Social Science & Medicine 365 (2025) 117499

Contents lists available at ScienceDirect

Social Science & Medicine

journal homepage: www.elsevier.com/locate/socscimed

Understanding the health system drivers of delayed cancer diagnosis in public healthcare networks of Chile, Colombia and Ecuador: A qualitative study with health professionals, managers and policymakers

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ARTICLE INFO

Keywords:
Early diagnosis of cancer
Access to healthcare
Health inequities
Qualitative research
Health services research
Latin America

ABSTRACT

Although the greatest delays in cancer diagnosis in Latin America occur in the provider interval little is known about the related factors. This study aims to analyze factors influencing access to cancer diagnosis -from initial contact with health services to confirmation- from institutional stakeholders' perspective in public healthcare networks of Chile, Colombia, and Ecuador. A qualitative, descriptive-interpretative study was conducted in two networks per country, using semi-structured individual interviews (n = 118; 23 to 58, per country) with a criterion sample of health professionals and administrative personnel from primary care (PC) (n = 41) and secondary/tertiary care hospitals (n = 47), network managers and policymakers (n = 30). The final sample size was reached through saturation. Thematic content analysis was performed, segmented by country. The analysis reveals interacting factors that cause cumulative delays throughout the patient's diagnostic pathway within healthcare networks, with differences between countries. In all three, informants identify similar characteristics of the networks: structural (deficits in diagnostic resources; geographical accessibility), organizational factors (long waiting times, especially after referral), and the limited knowledge and experience of PC doctors, which all lead to delayed diagnosis. In Chile and Colombia, health policy barriers related to care rationing/prioritization policies that hampered access to tests, and in Chile, increased delays for non-prioritized conditions. Country-specific barriers related to the organization of healthcare system also emerge: in Chile, private services subcontracting and the voucher system for using them; in Colombia, the management of care by insurers (care authorizations; fragmented and short-term contracting of providers); and in Ecuador, underfunding of the system. The barriers most affect the elderly, those with low socioeconomic status, with limited support networks,

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Abbreviations: PC, Primary care; SC, Secondary care.

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https://doi.org/10.1016/j.socscimed.2024.117499
Received 30 July 2024; Received in revised form 16 October 2024; Accepted 11 November 2024

and rural areas residents. The results reveal relevant barriers in access to timely cancer diagnosis which can and should be addressed with specific cancer diagnosis policies and general measures that strengthen public healthcare systems and networks.

1. Introduction

Delays in cancer diagnosis and treatment contribute to the already elevated and progressively rising cancer mortality rates in Latin America (LA) (De Lemos et al., 2019; Strasser-Weippl et al., 2015). The fragmentation of LA healthcare systems, characterized by limited access to care and poor coordination between levels, contributes to cancer diagnostic delays and underdiagnosis (Strasser-Weippl et al., 2015). Although further research is needed, available studies on the total cancer diagnostic interval in certain LA countries (Ministerio de Salud, 2018; Rezende et al., 2009) suggest that the longest delays occur in the *provider interval* (spanning from first contact to diagnostic confirmation), rather than in the *patient interval* (from symptom discovery to first consultation) (Weller et al., 2012). Some of the few existing studies focusing on breast cancer indicate median provider intervals exceeding 6 months (Bright et al., 2011; Rezende et al., 2009), substantially surpassing durations reported in high-income countries 7–32 days, according to country and study (Unger-Saldaña, 2014; Vedsted et al., 2022). Hence, there is an imperative to explore the key factors that elucidate these delays (Bright et al., 2011), especially those linked to policy and healthcare networks, also referred to as *health system factors* (Morris et al., 2020).

The aim of this study is to analyze the factors influencing access to cancer diagnosis - from initial contact with the health services to confirmation-from the viewpoint of health professionals, administrative personnel, managers and policymakers within the public healthcare networks of Chile, Colombia, and Ecuador. Thus, it complements the ongoing analysis of barriers to access from the patients' perspective. The study is part of a broader mixed-methods study (Vázquez et al., 2022), aimed at analyzing in-depth diagnostic intervals, care pathways and influencing factors within the public healthcare networks of the three countries.

1.1. A theoretical framework for the analysis of access to early diagnosis of cancer

This study is grounded in a comprehensive conceptual framework designed for the analysis of access to cancer diagnosis (Fig. 1). It is based on Walter et al. (2012) model for analyzing pathways to cancer diagnosis and treatment further developed by incorporating factors influencing healthcare access from Aday and Andersen's "Behavioural model of health services utilization" (1974). According to the framework, described in detail in the study protocol (Vázquez et al., 2022), patient and provider intervals can be influenced by various characteristics of the population, as well as by structural and organizational factors within health services, all of which interact throughout the patient's pathways. Health policies and strategies can in turn affect access barriers related to the health services or mutable characteristics of the population.

1.2. The need for more evidence on health system-related factors influencing access to cancer diagnosis

Despite the enduring interest of policymakers and researchers in identifying health system factors that may account for disparities in cancer diagnostic intervals and survival rates across countries, the limited comparative studies available have focused on high-income countries (HIC) and primarily rely on expert opinions and cancer policy analyses (Brown et al., 2014; Nolte et al., 2022; Seguin et al., 2020), rather than on the firsthand experiences of health professionals and managers involved.

Systematic review on access to cancer diagnosis in low- and middle-income countries (LMIC) (Brand et al., 2019) show that studies tend to focus on patient-related factors influencing appraisal and care-seeking and to a lesser extent on provider-related factors.

In LA, evidence is also limited and mostly concentrated on breast cancer in Mexico (Tejada-Tayabas et al., 2015; Unger-Saldaña and Infante-Castañeda, 2011) and Brazil (Gonçalves et al., 2014; Machado Feijó et al., 2016). Those studies, primarily using qualitative methodology, and based mostly on the patients' perspective, do not specifically

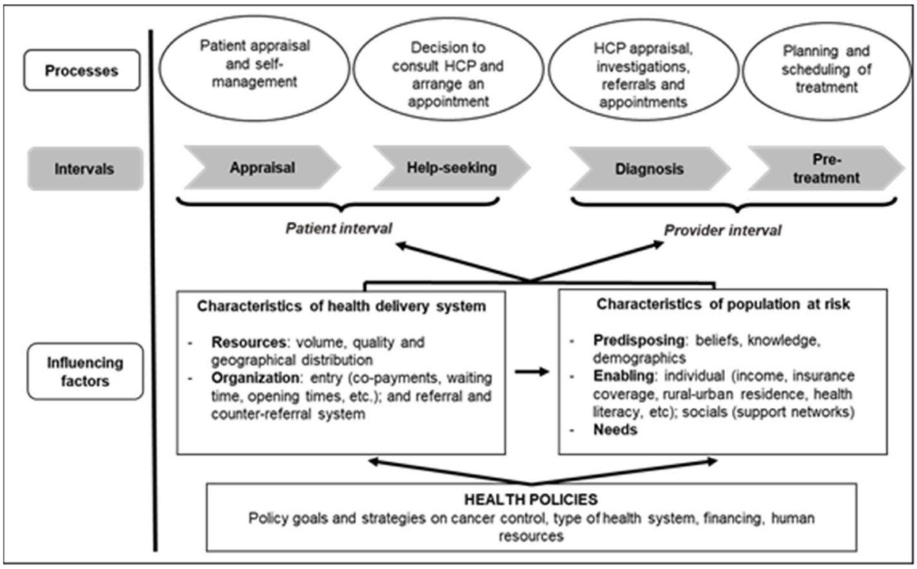

Fig. 1. Theoretical framework for the analysis of pathways to diagnosis of cancer and influencing factors.
HCP: Healthcare provider, Source (Vázquez et al., 2022): modified from Walter et al. (2012) based on Aday&Andersen(1974).

target access to cancer diagnosis, but instead encompass the whole pathways from symptoms' discovery to treatment from patients and caregivers' viewpoint. Commonly identified barriers to access during the provider interval include long waiting times and administrative obstacles for medical appointments and tests (Campaña et al., 2023; Gonçalves et al., 2014; Machado Feijó et al., 2016; Mota et al., 2021; Unger-Saldaña and Infante-Castañeda, 2011), which can result in patients resorting to private services (Campaña et al., 2023; Cavicchioli et al., 2007; Fermo et al., 2014; Mota et al., 2021; Uribe Pérez et al., 2019). Additionally, misdiagnosis or failure to suspect cancer during initial contacts is observed in public healthcare settings, usually by PC doctors (Campaña et al., 2023; Cavicchioli et al., 2007; Fermo et al., 2014; Unger-Saldaña and Infante-Castañeda, 2011), but also by specialists (Fermo et al., 2014), and in private healthcare settings (Tejada-Tayabas et al., 2015). Furthermore, patients may utilize multiple services until diagnostic confirmation (Fermo et al., 2014; Tejada-Tayabas et al., 2015). However, studies that comprehensively analyze the healthcare system-related factors leading to these access problems, taking into account the professionals, managers and policymakers viewpoint, are currently lacking.

1.3. Public healthcare subsystems and cancer diagnosis policies in the study countries

The three study countries, classified as middle-income (Colombia and Ecuador) and high-income (Chile), all exhibit significant socioeconomic and health inequalities (CEPAL, 2023). Public health expenditure per capita is notably low in Colombia ($347) and Ecuador ($281) and moderate in Chile ($721) (World Health Organization, 2020). Although they have different health system organization models, all are segmented by population groups according to socioeconomic or employment status (Atun et al., 2015), with a public subsystem and a private one. The public sector, which is the focus of this study, is financed by social security contributions and/or taxes and is generally aimed at lower-income populations and/or individuals without social security coverage. It encompasses at least one subsystem dependent on the ministry of health, which is decentralized/deconcentrated to different levels of government (departments/provinces and/or municipalities/districts). The public subsystems analyzed in this study are FONASA [*Fondo Nacional de Salud* - National Health Fund] in Chile, the subsidized social security scheme and for uninsured population in Colombia, and the subsystem of the Ministry of Health in Ecuador, with the population coverage of 82% in Chile (FONASA. Gobierno de Chile, 2024), and 51% in both Colombia (Ministerio de salud y protección social. Colombia, 2024a) and Ecuador (Lucio et al., 2011).

In the public subsystems of all three countries healthcare provision is organized in networks of health services of different levels of care (primary, secondary and tertiary care) that provide services to a defined population, with PC as the entry point and the coordinator of patient care (PAHO, 2010). Most healthcare providers are public, except in Colombia, with a managed competition model in which healthcare insurers, primarily private entities, are responsible for organizing healthcare networks for their enrollees, either through contracting with public or private providers or by providing services directly. In Chile, FONASA beneficiaries are permitted to opt for the free choice modality, which provides them with a voucher to use private services outside the public networks in addition to a co-payment (Becerril-Montekio et al., 2011). This does not apply to beneficiaries of lower socio-economic status exempted from social security contributions. Public healthcare networks are also allowed to contract-out services to accredited private providers, among others, the subcontracting of diagnostic tests by PC centers and by secondary/tertiary hospitals to ensure compliance of the diagnostic and/or treatment timeframes established by the Universal Access with Explicit Guarantees plan (AUGE Law/GES, for its Spanish name) for 87 priority health problems (Ministerio de Salud. República de Chile, 2022). In Ecuador, referral of patients to the other public subsystems (Ecuadorian Institute of Social Security, of the Armed Forces, etc.) - and subsidiarily to complementary network of private services - is allowed if those services required are not available within the Ministry of Health network (Ministerio de Salud Pública. Ecuador, 2013).

With regard to cancer, diagnosis and treatment are covered by the public health system in all three countries (Ministerio de Salud. Gobierno de Chile, 2022; Ministerio de Salud Pública. Ecuador, 2012; Ministerio de salud y protección social. Colombia, 2024b), although actual adequate access is limited. All three have cancer control plans and strategies (Ministerio de Salud. Gobierno de Chile, 2022; Ministerio de Salud Pública. Ecuador, 2017; Ministerio de Salud y Protección Social. Colombia, 2018; República de Colombia, 2022), however, only Chile and Colombia have taken further steps to promote integrated care strategies aimed at improving early cancer diagnosis, in line with WHO recommendations for LMICs (World Health Organization, 2017). These include establishing maximum waiting times and other conditions of access for the diagnosis and/or treatment of certain types of cancer (AUGE Law/GES 19.966) in Chile and Resolution 3280 in Colombia), as well as developing cancer care pathways and shared clinical guidelines within the healthcare network (Ministerio de Salud. Chile, 2024; Ministerio de salud y protección social. Colombia, 2024b; Ministerio de Salud y Protección Social. Colombia, 2018).

2. Material and methods

2.1. Study design and study areas

A qualitative, descriptive-interpretive study was conducted to analyze access to cancer diagnosis, examining facilitating or hindering factors across the various care levels used from initial contact through to confirmation, from the perspective of institutional stakeholders involved in the diagnostic process.

The study area in each country comprised two public healthcare networks, selected according to the following criteria: 1) provision of a continuum of services including at least primary care (PC) and secondary care (SC)/tertiary care (TC), with responsibility for cancer diagnosis and treatment; 2) provision of services to a defined population; 3) provision of care mainly to areas with low to middle-low socioeconomic status. In Chile, the study area encompassed the northern and southern networks of Santiago; in Colombia, the health regions of Sabana Centro, Soacha and Sur of Cundinamarca Department; and in Ecuador, the Southern (17D06) and Northern (17D03) health districts of Quito.

2.2. Sample of informants

A criterion sample was selected through a two-stage process. In the first stage, PC centers were chosen within each network - aiming for variation in experiences in access to cancer diagnosis related to different geographical accessibility (urban and rural) and size (different resources availability) - and their SC/TC referral hospitals for the diagnosis of cancer. In the second, informants were selected according to the following criteria to ensure variety in the discourses: 1) Health professionals and administrative personnel from PC and SC/TC. These individuals were required to have at least six months' experience at the center and to be directly involved in the cancer diagnosis process. As variation criteria, the following were taken into account: sex, age, professional category/position (doctor, nurse, social work, admissions, referral and counter-referral service, etc.) and medical specialties related to most frequent cancers; 2) Managers (directors and middle managers) from different care levels within the healthcare networks. For the selection of informants, an institutional contact from each healthcare network provided first a list of potential candidates based on the above criteria, which was discussed with the researchers according to the theoretical profiles, and then those selected to participate were invited.

Additionally, policymakers (at national, regional and local levels) capable of providing information for the analysis of access to cancer diagnosis and the implementation of policies for its improvement within the network were selected. The final sample size varied between 23 and 58 informants per country, depending on when information saturation was reached (Table 1).

2.3. *Data collection*

Individual semi-structured interviews were conducted using a topic guide comprising one common and one specific section for each informant group. The guides were built based on the theoretical framework for the analysis of access to diagnosis of cancer (Vázquez et al., 2022). They covered various topics, including opinions on access to cancer diagnosis and the factors that hinder or facilitate it for the network's population. No significant fieldwork difficulties or any refusals to participate arose. The interviews, mostly conducted in the workplace (except in Ecuador, where over half were conducted via videoconference due to the COVID-19 pandemic wave), lasted between 1 and 2 h and were audio-recorded and fully transcribed. Fieldwork took place between September 2021 and August 2022.

2.4. *Data analysis and quality of information*

Thematic analysis was carried out in two stages initially by country and then comparatively across countries, with the support of different software: Atlas.ti 23, Nvivo 1.6.1, and MAXQDA 2022. Data were segmented by country, informant group, and themes. Categories of analysis were generated through a process of mixing those from the topic guide with those emerging from the data. Themes were identified, coded, re-coded and classified to identify common patterns, observing regularities, convergences and divergences in the data through a process of constant comparison, moving back and forth between the data and the conceptual framework (Vázquez et al., 2022).

To ensure quality of data, the information was triangulated by comparing the results in each analytical category between different informant groups seeking similarities and differences and verifying the results from multiple perspectives. Moreover, results were contrasted with the existing literature and discussed with the informants. In addition, 7 analysts (2 from the international and 5 from the national research teams) collaborated on the comparative analysis, thoroughly discussing any discrepancies in the coding until a consensus was reached. These analysts had diverse backgrounds in health and social sciences and in-depth knowledge of qualitative methods, the research topic and the context.

Table 1
Final composition of informant sample by country.

Type of informant	Chile		Colombia		Ecuador	
	(n = 37)		(n = 58)		(n = 23)	
	Female	Male	Female	Male	Female	Male
Primary care professionals	*10*	*2*	*18*	*6*	*3*	*2*
Doctors	7	2	6	6	3	2
Nurses[a]	2	0	4	0	0	0
Other health professionals	0	0	0	0	0	0
Administrative personnel	1	0	8	0	0	0
Secondary/Tertiary care professionals	*14*	*5*	*11*	*6*	*5*	*6*
Doctors	4	4	4	5	4	6
Nurses	7	1	4	0	0	0
Other health professionals	0	0	0	0	1	
Administrative personnel	3	0	3	1	0	0
Network managers and policymakers	*3*	*3*	*11*	*6*	*2*	*5*
Total	**27**	**10**	**40**	**18**	**10**	**13**

[a] Includes nurses midwives.

2.5. *Ethical considerations*

The development and execution of the project fully complied with all current international conventions and declarations, EU legislation, ethical regulations, EU and national data protection legislation, and the professional code of conduct specific to each participating country (Vázquez et al., 2022). Conditions of study procedure, risk and benefit assessment, confidentiality, privacy, and informed consent were all approved by the ethical committees in the participating countries (Vázquez et al., 2022). In addition, confidentiality agreements were signed with all participating institutions. Written informed consent was obtained from every interviewee, after being informed that participation was voluntary and that they were free to decline or withdraw without any negative repercussions. The recordings and transcripts were coded and processed in a manner that ensured anonymity and were stored securely.

3. Results

Four groups of factors that influence access to cancer diagnosis emerged from the informants' discourse, with variations between countries concerning: 1) healthcare policies; 2) structural and organizational characteristics of the public healthcare network, including the purchase of private health services in Chile; 3) managed care mechanisms implemented by insurers in Colombia; and 4) demographic and socioeconomic characteristics of the population. Most of these factors hinder access throughout the diagnostic process, interacting with one another in a feedback loop, as shown in figures (2-4). The following sections describe these factors, concentrating on the causes and consequences identified by informants regarding access to diagnosis. As supplementary material, examples of quotations for the categories of analysis have been included (Appendix A).

3.1. *Factors related to healthcare policies*

Despite differences between countries, informants highlight healthcare policies that influence access to cancer diagnosis. In both Chile and Colombia, the *prioritization policies*, which establish maximum waiting times and access conditions for diagnostic tests of some cancer types – AUGE Law/GES (Universal Access with Explicit Guarantees plan) and Resolution 3280, respectively. Although many informants in Chile believe that AUGE Law/GES help reduce delays in diagnosis, some informants also highlight limitations regarding its design. On the one hand, the establishment of timeframes from advanced suspicion onwards or solely for treatment, which probably limit the law's impact on diagnostic delays. On the other hand, its contribution to increasing inequalities in access to diagnosis: firstly, between different types of cancer, by prioritizing network resources (tests, consultations, etc.) for those covered, thereby increasing diagnostic times for the other; and secondly, in socioeconomic terms, by favoring patients who can afford to pay for diagnostic tests privately, thus enabling them to activate the timeframe guarantee for diagnostic confirmation more rapidly. In Colombia, most informants indicate that Resolution 3280 only facilitates access in theory due to its very limited implementation.

> *"GES has strictly defined waiting times, so hospitals end up reserving (…) 'daily or weekly hours' for GES patients with suspected cancer (…) who need an endoscopy or colonoscopy or any other examination procedure (…) So the waiting list for non-GES patients, whether oncological or not, even if they try to speed things up, ends up being severely delayed (…) they*

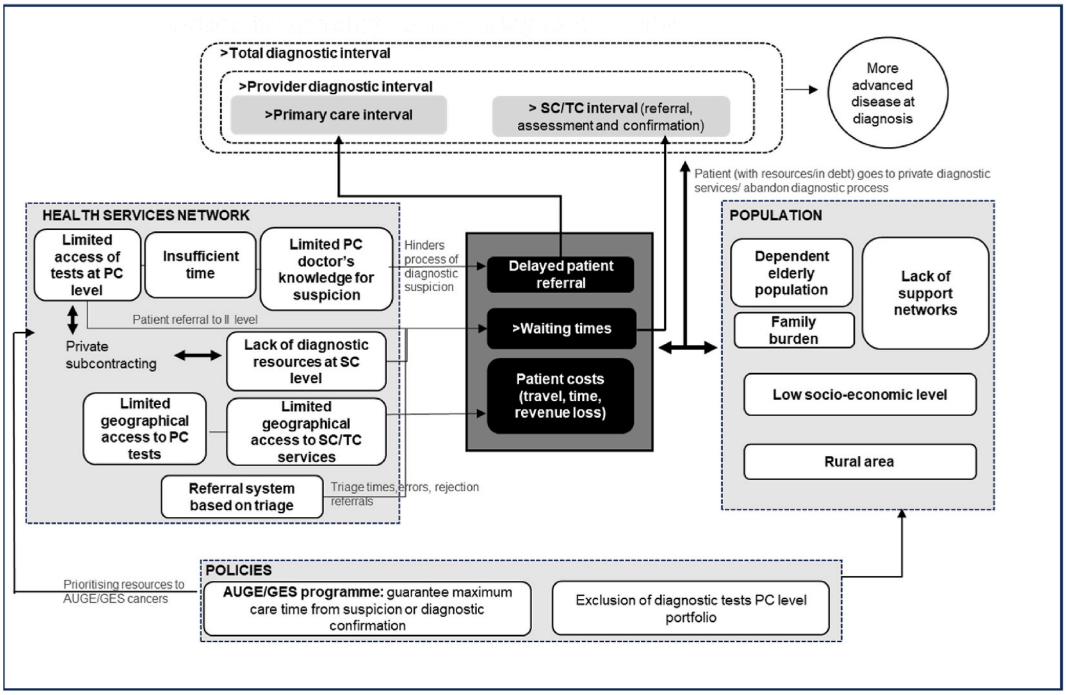

Fig. 2. Factors influencing access to cancer diagnosis: Chile.
PC: Primary care; SC: Secondary care; TC: Tertiary Care.

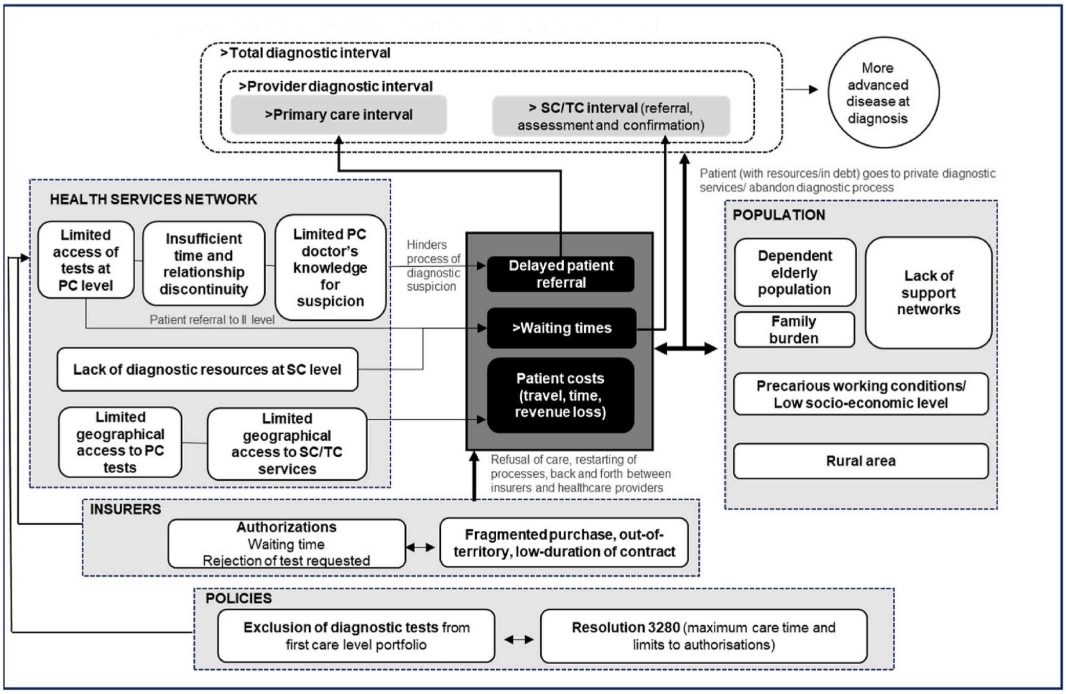

Fig. 3. Factors influencing access to cancer diagnosis: Colombia.
PC: Primary care; SC: Secondary care; TC: Tertiary Care.

> *could easily wait for 6 months, 8 months for their endoscopy or colonoscopy."* (Manager, Chile)

> *"The resolution* [3280] *is great* [in theory]*, but it doesn't get put into practice. The* [care] *pathways are fantastic because they tell you the* pathway*, the times, they tell you how … but the rule is made, but it's not enforced."* (SC administrative personnel, Colombia)

Moreover, the *exclusion of some diagnostic tests* from the PC portfolio (e.g., mammograms and ultrasounds in Colombia, Prostate-specific Antigen (PSA) or certain types of echography in Chile) and the *inability to directly refer patients* to certain specialties (e.g., pulmonology, gastroenterology) are identified by professionals and managers as factors that increase the diagnostic delay. Firstly, it becomes more difficult for PC doctors to formulate a diagnostic suspicion, leading to delayed referral. Secondly, it necessitates patient referral to a specialist for test requests (or referral to the specialty) increasing delay.

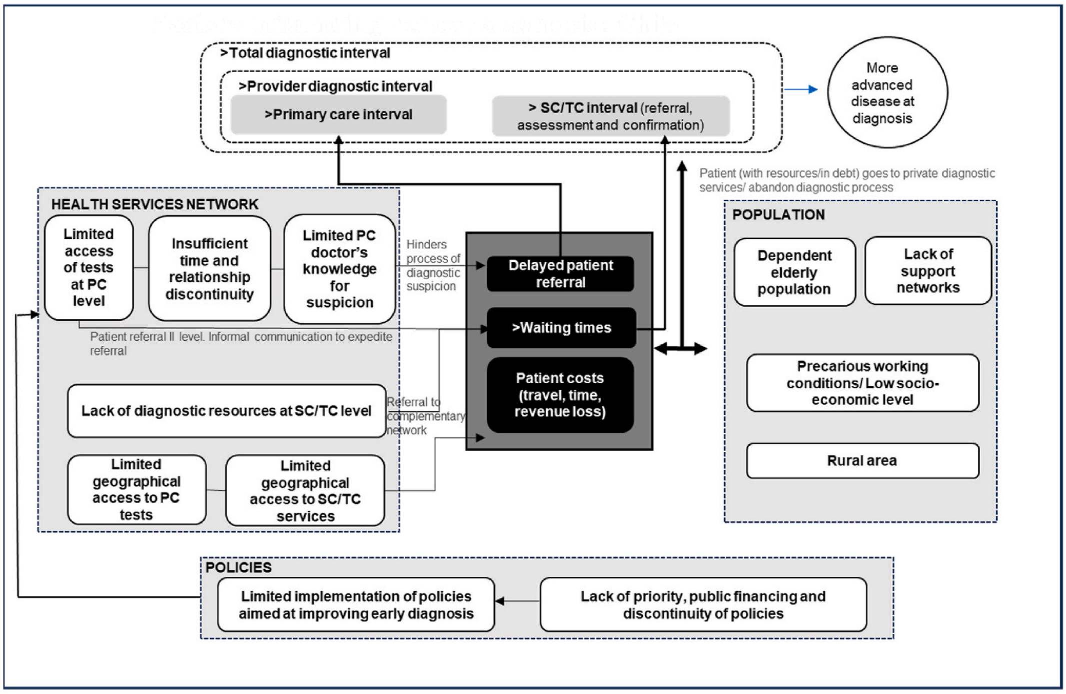

Fig. 4. Factors influencing access to cancer diagnosis: Ecuador.
PC: Primary care; SC: Secondary care; TC: Tertiary Care.

> *"The general practitioner is very limited in what lab tests they can request (…) Even if there is diagnostic suspicion, all they can do is refer to the specialist. (…) Three months, six months could easily pass, and the patient's still there with no diagnosis."* (SC health professional, Colombia)

In Ecuador, according to policymakers, the *limited development of policies* aimed at improving early diagnosis, along with the discontinuity of existing policies, causes deficits in the necessary diagnostic tests, supplies, equipment and health professionals in the networks, thus leading to delays in cancer diagnosis. Informants attribute this to the lack of political prioritization and public funding (compared to cancer treatment), and to the influence of the political cycle.

> *"Yes, studies have been done on the number of professionals and equipment required … They have already been submitted, but as I said, the turnover of authorities, turnover of technicians (…) has not permitted budget allocation."* (SC health professional, Ecuador)

3.2. Factors related to healthcare networks

3.2.1. Access to the primary care level

Informants from all three countries identify barriers related to *structural and organizational characteristics of the services* and *of the professionals* in PC that contribute to increased diagnostic delay. Among the structural barriers, a common highlight is limited access to diagnostic tests included in the PC portfolio, due to insufficient availability of equipment (and in Ecuador, also of supplies and human resources). This results in patients being referred to SC for test requests, thereby increasing diagnostic intervals. Moreover, patients who can afford to pay may turn to private services, especially in Chile and Ecuador.

> *"(…)* [the PC doctor] *doesn't have access to diagnostic imaging procedures that would give them a more accurate picture (…) and to just turn up with that patient and say: 'look, there's a strong suspicion of cancer here, so attend to it quickly' … it doesn't work that way here."* (PC health professional, Chile)

> *"(…) almost a third of referrals* [to the complementary network]*, within the scope of the Ministry of Public Health, occur because there is no diagnostic capacity at the health services. (…) Also, (…), in the* [political] *discourse, the idea that PC should resolve 80 percent of health problems is all very well, but this is not reflected in the funding, in the infrastructure, or in the supplies needed to function"* (Policymaker, Ecuador).

The *outsourcing of diagnostic tests* to private services in Chile, and to a lesser extent in Colombia, and referrals to the complementary network of private services to obtain them in Ecuador are identified as strategies implemented at PC level that could facilitate access to cancer diagnosis. However, informants –especially in Chile– identify numerous obstacles, related firstly to limited tests supply by the private services and secondly, to the tests' low quality resulting in diagnostic errors, repetitions, and distrust among health professionals in the networks. In Ecuador, some informants indicate that professionals are unaware of the referral process to the complementary network.

> *"Poor practices* [of subcontracted private services]*, awful, awful. So, you can't even be sure if they've got the right X-ray or not* [for the patient]*, and in fact, there are complaints (…) That's the extreme of course, but in between there's the: 'So how does it look, just at a quick glance?' 'It looks normal, here's the range of normality, clear costodiaphragmatic recesses, no nodules observed … ' (…) There's no observation in each case to see what's really going on, (…) they're not looking or comparing with a previous one or anything."* (Manager, Chile)

Informants also point to *organizational barriers* that hinder the process of diagnostic suspicion by PC doctors, such as short consultation times, and in Colombia and Ecuador, discontinuity in doctor-patient relationships due to high staff turnover.

> *"(…) The patient comes to the doctor's office because they have gastritis, so they are given treatment with omeprazole, for seven days or for a month. Then the patient returns to the office but doesn't see the same doctor. So, they're not prescribed omeprazole again, but another medication instead, and so on, but they never actually get a proper diagnosis […] Sometimes, professionals don't look over previous medical records,*

> *mostly I'd say due to time constraints […]"* (PC health professional, Colombia);

> *"(…) How is it possible* [to see] *30, 40 patients in a single workday? Obviously, the doctor is just going to say, 'you have hypertension, take this and off you go … ' and doesn't make a diagnosis."* (SC health professional, Ecuador)

Lastly, among the barriers related to the health professionals, a prominent issue is the *limited expertise and experience of PC doctors in cancer diagnosis.* This barrier emerges particularly in Colombia; in Ecuador, it concerns recently graduated doctors, and not family medicine specialists, who are present in many primary care centers. SC professionals and managers especially highlight deficiencies in investigating and managing symptoms and lesions, including prolonged duration, severity, and pain, as well as errors in diagnosis and treatment prescriptions, resulting in delayed referrals to SC. In all three countries, identified causes include inadequate training during undergraduate studies and the frequent turnover of professionals hindering their ongoing training. Additionally, in Colombia there is a noted lack of experience and support for physicians in PC centers, many of whom are recent graduates or fulfilling rural service requirements.

> " [referring to PC doctors] *… we don't do genital exams, we don't know what an abnormal cervix looks like, we can't identify a lump in a breast, whether it's normal or abnormal (…) clinical experience is 99%, (…) the expertise, the instinct to conduct a good breast exam, a good axillary exam (…)"* (SC health professional, Colombia);

> *"(…). So many times … patients come in with inflammatory breast carcinoma and they're told* [by PC doctor] *it's mastitis, so they're given antibiotics, hot compresses are applied to further invade the skin, so this is also a factor in delaying the diagnosis* (SC health professional, Ecuador).

Informants from all three countries indicate that these structural, organizational, and professional barriers affect rural areas more intensely, and in Colombia, they also affect peripheral urban areas. Not only is it more difficult for residents of these remote and poorly communicated areas to access PC, but it is also more of a challenge to contract health professionals to work in remotely located health centers.

3.2.2. Access to secondary/tertiary care level

During the cancer diagnostic process, the main barriers to accessing SC/TC are *prolonged waiting times* for test requests, test results, and medical consultations, and poor *geographical access* (distance and/or inadequate transport networks) for populations residing in rural areas.

Waiting times are particularly identified as access barriers in patient referrals from PC to SC (in Ecuador, also from SC to TC), although they also affect the evaluation and diagnostic confirmation processes at the specialized level. It emerges in the discourse of all informant groups, with greater intensity in Chile and Ecuador, that there is an accumulation of various waiting times (tests, consultations, etc.) throughout the diagnostic process. Consequently, the patient's health continues to deteriorate as they wait and, in some cases, they abandon the diagnostic process altogether.

> *"Until at some point* [the patient] *can't take it anymore and manages to get an appointment in PC, and PC then says, 'Yes, you need to have an endoscopy.' They issue the order, but when they arrive at the referral center* [SC Hospital]*, there's obviously a huge queue, and if they don't come in as a suspected gastric cancer case, they enter another queue … it's an endless queue. So, there they'll get an appointment with a specialist with a delay of 1 or 2 months. The specialist will see them and say, 'Yes, indeed, you need an endoscopy', and then they go on to another* [waiting list]*"* (SC health professional, Chile)

> *"… a patient can't wait for 6 months for an appointment, I mean, it's inhumane … they come with a Pap smear from 6 months ago, so it's no longer useful … those are the things that need to change …"* (SC health professional, Ecuador)

In Colombia, informants also point out that sometimes patients must wait so long that their insurance authorization orders expire, obliging them to restart the referral process and causing further delays in diagnosis.

> *"SC is a total mess, it takes ages to get an appointment … people sometimes even have their authorization expire while waiting for their appointment; an authorization lasts a minimum of 90 days, and waiting three months for an appointment is complicated, so sometimes you have to renew the authorization to be able to get the appointment"* (Policymaker, Colombia).

Only in Chile do informants consider that waiting times for patients referred with suspected cancer can be relatively short, in certain cases. This is due, firstly, to the existence of a rapid referral system and appointment scheduling in SC and TC hospitals, especially for patients with cancers covered by the GES (although they also indicate difficulties in guaranteeing the established maximum timeframes); and secondly, to the implementation of joint virtual clinical conferences in one of the study networks for the discussion of cases with suspected gastric cancer.

The use of private services is identified as a frequent strategy adopted by patients to circumvent long waiting times, especially in Chile and –although to a lesser extent– in Ecuador. In the latter, informants also mention referral of patients to the complementary network and informal communication in the study networks between professionals across care levels to expedite patient referrals. Many informants, especially in Chile, point out that the use of private services by patients who can afford it – often recommended by professionals in the networks– helps expedite the diagnostic process.

> *"There's a very high number of patients whose biopsies aren't from the hospital … Why? They come here with everything already done because the hospital doesn't provide timely responses to your needs"* (SC health professional, Chile)

However, some informants held contrary opinions, pointing out that the request of unnecessary tests by private services, having to repeat tests due to their poor quality, and having to return to PC to continue the diagnostic and/or treatment process in public networks, meant that it could have the opposite effect to that intended.

> *"(…) Lots of cases caught my eye of patients, for example, with suspected cancer, who were going to their designated network, which didn't respond* [in a timely manner]. *Then they accessed the private network paying out-of-pocket, which also responded poorly because it's not comprehensive … (…) It took several months to get the tests done. Then they went back to another network, starting all over again … a common practice that generally costs time and money, and yields very poor results."* (Policymaker, Chile)

Similarly, limitations are highlighted when outsourcing to private services to ensure diagnostic timeframes for cancers covered by GES, or for diagnostic tests not available in the centers in Chile, and in referral to the complementary network in Ecuador. These include slow contracting procedures with the private sector, budget constraints for purchasing, and insufficient private supply of tests.

Regarding the causes of the long waiting times, all groups of informants, with greater emphasis in Chile and Ecuador, concur in pointing out primarily structural factors such as the insufficiency (and sometimes poor condition) of diagnostic equipment and of specialists in SC, and in Ecuador also in TC. Organizational factors also emerge, such as the lack of prioritized referral pathways for patients with suspected cancer in Ecuador, and the referral system based on double triage in PC and SC in Chile. According to some informants, this system contributes to diagnostic delays by adding an extra waiting time, often excessive due to insufficient triage personnel, and because the referral can be rejected or reassigned as non-priority in cases where insufficient information is provided, or administrative errors were made when recording it in the information system.

> *"The patient arrives at the* [SC] *hospital, waits in line, (…) and when she finally gets there, the equipment is broken. So, they have to come back to me and say, 'Look, the equipment is broken. What should I do with your referral?' 'Let's wait and see if they fix the machine.' So, we don't make an early diagnosis here; we can't do it because we're limited by this"* (PC health professional, Ecuador)

> *"What the patient needs for their diagnosis includes, for example, interventional radiology, procedures guided by CT scan or ultrasound, to get imaging diagnoses done, things like that, which naturally few institutions can provide … And then the possibility of access for the user to have even just the diagnostic tests begins to close off, not to mention what happens with treatment itself."* (Manager, Colombia)

> *"It's actually quite common* [for referrals not to reach SC due to digitization issues] *… patients who came to inquire about their referral and it hadn't arrived because it hadn't been prioritized properly, or because the girl at the office simply hadn't put it in the system, etc. … If the patient doesn't turn up to inquire about their referral, we have no way of knowing that this referral is floating around out there and hasn't been done properly"* (SC health professional, Chile)

3.3. Factors related to insurers (Colombia): Managed care mechanisms

In Colombia, the use of managed care mechanisms - authorization procedures and service purchasing-by health insurers (EPS), as a cost-minimization strategy, is identified as one of the main barriers to accessing cancer diagnosis by all groups of informants. Although insurers vary in their practices, informants highlight that they often use authorization to restrict, delay, and/or reject diagnostic tests requested by PC doctors. This practice, contrary to policy (Resolution 3280), diminishes the resources available for early diagnostic suspicion. Furthermore, the bureaucratic procedures involved in obtaining authorizations for tests and consultations, particularly during referrals to specialized care, contribute to diagnostic delays (accumulating throughout the diagnostic process). Often, the expiration of the medical referral order means restarting the referral process. The back-and-forth between insurers and services increases travel costs for patients and sometimes leads to patient dropout from the diagnostic process.

> *"I believe it's the biggest problem we have … it's the authorization process. It's very disheartening to see time passing by without any action being taken. Especially with mammograms, which is something that really strikes you. You see patients in follow-ups who pass away, and it leaves you with a bitter feeling"* (PC health professional, Colombia)

> *"The less the insurance company invests in the patient, the more profit they make. Unfortunately, that's the truth of it … And there are obstacles, of course, there are obstacles to getting an ultrasound, to getting a Pap smear, and even more delays when they get to level two with the specialist"* (SC health professional, Colombia).

Regarding purchasing strategies employed by insurers, informants emphasize the effects of fragmented contracting of services (tests, consultations) to different providers, which forces patients to visit multiple providers, increasing the diagnostic delay. They also highlight the contracting of providers mostly outside the local area (despite availability of closer services), which increases travel costs; as well as the short duration of contracts, which results in patients being turned away from centers where the contract has ended, leading to a restart of the referral process.

> *"The EPS* [Empresas Promotoras de Salud - healthcare insurers] *(…) are always looking for if something costs a hundred pesos here and ninety there. So, they don't mind having a little bit contracted here, another there, another here, another there, which creates more bureaucracy for the patient"* (Manager, Colombia)

3.4. Factors related to population characteristics

In the informants' discourse, various interconnected population characteristics commonly emerge that exacerbate the challenges in dealing with the access barriers to diagnosis described above: 1) an elderly population with limited support networks, which can in turn be compounded by low socioeconomic and/or educational levels; 2) precarious employment conditions; and 3) residence in rural or peripheral urban areas. The lack of support networks among the elderly hinders –and their presence facilitates– both their ability to travel to the health services and their capacity to handle administrative tasks, due to difficulties in understanding the information provided. Precarious employment conditions and residing in rural or peripheral urban areas make it difficult to assume the direct and indirect costs of transportation (including loss of income and time), particularly when accessing SC/TC. Moreover, for individuals residing in rural areas, even accessing PC can be challenging.

"(…) there's another issue here, and that is (…), elderly people who live alone, they've got no family, and if there's no caregiver with them, well, it's really difficult to navigate through the [diagnostic] *process with these people*" (Policymaker, Colombia).

"What's more, these are people who also don't have the financial means to pay for the bus fare (…) Rural transport isn't cheap either. So, spending $5000, $6000 [5.35-6.42US$], on a trip to the doctor, only to then be told, 'You know what? Come back next month, or … come back in another 2 weeks to get an appointment.' (…) It's not an option for people, and that's where we lose them altogether" (SC health professional, Chile).

"Another big issue is that people there can't afford not to work; they live hand to mouth. So, farmers, for example, say, 'You know what, doctor? I can't even afford to stay in hospital until the doctor sees me, because I make a living from farming.' 'Yes, OK, fine, I'll come back.' But they don't" (SC health professional, Ecuador).

4. Discussion

This study contributes to the understanding of factors related to health systems organization, policies and services that affect access to cancer diagnosis from the first contact to confirmation in the public health subsystems of the three study countries and may serve to elucidate differences in provider intervals and pathways during cancer diagnosis. To the best of our knowledge, this is the first cross-country comparative study of factors influencing access to cancer diagnosis based on the firsthand experience of healthcare professionals, managers and policymakers. This approach enables the identification of factors related to health system characteristics, and could be adopted in other contexts, such as in Europe, where no conclusive results have been found to date on the influence of system-related factors on cancer outcomes (Brown et al., 2014).

The results show the confluence of numerous barriers that contribute to making access to cancer diagnosis difficult in the three countries analyzed. Although many of these barriers are also present in access to care for other diseases/health conditions (Garcia-Subirats et al., 2014) the urgent -in terms of health consequences- and resource-consuming nature of cancer diagnosis –in terms of equipment and trained staff– makes them more critic, meaning also that cancer could be used as a tracer condition to analyze problems of access and quality of health systems and their healthcare networks (Seguin et al., 2020).

4.1. Structural and organizational barriers to access related to the healthcare system organization

In all three countries, common factors emerge from the stakeholders' discourse that influence access to cancer diagnosis, contributing to its delay. These factors are related to structural and organizational characteristics of the healthcare networks and the population. Specific barriers related to the organization of healthcare systems are also identified: in Chile, problems with the design and implementation of prioritization policies and its interaction with the strategy of private services purchasing, both by public providers (outsourcing) and by patients (through the voucher system); in Colombia, with the design of the benefits plan and managed care mechanisms of insurers that restrict service provision; and in Ecuador, with a public healthcare system experiencing financing deficits and shortcomings in the implementation of the integrated care model.

The study findings reveal that structural barriers related to deficits in material and human resources, and consequently, waiting times during diagnosis, as generally reported by other studies (Campaña et al., 2023; Gonçalves et al., 2014; Machado Feijó et al., 2016; Mota et al., 2021; Unger-Saldaña and Infante-Castañeda, 2011), are particularly prominent in patient access to SC. The bottleneck effect, which results in the inadequacy of SC in public networks (medical consultations, pathology, and diagnostic imaging), particularly impacting cancer diagnosis, has been reported by other studies in the study countries and the wider region (Guzmán Finol, 2017; Solla and Chioro, 2009). The decline in public service provision has been consistent over time in all three countries, in contrast with the private sector, as a result of the introduction of neoliberal privatization reforms in their healthcare systems (Martinez-Gutierrez and Cuadrado, 2017; Atun et al., 2015; Homedes and Ugalde, 2005). The deficit is often associated, in addition to insufficient and inadequate funding, with limited cross-level clinical coordination within the healthcare network (Vázquez et al., 2017).

While further research is needed, the results suggest that the implementation of private contracting mechanisms within public health systems does not enhance timely access to cancer diagnosis. Instead, it generates socioeconomic and geographical inequalities in access and quality issues in diagnosis. These consequences are related to the combination of market incentives, weak regulation, and bureaucratic procedures. Studies in other contexts show that the use of private services in addition to public ones does not contribute to reducing the diagnostic interval, as it further fragments the diagnosis into multiple providers (Nnaji et al., 2022), and transfers the responsibility for navigating the diagnostic process to the patient.

4.2. Mechanisms for prioritization/rationing of services as barriers to access

While the introduction of explicit priority setting schemes is often recommended to address the distribution of limited resources, the results show that deficiencies in their design and implementation can create barriers and inequalities in access to cancer diagnosis. At the macro level, this is evident in the case of AUGE Law/GES in Chile which, according to informants, puts low-income populations at a disadvantage to acquire diagnostic tests privately and benefit from the treatment timeframe for cancer in the public system, and reduces resources for the timely diagnosis of non-priority population groups and cancers. The exclusion of certain diagnostic tests from the PC portfolio in Colombia and Chile is another factor that restricts access to required tests to formulate a diagnostic suspicion and refer the patient quickly. This aspect is deemed critical in countries with PC-based models of care that have achieved significant improvements in early cancer diagnosis (Seguin et al., 2020).

At the meso (network) level, informants in Colombia report issues with managed care mechanisms such as authorizations, which often result in insurers rejecting tests requested by PC doctors, making it difficult for them to formulate a diagnostic suspicion and prolonging waiting times and travel costs during the diagnostic process, or the fragmented purchasing of services during diagnostic episodes from multiple providers, which makes patients' trajectories even more complex. These results contribute to the existing evidence (Abadia and Oviedo, 2009; Vargas et al., 2012) on the risks to access when transferring the responsibility for organizing service provision –and setting priorities/rationing in care– to private insurers in low-resource settings with weak regulation, especially for diseases with high treatment costs such as cancer, where insurers may have incentives to hinder access to diagnosis to avoid the treatment costs.

4.3. Interaction of service and population factors along the care pathway

One of the most relevant findings, with some theoretical implications, is the evidence that the factors influencing access to cancer diagnosis feed into each other throughout the process, causing cumulative or 'cascading' delays (Morris et al., 2020) (e.g., tests, consultations at different care levels, authorizations, etc.) until diagnostic confirmation is finally reached. This supports later revisions of Andersen's trajectory model (Scott et al., 2013) and is further supported by qualitative studies from the patients' perspective (Unger-Saldaña and Infante-Castañeda, 2011), which emphasize that the patient trajectory during cancer diagnosis is not linear (patient interval followed by provider interval), but rather that there may be periods of reassessment and changes in the decision to seek care for their symptoms or to continue with the diagnostic process, especially when patients face significant barriers to access. Furthermore, the results confirm that population related factors not only influence the patient interval, but also the provider interval, just as service-related factors can influence the patient interval (Unger-Saldaña and Infante-Castañeda, 2011; Vázquez et al., 2022).

In this interplay of factors, a notable example lies in the nexus between those related to professionals (such as the limited knowledge of PC doctors) and organizational factors (e.g., restricted access to diagnostic tests, short consultation times, and discontinuities in doctor-patient relationships). These factors reinforce each other, thereby amplifying the likelihood of diagnostic errors and delayed referral of patients to SC. This phenomenon contributes to elucidate the misdiagnoses reported in studies conducted from the patients' viewpoint within the region (Campaña et al., 2023; Cavicchioli et al., 2007; Fermo et al., 2014; Unger-Saldaña and Infante-Castañeda, 2011). Another significant feedback loop occurs between various population characteristics that intersect and compound the access barriers during cancer diagnosis, such as an aging and dependent population, low socioeconomic status, limited support networks, and residence in rural areas. The direct and indirect costs associated with travelling to services (for example, specialized services outside the local area, or the back-and-forth between the patient's insurer and multiple service providers in Colombia) emerge as relevant barriers to access, even more so than the almost absent copayments in the discourse. These costs discourage the use of services during the diagnostic process and may even lead to patients abandoning it altogether. Therefore, it is essential to take an intersectional approach both in assessing access to early cancer diagnosis and in designing interventions to improve equity in access or the role of PC in early cancer diagnosis.

4.4. Limitations of the study

Data collection in Ecuador coincided with one of the COVID waves, so more than half of the interviews had to be conducted online or by telephone. To ensure the quality of the data collected, participants were informed of the importance of providing sufficient time and adequate space for the interview, as well as maintaining the cameras to facilitate interaction with the researchers. Selecting informants through an institutional contact and carrying out the interviews in the health services may both have introduced a bias towards a more positive discourse in all three countries. This limitation was addressed by involving the research team in the selection process, discussing informant profiles based on theoretical criteria, sufficient informants and expressly clarifying the confidentiality of information at the beginning of the interviews.

5. Conclusion and recommendations

In conclusion, the results reveal significant barriers to accessing cancer diagnosis in all three countries, stemming from structural and organizational features of the healthcare networks, coupled with specific barriers related to healthcare system organization and policies. The results contribute to a better understanding of the factors that explain the diagnostic delays identified by some existing studies and future research results. To address these barriers, specific policies for cancer diagnosis are needed, as well as broader policies aimed at strengthening public healthcare systems and networks. Specific measures include training and support for PC doctors in diagnostic suspicion, agreements with SC doctors on signs and symptoms of alarm, referral criteria, and fast-track referral pathways to SC. General measures include improving access to effective PC with diagnostic testing and clinical coordination with SC; increasing investment in resources (diagnostic tests, personnel) at the SC level; and implementing specific policies to improve access for vulnerable populations such as the elderly with low socioeconomic status (information dissemination, assisted transportation to healthcare facilities) and for residents in rural/peripheral urban areas (transportation to diagnostic centers, improved access to PC). Additionally, at the country level, the elimination/regulation of managed care mechanisms is recommended in Colombia; improving public financing and the articulation of the health system for an effective implementation of the PC-based healthcare model in Ecuador; and the review of criteria in the policies to extent the maximum waiting time for symptomatic patients to start from the moment of initial diagnostic suspicion in Chile.

CRediT authorship contribution statement

Ingrid Vargas: Writing – review & editing, Writing – original draft, Visualization, Methodology, Investigation, Funding acquisition, Formal analysis, Conceptualization. **Amparo-Susana Mogollón-Pérez:** Writing – review & editing, Supervision, Resources, Project administration, Investigation, Formal analysis, Data curation. **Pamela Eguiguren:** Writing – review & editing, Supervision, Resources, Project administration, Investigation, Formal analysis, Data curation. **Ana-Lucía Torres:** Writing – review & editing, Supervision, Resources, Project administration, Investigation, Formal analysis, Data curation. **Andrés Peralta:** Writing – review & editing, Supervision, Investigation, Formal analysis, Data curation. **Maria Rubio-Valera:** Writing – review & editing, Project administration, Investigation. **Signe Smith Jervelund:** Writing – review & editing, Project administration, Investigation. **Josep M. Borras:** Writing – review & editing, Investigation. **Sónia Dias:** Writing – review & editing, Project administration, Investigation. **María-Luisa Vázquez:** Writing – review & editing, Writing – original draft, Supervision, Resources, Project administration, Methodology, Investigation, Funding acquisition, Formal analysis, Conceptualization.

Availability of data and materials

The dataset (which includes individual transcripts) is not publicly available due to confidentiality policies. Nevertheless, additional examples of the categories under analysis are provided in the supplementary material (Additional file 1). Furthermore, a comprehensive table of citations for all categories and subcategories of analysis is available at: https://zenodo.org/records/12804990.

Ethics approval

This study complies with international and national legal stipulations on ethics. Conditions of the study procedure were approved by each country's ethical committee: Comité Ético de Investigación Clínica (CEIm) del Parc de Salut Mar, Barcelona, Spain. Comité de Ética de Investigación con medicamentos (CEIm) de la Fundació Sant Joan de Déu, Barcelona, Spain. Comité de Ética de la Investigación de Salud Metropolitano Norte (CEI-SSMN), Santiago de Chile, Chile. Comité de Ética en Investigación de la Universidad del Rosario (CEI-UR), Bogotá, Colombia. Registration No.: 11878848 in Information, Research and Innovation Systems of the Universidad del Rosario. Comité de Ética de la Investigación en Seres Humanos CEISH-PUCE de la Pontificia Universidad Católica del Ecuador (PUCE), Quito, Ecuador. Registration No.: 030-UIO-2021 in Research Register of the PUCE.

Funding

This study has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 965226 on the call topic SC1-BHC-17-2020, Global Alliance for Chronic Diseases - Prevention and/or early diagnosis of cancer. The funder had no role in study design, data collection and analysis, decision to publish, or preparation of the manuscript.

Acknowledgements

The authors are most grateful to the Local Steering Committees, professionals, managers and policymakers that participated in the study and generously shared their effort, time and opinions. We thank Kate Bartlett for her help with the English version of this article and the European Union's Horizon 2020 research and innovation programme for the funding. We highly appreciate the contributions to this study of the following individuals who, together with the authors of the paper, formed part of the **EquityCancer-LA project** led by M.L. Vazquez (mlvazquez@consorci.org). Spain: Aida Oliver, Verónica Espinel, Zahara Fernández (Consortium for Health Care and Social Services of Catalonia), Ignacio Aznar-Lou, Paula Arroyo-Uriarte, Montserrat Gil-Girbau, Antoni Serrano-Blanco, (Institut de Recerca Sant Joan de Déu); Chile: María Luisa Garmendia, Ana María Oyarce, Camilo Bass, Isabel Guzmán, Andrea Alvarez, Paola González (Public Health School Dr. Salvador Allende Gossens, University of Chile), Isabel Abarca, Rodney Stock, Berta Cerda, (National Cancer Institute), Guillermo Hartwig, Cristopher Tabilo (North Metropolitan Health Service), Carmen Aravena, Gloria Stephens (South Metropolitan Health Service); Colombia: Virginia Garcia, Ana Maria Restrepo, Angela Pinzón, Carol Cardozo, María Camila Rangel, Pablo Cristancho, Ana María Arellano, Lilian Gabriela Cala (School of Medicine and Health Sciences, Universidad del Rosario); Juan Gabriel Merchán, Omar Velandia, Rafael Torres, Mauricio O′Byrne, (Hospital Universitario la Samaritana), Liliana Lancheros (Hospital Profesor Jorge Cavalier, Cajicá); Oscar Duarte (Hospital San Rafael de Fusagasugá); Ecuador: Iván Dueñas, Hugo Pereira, Daniel Ruiz, Estefanía Rodríguez (Public Health Institute, Pontifical Catholic University of Ecuador); Portugal: Julian Perelman, Ana Gama, Patricia Marques, Inês Fronteira (National School of Public Health, NOVA University of Lisbon). Our sincere thanks also to Bettina Müller, Raúl Murillo and Karla Unger-Saldaña for their reflections as members of the International Scientific Committee of the project.

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.socscimed.2024.117499.

Data availability

The data that has been used is confidential.

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