95% CI)	OR (95% CI)	aOR (95% CI)	OR (95% CI)	aOR (95% CI)						
Sex												
Male	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Female	1.35 (0.75-2.41)	1.46 (0.69-3.07)	2.11 (1.32-3.36)	1.94 (1.18-3.19)	1.21 (0.82-1.79)	1.31 (0.82-2.10)	1.17 (0.77-1.77)	1.07 (0.66-1.73)	0.95 (0.69-1.32)	0.85 (0.57-1.26)	1.76 (0.77-4.04)	1.39 (0.53-3.60)
age												
18-39	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
40-64	0.66 (0.40-1.07)	0.56 (0.30-1.04)	0.72 (0.47-1.09)	0.70 (0.44-1.12)	0.50 (0.25-1.01)	0.65 (0.27-1.54)	0.38 (0.18-0.83)	0.30 (0.13-0.68)	1.28 (0.80-2.03)	1.12 (0.59-2.12)	0.60 (0.19-1.83)	0.37 (0.93-1.49)
>65	0.26 (0.07-0.91)	0.24 (0.62-0.96)	0.46 (0.28-0.75)	0.47 (0.26-0.82)	0.33 (0.16-0.67)	0.54 (0.22-1.34)	0.28 (0.13-0.62)	0.24 (0.10-0.57)	1.05 (0.64-1.73)	1.16 (0.58-2.34)	0.28 (0.08-0.92)	0.14 (0.31-0.64)
Education level												
none or incomplete primary	1.31 (0.67-2.56)	1.93 (0.85-4.35)	0.71 (0.46-1.07)	0.81 (0.51-1.30)	0.41 (0.26-0.64)	0.55 (0.32-0.91)	1.09 (0.66-1.78)	1.25 (0.71-2.18)	0.83 (0.60-1.16)	0.72 (0.47-1.11)	1.18 (0.47-2.98)	1.73 (0.57-5.22)
completed primary	1.20 (0.70-2.04)	1.32 (0.68-2.55)	0.88 (0.59-1.32)	1.00 (0.65-1.55)	0.51 (0.34-0.77)	0.54 (0.33-0.88)	1.43 (0.87-2.36)	1.66 (0.96-2.87)	0.91 (0.63-1.33)	0.92 (0.58-1.45)	0.56 (0.23-1.37)	0.54 (0.19-1.52)
secondary or higher	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Time of residence in the neighbourhood												

1 year or less	2.18 (0.69-6.84)	3.01 (0.85-10.56)	1.88 (0.75-4.68)	1.76 (0.60-5.16)	1.09 (0.46-2.55)	0.61 (0.20-1.87)	0.36 (0.10-1.21)	0.46 (0.13-1.62)	0.95 (0.40-2.28)	0.32 (0.10-1.02)	1.73 (0.21-13.82)	1.53 (0.13-17.28)
between 1 and 5 years	1.05 (0.46-2.41)	0.76 (0.28-2.06)	1.09 (0.62-1.91)	1.06 (0.57-1.94)	1.63 (0.67-3.98)	0.83 (0.23-3.01)	0.85 (0.47-1.51)	0.58 (0.29-1.16)	0.58 (0.26-1.28)	0.52 (0.12-2.25)	1.01 (0.13-7.72)	0.56 (0.04-7.19)
5 years or more	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
house income per capita												
1 MW or less	1.01 (0.33-3.03)	0.89 (0.23-3.36)	1.90 (1.05-3.45)	1.46 (0.78-2.76)	0.90 (0.44-1.83)	0.94 (0.42-2.08)	0.75 (0.33-1.70)	0.78 (0.31-2.00)	0.69 (0.42-1.11)	0.80 (0.46-1.41)	0.61 (0.12-3.09)	0.51 (0.08-2.96)
between 1 and 2 MW	0.87 (0.29-2.66)	0.82 (0.22-3.05)	1.56 (0.91-2.70)	1.30 (0.73-2.30)	1.41 (0.76-2.61)	1.47 (0.74-2.91)	0.67 (0.29-1.51)	0.95 (0.37-2.42)	0.85 (0.60-1.20)	0.90 (0.61-1.34)	1.39 (0.57-3.42)	1.18 (0.42-3.33)
more than 2 MW	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Regular source of care*												
yes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	-	-
no	1.48 (0.63-3.45)	1.16 (0.41-3.28)	0.90 (0.54-1.49)	0.88 (0.52-1.51)	0.60 (0.20-1.74)	0.20 (0.02-1.58)	1.25 (0.70-2.23)	1.12 (0.58-2.15)	1.20 (0.75-1.93)	0.99 (0.52-1.86)	-	-
Consistency of PC doctors												
always/frequently	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
hardly ever/never	1.29 (0.37-4.52)	0.67 (0.13-3.43)	1.33 (0.71-2.48)	1.38 (0.69-2.73)	1.09 (0.78-1.53)	0.90 (0.61-1.35)	1.18 (0.82-1.69)	1.14 (1.01-2.17)	1.05 (0.63-1.74)	0.99 (0.52-1.87)	4.21 (1.83-9.70)	2.51 (0.76-8.24)
Consistency of SC doctors												
always/frequently	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

hardly ever/never	2.50 (1.40-4.48)	2.94 (1.42-6.11)	1.25 (0.89-1.75)	1.12 (0.78-1.61)	1.72 (1.21-2.44)	1.76 (1.19-2.62)	1.61 (1.13-2.28)	1.47 (1.01-2.17)	1.47 (1.09-2.00)	1.44 (1.01-2.04)	4.10 (1.60-10.47)	2.66 (0.85-8.34)
Number of chronic conditions												
1	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
2	1.27 (0.78-2.06)	1.49 (0.83-2.65)	0.91 (0.63-1.30)	1.02 (0.69-1.50)	1.51 (0.90-2.53)	1.56 (0.86-2.83)	1.35 (0.90-2.03)	1.49 (0.94-2.36)	1.12 (0.82-1.53)	1.08 (0.74-1.56)	2.16 (1.03-4.53)	1.79 (0.75-4.27)
3 or more	1.59 (0.91-2.77)	1.85 (0.96-3.56)	1.04 (0.74-1.48)	1.17 (0.79-1.74)	1.25 (0.76-2.04)	1.42 (0.79-2.54)	1.83 (1.18-2.85)	1.83 (1.11-3.03)	1.46 (0.88-2.43)	1.61 (0.89-2.90)	3.01 (1.33-6.76)	2.31 (0.87-6.09)
Self-rated-health												
Good	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Bad	2.17 (1.41-3.35)	2.16 (1.30-3.59)	1.36 (0.90-2.06)	1.13 (0.72-1.77)	1.60 (1.04-2.46)	1.70 (1.02-2.81)	1.76 (1.18-2.63)	1.73 (1.10-2.74)	1.50 (1.09-2.07)	1.61 (1.08-2.39)	5.59 (2.54-12.30)	5.03 (1.99-12.70)

OR: Odds Ratio; CI: Confidence Interval; aOR: adjusted Odds Ratio; PC: Primary Care; SC: Specialized Care.

Odds ratio adjusted by sex, age, education level, house income per capita, consistency of PC and SC doctors, number of chronic conditions and self rated health. Results statistically significant shown in bold.

* Variable not included in model for Uruguay due to collinearity.

APPENDIX 3. MISSING DATA DISTRIBUTION AMONG EXPLANATORY VARIABLES BY RESPONSE VARIABLES

1. Barriers in seeking healthcare in another care level.

Missing values distribution among explanatory variables for response variable barriers in seeking healthcare in another care level.

	Argentina		Brazil		Chile		Colombia		Mexico		Uruguay		Total	
	Barrier	No	Barrier	No	Barrier	No	Barrier	No	Barrier	No	Barrier	No	Barrier	Total
	(n=85)	barrier	(n=132)	barrier	(n=135)	barrier	(n=61)	barrier	(n=205)	barrier	(n=49)	barrier	Barrier	Total
Age	0	0	0	2	0	0	0	0	0	0	0	4	0	6
Self-rated Health	0	3	1	1	0	0	0	0	4	2	4	13	9	28
Regular source of care	0	1	0	2	1	0	0	0	2	2	4	35	7	47
Educational level	0	0	1	2	1	7	0	1	0	0	0	3	2	15
Time of residence	0	0	0	4	0	0	0	0	0	0	0	1	0	5
Income per capita	19	95	6	18	19	103	5	76	29	74	6	61	84	511
Health plan	0	0	0	0	0	4	0	0	0	1	0	3	0	8
Consistency of doctor in PC	0	0	0	1	1	5	0	2	0	9	0	13	1	31
Consistency of doctor in SC	2	19	5	21	9	59	2	25	17	52	0	13	35	224
Total	21	118	13	51	31	178	7	104	52	140	14	146	138	875

No missing values in variables sex, number of chronic conditions.

According to the former table, missing data distribution in all the explanatory variables among the individuals that experienced barriers in seeking healthcare in another care level does not follow any specific pattern, allowing the assumption of missing completely at random.

2. Barriers of access to doctors' consultation.

Missing data distribution among explanatory variables for response variable barriers to doctors' consultation in another care level.

	Argentina		Brazil		Chile		Colombia		Mexico		Uruguay		Total	
	Barrier	No	Barrier	No	Barrier	No	Barrier	No	Barrier	No	Barrier	No	Barrier	Total
	(n=37)	barrier	(n=139)	barrier	(n=95)	barrier	(n=25)	barrier	(n=100)	barrier	(n=44)	barrier	Barrier	Total
Self-rated Health	0	3	1	1	0	0	0	0	1	5	0	17	2	28
Regular source of care	1	0	0	2	0	1	0	0	1	3	1	38	3	47

Educational level	0	0	1	2	0	9	0	1	0	0	0	3	1	16
Time of residence	0	0	1	3	0	0	0	0	0	0	0	1	1	5
Income per capita	7	107	4	18	9	113	4	76	15	88	2	65	41	508
Consistency of doctor in PC	0	0	0	1	2	4	0	2	0	9	1	12	3	31
Consistency of doctor in SC	1	20	3	23	7	61	1	26	8	61	0	13	20	224
Total	9	130	10	50	18	188	5	105	25	166	4	149	71	859

No missing values in variables sex, number of chronic conditions, health plan.

According to the former table, missing data distribution in all the explanatory variables among the individuals that experienced barriers to doctors' consultation in another care level does not follow any specific pattern, allowing the assumption of missing completely at random.

3. Difficulties during treatments/procedures

Missing data distribution among explanatory variables for response variable barriers to treatments/procedures in another care level.

	Argentina		Brazil		Chile		Colombia		Mexico		Uruguay		Total	
	Barrier (n=99)	No barrier	Barrier (n=296)	No barrier	Barrier (n=170)	No barrier	Barrier (n=169)	No barrier	Barrier (n=357)	No barrier	Barrier (n=42)	No barrier	Barrier	Total
Self-rated Health	0	3	2	0	0	0	0	0	4	2	2	15	8	28
Regular source of care	0	1	0	2	0	1	0	0	0	4	4	35	4	47
Educational level	0	0	0	3	1	8	1	0	0	0	0	3	2	16
Time of residence	0	0	1	3	0	0	0	0	0	0	0	1	1	5
Income per capita	17	98	7	16	19	104	12	69	60	44	4	63	119	513
Consistency of doctor in PC	0	0	0	0	1	5	0	2	5	5	1	12	7	31
Consistency of doctor in SC	6	15	7	18	12	56	4	23	38	34	1	12	68	226
Health plan	0	0	0	0	0	4	0	0	0	1	1	2	1	8
Total	23	117	17	42	33	178	17	94	107	90	13	143	210	874

No missing values in variables sex, number of chronic conditions.

According to the former table, missing data distribution in all the explanatory variables among the individuals that experienced barriers to doctors' consultation in another care level does not follow any specific pattern, allowing the assumption of missing completely at random.

4. Missing values among response variables.

Missing data distribution among response variables barriers.

	Argentina (n=789)		Brazil (n=792)		Chile (n=876)		Colombia (n=793)		Mexico (n=734)		Uruguay (n=837)		Total (n=4821)	
	Data	Missing	Data	Missing	Data	Missing	Data	Missing	Data	Missing	Data	Missing	Data	Missing
Barriers in seeking healthcare	757	32	784	8	866	10	793	0	724	10	829	8	4753	68
Barriers to doctors' consultation	757	32	776	16	866	10	791	2	724	10	828	9	4742	79
Barriers to treatments/procedures	778	11	786	6	873	3	792	1	732	2	827	10	4788	33

Missing values in all variables are not following any specific pattern, therefore it is possible to assume missing values completely at random in the sample. Would be interesting, given the sample size and also wanting not to lose statistical power, to perform a multiple imputation to the sample.

APPENDIX 4. MULTIVARIATE MODELLING.

Al crear los modelos multivariados, la variable seguro privado no se incluye en el análisis multivariado debido a colinealidad con las tres variables respuesta al presentar VIF de 10.80.

Barreras en la búsqueda de atención

Variable respuesta Derivado, comparación modelo con factores que predisponen y modelo con factores que capacitan.

H₀: Las variables adicionales en el modelo 1 no aportan información.

H₁: Las variables adicionales en el modelo 1 si aportan información.

Modelo*	-2 Log Likelihood (Deviance)	G (Δ Deviance)	Grados de Libertad G	P
Modelo 1	3145.7864			
Modelo 2	3164.2812	18.49	7	0.0099

*Modelo 1 incluye las variables sexo, edad, nivel educativo, tiempo de residencia en el barrio, ingresos per cápita, fuente regular de atención, consistencia medico general, consistencia medico especialista y Modelo 2 incluye sexo, edad, nivel educativo.

Variable respuesta Derivado, comparación modelo con factores que predisponen, que capacitan y de necesidad y modelo con factores que predisponen y capacitan

H₀: Las variables adicionales en el modelo 1 no aportan información.

H₁: Las variables adicionales en el modelo 1 si aportan información.

Modelo*	-2 Log Likelihood (Deviance)	G (Δ Deviance)	Grados de Libertad G	P
Modelo 1	3104.6528			
Modelo 2	3124.2712	19.62	3	0.0002

*Modelo 1 incluye las variables sexo, edad, nivel educativo, tiempo de residencia en el barrio, ingresos per cápita, fuente regular de atención, consistencia medico general, consistencia medico especialista, numero de enfermedades crónicas, salud autopercebida y Modelo 2 incluye sexo, edad, nivel educativo, tiempo de residencia en el barrio, ingresos per cápita, fuente regular de atención, consistencia medico general, consistencia medico especialista.

Barreras a la consulta médica

Variable respuesta Noatendido, comparación modelo con factores que predisponen y modelo con factores que predisponen.

H₀: Las variables adicionales en el modelo 1 no aportan información.

H₁: Las variables adicionales en el modelo 1 si aportan información.

Modelo*	-2 Log Likelihood (Deviance)	G (Δ Deviance)	Grados de Libertad G	P
Modelo 1	2430.1962			
Modelo 2	2438.4272	8.23	7	0.3104

*Modelo 1 incluye las variables sexo, edad, nivel educativo, tiempo de residencia en el barrio, ingresos per cápita, fuente regular de atención, consistencia medico general, consistencia medico especialista y Modelo 2 incluye sexo, edad, nivel educativo.

Variable respuesta Noatendido, comparación modelo con factores que predisponen y de necesidad y modelo con factores que predisponen.

H₀: Las variables adicionales en el modelo 1 no aportan información.

H₁: Las variables adicionales en el modelo 1 si aportan información.

Modelo*	-2 Log Likelihood (Deviance)	G (Δ Deviance)	Grados de Libertad G	P
Modelo 1	2818.7412			
Modelo 2	2864.808	46.07	3	0.0000

*Modelo 1 incluye las variables sexo, edad, nivel educativo, numero de enfermedades crónicas, salud autopercebida y Modelo 2 incluye sexo, edad, nivel educativo.

Variable respuesta Noatendido, comparación modelo con factores que predisponen, de necesidad y que capacitan y modelo con factores que predisponen y de necesidad.

H₀: Las variables adicionales en el modelo 1 no aportan información.

H₁: Las variables adicionales en el modelo 1 si aportan información.

Modelo*	-2 Log Likelihood (Deviance)	G (Δ Deviance)	Grados de Libertad G	P
Modelo 1	2390.1074			
Modelo 2	2396.7778	6.67	7	0.4640

*Modelo 1 incluye las variables sexo, edad, nivel educativo, numero de enfermedades crónicas, salud autopercebida, tiempo de residencia en el barrio, ingresos per cápita, fuente regular de atención, consistencia medico general, consistencia medico especialista. Modelo 2 incluye sexo, edad, nivel educativo, numero de enfermedades crónicas, salud autopercebida.

Barreras a tratamientos/procedimientos

Variable respuesta Dificultadtto, comparación modelo con factores que predisponen y que capacitan y modelo con factores que predisponen.

H₀: Las variables adicionales en el modelo 1 no aportan información.

H₁: Las variables adicionales en el modelo 1 si aportan información.

Modelo*	-2 Log Likelihood (Deviance)	G (Δ Deviance)	Grados de Libertad G	P
Modelo 1	4240.3176			
Modelo 2	4327.962	87.64	7	0.0000

* Modelo 1 incluye las variables sexo, edad, nivel educativo, tiempo de residencia en el barrio, ingresos per cápita, fuente regular de atención, consistencia medico general, consistencia medico especialista y Modelo 2 incluye sexo, edad, nivel educativo.

Variable respuesta Dificultadtto, comparación modelo con factores que predisponen, que capacitan y de necesidad y modelo con factores que predisponen y capacitan.

H₀: Las variables adicionales en el modelo 1 no aportan información.

H₁: Las variables adicionales en el modelo 1 si aportan información.

Modelo*	-2 Log Likelihood (Deviance)	G (Δ Deviance)	Grados de Libertad G	P
Modelo 1	4115.9548			
Modelo 2	4227.9764	112.02	3	0.0000

*Modelo 1 incluye las variables sexo, edad, nivel educativo, tiempo de residencia en el barrio, ingresos per cápita, fuente regular de atención, consistencia medico general, consistencia medico especialista, numero de enfermedades crónicas, salud autopercebida y Modelo 2 incluye sexo, edad, nivel educativo, tiempo de residencia en el barrio, ingresos per cápita, fuente regular de atención, consistencia medico general, consistencia medico especialista.

VI. CHECKLIST (STROBE)

STROBE Statement—Checklist of items that should be included in reports of *cross-sectional studies*

	Item No	Recommendation	Page No
Title and abstract	1	(a) Indicate the study's design with a commonly used term in the title or the abstract	1
		(b) Provide in the abstract an informative and balanced summary of what was done and what was found	2
Introduction			
Background/rationale	2	Explain the scientific background and rationale for the investigation being reported	3
Objectives	3	State specific objectives, including any prespecified hypotheses	4
Methods			
Study design	4	Present key elements of study design early in the paper	4
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection	4, 5
Participants	6	(a) Give the eligibility criteria, and the sources and methods of selection of participants	4
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable	5, 6
Data sources/ measurement	8*	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group	4, 5
Bias	9	Describe any efforts to address potential sources of bias	11
Study size	10	Explain how the study size was arrived at	5
Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why	6
Statistical methods	12	(a) Describe all statistical methods, including those used to control for confounding	6

		(b) Describe any methods used to examine subgroups and interactions	6
		(c) Explain how missing data were addressed	6
		(d) If applicable, describe analytical methods taking account of sampling strategy	N/A
		(e) Describe any sensitivity analyses	N/A
Results			
Participants	13*	(a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed	N/A
		(b) Give reasons for non-participation at each stage	N/A
		(c) Consider use of a flow diagram	N/A
Descriptive data	14*	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders	6, 7
		(b) Indicate number of participants with missing data for each variable of interest	
Outcome data	15*	Report numbers of outcome events or summary measures	7, 8
Main results	16	(a) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included	13,14
		(b) Report category boundaries when continuous variables were categorized	N/A
		(c) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period	N/A
Other analyses	17	Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses	N/A
Discussion			
Key results	18	Summarise key results with reference to study objectives	9
Limitations	19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias	11

Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence	10,11
Generalisability	21	Discuss the generalisability (external validity) of the study results	
Other information			
Funding	22	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based	12

*Give information separately for exposed and unexposed groups.

VII. BIBLIOGRAPHY

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