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Fostering translational research in chronic disease management: a logic model proposal

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Abstract

Translational research aims at reducing gaps between fundamental scientific discoveries and real-world applications. However, the trajectory of most scientific discoveries along the translation research continuum remains highly complex. Logic models are powerful tools that can help reduce this complexity. They are often used to lay out road maps and depict the relationship between activities and their intended effects. Few if any existing tools have been designed to guide the implementation and evaluation of collaborative models between community-based primary health care and biomedical research. To address this gap, we developed a logic model in two stages: 1) a literature review; and 2) the drafting and revision of the model by experts in the field. We describe its components, including objectives, inputs, activities, target groups, outputs, and results for a collaborative model involving fundamental biomedical research and primary health care practices. Our proposed logic model provides a road map that has the potential to reduce the complexity faced by translational research in chronic diseases by providing guidelines for decision-makers. Future work should attempt to validate the model before its broad-based implementation.

Keywords: Collaboration, Chronic disease management, Primary health care, Professional, Logic model, Translational research, Biomedical research, Community primary health services, Guidelines

Background

Health research can be construed as being composed of four main pillars: 1) biomedical research; 2) clinical research; 3) health services; and 4) population and communities health [1]. Biomedical research is a key component of health research and is crucial to understanding health issues [2], and primary care is the cornerstone of most health systems [3, 4]. Application of biomedical discoveries (pillar 1) in community-based primary health care (CBPHC) (pillars 3 and 4) to combat chronic diseases represents an important example of the research continuum from evidence to practice [3, 5]. As evidence emerged of a serious gap in the translation between these pillars of health research, policy makers and funding institutions of several countries have increasingly emphasized translational research, which aims to bridge these gaps [6]. However, addressing high priority research questions along with planning, implementing, and managing the performance of a successful health program is a complex process where multiple dimensions need to be considered. The logic model is a powerful organizational tool that can address this issue. It is defined as a graphical representation of how a program is intended to work and links objectives with processes and outcomes, as well as with the theoretical assumptions of the program

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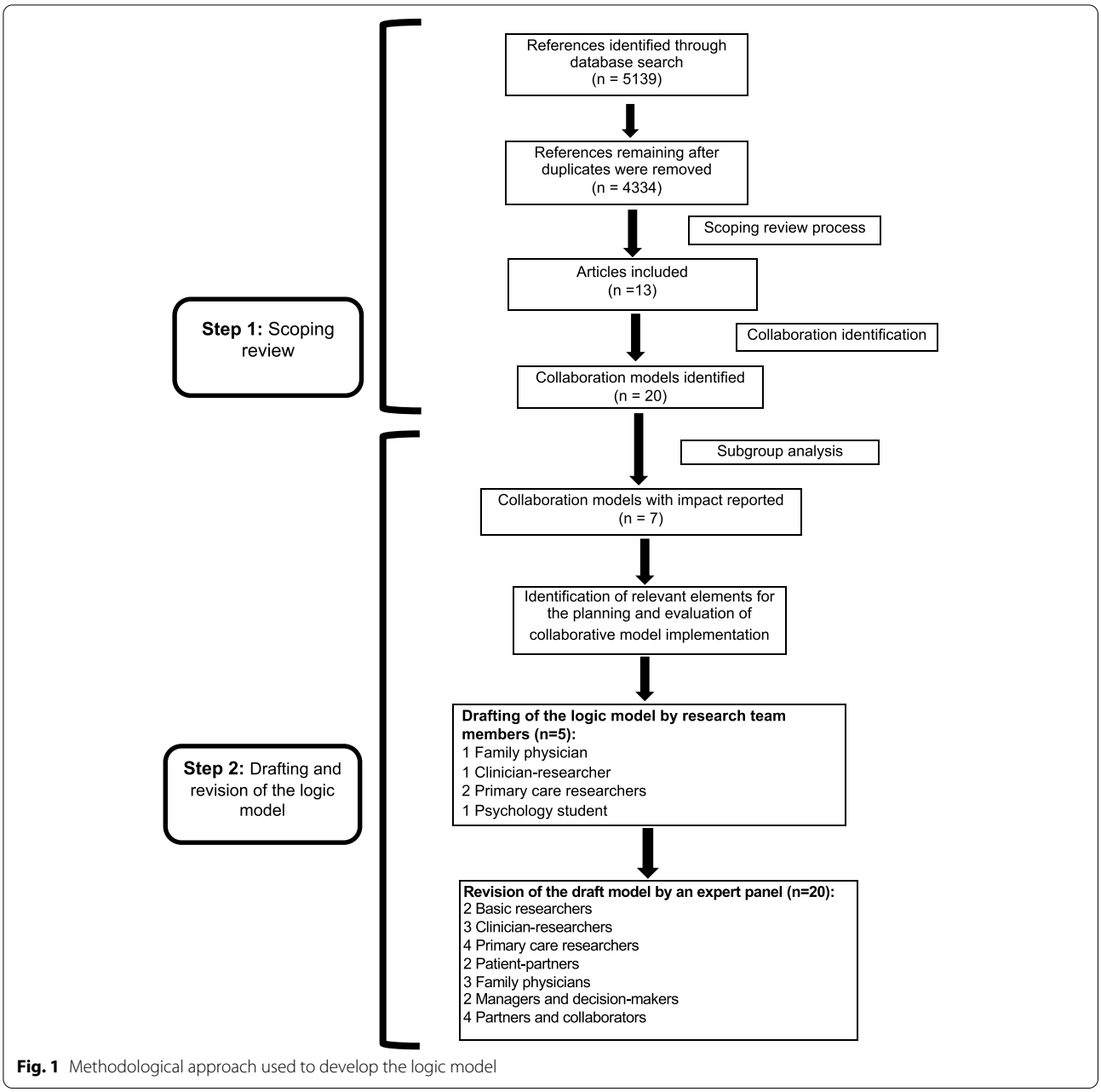

Fig. 1 Methodological approach used to develop the logic model

[7]. It provides a common approach to the integration, planning, implementation, and evaluation of a program or project [7]. Logic models are widely used, with some aiming at evaluating clinical programs [8] or the contributions of partners in community based participatory research [9]. However, few if any existing tools have been designed to guide the implementation of collaborative models linking community-based primary health care and biomedical research. Thus, the purpose of this article is to use the existing literature and expert opinion to develop a logic model that can provide guidelines and insights for health research decision-makers in implementing optimal translational collaboration in primary care research related to chronic disease management.

Developing the logic model

We developed our logic model following the methodological approach of similar studies [10, 11] based on a two-step process (Fig. 1): 1) a knowledge synthesis from a scoping review to identify and describe collaboration models that link biomedical research with CBPHC in chronic disease management. The chronic diseases

included in the literature review were diabetes, obesity, cardiovascular diseases, and their complications as well as any aging-associated chronic diseases. 2) The drafting of a logic model which was fine-tuned through discussions with a panel of experts in the fields of interest (Additional file 1).

Step 1: literature review

We conducted a scoping review with the ultimate goal of identifying and describing collaboration models that bridge biomedical research and CBPHC in chronic disease management. We performed a comprehensive literature search in the following library databases from their inception until November 2020: Medline (Ovid), Embase, Web of Science, and the Cochrane. The results are reported according to the Preferred Reporting Items for Systematic reviews and Meta-Analyses extension for Scoping Reviews (PRISMA-ScR) checklist. Details on the methodology and findings of our literature review were reported in another paper [12].

Step 2: drafting and revision of the logic model

A research team composed of a family physician (principal investigator, JSP); a clinician-researcher (FL); two primary care researchers (HTVZ and ED); and a psychology student (GL) drafted the logic model. Drawing upon studies identified through the scoping review, the research team first performed subgroup analyses based on the impact of implementing the collaboration models (i.e., studies with reported impact versus studies with no reported impact). Studies outlining positive measurable impacts were described, along with the success indicators reported by the authors. The relationships between the characteristics of collaboration models and their impact were identified through subgroup analyses and were incorporated into the system-based logic model. Four main categories were used to categorize the data, namely inputs, activities, outputs, and results. Within each of these categories, the research team classified elements from the findings of the scoping review that could be applicable for the planning and evaluation of collaborative model implementation.

In order to fine-tune the logic model, the draft was presented to a panel of 20 experts, selected on the basis of their profiles and experiences. The expert panel included two basic researchers in endocrinology; three clinical-researchers; four primary care researchers; two patient-partners; three family physicians; two managers and decision-makers; and four partners and collaborators (Additional file 1). At a two-hour workshop, results of the scoping review and subgroup analyses were presented in lay terms by the research team. A preliminary draft of the logic model was also presented to the panel and discussed. Panel members were asked to reflect on the proposed logic model, its relevance and potential, and areas for improvement according to their organization's perspective. Their input was essential in modifying the model and ensuring that its components were accurate and user-friendly. After the workshop, experts were sent the updated version of the logic model and final modifications were made. The study did not require approval from the local research ethics committee as experts were recruited from our networks and agreed to provide feedback on a voluntary basis.

Logic model

The final version of our logic model is represented in Fig. 2. Several strategies for the implementation of an impactful collaboration were identified. For example, the establishment of a consortium with appropriate organization, infrastructure, and leadership would allow for efficient project management and comprehensive guidelines.

Analysis of the data from the literature review revealed that, of the twenty collaboration models selected, seven reported a positive measurable impact, including creation of a strong base of talented expert researchers, participation of patients in workshops, and enrollment of medical professionals in training programs. These collaborations were considered to be impactful given the tangible results produced, contrary to the remaining 13 collaboration models where a lack of reported impact suggests a dearth of measurable results, at least to date.

Inputs

Further analysis revealed differences between collaborations with and without reported impacts regarding characteristics such as the profile group involved in the collaboration, its structure, location, clinical focus, the types of activities carried out, and deliverables. For example, six of the seven impactful collaboration models involved an additional profile supplementing the team of health care workers and biomedical researchers. The profiles included patients, members of the general public, users, and/or medical specialists. By contrast, eleven of the thirteen collaborations with no reported impact did not involve these profiles. Moreover, five out of the seven identified impactful collaborations operated in the form of a research network, whereas most of the collaborations with no reported impact adopted a hierarchical or divisional structure (i.e., division into semi-autonomous units). As such, these characteristics of impactful collaborations were used to develop our logic model.

Additionally, the level at which a collaboration operates was a factor highlighted by the participating experts. In fact, local collaboration can help in the translation of

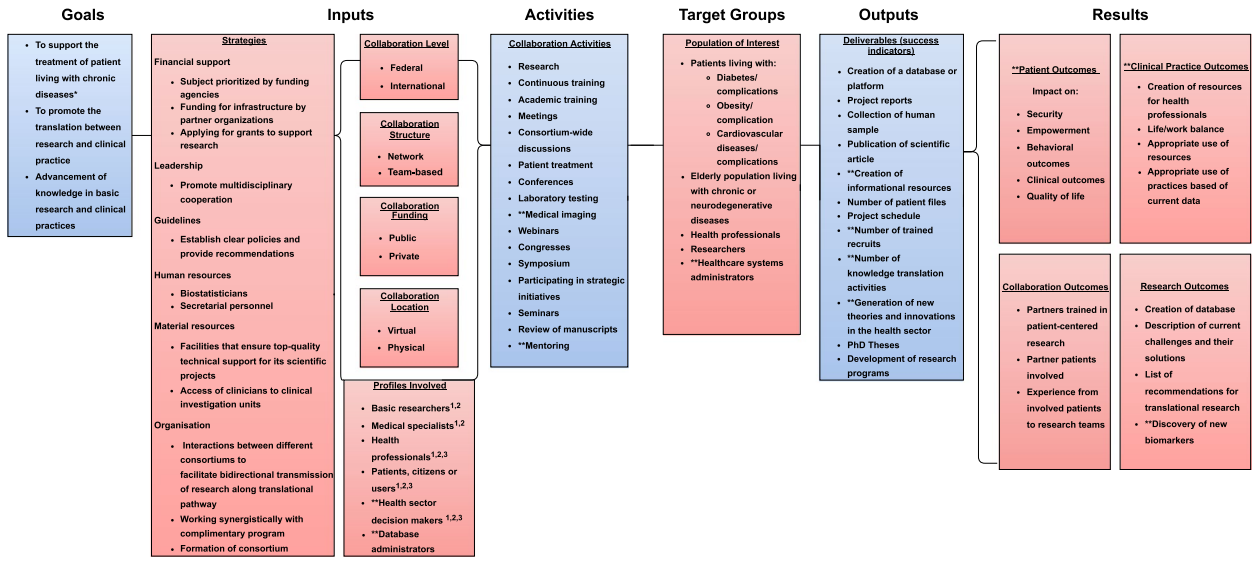

Fig. 2 Logic model for a global translational research collaboration model. * Diabetes, obesity, cardiovascular diseases, and their complications, and elderly population living with chronic or neurodegenerative disease. ** Elements that were not mentioned in the reviewed literature but were identified by experts in the field. 1,2,3 indicates profiles involved in the 1st, 2nd and 3rd pillars of research

research evidence into practice by overcoming health disparities with programs that include the sociocultural, geographic, and economic particularities of communities. Other characteristics such as funding and location were also considered.

Activities

Collaboration activities are an essential means of creating a connection between inputs and outputs. This is "where the rubber meets the road." The selected studies and expert panel served to identify a range of activities that translational research collaborations can precipitate in order to achieve an impact. For example, the organization of symposiums, workshops, congresses, seminars, and conferences have all emerged as beneficial knowledge translation activities that foster further collaboration and recognition.

Outputs

The direct output of collaborations was used as an indicator of their impact. These are concrete, measurable results that attest to the performance of the collaborations and can also be used to monitor and evaluate them. The authors of the selected articles reported outputs such as collections of human samples, publication of scientific articles, and project schedules as deliverables that resulted from the collaboration. Experts also agreed that the number of knowledge translation activities, the generation of new theories, and the training of fledgling recruits constitute relevant collaboration performance indicators as well.

Outcomes

On the longer term, different types of outcomes can be expected depending on the objective of the collaboration. The selected articles discussed beneficial outcomes for patients, such as greater security and an improved quality of life. Our expert team also suggested that behavioral and clinical outcomes for patients should be sought. Collaboration outcomes revolve around the experience and resources that the multidisciplinary team can provide, especially stemming from the involvement of patients as partners. Research outcomes relate to the advancement of science or to making data available in order to support research. Finally, experts found it relevant to distinguish between patient and clinical practice outcomes. In the latter case, actors of the third pillar of research benefit from additional resources, an improved work/life balance, and more.

Limitations

In this commentary, we raised useful reflections for the development of a logic model for collaboration between biomedical research and community-based primary health care actors. However, the proposed model has some limitations. Its development process would have been more thorough if, in addition to the literature search, we had performed a needs assessment and prioritization for the different actors involved in order to

optimize efficient collaboration. A more rigorous validation process using the Delphi Method (designed to reach a consensus among different actors taking into account their contexts, perspectives, and experiences in biomedical research and community-based primary health care) can mitigate this limitation in the future [13]. However, it is more appropriate to address these weaknesses in an empirical study. For the time being, this commentary is meant as a reflection roadmap that aims at fruitful collaboration involving the above-mentioned parties.

Conclusion

Introducing collaboration among the different pillars of the research continuum is a highly complex initiative involving the consideration of a multitude of factors, and managers will face considerable challenges in attempting it. Based on data from reports extracted with a rigorous methodology and on the first-hand experience of experts in the field, the present logic model provides a pathway for the process and the most relevant elements to consider when implementing a collaboration model for translational research in chronic diseases. What differentiates our logic model from other similar ones is that its development drew upon the results of a scoping review with a rigorous search methodology across several databases, whereas previous models tended to use more informal literature searches [9, 11]. Our model could serve as a foundation for decision-makers, clinicians, and researchers in the field of chronic disease research and primary care who want to engage in translational research. We look forward to further efforts to validate this logic model designed to support translational medicine in a chronic disease context.

Abbreviations

CBPHC: Community-based primary health care; OSF: Open Science Framework; PRISMA-ScR: Preferred Reporting Items for Systematic reviews and Meta-Analyses extension for Scoping Reviews; TR: Translational medicine or translational science.

Supplementary Information

The online version contains supplementary material available at https://doi.org/10.1186/s41231-022-00118-4.

Additional file 1. List of experts participating in the 2-hour workshop.

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Authors' contributions

HTVZ, JSP, FL and GL contributed to the conceptualization of the model. GL, HTVZ, JSP, ED and FL generated the first version. GL created the graphic design for the model and wrote the first draft of this manuscript with the contribution of HTVZ, ED and JSP. ED was a major contributor in the editing of the manuscript along with HTVZ, FL, VB and MCT. The authors as well as the experts who participated in the workshop provided input for the refinement of the model. All authors made contributions to the manuscript and have read and approved the final version.

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Availability of data and materials

The scoping review data that guided the conception of this logic model are available in the original article (Paquette et al., In press) and its supplementary information files.

Declarations

Ethics approval and consent to participate

Not applicable.

Consent for publication

All individuals named in the acknowledgements section below consented to being acknowledged in this publication. We did not include any other individual person's data in any form.

Competing interests

Authors have no potential conflicts of interest.

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