

Patient perceptions of continuity of health care and associated factors. Cross-sectional study in municipalities of central Colombia and north-eastern Brazil

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Abstract

Despite the fragmentation of healthcare provision being considered one of the main obstacles to attaining effective health care in Latin America, very little is known about patients' perceptions. This paper analyses the level of continuity of health care perceived by users and explores influencing factors in two municipalities of Colombia and Brazil, by means of a cross-sectional study based on a survey of a multistage probability sample of people who had suffered at least one health problem within the previous three months (2163 in Colombia; 2167 in Brazil). An adapted and validated version of the CCAENA© (Questionnaire of care continuity across levels of health care) was applied. Logistic regression models were generated to assess the relationship between perceptions of the different types of health care continuity and sociodemographic characteristics, health needs, and organizational factors. The results show lower levels of continuity across care levels in information transfer and care coherence and higher levels for the ongoing patient-doctor relationship, albeit with differences between the two countries. They also show greater consistency of doctors in the Brazilian study areas, especially in primary care. Consistency of doctors was not only positively associated with the patient-doctor ongoing relationship in the study areas of both countries, but also with information transfer and care coherence across care levels. The study area and health needs (the latter negatively for patients with poor self-rated health and positively for those with at least one chronic condition) were associated with all types of continuity of care. The influence of the sex or income varied depending on the country. The influence of the insurance scheme in the Colombian sample was not statistically significant. Both countries should implement policies to improve coordination between care levels, especially regarding information transfer and job stability for primary care doctors, both key factors to guarantee quality of care.

Keywords: Chronic illness, care continuity, doctor-patient relationship, health services research, multivariate analysis, referral survey, quality of care

Key Messages

- Empirical studies on continuity of health care in Latin America are scarce.
- The results show lower levels of continuity of information and care coherence across health care levels.
- The common associated factors were consistency of doctors, study area and declared morbidity.
- Addressing discontinuities requires effective policies to improve coordination across care levels.

Introduction

Continuity of health care has become a significant challenge for healthcare systems (van Servellen *et al.* 2006), not least in Latin America, where poor care coordination across care levels leads to difficulties in access to care, poor technical quality and the duplication of diagnostic tests (Montenegro *et al.* 2011, Vargas *et al.* 2015, Vargas *et al.* 2016). To address this challenge, measures should be taken to ensure patients' adequate access to care over time, information flow and uptake among the different providers caring for them, and good coordination between them to maintain care coherence and provider-patient relationships (Reid *et al.* 2002).

According to Reid *et al.* (2002), *continuity of health care* is the patient's experience of care over time as connected and coherent with his or her health needs and personal circumstances. In other words, continuity of care refers to the perception and experience of an individual patient, as opposed to the providers' perspective, which would be defined as *coordination of care*. This framework classifies continuity according to three types (Reid *et al.* 2002): firstly, continuity of clinical management—the patient's perception that they receive the different services in a coherent way that is responsive to their changing needs; secondly, continuity of information—the patient's perception that information on past events and personal circumstances is shared and used by the different providers; and lastly, relational continuity—the patient's perception of an ongoing therapeutic relationship with one or more providers. Continuity of clinical management and information can be analysed within and across levels of care (referring to the interaction between providers) whereas relational continuity can only be analysed in each care level separately.

In response to the challenge of achieving continuity of care, international agencies and governments in Latin America, including those of Colombia and Brazil, have promoted the introduction of Integrated Healthcare Networks (IHNs) (Herrera *et al.* 2007, Montenegro *et al.* 2011, Vilaça 2011). The IHN is defined as a network of organizations that provides or arranges to provide a coordinated continuum of services to a defined population and is willing to be held clinically and fiscally accountable for the health status and outcomes of the population served (Pan American Health Organization 2010). Theoretically, the integration of healthcare delivery contributes to more efficient, more equitable and higher quality health services (Banks 2004) through the achievement of intermediate goals: care coordination, continuity of care and access to health care (Vázquez *et al.* 2009).

The type of healthcare network promoted in Colombia and Brazil differs according to the organization of their health systems. Colombia has its General System of Social Security in Health (SGSSS), a managed competition model made up of two different insurance schemes: contributory for formal sector employees and those able to pay, and subsidized for the low income population (República de Colombia 1993). The SGSSS envisages enrolment-based healthcare networks, organized mainly by private for-profit

insurers (EPS and EPS-S) that receive a capitation payment per enrollee to cover a benefits package. Insurers may provide services directly through mergers or strategic alliances with providers—a strategy restricted to the contributory scheme and limited to a maximum of 30% of the insurer's healthcare expenses (República de Colombia 2007)—or by contracting private and public healthcare providers. The uninsured population, 8.6% (Observatorio Así vamos en salud 2014), receives care in public healthcare networks, which are delimited geographically and organized by regional and local health authorities. The Unified Health System (SUS) of Brazil was conceived as a national health system with universal coverage, financed by taxes and decentralized according to the different levels of government: federal, state and municipal (Presidência da República 1998). It envisages the organization of health services into regional-based networks at the supra-municipal level (regiões), made up of public and contracted private providers (profit or non-profit). The municipalities, in coordination with their states, are responsible for organizing the network of services, providing primary care and guaranteeing specialist care through direct provision or agreements ('pactos') with other municipalities (Ministério de Saúde da República Federativa do Brasil 2006). The SUS is mainly used by the lower and lower-middle income strata, who also use private health services in the latter case, while the middle and high income population have private medical insurance (supplementary system) and use the SUS only for high cost services (Ocke-Reis and Marmor 2010).

In both countries, care is organized by levels of complexity, with primary care as the entry point and patient's care coordinator and secondary care in a supporting role (Ministério de Saúde da República Federativa do Brasil 1990, República de Colombia 1993). In order to reinforce primary care, Brazil introduced the Family Health Program (PSF) in 1996, which works through Family Healthcare Teams (ESF). According to a survey, the PSF covered nearly half of all Brazilian households in 2008 (Giovannella *et al.* 2015). Primary care is also provided by doctors in traditional Basic Healthcare Units (UBS) and in polyclinics, which also provide secondary care.

Although it has been suggested that specific aspects of the complex phenomenon of care coordination are barely perceived by healthcare users, recent research shows that analysing continuity of care from the patient's perspective allows us to identify gaps in care coordination along the continuum of care. Furthermore, together with an analysis of influencing factors, it enables us to identify which organizational elements should be addressed to enhance continuity of care and also which target groups require specific organizational measures to improve the coordination of their care (Haggerty *et al.* 2013, O'Malley and Cunningham 2009, Uijen *et al.* 2010).

Despite the importance attributed to continuity of care, there are few existing studies that analyse this from the patient's perspective and identify the influencing factors in the Latin American context.

In fact, there appear to be none in the case of Colombia, whilst for Brazil, although there are some studies, they are very limited in their analysis. The majority focus on evaluating the quality of primary care using the Primary Care Assessment Tools (PCAT), and analyse the continuity of the patient-primary care doctor relationship and information transfer between levels (Carneiro *et al.* 2014, da Silva and Fraccolli 2014, Frank *et al.* 2015, Macinko *et al.* 2007), without exploring the factors associated with continuity.

At the international level, there is plenty of literature on continuity of care based on research conducted in high-income countries, focusing on one type of continuity of care or on a single pathology. Most studies on influencing factors have concentrated on individual factors, with diverse results. These suggest differences related to age and educational level—the elderly population are more likely to perceive an ongoing relationship with primary care (Aller *et al.* 2013b, Schers *et al.* 2005, Tarrant *et al.* 2003) and continuity of clinical management (Aller *et al.* 2013b, Deborah and Osheroff 2008, O'Malley and Cunningham *et al.* 2009), whilst the more highly educated population is significantly associated with lower ratings (Aller *et al.* 2013b, Deborah and Osheroff 2008)—but the influence of socioeconomic level, health status or sex is inconclusive (Aller *et al.* 2013b, Christakis *et al.* 2003, Deborah and Osheroff 2008, O'Malley and Cunningham 2009, Tarrant *et al.* 2003).

This study, the first attempt to comprehensively analyse perceptions of all three types of continuity in the Latin American context, forms part of a wider study that evaluates other elements entwined with continuity of care—namely, healthcare coordination across care levels (Vargas *et al.* 2015, Vargas *et al.* 2016) and access to the healthcare continuum (Garcia-Subirats *et al.* 2014b, Garcia-Subirats *et al.* 2014c)—in order to provide a global picture of health system performance in these areas. The aim of this article is to determine the level of continuity of care perceived by users and to explore influencing factors in two areas of countries with different health systems: Colombia and Brazil.

Methods

Study design and study areas

A cross-sectional study was carried out based on a population survey conducted with a structured questionnaire in two municipalities of central Colombia: i) Kennedy, a district of Bogotá, and ii) Soacha; and two municipalities of north-eastern Brazil: i) the micro regions 3.2 and 3.3 of District 3 in Recife, the state capital of Pernambuco, and ii) Caruaru, a city in the interior of Pernambuco. These four areas are those of the Equity-LA project (<http://www2.equity-la.eu/>), the broader project in which this study is framed (Garcia-Subirats *et al.* 2014b). The areas were selected because they are densely populated urban spaces with a high proportion of individuals with low or medium-low socioeconomic status, and with varying geographical access to specialist care.

Study population and sample

The study population was made up of residents of the study areas who had suffered at least one health problem or had visited the health services during the three months prior to the survey. The sample size was 2,163 in Colombia (1,083 in Kennedy, 1,080 in Soacha) and 2,155 in Brazil (1,076 in Recife, 1,079 in Caruaru). In both countries, multi-stage probability sampling was conducted. In the first stage, census tracts were randomly selected (in Soacha, from all six *comunas*, or districts) with replacement. In the second stage,

households were systematically selected. Details on the sample size calculation are described elsewhere (Garcia-Subirats *et al.* 2014b).

Questionnaire

A questionnaire was created to analyse the access to and continuity of health care, the design of which has been described in detail elsewhere (Garcia-Subirats *et al.* 2014a). To measure users' perception of continuity of care, it included the scale of the CCAENA© questionnaire (Cuestionario de Continuidad Asistencial Entre Niveles de Atención in Spanish) (Aller *et al.* 2013a, Letelier *et al.* 2010), which was adapted to the health systems of Colombia and Brazil and subsequently validated (Garcia-Subirats *et al.* 2015). The scale consists of 14 items grouped into four sub-scales according to the types of continuity of care: a) three items on transfer of clinical information between levels of care (continuity of information); b) three items on care coherence between levels of care (continuity of clinical management); c) four items on the ongoing patient-primary care doctor relationship and four on the patient-secondary care doctor relationship (relational continuity) (Appendix 1). A further question on the consistency of personnel (being seen by the same doctor), a dimension of relational continuity, is also included, but not as an item in the scale because it did not group with any of the factors. Open-ended questions were included on the reasons for their perceptions of continuity of care. The sub-scales were applied to sub-samples according to their experiences with the SGSSS/SUS: users who had been attended to by both primary and secondary care doctors answered all items, while users of only one level of care answered the corresponding items on relational continuity.

Data collection

Data were collected from February to June 2011 by means of face-to-face interviews conducted by specifically trained interviewers in each country. Strategies to ensure the quality and consistency of data included close supervision of interviewers in the field, a review of all questionnaires, and re-interviewing 20% of participants selected at random. Inconsistencies during data entry were controlled using the double-entry method.

Variables

The outcome variables were four synthetic indexes measuring: perception of transfer of clinical information across levels of care (continuity of information), perception of care coherence across levels of care (continuity of clinical management), the perception of an ongoing primary care doctor-patient relationship and perception of an ongoing secondary care doctor-patient relationship (relational continuity), in the SGSSS or SUS. The indexes were calculated using the same methodology as in the original scale (Aller *et al.* 2013a): the response of each item was rated from 0 to 3 points (never/rarely/very often/always); missing values were imputed with the mean value of each item of those observations with only one missing for each factor. The item's scores in each factor were added and divided by their highest possible score. Each continuity index was transformed into a categorical variable representing high perception of CC (more than half of the maximum score) versus low perception of CC (less than half of the maximum score). Users' reasons for perceiving that their primary care doctor collaborated with the specialists to solve their health problems (one of the care coherence items) were elicited by following up the item with the open-ended question 'Why?'

The explanatory variables were: a) sociodemographic: sex, age, level of education, per capita household income and being a holder of a private health plan (in Brazil); b) morbidity: having a chronic

health condition according to the classification of O'Halloran *et al.* (2004), and self-rated health, which was assessed using the question *How do you define your health?*, and the results were grouped into 'very good or good' and 'poor or very poor'; c) organizational: municipality, SGSSS insurance scheme (in Colombia only) and consistency of health personnel (consistency of the primary and secondary care doctor). The latter was assessed using the questions: 'When you make an appointment with a general practitioner are you always attended to by the same professional?' and 'When you make an appointment with a specialist for the same health problem are you always attended to by the same professional?'. The results were grouped into *yes (always or often)* and *no (occasionally or never)*.

Finally, a content analysis was conducted of the open-ended question on the users' reasons for perceiving that the primary care doctor collaborated with the specialist to solve their health problems).

Analysis

Firstly, univariate analyses were performed to describe each of the items of the scale, the reasons for perceiving that the primary care doctor collaborated with the specialist and the explanatory variables. Secondly, the indexes of perceived high and low levels of continuity of care and their corresponding confidence intervals (CIs) were calculated. Finally, logistic regression models were generated to assess the relationship between types of care continuity and associated factors. Robust covariance adjustments—employing the area variable—were used to account for correlated observations due to clustering. All the independent variables were included in the analysis, except for being a holder of a private health plan (in Brazil) because of its low numbers. Percentages and adjusted odds ratios (OR) were calculated for perceived high levels of continuity for each index. The model was constructed in three steps: in the first, sociodemographic and organizational variables were included; in the second, morbidity variables were added; and finally, in the third step, variables regarding the consistency of the health professionals were incorporated. This allowed us to ascertain the impact of different types of variables on adjusting the model. Multicollinearity between explanatory variables was tested using the variance inflation factor (VIF), which was found to be insignificant (VIF value falls below 1.5). Model fit was assessed with the Hosmer–Lemeshow goodness-of-fit test. All the regression models gave *P*-values higher than 0.05, indicating that the model estimates fit the data at an acceptable level. Statistical analyses were performed using Data Analysis and Statistical Software (STATA), version 12.

Results

Sample characteristics

The sample of regular primary care users was bigger than that of the secondary care users (1379 and 809 in Colombia; 1057 and 686 in Brazil, respectively; Appendix 2) and also bigger than that of users of both levels (609 in Colombia and 465 in Brazil). Table 1 shows the characteristics of the sample of users of both levels. In both countries, the majority of users were women. In Colombia, the central age Group (41–65 years) was dominant, while in Brazil, although the central age group was still dominant, the sample was slightly more evenly distributed across the different age groups. Educational level was not very high in either country, although it was higher in the Colombian sample. With regard to household income, over half of the sample in both countries earned less than half of the minimum wage per capita per month, with a more unequal

Table 1. Sociodemographic characteristics and perceived health-care need of the study sample of users of both levels of care in the study areas of Colombia and Brazil (2011).

	Colombia (<i>n</i> = 609) <i>n</i> (%)	Brazil (<i>n</i> = 465) <i>n</i> (%)
Sex		
Male	162 (26.6)	86 (18.5)
Female	447 (73.4)	379 (81.5)
Age		
0–17	72 (11.8)	65 (14.0)
18–40	120 (19.7)	96 (20.7)
41–65	293 (48.1)	204 (43.9)
>65	124 (20.4)	100 (21.5)
Level of education		
None	98 (16.3)	152 (33.0)
Primary	234 (38.8)	143 (31.0)
Secondary	218 (36.2)	151 (32.8)
University	53 (8.80)	15 (3.3)
Per capita income		
< 1/2 MW	309 (50.7)	253 (54.4)
1/2–1 MW	168 (27.6)	167 (35.9)
> 1 MW	132 (21.7)	45 (9.7)
Private health plan		
Yes	12 (2.2)	33 (7.1)
No	538 (97.8)	432 (92.9)
SGSSS scheme		
Contributory and special	396 (68.1)	
Subsidized	155 (26.6)	
Uninsured	31 (5.3)	
Self-rated health*		
Good	337 (55.3)	149 (32.1)
Poor	272 (44.7)	315 (67.9)
Chronic condition		
No	326 (53.5)	202 (43.4)
Yes (at least one)	283 (46.5)	263 (56.6)
Municipality		
Kennedy	342 (56.2)	
Soacha	267 (43.8)	
Recife		288 (61.9)
Caruaru		177 (38.1)

MW: minimum wage per capita per month; SGSSS: General System of Social Security in Health.

*Good: good or very good; poor: poor or very poor.

distribution in Brazil. With regard to SGSSS enrolment: 61.5% were enrolled in the contributory scheme, 6.5% in the special scheme, 26.6% in the subsidized scheme (SS), and 5.3% were uninsured. Self-rated health status was better in Colombia, where about half of the users (55.3%) perceived their health status to be either good or very good, compared to 32.1% in Brazil; 46.5% in Colombia reported having at least one chronic disease, in contrast to 56.6% in Brazil (Table 1). There are certain differences between this sample and those of users of only one level: in Colombia, users of both levels report a worse state of health, a greater prevalence of chronic conditions and are enrolled in higher proportions in the contributory and special schemes. In Brazil, this sample includes a lower proportion of low-income users than that of the regular users of primary care (Table 1 and Appendix 2).

Perception of continuity of care

The perception of continuity is analysed by means of the four indexes and the distribution of the items. The synthetic indexes

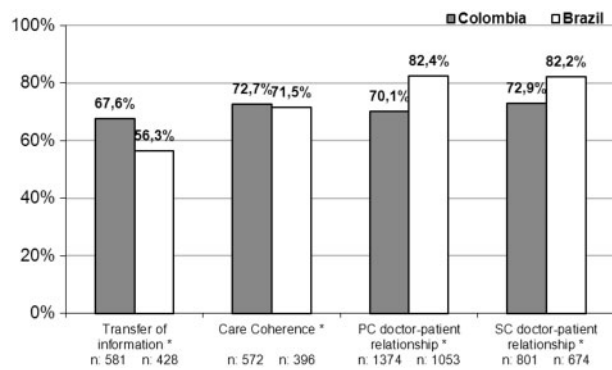


Figure 1. Continuity of care perceived by SGSSS and SUS users in the study areas of Colombia and Brazil (2011).

*OR statistically significant at 0.05. OR is adjusted by sex, age, per capita income, self-rated health, chronic disease and consistency of the professional team.

PC: primary care; SC: secondary care; SGSSS: General System of Social Security in Health; SUS: Unified Health System

show high levels of continuity of care, but with statistical differences between the countries (Figure 1). In both countries many items were rated high (always and often), especially those related to relational continuity. In Brazil, the ratings showed a greater tendency towards the extreme categories (always and never). The percentage of missing values was higher on items related to continuity across levels of care, especially on care coherence in Brazil (Table 2).

Continuity of information across levels of care

Continuity of clinical information was the lowest rated type of continuity in both countries, although the percentage of users who perceived a good level of transfer of clinical information was higher in Colombia (67.6%) than in Brazil (56.3%) (Figure 1). In Colombia, there were more users (64.1%) who considered that their specialists were aware of the primary care doctor's recommendations (always or often) than those who considered that the GP was aware of the specialists' instructions or discussed their specialist visits with them (Table 2). In Brazil, users appraised the three items in a similar way and nearly half of them perceived that the GP was aware of the specialists' recommendations and vice versa (Table 2).

Care coherence across levels of health care (continuity of clinical management)

Continuity of clinical management was perceived similarly in both countries with no statistical differences: 72.7% of users in Colombia and 71.5% in Brazil perceived high levels of care coherence (Figure 1). In Colombia, >64% of users considered that the primary care doctor and the specialist were (always or often) in agreement over treatments and 57.2% of users believed that their primary care doctor always or very often collaborated with the specialists to solve their health problems. Although the percentages are somewhat lower, in Brazil more users perceived that the primary care doctor was in agreement with the specialist's treatment and diagnosis (57.9%) than vice versa (54.8%) and 54.8% perceived that their doctors collaborated with each other (Table 2). In response to the open questions, the reasons for considering that their primary care doctor rarely or never collaborated with the specialists were similar in both countries: no communication between professionals (29.6% in Colombia and 29.1% in Brazil); they differ in their opinions or recommendations (16.2% and 16.5% respectively); they do not

know each other (13.1% and 7.9% respectively); they do not take into account the care being given at the other care level (12.7% and 15.7% respectively); and they do not work as a team (8.8% and 8.7%, respectively) (Figure 2).

Relational continuity with the primary care and secondary care doctors

With regard to relational continuity, a higher percentage of users in Brazil perceived an ongoing relationship with their primary care doctors (82.4%) and specialists (82.2%) than users in Colombia (70.1% and 72.9% respectively), and the differences between the two countries were statistically significant. In Colombia, more users perceived an ongoing relationship with the secondary care doctor than with the primary care doctor. >74% of users declared that they felt comfortable discussing their health problems with the primary care doctor and also with the specialist, that they had confidence in the professional abilities of these doctors and that they received sufficient information from the specialist doctor, although less so from the primary care doctor (66.4%). In Brazil, differences were found in the perception of an ongoing relationship with the primary care and secondary care doctors. Around 80% declared that they had confidence in their professional abilities and felt at ease to discuss any concerns with both types of doctor, although somewhat less so with the specialist, and approximately 75% said they had been sufficiently well informed. Lastly, differences were found between countries with regard to the consistency of personnel. This was rated lower in Colombia, where around half of users reported that they always or nearly always saw the same doctor (both in the case of primary care doctors and specialists), whereas in Brazil >70% of users confirmed this (Table 2).

Factors associated with the perception of continuity of care

Factors associated with the perception of continuity of care differed by country and type of continuity of care. With regard to *continuity of information across levels of care*, in Colombia, women and users with a per capita income between $\frac{1}{2}$ and 1 minimum wage were more likely to report high levels of transfer of information, while users older than 41 were more likely to report low levels (Table 3). In Brazil, men and users from Recife were more likely to report higher levels of transfer of information and users between 18 and 40, lower levels. In both countries, users who reported having at least one chronic condition and who perceived consistency of the doctor (of both care levels in Colombia and of secondary care in Brazil) were more likely to report high levels of transfer of information (Table 4).

With regard to *continuity of clinical management across levels of care*, in Colombia, factors associated with higher perceived levels of care coherence were good health, having at least one chronic condition, living in Soacha and the perception of consistency of doctors of both care levels (Table 3). In Brazil, users who were men, had a per capita income of > 1 minimum wage, reported good health, lived in Recife and perceived consistency of doctors were more likely to perceive higher levels of care coherence, while those between 18 and 40 years of age were less likely to do so (Table 4).

With regard to *relational continuity*, the main factor in both countries associated with a perceived ongoing relationship with the primary or secondary care doctor was the consistency of doctors. In Colombia, the factors of being female, being over 65 years of age, reporting good health and having at least one chronic illness, being from Soacha and being uninsured were all associated with a greater

Table 2. Distribution of answers for each item according to type of continuity and consistency of health personnel in the study areas of Colombia and Brazil (2011).

	Colombia					Brazil				
	Always	Very often	Rarely	Never	missing	Always	Very often	Rarely	Never	missing
Transfer of information (Continuity of information)										
1. My PC doctor is aware of the instructions given to me by the specialist before I explain them to him/her	238 (39.2)	116 (19.1)	136 (22.4)	87 (14.3)	30 (4.9)	191 (41.7)	40 (8.7)	53 (11.6)	136 (29.7)	38 (8.3)
2. The specialist is aware of the instructions given to me by my PC doctor before I explain them to him/her	247 (40.7)	142 (23.4)	109 (18.0)	79 (13.0)	30 (4.9)	185 (40.2)	41 (8.9)	65 (14.1)	127 (27.6)	42 (9.1)
3. After seeing the specialist my PC doctor discusses the visit with me	278 (46.0)	92 (15.2)	116 (19.2)	104 (17.2)	14 (2.3)	210 (46.0)	25 (5.5)	49 (10.7)	149 (32.6)	24 (5.3)
Care coherence (Continuity of clinical management)										
4. My PC doctor is in agreement with the specialist's instructions	243 (40.2)	143 (23.6)	116 (19.2)	61 (10.1)	42 (6.9)	222 (49.2)	39 (8.7)	68 (15.1)	65 (14.4)	57 (12.6)
5. The specialist is in agreement with my PC doctor's instructions	229 (37.8)	156 (25.7)	118 (19.5)	55 (9.1)	48 (7.9)	215 (47.5)	33 (7.3)	63 (13.9)	69 (15.2)	73 (16.1)
6. I think that my primary care doctor collaborates with the specialist to solve my health problems	244 (40.3)	102 (16.9)	119 (19.7)	87 (14.4)	53 (8.8)	218 (47.4)	34 (7.4)	54 (11.7)	81 (17.6)	73 (15.9)
PC doctor-patient relationship (Relational continuity)										
7. I have confidence in the professional ability of my PC doctor	678 (49.3)	303 (22.0)	351 (25.5)	38 (2.8)	5 (0.4)	733 (69.4)	112 (10.6)	172 (16.3)	33 (3.1)	7 (0.7)
8. I feel comfortable consulting my PC doctor about my doubts or health problems	752 (54.6)	280 (20.3)	287 (20.8)	57 (4.1)	1 (0.1)	825 (78.1)	74 (7.0)	103 (9.7)	52 (4.9)	3 (0.3)
9. The information my PC doctor gives me is sufficient	620 (45.0)	295 (21.4)	393 (28.5)	66 (4.8)	3 (0.2)	724 (68.5)	87 (8.2)	172 (16.3)	66 (6.2)	8 (0.8)
10. I would recommend my PC doctor to my family and friends	627 (45.6)	229 (16.6)	304 (22.1)	206 (15.0)	10 (0.7)	747 (70.7)	80 (7.6)	85 (8.0)	134 (12.7)	11 (1.0)
SC doctor-patient relationship (Relational continuity)										
11. I have confidence in the professional ability of the specialists treating me	431 (53.7)	177 (22.1)	155 (19.3)	35 (4.4)	4 (0.5)	478 (69.9)	72 (10.5)	97 (14.2)	25 (3.7)	12 (1.8)
12. I feel comfortable consulting the specialists about my doubts	458 (57.0)	142 (17.7)	164 (20.4)	37 (4.6)	2 (0.3)	490 (71.6)	53 (7.8)	88 (12.9)	47 (6.9)	6 (0.9)
13. The information the specialists give me is sufficient	398 (49.6)	177 (22.0)	178 (22.2)	47 (5.9)	3 (0.4)	464 (67.7)	53 (7.7)	101 (14.7)	54 (7.9)	13 (1.9)
14. I would recommend my specialists to my friends and family	412 (51.3)	134 (16.7)	126 (15.7)	126 (15.7)	5 (0.6)	488 (71.7)	50 (7.3)	47 (6.9)	83 (12.2)	13 (1.9)
Consistency of the health professional (doctor)										
Attended by the same PC doctor	498 (36.1)	217 (15.7)	498 (36.1)	164 (11.9)	2 (0.2)	756 (71.5)	58 (5.5)	155 (14.7)	85 (8.0)	3 (0.3)
Attended by the same specialist for the same health problem	334 (41.7)	108 (13.5)	235 (29.2)	119 (14.8)	7 (0.9)	461 (67.4)	36 (5.3)	111 (16.2)	62 (9.1)	14 (2.1)

PC: primary care.

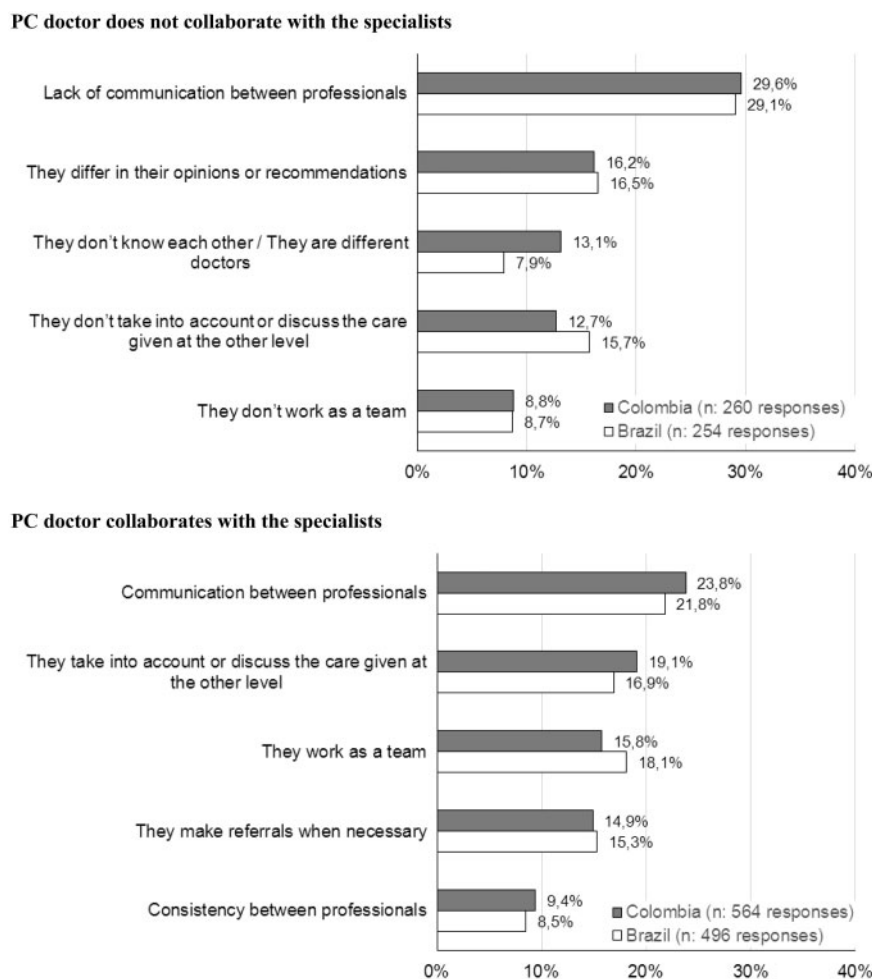


Figure 2. SGSSS/SUS users' reasons for perceiving that their primary care doctor collaborates with the specialists to solve their health problems.

*Reasons listed in descending order of results for Colombia.

**Multiple answers possible

PC: primary care

perception of relational continuity with the primary care doctor. Users over 40, reporting good health, belonging to the contributory scheme and coming from Soacha were more likely to perceive an ongoing relationship with the specialist (Table 3). In Brazil, other factors positively associated with a greater perception of relational continuity were being male, being over 65, having a per capita income of > 1 minimum salary (more than half a minimum salary for PC), having good self-rated health status and living in Recife. Moreover, having a regular source of primary care other than the PSF was associated with a more favourable perception of relationships with primary care doctors, and a less favourable one of those with specialists (Table 4). Incorporating the variables in stages allowed us to observe that adding the morbidity variables significantly improved the quality of the model when compared to the previous one, and that it was improved yet again when the variables on consistency of health professionals were included.

Discussion

This study is the first attempt to analyse comprehensively and comparatively the perception of the three types of continuity of care in the Latin-American region, encompassing patients from different

age groups and suffering from diverse medical conditions. It is based on a survey of a large sample of users using a common tool to measure continuity of care, which permits the exploration of individual factors (socio-demographic characteristics and morbidity) and organizational factors (area, insurance scheme, regular source of care, stability of personnel) that may contribute to explaining perceptions of continuity of care. Although the study was only conducted in two municipalities of central Colombia and two of north-eastern Brazil, and one should be cautious in generalizing to other regions or countries based on the results, they are nevertheless in keeping with other studies, especially in Brazil where there are some partial evaluations (Carneiro *et al.* 2014, da Silva and Fracoli 2014) (Macinko *et al.* 2007, van Stralen *et al.* 2008).

The results show lower ratings for continuity of care across levels in terms of transfer of information and care coherence, while the ongoing patient-doctor relationship was rated higher in the study areas of both countries. These results are consistent with the opinions of health professionals (Vargas *et al.* 2016) and point towards limited care coordination across levels of care, most worryingly in the case of the transfer of clinical information. The most consistently associated factors were stability of health personnel, study area and declared morbidity, which were associated with all types of

Table 3. Factors associated with higher levels of continuity of care in the study areas of Colombia (2011).

	Informational continuity			Clinical management continuity			Relational continuity					
	Transfer of information (n = 550)			Care coherence (n = 541)			Ongoing PC - patient relationship (n = 1293)			Ongoing SC - patient relationship (n = 761)		
	Crude %*	Unadj-OR	AdjOR (IC)	Crude %*	Unadj-OR	AdjOR (IC)	Crude %*	Unadj-OR	AdjOR (IC)	Crude %*	Unadj-OR	AdjOR (IC)
sociodemographic												
Sex												
Male	58.6%	1	1	70.4%	1	1	67.5%	1	1	73.3%	1	1
Female	71.0%	1.72	2.01 (1.89–2.14)	73.6%	1.17	1.34 (0.92–1.93)	71.1%	1.18	1.28 (1.01–1.62)	72.8%	0.98	0.94 (0.67–1.33)
Age												
0–17	71.4%	1.01	1.11 (0.99–1.24)	79.1%	1.49	1.36 (0.66–2.80)	75.4%	1.59	1.67 (1.17–2.36)	69.3%	1.10	1.18 (0.61–2.29)
18–40	71.2%	1	1	71.8%	1	1	65.7%	1	1	67.2%	1	1
41–65	66.6%	0.81	0.61 (0.59–0.63)	72.1%	1.01	0.96 (0.86–1.09)	69.4%	1.18	1.18 (0.69–2.03)	74.4%	1.42	1.50 (1.35–1.67)
>65	64.4%	0.73	0.47 (0.43–0.52)	71.6%	0.99	0.86 (0.28–2.64)	73.8%	1.47	1.26 (1.02–1.56)	77.7%	1.70	1.87 (1.76–1.97)
Per capita income												
< 1/2 MW	64.3%	1	1	68.3%	1	1	69.5%	1	1	68.2%	1	1
1/2–1 MW	72.0%	1.42	1.51 (1.26–1.82)	79.0%	1.74	1.76 (0.61–5.07)	71.4%	1.09	1.15 (0.80–1.66)	75.9%	1.47	1.20 (0.76–1.91)
> 1 MW	70.1%	1.30	1.25 (0.49–3.14)	75.0%	1.39	1.31 (0.93–1.85)	69.7%	1.01	0.87 (0.69–1.11)	78.9%	1.74	1.04 (0.84–1.29)
Self-rated health												
Good	70.4%	1	1	77.9%	1	1	73.4%	1	1	75.9%	1	1
Poor	64.2%	0.76	0.72 (0.50–1.05)	66.1%	0.55	0.52 (0.43–0.63)	65.0%	0.67	0.57 (0.55–0.60)	69.1%	0.71	0.66 (0.64–0.68)
Chronic condition												
No	63.9%	1	1	70.7%	1	1	67.7%	1	1	69.3%	1	1
Yes (at least one)	72.0%	1.45	1.65 (1.10–2.47)	75.1%	1.25	1.45 (1.37–1.54)	74.4%	1.39	1.47 (1.32–1.64)	77.6%	1.53	1.39 (0.45–4.29)
organizational												
SGSSS scheme												
Contributory and special	69.9%	1	1	74.1%	1	1	70.7%	1	1	76.9%	1	1
Subsidized	64.9%	0.80	0.94 (0.87–1.02)	74.7%	1.03	1.44 (0.73–2.84)	70.6%	1.00	1.08 (0.90–1.30)	68.0%	0.64	0.84 (0.58–1.22)
Uninsured	55.2%	0.53	0.58 (0.24–1.38)	56.7%	0.46	0.61 (0.19–1.93)	67.0%	0.84	1.06 (1.01–1.12)	56.6%	0.39	0.49 (0.41–0.60)
Municipality												
Kennedy	68.0%		1	71.7%	1	1	68.2%	1	1	74.6%	1	1
Soacha	67.2%	0.96	1.04 (0.87–1.24)	74.2%	1.13	1.09 (1.09–1.10)	72.1%	1.21	1.26 (1.22–1.31)	71.0%	0.83	1.22 (1.01–1.47)
Consistency of PC doctor												
No	58.6%	1	1	64.2%	1	1	50.7%	1	1			
Yes	76.1%	2.25	2.32 (2.27–2.37)	80.4%	2.29	2.24 (1.07–4.69)	88.0%	7.11	7.19 (5.72–9.04)			
Consistency of SC doctor												
No	61.6%	1	1	65.5%	1	1				53.7%	1	1
Yes	73.3%	1.71	1.49 (1.29–1.72)	78.4%	1.92	1.70 (1.14–2.54)				88.4%	6.59	6.45 (4.78–8.71)

Adj-OR: adjusted OR; CI: confidence interval; MW: minimum wage per capita per month; PC: primary care; Ref.: reference category; SGSSS: General System of Social Security in Health; Unadj-OR: unadjusted OR.

Statistically significant OR are shown in bold. CI was calculated at 95% significance.

* Values represent the percentage of patients in each category perceiving high levels of continuity of care.

Table 4. Factors associated with higher levels of continuity of care in the study areas of Brazil 2011.

	Informational continuity			Clinical management continuity			Relational continuity					
	Transfer of information (n = 416)			Care Coherence (n = 387)			Ongoing PC - patient relationship (n = 1036)			Ongoing SC - patient relationship (n = 655)		
	Crude %*	Unadj-OR	AdjOR (IC)	Crude %*	Unadj-OR	AdjOR (IC)	Crude %*	Unadj-OR	AdjOR (IC)	Crude %*	Unadj-OR	AdjOR (IC)
sociodemographic												
Sex												
Male	69.5%	1	1	82.4%	1	1	84.5%	1	1	90.2%	1	1
Female	53.2%	0.50	0.63 (0.42-0.95)	68.9%	0.47	0.53 (0.41-0.68)	81.7%	0.82	0.78 (0.76-0.80)	80.0%	0.44	0.36 (0.16-0.82)
Age												
0-17	70.5%	3.58	2.73 (1.78-4.19)	79.3%	3.18	2.60 (1.29-5.24)	78.8%	1.16	0.89 (0.82-0.97)	79.0%	1.25	0.80 (0.78-0.83)
18-40	40.0%	1	1	54.7%	1	1	76.2%	1	1	75.0%	1	1
41-65	60.1%	2.26	1.87 (1.84-1.90)	74.3%	2.39	2.23 (1.96-2.53)	83.3%	1.55	1.40 (0.70-2.79)	85.0%	1.89	2.41 (1.58-3.67)
>65	55.1%	1.84	1.35 (0.70-2.59)	77.7%	2.88	2.47 (1.67-3.63)	90.1%	2.82	2.23 (1.19-4.19)	87.2%	2.28	2.49 (1.94-3.20)
Per capita income												
< 1/2 MW	54.9%	1	1	72.2%	1	1	81.6%	1	1	82.4%	1	1
1/2-1 MW	53.6%	0.95	0.94 (0.47-1.88)	67.6%	0.80	0.79 (0.35-1.76)	84.4%	1.22	1.15 (1.04-1.27)	79.8%	0.84	0.87 (0.51-1.49)
> 1 MW	75.0%	2.46	2.14 (0.86-5.36)	82.5%	1.81	1.69 (1.66-1.72)	81.0%	0.96	1.00 (0.98-1.02)	89.9%	1.89	1.99 (1.18-3.36)
Self-rated health												
Good	58.7%	1	1	74.0%	1	1	84.3%	1	1	86.1%	1	1
Poor	55.4%	0.88	0.85 (0.39-1.85)	70.2%	0.83	0.73 (0.56-0.96)	81.3%	0.81	0.62 (0.50-0.76)	80.3%	0.66	0.63 (0.58-0.67)
Chronic condition												
No	53.8%	1	1	68.4%	1	1	79.7%	1	1	81.2%	1	1
Yes (at least one)	58.3%	1.20	1.17 (1.10-1.23)	73.9%	1.31	1.05 (0.73-1.52)	85.2%	1.46	1.02 (0.99-1.04)	83.1%	1.14	0.72 (0.42-1.23)
organizational												
Municipality												
Recife	60.3%	1	1	75.4%	1	1	87.2%	1	1	86.2%	1	1
Carnaru	49.7%	0.65	0.74 (0.74-0.74)	64.6%	0.60	0.68 (0.67-0.69)	75.6%	0.45	0.65 (0.57-0.74)	75.9%	0.50	0.59 (0.49-0.72)
Regular source of care												
Yes, a PSF	56.6%	1	1	75.2%	1	1	84.8%	1	1	85.0%	1	1
Yes, other	59.2%	1.11	1.13 (0.80-1.58)	72.3%	0.86	0.89 (0.53-1.48)	84.4%	0.97	1.40 (1.14-1.73)	84.3%	0.95	0.81 (0.77-0.85)
No	48.0%	0.71	0.94 (0.24-3.61)	60.3%	0.50	0.69 (0.14-3.35)	71.9%	0.46	0.92 (0.83-1.02)	74.2%	0.51	0.57 (0.32-1.02)
Consistency of PC doctor												
No	39.8%	1	1	56.0%	1	1	55.9%	1	1			
Yes	60.9%	2.36	2.04 (0.93-4.47)	75.6%	2.44	1.79 (1.30-2.45)	90.1%	7.13	6.41 (3.68-11.17)			
Consistency of SC doctor												
No	49.0%	1	1	62.8%	1	1	60.4%	1	1	60.4%	1	1
Yes	59.4%	1.50	1.38 (1.06-1.80)	74.2%	1.71	1.45 (1.28-1.65)	89.5%	5.60	5.51 (4.97-6.11)	89.5%	5.60	5.51 (4.97-6.11)

Adj-OR: adjusted OR; CI: confidence interval; MW: minimum wage per capita per month; PC: primary care; PSF: Family Health Program; Ref.: reference category; SC: secondary care; Unadj-OR: unadjusted OR. Statistically significant OR are shown in bold. CI was calculated at 95% significance.

*Values represent the percentage of patients in each category perceiving high levels of continuity of care.

continuity of care. The influence of other factors such as sex or per capita income varied between the two countries, in keeping with existing international evidence, which is also inconclusive (Christakis *et al.* 2003, O'Malley and Cunningham 2009). Other factors related to the healthcare model, such as insurance scheme in Colombia or use of the PSF as the regular source of care in Brazil, either were not statistically significant, or the association was unexpected, highlighting the need for further research on the influence of organizational factors, both at local and international level.

The perception of continuity of care reveals poorly coordinated care across care levels in the SGSSS and SUS in the study areas

The indexes and items on transfer of information between secondary care and primary care doctors are the most negatively appraised in both countries, indicating not only the lack of counter-referrals by specialists (de Brito *et al.* 2012, Harris *et al.* 2007, Vargas *et al.* 2015, Vargas *et al.* 2016), but also primary care doctors' lack of interest in performing adequate follow-ups of their patients throughout the care continuum. This would require discussing visits paid to other care levels with the patient (Mehrotra *et al.* 2011). These results, which are in keeping with studies conducted in other municipalities in Brazil using the PCAT (Cameiro *et al.* 2014, da Silva and Fraccolli 2014), highlight how important it is that any intervention to improve counter-referral information in either country must not only be aimed at improving the quality of the information recorded by specialists but also at ensuring that primary care doctors make proper use of this information in patient follow-ups (Starfield 1998a).

With regard to care coherence, there is a high percentage of users who perceive that their primary care doctor does not collaborate with the specialists to solve their health problems. They relate this to the aforementioned lack of communication and transfer of information, and also to disagreements between the primary care doctor and specialist on diagnosis and treatments. This lack of consistency may be a reflection of errors in the diagnosis and treatment of primary care doctors due to specialists failing to send them the patients' clinical information, or to the low quality of primary care (inadequate training and restrictions on the diagnostic tests they can request), or a combination of the two. It also appears to indicate an absence of coordination mechanisms to facilitate the establishment of shared clinical objectives and agreement on treatments (Vargas *et al.* 2015).

The results also reflect greater staff instability in Colombia than in Brazil, especially in primary care. Only 52% of users in Colombia say they were always or often seen by the same primary care doctor. At this care level, the presence of a regular source of care—the primary care doctor—favours familiarity and ongoing therapeutical relationships with the patients and is associated with better preventive care and a reduction in the number of hospital admissions (Saultz and Lochner 2005, Starfield 1998b). The high turnover of primary care doctors in Colombia is partly justified by the fact that many are working their 'rural year' (*año rural*), the obligatory period of public service on completion of their studies. Mainly, however, it is explained by the highly temporary nature of doctors' contracts. This forms part of the cost control strategy of insurers and providers (Carrioni *et al.* 2007), a strategy which also affects secondary care.

The importance of organizational factors for continuity of care

The most consistently associated organizational factors were consistency of health personnel and study area, which were related to all types of continuity of care. Consistency of health personnel was not

only the best predictor of ongoing relationships with doctors in the two countries, but also an important determinant of continuity of information and care coherence across care levels. This finding is consistent with studies in other contexts (Haggerty *et al.* 2008, O'Malley and Cunningham 2009). It is worth noting that this influence is more marked in the case of consistency of the primary care doctor, thus highlighting the importance of job stability in performing the role of care coordinator for the patient throughout the care continuum, which is an aim of health policies in both countries (Ministério de Saúde da República Federativa do Brasil 1990, República de Colombia 1993). Furthermore, the greater consistency of personnel in Brazil, especially in the case of primary care doctors, could explain why more users perceive ongoing relationships than in Colombia. According to available qualitative studies, the stability of the primary care doctor over time contributes to the doctor-patient relationship by facilitating mutual accumulated knowledge, including the doctor's greater familiarity with the patient's medical history along the care continuum, communication, and trust in the doctor (Waibel *et al.* 2015, Waibel *et al.* 2012). In turn, consulting more than one doctor could disorganize treatment plans or lead to receiving different recommendations to follow (Waibel *et al.* 2012).

In Brazil, patients from Caruaru—the interior municipality of Pernambuco state—perceived worse continuity of care. This result is consistent with the poor coordination of information highlighted by professionals (Vargas *et al.* 2015), which is related to the absence of standardized forms for the transfer of information between levels. The problems of insufficient human resources described in the SUS, which are more acute in the interior regions of the country (Machado and Pereira 2002), generate frequent staff rotation, which might serve to explain the lower levels of ongoing relationships with doctors. One result which is more difficult to explain is the better perception of patients from Soacha of their ongoing relationships with primary and secondary care doctors and care consistency. A worse perception of ongoing relationships in this municipality was anticipated due to the greater rotation of primary care doctors in its subsidized networks and worse geographical access to secondary care in its contributory networks.

The lack of influence of the SGSSS scheme in Colombia on the perception of continuity of care also requires further investigation. As this is a managed competition model in which the insurers organize the networks of services for their members, it may be that the characteristics of the organizational model they use are more influential than the insurance scheme itself; for example, whether there is co-location of primary care and outpatient secondary care on the same site, more or less fragmentation in the purchase of services, more or less stability in contracts with providers and professionals, etc. (Vargas *et al.* 2016).

Finally, the results show worse perceptions of ongoing relationships with the primary care doctor among users whose regular source of care is an ESF. Previous studies in other areas of Brazil do not show better results in relational continuity for the PSF (Macinko *et al.* 2007, van Stralen *et al.* 2008). Some authors attribute these results to deficiencies in the implementation of primary care health policies in Brazil (da Silva and Fraccolli 2014), due to an inability to maintain stable jobs for doctors in the Family Health Units (USF), especially in the municipalities of the interior.

Morbidity: the most relevant individual factor influencing continuity of care

With regard to declared morbidity, results in both countries indicate that patients with poor self-rated health were less likely to report

that they had an ongoing relationship with doctors and that their care was consistent. Previous studies (Aller *et al.* 2013b, Deborah and Osheroff 2008), (Burgers *et al.* 2010, Gulliford *et al.* 2011) found a similar association, which might be due to the fact that individuals with worse health status are more likely to be more critical of the care they receive (Hewitson *et al.* 2014, Paddison *et al.* 2015). Furthermore, the more frequent use of emergency services among patients with worse health status, also found in the same areas (Garcia-Subirats *et al.* 2014c), could contribute to them perceiving greater discontinuity in their care. In contrast, having at least one chronic condition showed a positive association with continuity of information, and in Colombia, with the other dimensions of continuity too. Some previous studies found a similar association (Jatrana *et al.* 2011; Kristjansson *et al.* 2013). Although patients with chronic diseases are vulnerable to discontinuities in care because they interact frequently with health services (Gulliford *et al.* 2011), it may be precisely this greater contact with the health services (Garcia-Subirats *et al.* 2014c) that allows professionals to acquire accumulated knowledge on past events (Waibel *et al.* 2012), and patients to develop a closer relationship with their doctors than users with acute conditions. A similar interpretation could be made regarding the positive association found between the patient's age and their ongoing relationship with doctors.

Limitations of the study

With respect to the limitations of the study, the dichotomization of indexes to facilitate the interpretation of data could lead to some loss of information. Furthermore, the findings of this study, conducted in two municipalities of Colombia and Brazil, may not be generalizable to Brazil and Colombia as a whole. In this regard, the scarcity of previous studies in Colombia and Brazil aimed at a comprehensive understanding of the phenomenon of continuity of care makes it difficult to contrast the results with those from other studies.

Conclusion

The results of the study show discontinuities of care between care levels perceived by users, which points to deficiencies in care coordination in the studied networks of Colombia and Brazil. The associated factors to perception of continuity of care highlight certain aspects, such as the importance of staff stability to strengthen the doctor-patient relationship or the influence of patients' individual characteristics on continuity of care, which are points already made in the literature. Other less explored associations were also identified, such as the influence of consistency of health personnel on the perception of continuity across care levels, which seem particularly significant in settings where care provision is highly fragmented. Addressing discontinuities in care and associated factors requires the implementation of effective policies and interventions to improve coordination across care levels; for example, interventions aimed at ensuring the exchange of clinical information, such as the doctors' adequate use of referral and counter-referral forms. Labour reforms are also necessary to lend greater job stability to doctors, especially in Colombia. Both of these aspects—the exchange of clinical information between care levels and job stability—are key in order for doctors to be able to provide adequate care for their patients in the long term. Lastly, the results indicate the need for further research to determine what other organizational factors may determine differences in levels of continuity.

Ethical considerations

Ethics approval was obtained from the ethics committees in the participating countries: the National Committee of Research Ethics in Brazil; the Research Ethics Committee of the Health Sciences School at the University of Rosario in Colombia; the Institutional Review Board of the Institute of Tropical Medicine in Belgium; and the Clinical Research Ethics Committee of Parc de Salut Mar in Spain. All interviewees participated on a voluntary basis, after signing an informed consent. The right to refuse to participate or withdraw from the survey, anonymity and confidentiality were guaranteed, as was data protection.

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Appendix 1 Items included in the adapted and validated version of the CCAENA© in Colombia and Brazil, by type and dimension of continuity of care.

Type of Continuity	Care continuity scale	Attributes of continuity	Item
Relational continuity	Patient-PC doctor relationship	Trust between provider and patient	I have confidence in the professional ability of my PC doctor
			I feel comfortable consulting my PC doctor about my concerns and health problems
			I would recommend my PC doctor to my family and friends
Patient-SC doctor relationship	Effective Communication	Trust between provider and patient	The information my PC doctor gives me is sufficient
			I have confidence in the professional ability of the specialists treating me
			I feel comfortable consulting the specialists about my concerns and health problems
Informational continuity	Information transfer	Effective communication Knowledge of clinical history	I would recommend my specialists to my friends and family
			The information the specialists give me is sufficient
			My PC doctor is aware of the instructions given to me by the specialist before I explain them to him/her
Continuity of clinical management	Care coherence	Delivery of opportune and adequate information to patients Coherence of care across care levels Collaboration across care levels	The specialist is aware of the instructions given to me by my PC doctor before I explain them to him/her
			After seeing the specialist my PC doctor discusses the visit with me
			My PC doctor is in agreement with the specialist's instructions
			The specialists are in agreement with my PC doctor's instructions
			I think that my primary care doctor collaborates with the specialist to solve my health problems

CCAENA: Cuestionario Continuidad Asistencial Entre Niveles de Atención; Questionnaire of care continuity across levels of care; PC: primary care.

Appendix 2. Sociodemographic characteristics and perceived healthcare need of the study sample in the study areas of Colombia and Brazil (2011).

	People who usually go to the PC doctor		People who usually go to the specialists	
	Colombia (n = 1379) n (%)	Brazil (n = 1057) n (%)	Colombia (n = 809) n (%)	Brazil (n = 686) n (%)
Sex				
Male	388 (28.2)	266 (25.2)	231 (28.6)	144 (21.0)
Female	991 (71.9)	791 (74.8)	578 (71.5)	542 (79.0)
Age				
0–17	217 (15.7)	251 (23.8)	88 (10.9)	97 (14.1)
18–40	355 (25.7)	182 (17.2)	179 (22.1)	165 (24.1)
41–65	586 (42.5)	403 (38.1)	393 (48.6)	279 (40.7)
>65	221 (16.0)	221 (20.9)	149 (18.4)	145 (21.1)
Level of education				
None	223 (16.3)	351 (34.1)	131 (16.3)	211 (31.1)
Primary	530 (38.7)	321 (31.2)	300 (37.4)	206 (30.3)
Secondary	508 (37.1)	333 (32.3)	299 (37.2)	239 (35.2)
University	107 (7.8)	25 (2.4)	73 (9.1)	23 (3.4)
Per capita income				
< 1/2 MW	705 (51.1)	643 (60.8)	388 (48.0)	362 (52.8)
1/2–1 MW	419 (30.4)	335 (31.7)	226 (27.9)	255 (37.2)
> 1 MW	255 (18.5)	79 (7.5)	195 (24.1)	69 (10.1)
Private health plan				
Yes	23 (1.9)	81 (7.7)	18 (2.5)	60 (8.8)
No	1,195 (98.1)	976 (92.3)	699 (97.5)	626 (91.3)
SGSSS scheme				
Contributory and special	821 (62.9)		523 (67.6)	
Subsidized	390 (29.9)		198 (25.6)	
Uninsured	95 (7.3)		53 (6.9)	
Self-rated health*				
Good	831 (60.3)	397 (37.6)	454 (56.1)	241 (35.2)
Poor	548 (39.7)	659 (62.4)	355 (43.9)	444 (64.8)
Chronic condition				
No	893 (64.8)	536 (50.7)	454 (56.1)	316 (46.1)
Yes (at least one)	486 (35.2)	521 (49.3)	355 (43.9)	370 (53.9)
Municipality				
Kennedy	713 (51.7)		383 (47.3)	
Soacha	666 (48.3)		426 (52.7)	
Recife		619 (58.6)		422 (61.5)
Caruaru		438 (41.4)		264 (38.5)

MW: minimum wage per capita per month; SGSSS: General System of Social Security in Health; PC: primary care.

*Good: good or very good; poor: poor or very poor.