Assessing the impact of clinical coordination interventions on the continuity of care for patients with chronic conditions: participatory action research in five Latin American countries

Verónica Espinel-Flores [1], **Ingrid Vargas** [1,*], **Pamela Eguiguren** [2],
Amparo-Susana Mogollón-Pérez [3], **Marina Ferreira de Medeiros Mendes** [4],
Julieta López-Vázquez [5], **Fernando Bertolotto** [6] and **María Luisa Vázquez** [1] for Equity LA II

[1] Health Policy and Health Services Research Group, Health Policy Research Unit, Consortium for Health Care and Social Services of Catalonia, Avinguda Tibidabo 21, Barcelona ES08022, Spain
[2] Escuela de Salud Pública Dr. Salvador Allende Gossens, Universidad de Chile, Independencia, Santiago de Chile 939, Chile
[3] Escuela de Medicina y Ciencias de la Salud, Universidad del Rosario, Cra 24 No. 63C-69, Quinta Mutis, Bogotá 11001, Colombia
[4] Grupo de Estudos de Gestão e Avaliação em Saúde, Instituto de Medicina Integral Prof. Fernando Figueira, Rua Dos Coelhos No. 300, Boa Vista, Recife 50070-550, Brazil
[5] Instituto de Salud Pública, Universidad Veracruzana, Av. Dr. Luis Castelazo Ayala s/n Col. Industrial Ánimas, Xalapa, Veracruz 91190, Mexico
[6] Facultad de Enfermería, Universidad de la República, Avenida 18 de Julio 124, 11200, Montevideo, Uruguay

*Corresponding author. Health Policy and Health Services Research Group, Health Policy Research Unit, Consortium for Health Care and Social Services of Catalonia, Avinguda Tibidabo 21, Barcelona ES08022, Spain. E-mail: ivargas@consorci.org

Abstract

Although fragmentation in the provision of services is considered an obstacle to effective health care, there is scant evidence on the impact of interventions to improve care coordination between primary care and secondary care in terms of continuity of care—i.e. from the patient perspective—particularly in Latin America (LA). Within the framework of the Equity-LA II project, interventions to improve coordination across care levels were implemented in five Latin American countries (Brazil, Chile, Colombia, Mexico and Uruguay) through a participatory action research (PAR) process. This paper analyses the impact of these PAR interventions on the cross-level continuity of care of chronic patients in public healthcare networks. A quasi-experimental study was performed with measurements based on two surveys of a sample of patients with chronic conditions (392 per network; 800 per country). Both the baseline (2015) and evaluation (2017) surveys were conducted using the CCAENA questionnaire. In each country, two comparable public healthcare networks were selected, one intervention and one control. Outcomes were cross-level continuity of information and clinical management continuity. Descriptive analyses were conducted, and Poisson regression models with robust variance were fitted to estimate changes. With differences between countries, the results showed improvements in cross-level continuity of clinical information (transfer of clinical information) and clinical management continuity (care coherence). These results are consistent with those of previous studies on the effectiveness of the interventions implemented in each country in improving care coordination in Brazil, Chile and Colombia. Differences between countries are probably related to particular contextual factors and events that occurred during the implementation process. This supports the notion that certain context and process factors are needed to improve continuity of care. The results provide evidence that, although the interventions were designed to enhance care coordination and aimed at health professionals, patients report improvements in continuity of care.

Keywords: Continuity of care, continuity of information, care coherence, Latin America, participatory action research

Introduction

Achieving care coordination and, hence, continuity of care (CC) poses a challenge for many Latin American health systems, which are characterized by healthcare fragmentation. This is of growing concern (Mac Adam, 2008) due to demographic and epidemiological transitions, with an increase in the aging population and chronic conditions (Pan American Health Organization, 2010) requiring the coordination of multiple health professionals and care settings (Nolte and McKee, 2008). Despite the relevance of CC in terms of improving treatment adherence, reducing hospital admissions (Chen *et al.*, 2013), increasing quality of life (Plate *et al.*, 2018) and reducing mortality rates (Pereira Gray *et al.*, 2018), significant discontinuities between primary care (PC) and secondary care (SC) for patients with chronic conditions have been identified in many Latin American countries

---

> **Key messages**
>
> - PAR interventions for cross-level care coordination also improve care continuity.
> - Improvements in care continuity related to interventions differ across settings.
> - The right context and process factors are needed to improve care continuity.

(Vargas *et al.*, 2017; Ollé-Espluga *et al.*, 2020). These problems have been associated in part to the poor performance of PC in its role as coordinator of patient care (Doubova *et al.*, 2016) and other organizational factors (Macinko *et al.*, 2016; Ollé-Espluga *et al.*, 2020).

Whilst care coordination refers to the perspective of providers, CC implies the result of care coordination from the patients' perspective. CC is defined as the degree to which patients experience care over time as coherent and linked (Reid *et al.*, 2002). Three interrelated types of CC have been described: (1) continuity of information, patients' perception that information on past events and personal circumstances is shared and used by different providers; (2) continuity of clinical management, patients' perception of receiving different services in a coherent way; and (3) relational continuity, patients' perception of an ongoing therapeutic relationship with one or more providers. Continuity of information and clinical management can be analysed within or across levels of care referring to the interaction between providers, from the patient's viewpoint, whereas relational continuity can only be analysed in each care level separately, as it refers to patient–provider interaction (Reid *et al.*, 2002; Vargas *et al.*, 2017).

A number of interventions are being implemented to improve care coordination, which generally introduce different ways of organizing healthcare provision (such as care-management models or coordination mechanisms) that are expected to improve CC. However, evidence on the effectiveness of these interventions in improving CC is relatively limited. It comes predominantly from Europe (King *et al.*, 2009; Tammes *et al.*, 2019) and high-income countries (Skrutkowski *et al.*, 2008; Aubin *et al.*, 2012; Gabitova and Burke, 2014; Tremblay *et al.*, 2017), focuses on patients with a specific chronic condition (Uijen *et al.*, 2012), mainly cancer (Skrutkowski *et al.*, 2008; King *et al.*, 2009; Aubin *et al.*, 2012; Tremblay *et al.*, 2017), or on type of care, such as palliative care (Hudson *et al.*, 2019) or the elderly (Barker *et al.*, 2016; Tammes *et al.*, 2019), and all the interventions involved are intra-level.

Moreover, although these interventions aim to improve CC, only a few studies measure their impact on continuity, and these focus on intra-level relational continuity (King *et al.*, 2009; Tammes *et al.*, 2019), while most studies evaluate their impact on intermediate or final health outcomes (Skrutkowski *et al.*, 2008; King *et al.*, 2009) or other quality indicators, such as patient satisfaction (King *et al.*, 2009; Aubin *et al.*, 2012) or are insufficiently described, such as patient-reported experience (Tremblay *et al.*, 2017), making it difficult to understand their actual impact on any type of CC, particularly across levels. Apart from Tremblay (Tremblay *et al.*, 2017) and Uijen (Uijen *et al.*, 2012), none of the researchers used specific instruments to comprehensively measure results for continuity. In addition, the potential influence of the implementation process and context on intervention outcomes (Durlak and DuPre, 2008)—for instance, in such important aspects as the adaptation of the interventions to the contexts (Barker *et al.*, 2016; Tammes *et al.*, 2019)—is still neglected.

Many Latin American countries have also adopted strategies to achieve care coordination and improve related cross-level CC (Vargas *et al.*, 2015). Yet here, as elsewhere, these strategies are commonly designed top-down with little to no participation from professionals and no adaptation to the local context and thus are likely to be less effective in terms of adoption and sustainability over time (Blevins *et al.*, 2010). While in Latin America there is a long tradition of participatory action research (PAR) in the field of community health, its application in healthcare services is very limited (Mercado-Martínez *et al.*, 2018) and its potential to improve healthcare quality attributes, such as care coordination and CC, is yet unexplored.

This study is part of a wider research project, Equity-LA II (Vázquez *et al.*, 2015), aimed at evaluating the effectiveness of interventions, developed through a PAR process, in improving cross-level clinical coordination in health services networks of Brazil, Chile, Colombia, Mexico and Uruguay. The improvements in cross-level care coordination (primary results) were expected to influence the CC experienced by patients. The impact of the interventions on care coordination (Vargas *et al.*, 2020a; Vázquez *et al.*, 2021) and the implementation process (Vargas *et al.*, 2020b) have been comprehensively assessed from the health professionals' perspective and are complemented here by the analysis of CC from the patient perspective. The objective is to analyse the impact of PAR interventions to improve care coordination on CC for chronic patients in public healthcare networks of Latin America.

Methods

Study design

A quasi-experimental (controlled before-and-after) design, described elsewhere (Vázquez *et al.*, 2015), was adopted to evaluate the impact of PAR-based care coordination interventions on cross-level CC in the selected healthcare networks (HNs). Baseline and evaluation measures of CC were performed by means of a survey of chronic patients using the CCAENA questionnaire (Garcia-Subirats *et al.*, 2015; Ollé-Espluga *et al.*, 2020).

Study setting and intervention

Two comparable public HNs were selected in each country based on the following criteria: provision of a continuum of services, including at least PC and SC, to a defined population; mainly in urban areas of low or medium–low socioeconomic status; and willingness to participate. One network became the intervention (IN), and the other became the control (CN). The selected HNs were Brazil, district III and VII in Recife and the urban area of Caruarú; Chile, southern and northern area of Santiago, encompassing three districts each; Colombia, south-western and southern district networks of Bogotá; Mexico, municipal networks of Xalapa and Veracruz; and Uruguay, two networks of the western region, encompassing seven districts (Vázquez *et al.*, 2015).

In each country, the PAR process began with the establishment of a local steering committee to lead the design and implementation process, comprising relevant stakeholders, with the participation of a platform (working group) of professionals. The PAR process consisted of several phases: analysis of care coordination and CC problems in the network; selection of problems to address (limited cross-level communication and clinical agreement) and interventions to implement; and design and implementation (Vargas *et al.*, 2020a,b).

While the problems identified were similar, the implemented interventions differed slightly between countries (Vargas *et al.*, 2020a). The interventions were the following: (1) joint meetings between PC and SC doctors to discuss clinical cases and/or for ongoing training, in person in Brazil (mental health), Colombia (chronic diseases) and Mexico (maternal care and chronic diseases) and online in Chile (any condition); (2) offline virtual consultations between PC and SC doctors, via email in Brazil and via a digital platform in Mexico (chronic diseases); (3) the design (in cross-level joint meetings) and implementation of shared care guidelines for diabetes, in Brazil; (4) a strategy to promote the use of referral and reply letters, in Uruguay; and (5) an induction program developed to promote a common identity and shared vision in the HN, in Chile. The duration of the implementation varied according to each intervention. The interventions implemented in the study networks are summarized in Box 1.

Study population and sample

The study populations were residents of the study areas, aged over 18 years, who suffered at least one chronic condition and had used two care levels (PC and SC or emergency services) in the six months prior to survey for the same health condition.

The survey was conducted in PC centres and patients were selected by simple random sampling. The sample size was calculated taking into account the controlled before-and-after design of the study. A sample size of 392 patients per network (784 per country and year) was estimated to ensure detection of 10% variation in patients' perception of CC, between years and networks. It was calculated based on 80% statistical power ($\beta = 0.20$) and 95% confidence level ($\alpha = 0.05$) in a bilateral contrast.

Questionnaire

The CCAENA questionnaire® [*Cuestionario de Continuidad Asistencial Entre Niveles de Atención* in Spanish] was used to establish baseline and evaluation measures. This validated tool (available on www.equity-la.eu) was adapted to each context and translated into Portuguese in Brazil. Detailed information on the design, adaptation and validation of the questionnaire has already been published (Aller *et al.*, 2013; Garcia-Subirats *et al.*, 2015; Ollé-Espluga *et al.*, 2020). The questionnaire is divided into 11 sections: (1) patients' health conditions; from (2) to (5) most recent experience of CC in transitions between PC and outpatient SC or emergency services; (6) accessibility across care levels; (7) perception of cross-level CC of information (three items) and of clinical management (six items); (8) perception of relational continuity with PC and with SC doctors (three items each). The final sections refer to sociodemographic and insurance characteristics.

Data collection

Data was collected by specifically trained interviewers by means of face-to-face interviews in each country. Baseline data was collected from May 2015 to December 2015 and

---

Box 1. Description of the implemented interventions in the study networks

Network	Characteristics	Duration	Participants
Brazil	Joint discussions of clinical cases in mental health, face-to-face.	7 months	PC teams and psychiatrists
	Asynchronous virtual consultation between levels in mental health via email.	3 months	PC doctors and psychiatrists
	Diabetes shared care guidelines, created in nine sessions.	21 months	PC doctors, endocrinologists and other professionals
Chile	Joint virtual clinical conferences, discussion of clinical cases, referral criteria and follow-up, any condition.	13 months	PC and SC doctors and other professionals
	Induction program for working in network, 4 cross-level visits.	13 months	Professionals of both care levels, but focusing on those starting to work in the healthcare network
Colombia	Joint meetings for discussion of clinical cases and medical training, chronic diseases, face-to-face.	16 months	PC and SC doctors and other healthcare professionals
Mexico	Joint training sessions, based on clinical cases, maternal and perinatal care and chronic diseases, face-to-face.	6 months	PC and SC doctors
	Cross level asynchronous virtual communication system for chronic diseases and maternal and perinatal care via digital platform, and clinical protocols/guidelines repository.	14 months	PC and SC doctors
Uruguay	Strategy to promote use of referral/counter-referral form.	7 months	PC and SC doctors and other professionals

PC—Primary care; SC—Secondary care.
More details on the characteristics of each intervention in: http://www.equity-la.eu/en/publicaciones.php?t=PR.

evaluation data from November 2017 to January 2018. Strategies to ensure the quality and consistency of data included supervision of interviewers in the field, review of all questionnaires, re-interviewing of 20% of randomly selected participants and double-entry method to control inconsistencies during data entry. As patient registers were unavailable in some of the networks studied, all patients waiting in doctors' waiting rooms, reception and clinical laboratory areas of the networks' PC centres were approached. Only patients meeting the inclusion criteria were interviewed.

Variables

The selected outcome variables were those items related to patients' experience and perception of cross-level care continuity in which changes could be expected as a consequence of the interventions (Table 2):

- *Continuity of clinical information*: experience of transfer of clinical information in every transition between PC and outpatient SC (five questions on the most recent experience) and perception of continuity of information (three items).
- *Clinical management continuity:* care coherence across levels of care (four questions) and perception of clinical management continuity (four items).

The explanatory variables were those potentially associated with changes in continuity across levels of care and that were not susceptible to being affected by the interventions (Table 1): (1) sociodemographic: sex, age, level of education; (2) morbidity: number of chronic diseases according to O'Halloran's classification (O'Halloran *et al.*, 2004); (3) use of out-of-network services; and (4) consistency of personnel in PC and SC.

Analysis

Firstly, a descriptive analysis stratified by country, network and year was carried out. Bivariate analyses using the Chi-squared test were conducted to identify significant differences in outcomes and explanatory variables between baseline (2015) and evaluation (2017) results in the IN and CN of each country. Secondly, to analyse the impact of the interventions, prevalence ratios (PRs) with 95% confidence intervals (CI95%) were estimated through Poisson regression models with robust variance to compare changes in the outcome variables between 2015 and 2017 in each network and also to compare the results of the IN with the CN at baseline and evaluation. To control possible changes that were not related to the interventions, models were adjusted for all the explanatory variables. All analyses were performed using Data Analysis and Statistical Software (STATA), version 15 (StataCorp LLC, 2017).

Ethical considerations

Ethical approval was obtained from ethics committees in the participating countries. All interviewees participated on a voluntary basis after signing an informed consent. The right to refuse to participate or withdraw from the survey, anonymity, confidentiality and protection of data were all guaranteed.

Results

In this section, to facilitate description, country names are used to refer to the IN results in 2017; unless the CN or baseline study (2015) are specified.

Sample characteristics

In the INs in 2017, the majority of participants was women (66.6% in Chile to 81.8% in Colombia). The most common age bracket was 40–64 years in Brazil (59.5%), Mexico (55.0%), Uruguay (55.1%) and over 65 in Chile (56.6%), while in Colombia, there was a more even distribution across these age groups. In all countries, the education level of the sample was low, with the majority having no studies/incomplete primary or primary education, except for Chile where there was a more even distribution across levels of education. In terms of morbidity, the majority suffered from two or more chronic diseases (73.8% in Colombia to 85.2% in Brazil). The majority, despite differences across countries, made no use of out-of-network services (58.3% in Mexico to 93.7% in Uruguay) and reported consistency of doctors in PC (53.7% in Chile to 91.4% in Brazil) and in SC (Chile, 58.4%, to 93.4% in Uruguay), except for Colombia (38.8%) (Table 1).

There were some differences between the 2015 and 2017 samples. In Uruguay, the proportion of female patients of age groups 18–39 and 40–64 years with primary education was higher in 2017. The proportion of patients suffering two or more chronic conditions increased in Brazil (66.2% in 2015 to 85.2% in 2017) and Colombia (60.6% in 2015 to 73.8% in 2017) and decreased in Uruguay (48.9% in 2015 to 39.7% in 2017). Moreover, the percentage of patients that made use of out-of-network services increased in Colombia (5.6% in 2015 to 27.0% in 2017) and decreased in Mexico (55.1% in 2015 to 41.7% in 2017). An increase in the reported consistency of SC doctors was observed in Chile (52.8% in 2015 to 58.4% in 2017) and Mexico (54.9% in 2015 to 79.1% in 2017), but it decreased in Brazil (65.9% in 2015 to 62.4% in 2017) and Colombia (48.2% in 2015 to 38.8% in 2017).

Changes in perception and experience of cross-level continuity of care
Continuity of clinical information

Continuity of information regarding the exchange of clinical information between PC and SC doctors increased in Brazil, Chile, Mexico and Colombia in comparison with the CN, with differences across countries, Brazil being the country that showed most improvement (Table 2). With regard to perceptions of information transfer, Brazil showed an increase in patients reporting PC doctors' awareness of the diagnosis, treatment and recommendations given by the specialists (aPR = 1.4; 95% CI: 1.2–1.6), and Mexico in specialists' awareness of the diagnosis, treatment and recommendations given by the PC doctor (aPR = 1.3; 95% CI: 1.1–1.6). In Mexico, however, when compared to the CN these differences were also observed in the control network and they were similar to the baseline (Table 2).

With regard to experience of information exchange in transitions across care levels, in Brazil, there was an increase in the proportion of patients reporting that their PC doctor was aware of the instructions given by the specialists before explaining it to them (aPR = 1.5; 95% CI: 1.2–1.9)

Table 1. Distribution of the characteristics of the sample of patients with chronic conditions in the intervention network, by country. CCAENA 2015–2017

Variables	Brazil		Chile		Colombia		Mexico		Uruguay	
	2015 (n = 396)	2017 (n = 420)	2015 (n = 445)	2017 (n = 449)	2015 (n = 396)	2017 (n = 400)	2015 (n = 392)	2017 (n = 393)	2015 (n = 448)	2017 (n = 396)
	n (%)		n (%)		n (%)		n (%)		n (%)	
Sex										
Female	328 (82.8)	342 (81.4)	311 (69.9)	299 (66.6)	308 (77.8)	327 (81.8)	297 (75.8)	313 (79.6)	322 (71.9)	317 (80.0)**
Male	68 (17.2)	78 (18.6)	134 (30.1)	150 (33.4)	88 (22.2)	73 (18.3)	95 (24.2)	80 (20.4)	126 (28.1)	79 (20.0)**
Age										
18–39	70 (17.7)	70 (16.7)	14 (3.2)	16 (3.6)	14 (3.5)	15 (3.8)	46 (11.7)	64 (16.3)	22 (4.9)	41 (10.4)**
40–64	237 (59.9)	250 (59.5)	183 (41.1)	179 (39.9)	177 (44.7)	187 (46.8)	233 (59.4)	216 (55.0)	212 (47.3)	218 (55.1)**
65 or over	87 (22.0)	97 (23.1)	248 (55.7)	254 (56.6)	205 (51.8)	198 (49.5)	113 (28.8)	113 (28.8)	212 (47.3)	137 (34.6)**
Level of education										
No studies or incomplete primary	178 (45.0)	208 (49.5)	118 (26.5)	161 (35.9)	190 (48.0)	181 (45.3)	178 (45.4)	152 (38.7)*	137 (30.6)	65 (16.4)**
Complete primary	153 (38.6)	145 (34.5)	140 (31.5)	147 (32.7)	165 (41.7)	165 (41.3)	163 (41.6)	156 (39.7)*	231 (51.6)	257 (64.9)**
Secondary and further	62 (15.7)	65 (15.5)	182 (40.9)	139 (31.0)	40 (10.1)	53 (13.3)	51 (13.0)	84 (21.4)*	80 (17.9)	73 (18.4)**
Number of chronic diseases										
One	134 (33.8)	62 (14.8)**	77 (17.3)	89 (19.8)	156 (39.4)	105 (26.3)**	205 (52.3)	171 (43.5)**	229 (51.1)	207 (52.3)**
Two or more	262 (66.2)	358 (85.2)**	368 (82.7)	356 (79.3)	240 (60.6)	295 (73.8)**	187 (47.7)	189 (48.1)**	219 (48.9)	157 (39.7)**
Use of out-of-network services										
Yes	57 (14.4)	76 (18.1)	139 (31.2)	123 (27.4)	22 (5.6)	108 (27.0)**	216 (55.1)	164 (41.7)**	24 (5.4)	20 (5.1)
No	339 (85.6)	344 (81.9)	306 (68.8)	326 (72.6)	374 (94.4)	290 (72.5)**	176 (44.9)	229 (58.3)**	423 (94.4)	371 (93.7)
Consistency of PC and SC doctors										
When I make an appointment with the PC doctor, the same doctor attends to me.	365 (92.2)	384 (91.4)	228 (51.2)	241 (53.7)	238 (60.1)	261 (65.3)	346 (88.3)	345 (87.8)	403 (90.0)	354 (89.4)
When I make an appointment with the specialist, the same doctor attends to me.	261 (65.9)	262 (62.4)**	235 (52.8)	262 (58.4)*	191 (48.2)	155 (38.8)**	215 (54.9)	311 (79.1)**	412 (92.0)	370 (93.4)

*P-value < 0.05;
**P-value < 0.01.
The total of each variable does not coincide because of missing values. The percentages are calculated referring to the number of patients answering each question, including the missing values.

Table 2. Changes in the perceptions and experiences of continuity of care between years in the intervention and control network, by country. CCAENA 2015–2017

Variables	Brazil IN 2017/2015 aPR (CI 95%)[a]	Brazil CN 2017/2015 aPR (CI 95%)[a]	Chile IN 2017/2015 aPR (CI 95%)[a]	Chile CN 2017/2015 aPR (CI 95%)[a]	Colombia IN 2017/2015 aPR (CI 95%)[a]	Colombia CN 2017/2015 aPR (CI 95%)[a]	Mexico IN 2017/2015 aPR (CI 95%)[a]	Mexico CN 2017/2015 aPR (CI 95%)[a]	Uruguay IN 2017/2015 aPR (CI 95%)[a]	Uruguay CN 2017/2015 aPR (CI 95%)[a]
Transfer of clinical information across levels of care										
Perception of continuity (scale):										
The PC doctor was aware of the diagnosis, treatment and recommendations given to me by the specialist.	**1.4 (1.2–1.6)**	1.1 (0.9–1.3)	1.0 (0.9–1.1)	1.1 (0.9–1.3)	0.9 (0.8–1.0)	**1.4 (1.3–1.6)**	1.1 (1.0–1.3)	1.0 (0.9–1.1)	**0.8 (0.7–0.9)**	**0.8 (0.7–0.9)**
The PC doctor asked me about any appointments I've had with specialists.	1.1 (0.9–1.3)	0.9 (0.8–1.0)	1.0 (0.9–1.2)	1.0 (0.8–1.1)	0.9 (0.8–1.0)	1.1 (1.0–1.2)	1.0 (0.9–1.1)	1.0 (0.9–1.1)	**0.9 (0.8–0.9)**	**0.8 (0.7 – 0.9)**
The specialists were aware of the diagnosis, treatment and recommendations given to me by the PC doctor.	1.2 (1.0–1.5)	1.2 (1.0–1.5)	1.0 (0.9–1.1)	1.1 (0.9–1.3)	0.9 (0.8–1.0)	**1.4 (1.2–1.7)**	**1.3 (1.1–1.6)**	**1.2 (1.1–1.4)**	**0.8 (0.7–0.9)**	**0.8 (0.7–0.9)**
Experience of continuity										
Transition from SC to PC doctor										
The PC doctor was aware of the instructions given to me by the specialist before I explained them to him/her.	**1.5 (1.2–1.9)**	1.2 (0.9–1.5)	0.8 (0.7–1.0)	0.8 (0.7–1.1)	0.9 (0.8–1.1)	**2.0 (1.6–2.4)**	1.2 (1.0–1.4)	1.1 (0.9–1.2)	1.0 (0.9–1.1)	1.0 (0.9–1.1)
The specialists delivered a clinical report for the PC doctor.	1.3 (0.9–1.9)	0.8 (0.8–0.9)	**1.3 (1.1–1.7)**	1.0 (0.7–1.2)	0.8 (0.6–1.1)	**3.4 (2.3–4.9)**	0.9 (0.8–1.2)	0.8 (0.7–1.0)	**0.6 (0.5–0.7)**	1.1 (0.9–1.3)
Transition from PC to SC doctor										
The PC doctor gave me a clinical report for the specialist.	1.1 (1.0–1.3)	0.8 (0.8–0.9)	1.0 (0.9–1.1)	0.9 (0.8–1.0)	0.9 (0.8–1.1)	0.9 (0.8–1.0)	1.0 (0.9–1.0)	1.0 (0.9–1.1)	**0.7 (0.6–0.9)**	1.1 (0.9–1.2)
The specialists were aware of my clinical records with the PC doctor before I explained them to him/her.	**2.0 (1.4–3.0)**	0.9 (0.7–1.1)	1.0 (0.8–1.2)	1.0 (0.8–1.4)	1.1 (0.9–1.3)	**1.5 (1.3–1.8)**	**1.3 (1.1–1.7)**	**1.5 (1.2–1.8)**	1.0 (0.9–1.1)	0.9 (0.8–1.0)
The specialists were aware of the reasons why the PC doctor made the referral for consultation before I explained them to him/her.	**2.1 (1.5–3.0)**	0.7 (0.6–1.0)	0.9 (0.8–1.1)	0.9 (0.8–1.2)	0.9 (0.8–1.2)	**1.3 (1.1–1.7)**	1.0 (0.8–1.2)	**1.5 (1.2–1.8)**	0.9 (0.7–1.0)	1.0 (0.9–1.2)
Care coherence across levels of care										
Perception of continuity (scale):										
The PC doctor was in agreement with the diagnosis, treatment and recommendations given to me by the specialists.	1.0 (0.9–1.1)	0.9 (0.9–1.0)	1.1 (1.0–1.2)	1.0 (0.9–1.1)	0.9 (0.9–1.0)	**1.1 (1.1–1.2)**	1.1 (1.0–1.1)	1.0 (0.9–1.1)	1.0 (0.9–1.1)	1.0 (0.9–1.0)
The specialists were in agreement with the diagnosis, treatment and recommendations given to me by the PC doctor.	1.0 (0.9–1.1)	0.9 (0.8–1.0)	**1.3 (1.2–1.4)**	1.0 (0.9–1.1)	0.9 (0.8–1.0)	**1.2 (1.1–1.3)**	1.1 (1.0–1.2)	1.0 (0.9–1.0)	1.0 (0.9–1.0)	0.9 (0.9–1.0)
The PC and specialist doctors collaborate to solve my health problems	**1.8 (1.5–2.1)**	**2.6 (2.0–3.4)**	1.1 (1.0–1.3)	1.1 (1.0–1.3)	1.1 (1.0–1.3)	**1.9 (1.5–2.3)**	1.0 (0.9–1.1)	1.1 (1.0–1.2)	1.0 (0.9–1.0)	0.9 (0.9–1.0)
The PC doctor sent me to the specialist whenever I needed a consultation.	1.0 (0.9–1.0)	1.0 (0.9–1.0)	1.1 (1.0–1.2)	1.0 (0.9–1.1)	1.0 (0.9–1.0)	1.0 (0.9–1.0)	1.0 (0.9–1.0)	1.0 (0.9–1.0)	0.9 (0.9–1.0)	1.0 (0.9–1.0)
Experience of continuity										
Transition from SC to PC doctor										
The PC doctor repeated medical exam(s) already carried out by the specialist.	1.1 (1.0–1.2)	1.0 (0.9–1.1)	1.0 (0.9–1.2)	1.2 (1.0–1.4)	1.1 (1.0–1.2)	1.0 (0.9–1.1)	0.9 (0.8–1.1)	1.0 (0.9–1.1)	**1.2 (1.1–1.4)**	0.9 (0.8–1.0)
I visited the PC doctor because I was counter-referred by the specialist.	1.2 (0.9–1.7)	**3.3 (2.4–4.7)**	1.1 (0.9–1.3)	0.7 (0.6–0.9)	0.9 (0.7–1.2)	**1.6 (1.1–2.4)**	1.0 (0.8–1.1)	**1.4 (1.2–1.8)**	**0.6 (0.4–0.8)**	**0.6 (0.5–0.8)**
Transition from PC to SC doctor										
The PC doctor referred me to the specialist.	**1.2 (1.1–1.3)**	1.0 (0.9–1.1)	1.1 (1.0–1.2)	1.0 (0.9–1.1)	0.9 (0.8–1.0)	1.0 (0.9–1.0)	1.0 (0.9–1.0)	1.0 (0.9–1.0)	0.9 (0.8–1.0)	1.0 (0.9–1.1)
The specialist referred me back to the PC doctor after consultation with him/her.	**1.9 (1.4–2.8)**	**1.3 (1.1–1.6)**	0.8 (0.6–1.1)	1.3 (0.9–1.9)	0.8 (0.5–1.1)	1.4 (0.9–2.1)	1.1 (0.9–1.4)	0.9 (0.7–1.1)	**0.5 (0.4–0.8)**	**0.4 (0.3–0.5)**

aPR: adjusted prevalence ratio; prevalence ratio of 2017 vs 2017 for each network; all models are adjusted for sex, age, level of education, number of chronic diseases and consistency of health personnel in PC and SC.

[a]Valid *n* and percentage of respondents perceiving and experiencing high levels of continuity of care in each item.

and that the specialists were aware of their clinical records with the PC doctor (aPR = 2.0; 95% CI: 1.4–3.0), and of the reason why the PC doctor referred the patient for consultation before explaining it (aPR = 2.1; 95% CI: 1.5–3.0). Likewise, in Chile, there was an increase in patients reporting that the specialist delivered a clinical report for the PC doctor (aPR = 1.3; 95% CI: 1.1–1.7) (Table 2). Compared with the CN, a higher proportion of patients in the IN in Colombia reported the PC doctor's delivery of a clinical report for the SC doctor (aPR = 1.2; 95% CI: 1.1–1.4), in contrast to the baseline, where no differences were observed (Table 3).

Continuity of clinical management: care coherence across levels

Care coherence-related improvements in the perception and experience of clinical management continuity occurred in Brazil, Chile and Uruguay. Changes in perception were observed only in Chile, where there was an increase in patients reporting that the specialists were in agreement with the diagnosis, treatments and recommendations given by the PC doctor (aPR = 1.3; 95% CI: 1.2–1.4).

In terms of experience of care coherence, Brazil showed an increase in patients who reported being referred to the specialist by the PC doctor (aPR = 1.2; 95% CI: 1.1–1.3) and vice versa, in those who reported being referred to the PC doctor by the specialist (aPR = 1.9; 95% CI: 1.4–2.8). In Chile, compared with the CN, the proportion of patients that reported being counter-referred to the PC doctor by the specialist was higher (aPR = 1.4; 95% CI: 1.1–1.7), unlike the baseline, where there were no differences (Table 3). Finally, in Uruguay, the proportion of patients reporting that PC doctors did not repeat medical exams already carried out by the specialists increased (aPR = 1.2; 95% CI: 1.1–1.4) (Table 2).

Discussion

Tackling healthcare fragmentation is a priority for LA health systems, yet evidence on the extent to which improving care coordination can account for patients experiencing better CC, particularly cross-level continuity, is inexistent to the best of our knowledge. The limited evidence available on care coordination interventions expected to improve continuity evaluates their impact on intermediate or final outcomes (Skrutkowski *et al.*, 2008; King *et al.*, 2009; Aubin *et al.*, 2012), and very few studies (Uijen *et al.*, 2012; Tremblay *et al.*, 2017) measure any type of continuity using a comprehensive instrument from the patient's perspective. This study conducts a comprehensive comparative analysis using a validated and adapted tool (CCAENA questionnaire) to provide evidence on the impact of PAR interventions to enhance care coordination on cross-level CC from the chronic patient's perspective.

In all five INs, patients reported improvements in cross-level CC after implementation of the PAR interventions that are consistent with the improvements in care coordination identified and attributed to the interventions by doctors (Vázquez *et al.*, 2021) and other participants (Vargas *et al.*, 2020a,b), albeit with differences across countries. The most noteworthy changes occurred in continuity of information in Brazil, followed by the improvements in Chile and to a lesser extent in Mexico and Colombia, and clinical management continuity increased in Brazil, Chile and Uruguay. Both are important improvements on the discontinuities previously observed in these countries (Ollé-Espluga *et al.*, 2020). As part of a larger study, these results add evidence to support the analysis of the effectiveness of the implemented PAR interventions on care coordination (Vargas *et al.*, 2020a; Vázquez *et al.*, 2021).

Improvements in cross-level CC: the connection with care coordination enhancement and PAR interventions.

In all countries, patients reported improvements in cross-level CC and these were consistent with those reported by doctors in their experience of cross-level coordination, both for clinical information exchange and clinical management coordination and for influencing factors. The results are also in keeping with the implemented interventions based on joint clinical meetings, which aimed to improve communication and clinical agreement between PC and SC doctors, the main problems cited by doctors (Vázquez *et al.*, 2017) and perceived by patients (Ollé-Espluga *et al.*, 2020) at baseline.

Regarding cross-level continuity of information, the reported exchange of clinical information between PC and SC doctors increased in all countries except Uruguay (in the case of Colombia, only in comparison with the CN). Patients' perception of better transfer of clinical information, mainly in Brazil and Chile, is consistent with the enhanced cross-level exchange of clinical information reported by doctors (Vázquez *et al.*, 2021) and improved communication between PC and SC doctors due to joint meetings (Vargas *et al.*, 2020a).

The increase in patients' perceptions of care coherence across levels in Chile with regard to the SC doctor's agreement with the diagnosis, treatments and recommendations given by the PC doctor and being referred by the SC doctor back to the PC doctors when necessary, is also in keeping with doctors' reported improvements in clinical management coordination, particularly in terms of the adequacy of patient follow-up (Vázquez *et al.*, 2021), and also with the improved clinical agreement between doctors and appropriateness of referrals to SC as a result of the joint meetings (Vargas *et al.*, 2020a). According to informants in the qualitative evaluation of the interventions in the Chile IN, virtual joint meetings enhanced agreement on the management of complex clinical cases, waiting lists and referral criteria and reduced unnecessary referrals to SC as PC's capacity to resolve cases was strengthened. In Uruguay, patients' reports that medical exams already done by the specialist were not repeated in PC are in line with doctors reporting lower test repetition (although not statistically significant) and increased agreement over treatments prescribed by the other care level (Vázquez *et al.*, 2021).

Another noteworthy finding was that improvements in CC reported by patients are consistent with the expected impact of the interventions implemented in each network, particularly with the **joint meetings**. Although the current evidence on the effectiveness of care coordination interventions in improving CC is limited and difficult to compare with our results, it does however corroborate that continuity of clinical information is improved when care coordination strategies include spaces in which professionals can share patients' clinical information (Tremblay *et al.*, 2017). In line with this, a qualitative study analysing CC in HNs in Spain found that patients perceived that face-to-face meetings of professionals of both care levels

Table 3. Differences in perceptions and experiences of high levels of continuity of care between the intervention and control network, by country and year. CCAENA 2015–2017

Variables	Brazil		Chile		Colombia		Mexico		Uruguay	
	IN vs CN 2017 aPR (CI 95%)[a]	IN vs CN 2015 aPR (CI 95%)[a]	IN vs CN 2017 aPR (CI 95%)[a]	IN vs CN 2015 aPR (CI 95%)[a]	IN vs CN 2017 aPR (CI 95%)[a]	IN vs CN 2015 aPR (CI 95%)[a]	IN vs CN 2017 aPR (CI 95%)[a]	IN vs CN 2015 aPR (CI 95%)[a]	IN vs CN 2017 aPR (CI 95%)[a]	IN vs CN 2015 aPR (CI 95%)[a]
Transfer of clinical information across levels of care										
Perception of continuity (scale):										
The PC doctor was aware of the diagnosis, treatment and recommendations given to me by the specialist.	**1.2 (1.1–1.4)**	1.0 (0.8–1.2)	**1.2 (1.1–1.4)**	1.3 (1.1–1.5)	0.9 (0.8–1.0)	**1.4 (1.2–1.6)**	**0.8 (0.7–0.9)**	**0.7 (0.7–0.8)**	1.0 (0.9–1.1)	0.9 (0.9–1.0)
The PC doctor asked me about any appointments I've had with specialists.	1.0 (0.9–1.2)	**1.4 (1.2–1.6)**	1.0 (0.9–1.2)	1.0 (0.8–1.1)	**0.8 (0.7–0.9)**	1.1 (1.0–1.2)	0.9 (0.9–1.0)	0.9 (0.9–1.0)	0.9 (0.9–1.0)	0.9 (0.8–1.0)
The specialists were aware of the diagnosis, treatment and recommendations given to me by the PC doctor.	0.9 (0.8–1.1)	1.0 (0.8–1.2)	**1.4 (1.2–1.6)**	1.2 (1.0–1.4)	0.9 (0.8–1.0)	**1.4 (1.2–1.7)**	0.9 (0.7–1.0)	**0.8 (0.6–0.9)**	1.0 (0.9–1.1)	0.9 (0.9–1.0)
Experience of continuity										
Transition from SC to PC doctor										
The PC doctor was aware of the instructions given to me by the specialist before I explained them to him/her.	**1.3 (1.1–1.6)**	0.9 (0.7–1.2)	1.1 (0.9–1.4)	1.2 (0.9–1.4)	**0.7 (0.6–0.9)**	**1.6 (1.3–2.0)**	**0.8 (0.7–1.0)**	0.8 (0.7–1.0)	1.0 (0.9–1.1)	1.0 (0.9–1.1)
The specialists delivered a clinical report for the PC doctor.	**0.5 (0.4–0.7)**	1.3 (0.8–2.1)	1.2 (1.0–1.5)	0.8 (0.7–1.1)	**0.7 (0.5–0.9)**	**2.9 (2.0–4.3)**	0.9 (0.7–1.1)	**0.8 (0.6–0.9)**	**0.7 (0.5–0.9)**	1.2 (1.0–1.5)
Transition from PC to SC doctor										
The PC doctor gave me a clinical report for the specialist.	1.1 (1.0–1.2)	**0.8 (0.7–0.9)**	0.9 (0.8–1.1)	0.9 (0.8–1.0)	1.1 (1.0–1.2)	1.1 (1.0–1.2)	1.1 (1.0–1.1)	1.1 (1.0–1.4)	0.9 (0.7–1.0)	1.2 (1.0–1.4)
The specialists were aware of my clinical records with the PC doctor before I explained them to him/her.	1.2 (1.0–1.6)	**0.5 (0.4–0.8)**	**1.4 (1.1–1.9)**	**1.6 (1.2–2.0)**	**0.8 (0.7–0.9)**	1.2 (1.0–1.4)	**0.7 (0.6–0.9)**	0.8 (0.7–1.1)	1.1 (1.0–1.2)	1.0 (0.9–1.0)
The specialists were aware of the reasons why the PC doctor made the referral for consultation before I explained them to him/her.	**1.5 (1.2–1.9)**	**0.5 (0.4–0.8)**	1.2 (0.9–1.4)	1.2 (1.0–1.4)	0.9 (0.7–1.1)	**1.3 (1.1–1.7)**	**0.7 (0.6–0.9)**	1.1 (0.9–1.3)	1.0 (0.8–1.1)	1.1 (0.9–1.2)
Care coherence across levels of care										
Perception of continuity (scale):										
The PC doctor was in agreement with the diagnosis, treatment and recommendations given to me by the specialists.	1.0 (0.9–1.1)	0.9 (0.8–1.0)	1.0 (0.9–1.1)	0.9 (0.8–1.0)	0.9 (0.9–1.0)	1.1 (1.0–1.2)	1.0 (0.9–1.1)	1.0 (0.9–1.1)	1.0 (1.0–1.1)	1.0 (0.9–1.0)
The specialists were in agreement with the diagnosis, treatment and recommendations given to me by the PC doctor.	1.0 (0.9–1.1)	0.9 (0.8–1.0)	1.1 (1.0–1.2)	0.9 (0.8–1.0)	0.9 (0.8–1.0)	1.1 (1.0–1.2)	1.0 (0.9–1.2)	1.0 (0.9–1.1)	1.0 (1.0–1.1)	1.0 (0.9–1.0)
The PC and specialist doctors collaborate to solve my health problems.	**1.2 (1.1–1.4)**	**1.7 (1.3–2.4)**	1.1 (1.0–1.2)	1.1 (0.9–1.3)	0.9 (0.8–1.0)	**1.5 (1.2–1.8)**	1.0 (0.9–1.1)	1.0 (0.9–1.1)	1.0 (0.9–1.0)	1.0 (1.0–1.0)
The PC doctor sent me to the specialist whenever I needed a consultation.	1.0 (0.9–1.0)	1.0 (0.9–1.0)	1.0 (0.9–1.1)	1.0 (0.9–1.0)	1.0 (0.9–1.0)	1.0 (0.9–1.0)	1.0 (0.9–1.0)	1.0 (0.9–1.0)	1.0 (0.9–1.0)	1.0 (0.9–1.0)
Experience of continuity										
Transition from SC to PC doctor										
The PC doctor repeated medical exam(s) already carried out by the specialist.	1.0 (0.9–1.1)	1.0 (0.9–1.1)	1.0 (0.80–1.1)	1.1 (0.9–1.3)	0.9 (0.9–1.0)	1.1 (1.0–1.2)	1.1 (1.0–1.2)	1.1 (1.0–1.2)	1.1 (1.0–1.3)	0.8 (0.8–1.0)
I visited the PC doctor because I was counter-referred by the specialist.	**0.6 (0.4–0.7)**	1.5 (1.0–2.3)	**1.4 (1.1–1.7)**	1.2 (0.8–1.1)	1.2 (0.8–1.7)	**2.4 (1.7–3.5)**	1.0 (0.9–1.2)	**1.6 (1.3–1.9)**	0.8 (0.6–1.2)	0.9 (0.8–1.1)
Transition from PC to SC doctor										
The PC doctor referred me to the specialist.	1.0 (0.9–1.1)	0.9 (0.8–1.0)	1.1 (1.0–1.2)	1.0 (0.9–1.1)	1.0 (0.9–1.0)	1.0 (1.0–1.1)	1.0 (0.9–1.1)	1.0 (0.9–1.0)	0.9 (0.9–1.0)	1.0 (1.0–1.1)
The specialist referred me back to the PC doctor after consultation with him/her.	0.8 (0.6–1.0)	**0.5 (0.3–0.7)**	0.9 (0.6–1.3)	1.4 (1.0–1.9)	1.1 (0.8–1.6)	**2.1 (1.4–3.0)**	1.1 (0.7–1.6)	**0.7 (0.6–0.9)**	1.1 (0.7–1.6)	**0.7 (0.5–0.9)**

aPR: adjusted prevalence ratio; prevalence ratio of intervention network vs control network; all models are adjusted for sex, age, level of education, number of chronic diseases and consistency of health personnel in PC and SC.

[a]Valid *n* and percentage of respondents perceiving and experiencing high levels of continuity of care in each item.

led to mutual knowledge, thus improving consistency of care (e.g. facilitating referrals to SC) (Waibel *et al.*, 2016).

Differences with regard to doctors' experiences and across countries: the role of time, content, context and process for interventions to improve care coordination.

While not all improvements perceived by patients could be associated with improvements reported by doctors, the contrary is also true: not all improvements reported by doctors were reflected from the patient's perspective. Whereas only patients in Chile reported improvement in specialists agreeing with the PC doctor, doctors from Brazil, Colombia and Uruguay did experience an enhancement in this attribute while patients did not. One possible explanation is that the level of agreement on treatments perceived by patients was already high at the baseline (Ollé-Espluga *et al.*, 2020), and thus, it was more difficult to perceive an increase. In fact, baseline results were worse (disagreement was greater) in Chile, precisely in the network in which an improvement was reported by patients. Likewise, while results from the qualitative evaluation reported an increased willingness to collaborate and find joint care strategies among participants (Vargas *et al.*, 2020a), patients' perception that doctors from both care levels collaborated to solve their health problems showed no changes. Perhaps these differences between patients' and doctors' perceptions are reflecting quality gaps related to poor care coordination yet to be tackled, as patients are more susceptible to detecting these types of problems in their care (Maeng *et al.*, 2012; Ollé-Espluga *et al.*, 2020).

There are other potential explanations for these results. Given that the interventions were aimed at doctors, and reached only a part of the doctors in the networks, it is possible that the interventions simply needed more time and greater network penetration for a higher proportion of patients to perceive changes in their care management. Furthermore, the lower participation rates of SC doctors in all countries but Chile may have limited potential improvements in cross-level continuity of clinical management (Vargas *et al.*, 2020b).

In terms of differences across countries, the interventions were introduced through slightly different processes, which might have influenced the results. Moreover, certain context or process factors (political context, organizational factors and levels of institutional support) were important determinants of the implementation process, as they either hindered or favoured the uptake of the interventions. These varied across countries (Vargas *et al.*, 2020b) and must be taken into consideration in our interpretation of the results for CC. In this regard, it is plausible that the scarcity of changes in both information and clinical management continuity reported by patients in the Colombia and Uruguay INs may in part be the result of unfavourable influencing factors. In Colombia, inadequate working conditions, slow and challenging implementation of the intervention and reforms in the district networks introduced by the Bogotá Health Department (León-Arce *et al.*, 2021), and in Uruguay, weak institutional support, lack of referral forms in some centres and limited penetration of the intervention (Vargas *et al.*, 2020a).

Limitations

This study has **limitations** to consider. The time window for the implementation was short (3–21 months (Vargas *et al.*, 2020b)) in almost all countries. Given that the interventions were aimed at doctors, this may not have been long enough for patients to perceive changes in CC. Another interrelated limitation arising from the quasi-experimental design—in that the evaluation process consisted of only two measurements, baseline and post-intervention—is that the interventions could be susceptible to the effects of history (effect of external events on study outcomes) and maturation (effect of the passage of time on subjects) (Robson *et al.*, 2001; Gasparrini and Lopez Bernal, 2015), which may have influenced the results observed for selected outcomes. Nevertheless, these measurements give us a sense of the pattern of variability over time between the baseline and the 'after' measurement (Robson *et al.*, 2001). Besides, the analyses included variables potentially associated with changes in cross-level CC and not susceptible to being affected by the interventions. Moreover, this study is embedded in a more extensive research project including evaluations of the impact of the interventions and the implementation process, which enabled a more accurate interpretation of the results.

Conclusions

The results indicate improvements in cross-level continuity of clinical information (transfer of clinical information) and clinical management continuity (care coherence) in all countries, but with differences between them. The consistency of results across patients, doctors and other stakeholders substantiates the argument that PAR interventions to enhance care coordination aimed at health professionals, especially joint meetings, have the potential to improve the cross-level transfer of clinical information and patient follow-up and supports the notion that they have a positive impact on CC. This experience should therefore be disseminated to more professionals in order to enhance cross-level CC.

The differences observed, in terms of the relatively limited impact of PAR interventions on CC in some of the participating countries, throw into focus certain areas for improvement that need to be explored more in depth. It is clear that the right context (working conditions, institutional support) and process factors (limited penetration of the interventions) are needed to achieve CC. Given its comprehensiveness and the consistency of the results with those that evaluate intervention effectiveness and the implementation process, this study should be of interest to both researchers and policy makers aiming to improve cross-level CC for chronic patients in any care setting.

Supplementary data

Supplementary data are available at *Health Policy and Planning* online.

Data availability

The data underlying this article will be shared on reasonable request to the corresponding author.

Acknowledgements

References

Aller M, Vargas I, Garcia-Subirats I *et al*. 2013. A tool for assessing continuity of care across care levels: an extended psychometric validation of the CCAENA questionnaire. *International Journal of Integrated Care* **13**: e050.

Aubin M, Giguère A, Martin M *et al*. 2012. Interventions to improve continuity of care in the follow-up of patients with cancer. *Cochrane Database of Systematic Reviews* CD007672.

Barker I, Lloyd T, Steventon A. 2016. Effect of a national requirement to introduce named accountable general practitioners for patients aged 75 or older in England: regression discontinuity analysis of general practice utilisation and continuity of care. *BMJ Open* **6**: e011422.

Blevins D, Farmer MS, Edlund C, Sullivan G, Kirchner JE. 2010. Collaborative research between clinicians and researchers: a multiple case study of implementation. *Implementation Science* **5**: 76.

Chen CC, Tseng CH, Cheng SH. 2013. Continuity of care, medication adherence, and health care outcomes among patients with newly diagnosed type 2 diabetes: a longitudinal analysis. *Medical Care* **51**: 231–7.

Doubova SV, Guanais FC, Pérez-Cuevas R *et al*. 2016. Attributes of patient-centered primary care associated with the public perception of good healthcare quality in Brazil, Colombia, Mexico and El Salvador. *Health Policy and Planning* **31**: 834–43.

Durlak JA, DuPre EP. 2008. Implementation matters: a review of research on the influence of implementation on program outcomes and the factors affecting implementation. *American Journal of Community Psychology* **41**: 327–50.

Gabitova G, Burke NJ. 2014. Improving healthcare empowerment through breast cancer patient navigation: a mixed methods evaluation in a safety-net setting. *BMC Health Services Research* **14**: 1–11.

Garcia-Subirats I, Aller MB, Vargas Lorenzo I, Vázquez Navarrete ML. 2015. Adaptación y validación de la escala CCAENA© para evaluar la continuidad asistencial entre niveles de atención en Colombia y Brasil. *Gaceta Sanitaria* **29**: 88–96.

Gasparrini A, Lopez Bernal J. 2015. Commentary: on the use of quasi-experimental designs in public health evaluation. *International Journal of Epidemiology* **44**: 966–8.

Hudson BF, Best S, Stone P, Noble T. 2019. Impact of informational and relational continuity for people with palliative care needs: a mixed methods rapid review. *BMJ Open* **9**: e027323.

King M, Jones L, McCarthy O *et al*. 2009. Development and pilot evaluation of a complex intervention to improve experienced continuity of care in patients with cancer. *British Journal of Cancer* **100**: 274–80.

León-Arce HG, Mogollón-Pérez A-S, Vargas Lorenzo I, Vázquez Navarrete M-L. 2021. Factores que influyen en el uso de mecanismos de coordinación entre niveles asistenciales en Colombia. *Gaceta Sanitaria* **35**: 177–85.

Mac Adam M 2008. Framework of integrated care for the elderly: a systematic review of the literature. *CPRN research report*. Canadian Policy Research Networks, pp. 1–35.

Macinko J, Guanais FC, Mullachery P, Jimenez G. 2016. Gaps in primary care and health system performance in six latin American and Caribbean countries. *Health Affairs* **35**: 1513–21.

Maeng DD, Martsolf GR, Scanlon DP, Christianson JB. 2012. Care coordination for the chronically ill: understanding the patient's perspective. *Health Services Research* **47**: 1960–79.

Mercado-Martínez FJ, Robles-Silva L, Jiménez-Domínguez B. 2018. Participatory health research in Latin America: scientific production on chronic diseases. In: Wright M, Kongats K (eds) *Participatory Health Research*. Cham: Springer International Publishing, 139–63.

Nolte E, McKee M. 2008. *Caring for People with Chronic Conditions: A Health System Perspective*. New York, NY, USA: Open University Press.

O'Halloran J, Miller GC, Britt H. 2004. Defining chronic conditions for primary care with ICPC-2. *Family Practice* **21**: 381–6.

Ollé-Espluga L, Vargas I, Mogollón-Pérez A *et al*. 2020. Care continuity across levels of care perceived by patients with chronic conditions in six Latin-American countries. *Gaceta Sanitaria* **81**: e89–92.

Pan American Health Organization. 2010. *Renewing Primary Health Care in the Americas*. Washington DC: Concepts, policy options and a road map for implementation in the Americas.

Pereira Gray DJ, Sidaway-Lee K, White E, Thorne A, Evans PH. 2018. Continuity of care with doctors—a matter of life and death? A systematic review of continuity of care and mortality. *BMJ Open* **8**: e021161.

Plate S, Emilsson L, Söderberg M, Brandberg Y, Wärnberg F. 2018. High experienced continuity in breast cancer care is associated with high health related quality of life. *BMC Health Services Research* **18**: 127.

Reid R, Haggerty J, McKendry R. 2002. *Defusing the Confusion: Concepts and Measures of Continuity of Healthcare*. Ottawa: Canadian Health Services Research Foundation.

Robson LS, Shannon HS, Goldenhar LM, Hale AR 2001. Guide to evaluating the effectiveness of strategies for preventing work injuries: how to show whether a safety intervention really works. https://www.cdc.gov/niosh/docs/2001-119/, accessed 14 October 2019.

Skrutkowski M, Saucier A, Eades M *et al*. 2008. Impact of a pivot nurse in oncology on patients with lung or breast cancer: symptom distress, fatigue, quality of life, and use of healthcare resources. *Oncology Nursing Forum* **35**: 948–54.

StataCorp LLC. 2017. *Stata Statistical Software: Release 15*. *2017*. Texas, USA: StataCorp LLC.

Tammes P, Payne RA, Salisbury C *et al*. 2019. The impact of a named GP scheme on continuity of care and emergency hospital admission: a cohort study among older patients in England, 2012–2016. *BMJ Open* **9**: e029103.

Tremblay D, Roberge D, Touati N, Maunsell E, Berbiche D. 2017. Effects of interdisciplinary teamwork on patient-reported experience of cancer care. *BMC Health Services Research* **17**: 218.

Uijen AA, Bischoff EW, Schellevis FG *et al*. 2012. Continuity in different care modes and its relationship to quality of life: a randomised controlled trial in patients with COPD. *British Journal of General Practice* **62**: e422–8.

Vargas I, Eguiguren P, Mogollón-Pérez A-S *et al*. 2020a. Can care coordination across levels be improved through the implementation of participatory action research interventions? Outcomes and conditions for sustaining changes in five Latin American countries. *BMC Health Services Research* **20**: 941.

Vargas I, Eguiguren P, Mogollón-Pérez A-S *et al*. 2020b. Understanding the factors influencing the implementation of participatory interventions to improve care coordination. An analytical framework based

on an evaluation in Latin America. *Health Policy and Planning* **35**: 962–72.

Vargas I, Garcia-Subirats I, Mogollón-Pérez AS *et al.* 2017. Patient perceptions of continuity of health care and associated factors. Cross-sectional study in municipalities of central Colombia and north-eastern Brazil. *Health Policy and Planning* **32**: 549–62.

Vargas I, Mogollon-Perez AS, De Paepe P *et al.* 2015. Do existing mechanisms contribute to improvements in care coordination across levels of care in health services networks? Opinions of the health personnel in Colombia and Brazil. *BMC Health Services Research* **15**: 213.

Vázquez M-L, Miranda-Mendizabal A, Eguiguren P *et al.* 2021. Evaluating the effectiveness of participatory action research interventions to improve clinical coordination between care levels : lessons learned from a quasi-experimental study in public healthcare networks in Latin America. *Under Review*.

Vázquez M-L, Vargas I, Garcia-Subirats I *et al.* 2017. Doctors' experience of coordination across care levels and associated factors. A cross-sectional study in public healthcare networks of six Latin American countries. *Social Science & Medicine* **182**: 10–9.

Vázquez M-L, Vargas I, Unger J-P *et al.* 2015. Evaluating the effectiveness of care integration strategies in different healthcare systems in Latin America: the EQUITY-LA II quasi-experimental study protocol. *BMJ Open* **5**: e007037.

Waibel S, Vargas I, Aller MB *et al.* 2016. Continuity of clinical management and information across care levels: perceptions of users of different healthcare areas in the Catalan national health system. *BMC Health Services Research* **16**: 466.