Challenges and Recommendations for Conducting Research in Primary Health Care Practice: An integrative review

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Abstract

Background

Primary care practice-based research is valuable for advancing scientific knowledge in real-world settings and promoting evidence-based practice. It has external validity to other primary health care settings, making translation of research findings easier. However, conducting such research can be challenging, especially in low- and middle-income countries with limited resources and infrastructure. Systematizing the challenges and recommendations is necessary to support researchers in producing high-quality research in primary care.

Objective

To identify challenges and recommendations for conducting practice-based research in primary health care services.

Method

An integrative literature review was performed on PubMed, Embase, Scopus, Web of Science and Lilacs databases.

Results

440 articles were identified and 25 were included in the analysis. There was a prevalence of descriptive studies, conducted in developed countries, and the majority with the participation of physicians. The challenges and recommendations for conducting practice-based research in primary health care services were grouped into six topics: research planning; infrastructure; engagement of health professionals in research; knowledge translation; relation between universities and practice; international partnerships and collaboration.

Conclusion

The challenges to implementing research in primary health care settings are similar in several analyzed contexts and the recommendations found point to the necessity for lasting and systemic action that engages managers, decision makers, academics, health professionals of different categories and users, aiming towards the sustainability and transformation of the practice.

Introduction

In spite of global efforts towards strengthening primary health care (PHC) in the last 40 years, providing accessible and good quality patient-centered health care is still a challenge to most countries. Recently, the report *Operational Framework for Primary Health Care* (2020) released by the World Health

Organization reinforced the principles of the Astana Declaration highlighting 14 levers that must be simultaneously pulled to promote PHC across the world[1].

One of those 14 "operational levers" describes the importance of conducting research that is meaningful for PHC: "*Research and knowledge management, including dissemination of lessons learned, as well as the use of knowledge to accelerate the scale-up of successful strategies to strengthen PHC*"[1]. Although conducting research that meets these premises is not simple, primary care practice-based research (PC-PBR) has become an important vehicle for the development of science in the real world, because of its external validity to other PHC settings and contexts, making knowledge translation easier to put evidence into professional practice[2].

PC-PBR happens in the context of patient health care in the community, resulting in the research questions being primarily generated by the health services in order to respond to the needs of their territory[3]. PHC is responsible for being the first point of contact for a patient which all health problems should get go through, PHC can and must serve as the setting for conducting practice-based research, involving implementing innovations, studies to improve the quality of care for various health conditions such as mental health[4] and chronic kidney disease[5], or in the context of public health emergencies like the Covid-19 pandemic[6].

One solution to foster this type of research is creating practice-based research networks (PBRN). Their aim is to bring health care professionals, researchers, health managers, and academic institutions together, facilitating partnerships, providing structure and technical support to health care professionals to carry out research projects that are developed and conducted in PHC settings to tackle important aspects of PHC[7,8]. They also help on the job of acquiring fundings, capacity building, organizing the necessary logistics to put a research project in place and all sorts of tasks from study design to publication[3,9]. In this way, PBRNs seek to promote a culture of scientific research in an environment originally dedicated to health care[10] and to answer relevant questions about the local health needs of PHC services. PBRNs are increasingly seen as institutions that can simultaneously conduct research in an efficient manner and catalyze changes in the practice[11], serving as laboratories for approaching important challenges to PHC.

Even though the literature on PC-PBR is growing, "how to implement a PBRN and how to scale PC-PBR?" and "How can a healthcare service become a setting for knowledge and innovation production?" are two questions still unanswered. Moreover, scenarios with incipient PHC could benefit from evidence-oriented policies and practice-oriented research. To answer these two questions, available information from places that already run PC-PBR projects needs to be systematized around the challenges, obstacles and solutions found by other researchers. Aiming to help researchers from low- and middle-income countries that are willing to produce research in primary care, we performed an integrative review identifying the challenges and recommendations for carrying out PC-PBR.

METHODS

An integrative literature review was performed based on the methodology proposed by Whittemore & Knafl (2005)[13] that includes (a) identification of the problem, (b) literature search, (c) evaluation, (d) analysis and (e) presentation of results. Additionally, the literature search stage was performed accordingly to the *Preferred Reporting Items for Systematic Reviews and Meta Analyses (PRISMA) Checklist*[14].

Differently from a systematic review, the broader focus of an integrative review enables the inclusion of studies using different methodologies (qualitative, quantitative and mixed) in the analysis and supplies the methodological rigor necessary to a broader understanding of one specific phenomenon[15,16].

Literature Search

The research question was developed using the PICo framework (Population, Interest and Context). The elements were organized by P - Primary health care (PHC); I - Challenges and Recommendations; Co - Practice-based research (PBR); resulting in the guiding question: "What are the challenges and recommendations to carry out PBR in PHC?" Data was collected in February 2022 from the databases PubMed, Embase, Scopus, Web of Science and Lilacs, using descriptions and keywords from the *Medical Subject Headings* (MeSH) and Health Science Descriptions (DeCS), combined with the Boolean operators "AND" and "OR" (Table 1).

Table 1
Search strategies, according to the database and Boolean operators. São Paulo, SP, Brasil, 2022.

Database	Search Strategies
Scopus	(KEY ("Primary care" OR "community-based care" OR "community-based PHC") AND TITLE-ABS-KEY ("family practice research" OR "practice based research" OR "service research") AND KEY ("barriers" OR "challenges" OR "capacity building"))t
Pubmed	(Primary care [Title/Abstract] OR community-based care [Title/Abstract] OR community-based PHC [Title/Abstract]) AND (family practice research [Title/Abstract] OR practice based research [Title/Abstract] OR service research [Title/Abstract]) AND (barriers[Title/Abstract] OR challenges [Title/Abstract] OR capacity building [Title/Abstract])
Embase	('primary care':ti,ab,kw OR 'community-based care':ti,ab,kw OR 'community-based phc':ti,ab,kw) AND ('family practice research':ti,ab,kw OR 'practice based research':ti,ab,kw OR 'service research':ti,ab,kw) AND ('barriers':ti,ab,kw OR 'challenges':ti,ab,kw OR 'capacity building':ti,ab,kw)
Web of science	Primary care OR community-based care OR community-based PHC (Author Keywords) and family practice research OR practice based research OR service research (Topic) and barriers OR challenges OR capacity building (Author Keywords)
Lilacs	(Primary care) AND (research) AND (based) AND (practice)

Study Selection

Articles in English, Spanish and Portuguese were included, independent of the publication year. Review studies; essays; letters to the editor; studies conducted in non-PHC settings, e.g. emergency services, and those focused on specific health problems were excluded.

Two researchers independently screened the articles by title and abstract, and disagreements were discussed and mediated by the authors. After this stage, the studies were read in their entirety, and the data collected, common understandings and disagreements amongst the researchers were examined by the research group during the analysis phase.

Data Extraction

Data were extracted from the articles and mapped using a spreadsheet created by the authors to identify the following aspects that were relevant to answering the research question: authors names; year of publication; type of study; country where the study was conducted; objectives; methods; study population; main internal and external challenges to putting research in PHC into practice; and recommendations for its implementation.

Data analysis

Data analysis was had three phases: pre-analysis; data analysis; and interpretation of the results. In the pre-analysis stage each article was read and had its information extracted and stored in a spreadsheet created to summarize all articles included in the study. In the data analysis stage, the content was categorized according to the similarities of the barriers and challenges identified. Finally, in the interpretation of the results, a reflective and critical analysis of the content was conducted, summarizing the content into themes of analysis[17].

Results

440 publications were identified in the databases. After excluding duplicate studies (n = 120) and those that did not answer the guiding question (n = 283), 37 studies were read in their entirety. Of these, 12 were excluded for not meeting the eligibility criteria. The final sample was composed of 25 studies (Fig. 1), being the majority were published in the past two decades and conducted in high-income countries (HIC), primarily the United States of America (n = 13). Additionally, case studies focusing on the medical profession were largely predominant (Table 2).

Table 2

Description of the primary studies included in the integrative literature review according to the lead author, year, country, objective, population, and type of study.

Authors	Year	Country	Objective	Population	Type of Study
Robitaille et al.[18]	2014	Canada	Describe an original and systemic recruitment process that was created to overcome the main barriers to enrolling family physician-patient pairs in Practice-based Research Networks.	Family physicians (n = 276) and patients(n = 276)	Observational description
Planas et al.[19]	2019	USA	Describe the perceptions of a group of physicians who are part of PBR about: development of a pharmaceutical that works with PBRN, aspects of the practice that can benefit from the collaboration with pharmaceuticals that are part of a PBR and benefits and challenges from the participation of the PBR members.	Physicians (n = 15)	Qualitative study
Mash[20]	2020	South Africa	Describe the experience of implementing the Stellenbosch University Family Physician Research Network (SUFPREN)	Family physicians (n = 25)	Experience report
Michalec et al.[21]	2013	USA	Understand the perceived restrictions on primary care practices from being involved in studies with perspectives on the micro, meso and macro levels.	Professionals from 5 Primary Care Clinics (n = 17)	Qualitative study

NG = Not given

Authors	Year	Country	Objective	Population	Type of Study
Bodenheimer et al.[22]	2005	USA	Alert researchers to pitfalls they may face when working with the double motive of research and improving the practice.	Practice-based Research Networks (n = 17)	Case study
Davies et al.[23]	2002	UK	Evaluate the interest level for research among nurses who work in Essex and East London, United Kingdom; (2) identify the research priorities for nurses in the practice; and (3) explore the factors that facilitate or hinder the development of practice-based nursing research.	Nurses (n = 1054)	Mixed methods
Loskutova et al.[24]	2018	USA	Present a detailed case study of the recruitment methods and results used in a large practice-based study.	Primary Care Clinics(n = 25)	Case study
Thandi et al.[9]	2021	Canada	Report recent descriptive discoveries about weaknesses, describe strategies for working in practice-based research and learning networks (PBRLNs) in primary care and share lessons learned to engage PBRLNs.	Physicians (n = 109)	Participation-based descriptive study
Ponka et al.[7]	2020	Guiana, Sub-Saharan Africa, Malaysia, Nigeria	Explore the current risks or barriers to research training in PHC, identify the ongoing tensions that need to be resolved and offer solutions.	Low and middle income countries (n = 5)	Multiple case report

NG = Not given

Authors	Year	Country	Objective	Population	Type of Study
Hudson et al.[25]	2006	USA	Provide a model to recruit community-based primary care clinics with minority physicians for research studies.	Primary care clinics (n = 18)	Intervention study
Cole et al.[26]	2014	USA	Describe the main non-technical challenges that the academic implementation team encountered during the project. The objective is to describe approaches that can be used to effectively tackle these challenges.	Primary care clinics (n = 9)	Implementation study
Soós et al.[10]	2010	Australia	Discuss key factors for establishing and developing the organizational structure of the Victorian Primary Care Practice Based Research Network (VicReN) and describe the outcome measures used to evaluate the network.	Primary care professionals and academics (n = 117)	Case study
Delaney et al.[27]	2012	USA	Develop electronic health records software to facilitate clinical primary care studies and explore barriers to the adoption of the prototype by PBRNs in the United States.	N/A	Case study

NG = Not given

Authors	Year	Country	Objective	Population	Type of Study
Macfarlane et al.[28]	2005	UK	Identify the main developmental and environmental structural characteristics associated with successful and sustained involvement in research and inform a national strategy for primary care research training.	Lead clinical doctors (n = 7), clinical doctors (n = 4), nurses (n = 10), research coordinator (n = 1) and managers (n = 6)	Qualitative study
Holden, et al.[29]	2012	Australia	Evaluate the impact of a research training approach for primary care teams using a validated quantitative measurement for research training for the individual, team and organization.	Multidisciplinary teams (n = 8)	Non-randomized study
Anderko, et al.[30]	2005	USA	Describe the experiences of the Community Nursing Homes with PBRNs in primary health care research and highlight the need for research on community-based primary care to approach the health disparities experienced by large populations in the United States.	Community nursing homes(n = 8)	Case study

NG = Not given

Authors	Year	Country	Objective	Population	Type of Study
Advocat, et al.[31]	2015	Australia	Describe a new three-way partnership between a health authority, a primary care organization and a university on the suburbs of southeastern Melbourne. The partnership, known as SAPCRU, is a potential model for organizations that seek to bridge the gap between research and the real world.	Representatives of the partnership organizations (n = 9)	Case study
Hoffmann et al.[32]	2015	USA	Describe a qualitative evaluation of the experiences of primary care physicians and the clinical team that participated in various Practice-based Research projects.	Doctors, advanced practice nurses, nurses, clinic managers/directors, physician's assistants, lab techs, receptionists and admin staff(n = 53)	Qualitative study
Wasserman et al.[33]	1998	USA and Puerto Rico	Describe the establishment of a national network for pediatric primary care research to improve child health care—Pediatric Research in Office Settings (PROS)—and evaluate the progress of the network in reaching its goals.	Pediatric doctors and nurses (n = 1400)	Case study
Mold et al.[34]	2012	USA	Discuss the potentials of a coordinating center for multiregional PBRN studies based on 2 recent studies.	Coordinating centers for research based on primary care practice	Observational description

NG = Not given

Authors	Year	Country	Objective	Population	Type of Study
Romani et al.[35]	2016	Bahrain, Egypt, Iraq, Jordan, Lebanon, Oman, Saudi Arabia, Syria and UAE	Explore the current status of academic research on primary care in Arab countries and investigate the barriers to its adequate implementation.	FCM academics in Arab countries (n = 139)	Observational description
Farland, et al.[36]	2012	USA	Describe the steps taken by UT Pharm Net using a structure of principle strategies and directives to successfully develop a PBRN in various areas of interdisciplinary primary care practice.	Pharmacy students and residents (n = NG)	Observational description
Nagykaldi et al.[37]	2008	USA	Describe how the technology Access Grid (AG) was used by a PBRN.	American PHC practice-based research networks (n = NG)	Observational description
Morténius[38]	2014	Sweden	Describe, accompany and evaluate a primary care campaign based on strategic communication designed to increase health professionals' interest in R&D over time.	Members of the PHC team (nurse, medical secretary, admin staff, midwife, physiotherapist, occupational therapist, dentist, psychologist, physician)(n = 846)	Cohort study
Dolor et al.[2]	2011	USA	Develop an open-access site providing adaptable resources to facilitate best practices in research.	Researchers (n = 55)	Observational description

NG = Not given

Authors	Year	Country	Objective	Population	Type of Study
Heal et al.[39]	2008	Australia	Describe the process of conducting a successful randomized controlled trial in a PHC environment and identify facilitating factors and barriers to investigating the effect of letting sutures be damp and discovered in the first 48 hours after small excisions.	PHC users (n = 857)	Description of a randomized controlled trial
NG = Not given					

During the data analysis, six overarching themes and 15 sub-themes related to the challenges of carrying out PC-PBR emerged. Among these challenges, difficulties regarding *research planning* were noteworthy, with issues ranging from excessive bureaucracy to challenges in planning and developing a research project. *Engagement of health professionals in research* was recognized as one theme encompassing four different sub-themes: lack of training and experience in scientific writing; difficulties with foreign languages; previous negative research experiences; and fears of negative impacts on the healthcare team, patients and productivity. *Challenges regarding knowledge translation* detail the difficulties in applying the knowledge acquired from one research into a change in the daily work. *Infrastructure issues* are related to the location of the health services and how disperse they can be in one area, to the lack of technological tools and to the little access to funding resources to sponsor more robust and long-term projects. Finally, *weak relationship between universities and health services* can lead to little – or even no – collaboration between research institutes and PHC practices. The *lack of international partnerships* is finally presented as one main challenge for low- and middle-income countries (LMIC) since such collaborations could be helpful in building capacity for young research centers to address pressing issues for contexts where PHC is still very incipient. (Table 3).

Table 3
Summary of findings on challenges for conducting PC-PBR.

Main Topic	Sub-topics	Keys
Research planning	Bureaucratic aspects/flows	Submission to and approval by the ethics committee
	Project preparation and development	Choosing the research question
Engagement of health professionals in research	Research abilities	Lack of training
		Lack of experience with scientific writing
		Ability and confidence to start and conduct studies
		Difficulty with the language of the articles
	Fears of professionals and management	Frustrating research experiences
		Fear that the study will hinder the team and relationship with patients
		Fear that the study will have a negative impact on patients
	Organizational aspects	Lack of time to dedicate to research
		Heavy caseload
		Research activities overloading clinical tasks
		Competing demands (care and scientific) negatively impacting productivity
		Institutional consent to the professional's participation in a research project
	Incentives and advocacy	Little incentive for PHC research
		Lack of interest, engagement and motivation for health professionals
		Lack of support for research from health services
Knowledge translation	Application of knowledge	Difficulting translating knowledge into health policies and practices
		Lack of randomized studies estimating outcome measures of campaigns
Infrastructure	Location and structure	Geographic isolation in remote and rural areas
		Precarious physical structure to host a research group

Main Topic	Sub-topics	Keys
	Technological resources	Irregular internet access
		Differences in data-sharing systems
		Unavailability of electronic records
		Precarious access to software and statistical tools
		Lack of adequate technology for sharing data
	Funding	Limited financial resources to invest in infrastructure
		Costs progressively increase as a research network grows
		Shortage of financial resources to conduct studies, especially in low- and middle-income countries
Relationship between universities and health services	Training	Offering of research courses and trainings is restricted to master's and doctorate program norms
		Shortage of qualified supervisors
		Lack of interprofessional collaboration and education with a multidisciplinary approach
	Integration of research and practice	Distance between health professionals and researchers
		Universities and research centers maintaining a conservative view of the way to conduct studies
		Precarious link between universities and health services
		Academic priorities do not reflect community needs
		Lack of a common agenda between universities and PHC services
Partnerships between countries	Exodus of researchers	"Brain drain" on different levels
	International collaboration	Little international collaboration to conduct studies in developing countries
		Lack of training to do research in developing countries

The recommendations listed in the articles included in this review were organized according to the challenges described in the previous session. The following were highlighted: suggestions related to creating a research agenda adapted to each reality; training strategies to develop research skills; sharing the results with all stakeholders involved, from participants to health managers and decision makers; and the importance of creating networks for practice-based research (Table 4).

Table 4
Recommendations for conducting PC-PBR.

Challenges	Recommendations
Research planning	Understand how your regional ethics committee works
	Include all stakeholders in the study (professionals, researchers, patients, employees), from initial development to conducting the study
	Consider the entire served population as a potential study population
	Think proactively and create an agenda for studies based on your reality
	Identify national and international funding opportunities
Engagement of health professionals in research	Hold trainings with the goal of developing research skills and sharing experiences
	Initiate scientific activities with "small projects"
	Involve patients in designing practice-based research projects
	Guarantee protected time in the professional agenda to develop studies
	Advocate for studies to be done in PHC practice settings
	Promote opportunities for collaboration among individuals
	Incentivize professionals to learn more about studies and reflect on their own practice
	Involve different parties, especially governments and academic institutions, societies and funding institutions and promote the coordination of efforts for research
Knowledge translation	Plan the stages involved in knowledge dissemination
	Guarantee dialogue with health policy makers and identify priorities and particularities of implementation in countries' different development contexts
	Seek out the best ways to implement the results of studies
	Share the results with study participants, professors and academics, health professionals and municipal managers
	Identify opportunities to speed up the translation of discoveries into practice
Infrastructure	Connect universities and research institutes to local practice-based research networks
	Work collaboratively with all parts of the network, establish clear priorities
	Use secure technology to identify potential patients, facilitate communication between information systems

Challenges	Recommendations
	Develop and use coordinating centers as a way to strengthen the PBRN research infrastructure and increase the reliability and generalization of the study results
Relationship between the universities and practice	Involve the community and understand local needs
	Bring research networks closer to PHC professionals
	Strengthen the interaction between universities, research institutes and practice to guarantee joint ownership of the research
	Establish international and multidisciplinary collaborations
	Consider the possible conflicts between research and the change in practice
	PBRN projects should be led by professionals or professors who have health care activities in PHC services
	Establish practice-based research networks, contributing to the increase of relevant research on the local level and to building up research capabilities
	Define the roles of members from academia and health services and select a coordinator who is responsible for the research project.
Partnership between countries	Explore different contexts of practice to enrich your research, establishing comparisons
	Defend the ability to research in all countries, including low- and middle-income countries
	Create contact networks between researchers from different countries
	Explore already existent collaboration opportunities

Challenges and recommendations for conducting PC-PBR Research planning

In this domain are combined a series of challenges related to designing a research plan, such as developing and refining a research question, designing a strategy for data collection and data analysis, writing and submitting a proposal for the ethics board committee and the amount of time it takes to get the approval to start the project.[7,9,19,20,22,31,34,40] The time needed to carry out and conclude a study is often very different from the amount of time needed to make decisions in health care. Conducting a study with the length of time necessary to meet the needs for the transformation of health services is hard task, since managers and decision makers may have more immediate expectations and hope for quick solutions to their problems[7]. To overcome this limitation, it is important that all stakeholders (managers,

patients, health professionals, and researchers) are involved in the study, mainly to facilitate the understanding of the steps that one study needs to go through until its publication[9,31,33].

Engagement of health professionals in research

Some decision makers and health managers have a fear that a research project can cause trouble to the way that a health facility is used to operate, impairing its productivity or even hindering the patients trust in the health service[7, 18, 19, 20, 21, 23, 30]. In addition, many managers see research projects as less important than the practice, without acknowledging the possible benefits of the research on patient care[24]. Researchers must bring these issues into debate with health managers and decision makers so that barriers like a lack of time dedicated to research, high caseloads limiting the time dedicated to research, and the needs for institutional approval to allow professionals to participate in research projects can be overcome[29]. If this is not done, it will be difficult to create a routine of knowledge production and innovative research that integrates health care professionals, patients and researchers to create robust scientific evidence with an impact on the workplace, on patients' care and on the quality of the services provided.

Knowledge translation

This theme involves the processes of generating, sharing and applying knowledge (not necessarily in that order)[7,34, 40]. In theory, carrying out PC-PBR is a powerful resource to make knowledge translation happen, since research questions are created to answer to local needs, relying on the participation of professionals – and sometimes the patients – in the practice.

However, one of the barriers to knowledge translation lies in the difficulty of adapting the knowledge to contexts that are distinct from those where one study was held, e.g., results from HIC being translated to LMIC. This reinforces the need to involve all stakeholders in the stages of designing the project to describe the particular aspects of the context where the research will be held, outlining this information in the discussion section of the article as well, making it easier for the reader to understand its external validity.[2,7 20, 33]

The long time span for the publication of the study results in scientific journals, in addition to the high rejection rate, are factors that further delay the process of knowledge translation.[40] Considering the dynamic nature of primary care services, studies should have a broad plan to disseminate results, with the intention of implementing the evidence in a timely manner.

Infrastructure

Challenges related to infrastructure are frequently found in PC-PBR studies, from the distance between primary care services in rural settings and the difficulty to reach some services, to the often lack of technology resources, such as internet access, and patients' electronic records.[7,9,19,26,34,36,40]

The lack of reliable, sustainable and systematic funding for PC-PBR research activities is the main obstacle to overcoming these infrastructure limitations and promoting the creation of PC-PBR.[7,10,19,21,25,30,36] Like every research initiatives, PC-PBR needs to be supported with adequate and constant funding. For that reason, researchers must remain attentive and updated to identifying funding opportunities.[31]

Health care services produce every day a large volume of data. Information about health care procedures, prescriptions, patients' profile, and all sorts of interactions between the patient and its healthcare provider. However, the quality of the information inputted and the way it is stored can limit its use.[9] It is essential for managers and stakeholders to verify how these data have been used, not only how practitioners use it for patients management, but also for research, surveillance, and accountability.

Confidential information should be strictly and safely handled so that no patient information becomes public, allowing its use for research with no harm for the patient or for the practice.[37] For this purpose, all parties using these data must agree to a common commitment across the PC-PBR network to develop and implement research programs. Ideally, the research priorities should be established by the researchers and managers, with a clear evaluation of the capabilities of each practice, of the information systems available and of the whole network. When used appropriately, these real-world data can generate new knowledge from the practice to improve patients' care.[31]

Relationship Between Universities And Health Services

Some studies highlighted the strains of integrating universities and health services[7,30,23]. The distance between these two scenarios can be explained by several factors: (a) the fact that academic priorities may not reflect the needs of the communities[7]; (b) weak connections between academia and primary care services[30]; (c) the lack of a mutual agenda between them combining common interests;[32] (d) the distance between researchers and health professionals;[7] (e) the restricted access to specific research training courses ran by universities, apart from formal master's and doctorate courses[23]. Such training courses are usually offered during work days, which limits the participation of those who work full-time as health care providers. Offering post-graduate courses in research aimed at health professionals and that take advantage of the students' experience to generate relevant research questions and new knowledge for health care could be transformative both for universities and health services. However, gathering together individuals who traditionally work in different sectors is not easy. In addition, creating organizational structures that support primary care-based studies can demand financial resources, time, and people that are not easily available[28].

Among the recommendations found in the articles to overcome this challenge, it is important that the research questions arise from the practice and that the roles of researchers, academics and health professionals are well-defined within the group. Besides this, it is important to select a coordinator responsible for managing the research project and the tasks that need to be executed.[20,37]

Implementing PC-PBR can bring results both for the practice and the academia, bringing together different professionals to achieve a common goal of improving patient care.[40] Strengthening the interaction between academia and primary care services can help to promote the sustainable development of research projects in which health professionals can develop innovations in health care that can be studied and tested, creating a virtuous cycle beginning with raising questions from the practice, conducting experiments, finding results and producing evidence that with serve the purpose of improving patient care and the health of the population.[30]

Partnerships between countries

In spite of this being a topic addressed in only two of the articles under analysis,[7] promoting international partnerships can be a solution to many of the challenges mentioned here. However, such collaborations are not yet a reality for many countries. There is a shortage of international initiatives to promote research courses and training, with the goal of bringing together mentors from HIC and young researchers from LMIC, and providing direction for conducting studies in contexts with little resources.

In addition, many professionals from LMIC who get involved in studies or education abroad end up migrating to other countries, contributing to the so-called "brain drain" of skilled professionals, worsening the inequality in the scientific production between HIC and LMIC.[7]

Addressing research projects within the local context and exploring opportunities for international collaboration is important enough to foster PBR and guide health professionals in places where universities and research institutes are not yet established. Moreover, it is important to consider the epidemiological profile, the cultural aspects and the social determinants of health in every scenario involved when an international collaboration is planned to be built. The different contexts of practice can enrich the research and establish comparisons that can be decisive for international scientific advance[7].

Discussion

The challenges and recommendations for the implementation of PC-PBR indicate operational, structural and political issues. One of the key aspects learned about planning a PC-PBR study is to identify and include all stakeholders (patients, employees, doctors and administration) in the development phase of the project, allowing for discussions about the study design and its implementation phases. This approach must become a constituent part of the study, being comprehensive to addressing barriers to participation, to obtain data, to analyze and interpret the results and, finally, to discuss its findings and implications. Additionally, planning data collection that demands little effort from the health professionals can strengthen the study's realization and the involvement of everyone in the study.

PC-PBR only happens if the professionals who are directly involved in patient care and health service management are integrated as part of the team of researchers, not being only the subjects of the

research. Though it is a great challenge, training health care professionals to conduct research in primary care is fundamental for the success of these projects[7,18,20,36,39].

Alternative research approaches, such as implementation research, have advanced and grown as new strategies to reduce the gap between research and practice, mainly because they systematically approach the factors that contribute to this gap, understanding the context and identifying barriers and solutions for delivering sustainable and effective health care.[41] Thus, to make progress in overcoming these structural barriers it is important to understand the essential pieces of the research process, without which a project will likely die prematurely. One of these elements is the minimal infrastructure required for PC-PBR research projects to be long-lasting and sustainable.[9,36]

The studies under analysis point out that the most promising way for this to happen is through collaboration between primary care services, universities and research institutes. In addition, these collaborations can provide training in research skills for health professionals, creating an conducive environment to exchanging experiences, ideas and questions about the practice. All of these suggestions will help to create a research agenda oriented towards solving real issues related to taking care of patients in primary care, which is the main objective of conducting PC-PBR[7].

The distance between universities and primary care settings is recurrently cited. This issue reinforces the idea that there is a place where knowledge is produced (universities and academia) that is different from the places where health care occurs. In other words, primary care seen as a place where scientific evidence produced by academia is put into practice.

Conducting scientific research within primary care practices is innovative and can create ruptures and conflicts when it affects the way the job is done or when it takes people out of their comfort zone. By placing health professionals—and at times, patients—as agents of research production, PC-PBR can change the way new knowledge is produced. If knowledge is traditionally produced in academia and then taken as a truth by the place where patient care happens, PC-PBR can not only generate new knowledge to change its own professional practice, but it can also bring new evidence to change the way academia works, guiding new research that is better aligned with reality.[37]

In some countries, a more horizontal construction of new evidence and knowledge translation can be seen between academia and health care practice. In Australia, for example, PBR protocols are designed with the aim of building a sustainable collaboration between a PBRN and an Advanced Center of Research and Translation in Health to build a research platform for planning, conducting and translating research evidence to improve care across the health care spectrum.[42]

Aligned with the need for partnership between universities and practices, international collaborations are also an opportunity to guide professionals in places where universities and research institutes are not yet established. Cases like Australia and New Zealand, where two PBR networks were established to incentivize research in the area of osteopathy, show that PBRN has the potential to facilitate the access

of professional researchers and clinics that are interested in collaborating with clinical tests and, thus, offer the scientific community an opportunity to conduct research with different methodologies in diverse contexts.[42]

Regarding the difficulties in engaging health professionals in PC-PBR, some examples listed in the articles were little experience in scientific writing, difficulties reading articles in foreign languages, limited self-trust and lack of training to start and conduct studies. Thus, studies recommend that universities and research institutes organize training courses to develop research skills, as well as exchanging experiences to determine shared research priorities[7].

Though essential, the development of research skills is not enough for the professionals to engage with and incorporate studies into their places of practice. For PC-PBR projects to advance, leadership is necessary to influence policy makers and managers, and advocate for studies to be directly connected with the practice where health care happens.

The majority of the selected studies highlighted the medical category in the discussion about PBR. However, it is important to expand the professional composition of PC-PBR beyond and consider other categories with the goal of organizing more participative and multidisciplinary studies. All health professionals must be invited to interact and collaborate with scientific activities and implement new projects. The inclusion of all health professionals, including community health workers, nursing assistants, and dental hygienists, who are commonly found in LMIC, can improve the development of research projects that will better take into consideration the patients' and the territory's needs.[7]

Implementing PC-PBR goes beyond research production, since the results of the studies produced by researchers, health professionals, users and managers, in addition to the lessons learned, are shared with the health service where the study was held, bringing greater transparency to the entire process and motivating more health professionals to actively participate in future research projects.[33]

Limitations

As this review was limited to literature that reported lessons learned and experiences conducting PC-PBR, few empirical studies with primary data from the practice were found. Additionally, there is little representation from LMIC. This limits the conclusions of this review to the contexts described here, i.e., HIC where PHC already has a solid structure and a robust research production. Exploring studies performed in PC-PBR networks and identifying their strengths and weaknesses would be a step forward in this sense, but it would demand greater operational efforts. However, this is a first review that is necessary for the advance of primary care research mainly in LMIC.

Conclusion

The challenges for implementing PBR are similar in the contexts analyzed, showing that turning one place that was originally designed for delivering primary care into a place of knowledge production is not a trivial task. The benefits depicted from the studies show that transforming the traditional methods of knowledge production and translation through PC-PBR can generate a virtuous cycle, providing criticism and reflection about the practice and generate innovations and new knowledge to improve healthcare and patients' health and wellbeing. Additionally, the found recommendations point to the need for lasting and systemic actions involving health managers, decision-makers, academics, different types of health professionals and patients, aiming to transform PHC practice in the long term. In spite of being more the exception than the rule in Brazil, PC-PBR has the potential to transform a PHC system that is still under development into an innovative, socially accountable, more comprehensive, accessible, and patient-centered healthcare approach.

Declarations

Ethics approval and consent to participate

Not applicable.

Consent for publication

Not applicable.

Availability of data and materials

All data generated or analysed during this study are included in this published article.

Conflict of interests

The authors declare that they have no conflict of interests.

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Authors' contributions

Conception and planning of the study: DB and AGJ. Writing the main manuscript text: DB, LB, LYA, IEO, SRMV, CNM, AGJ. Analysis and interpretation: DB, LB, LYA, IEO, SRMV, CNM, AGJ. All authors read and gave final approval for the final version to be published and agreed to be accountable for all aspects of the work.

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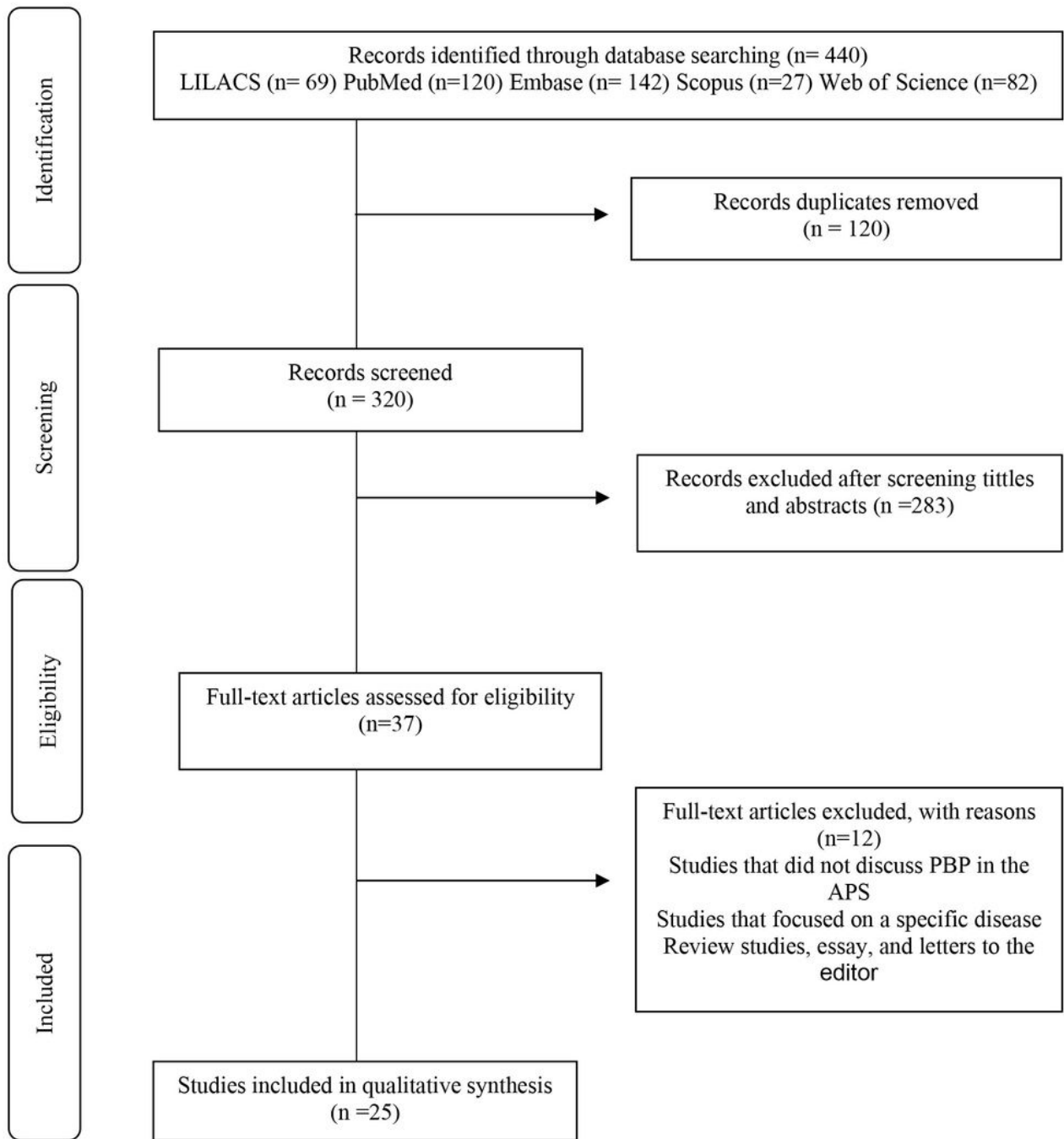
Figures

Figure 1

Flowchart of study selection