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Knowledge, skills, and training of community health workers to contribute to interprofessional education: a scoping review

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ABSTRACT

A scoping review of 32 publications was conducted with the aim of mapping literature to determine what is known about the knowledge, skills, and training of community health workers that could contribute to interprofessional education. Interprofessional education, as a pedagogical approach, prepares health professions students to serve patients in collaboration with other health professionals to improve patient outcomes. All over the world, the role of community health workers is vital for its support of community service and community health outcomes. However, no evidence could be found on the knowledge, skills, and training of community health workers that contribute to interprofessional education. The knowledge that community health workers need to contribute to interprofessional education, as reported by the literature, relates to case management, communication, health education, recordkeeping and referrals. Skills, such as critical thinking, interprofessional collaboration, and various clinical procedures, were noted. Training approaches reported included the use of technology such as mobile phones and web-based learning. The scoping review improved our understanding of the knowledge, skills, and training of community health workers that could contribute to interprofessional education. Applying a fit-for-purpose approach, and building on existing knowledge, skills, and training, could fast-track the contribution of community health workers to interprofessional education.

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KEYWORDS

Community health worker; interprofessional education; knowledge; scoping review; skills; training

Introduction

The WHO notes that simply increasing the numbers of workers is not enough; rather, scaling up educational programs to produce multi-disciplinary service delivery teams is urgent and essential (Ajeani et al., 2017).

Ajeani et al. (2017) explicitly state that a multidisciplinary team approach is vital to ensuring the effective transfer of knowledge and skills obtained during training. Enabling such an approach requires higher education institutions to make a paradigm shift, from traditional learning and teaching approaches to training that is results oriented. Interprofessional education (IPE), as a pedagogical approach, prepares health professionals to serve patients in an interprofessional, multidisciplinary, collaborative environment. It is defined as an approach that involves educators and students from different health professions, including these professions' basic disciplines, who co-create and nurture collaborative learning. IPE is founded on the principle that collaborative healthcare will result in improved patient outcomes (Buring et al., 2009). Experiential learning, a vital element of IPE, refers to students' learning and practice that are embedded in authentic, real-life practice environments, thereby providing optimal health services to communities (Institute of Medicine, 2013). Community health workers (CHWs) and other groups of health workers that contribute to improving the health outcomes of communities, were the focus of this scoping review.

Background

CHWs – defined as a group of lay health workers or lay persons representing their own communities (Ludwick et al., 2018) – have a vital role to play in supporting health services and health outcomes (Musoke et al., 2019). Described as a backbone (Gupta et al., 2020) or lay health educators (Hall-Lipsy et al., 2020), CHWs are deployed all over the world to fill the gap left by either a shortage or unequal distribution of health professionals and other human resources, such as physicians, nurses, and midwives earmarked for healthcare (Najafizada et al., 2019). The variety of services rendered by CHWs include counseling, mobilizing people for public health interventions, doing health education, serving as community and patient advocates, providing access to healthcare for patients, and doing research (Hall-Lipsy et al., 2020; Musoke et al., 2019).

Though most countries support short-term training (Ludwick et al., 2018; Najafizada et al., 2019), and have ample experience of utilizing CHWs as a workforce, challenges remain. Firstly, although CHWs are trained to provide basic services in their communities (Brownstein et al., 2011), they obtain no formal professional certification (Ludwick et al., 2018). According to Musoke et al. (2019), despite some role-related training, they receive no formal professional or paraprofessional education. Secondly, challenges related to key program implementation (Ludwick et al., 2018), namely, the improvement and sustainability of programs, performance-related barriers (Musoke et al., 2019), and the reluctance of some policymakers to

acknowledge CHWs as an important human resource, remain (Najafizada et al., 2019). Lastly, relevant detail related to CHWs' job-related experiences, the extent of their training, and the availability of expert supervision are sometimes neglected (Ajeani et al., 2017; Brownstein et al., 2011; Norris et al., 2006). In addition, according to Pinto et al. (2012), "a theoretically- and empirically-based framework to describe and explain CHW praxis, is not yet available." It is, therefore, difficult to determine the relationship between CHW training, support, and community health outcomes (Lewin et al., 2005; Viswanathan et al., 2010).

Integration of CHWs into interprofessional service provision requires clear statements about their responsibilities (Asweto et al., 2016). Schnieder (2019) mentions that the "precarious" connection between CHWs and healthcare needs to be identified and managed well. Najafizada et al. (2019) state that, in Afghanistan, CHWs found themselves positioned between professional and traditional health workers, which places them in an uncertain, but nonetheless a potentially important, position. Efforts to integrate CHWs into healthcare systems are evident. The Shree Krishna Hospital Program for Advancement of Rural and Social Health (SPARSH) initiative links CHWs with mobile healthcare teams, extension centers and tertiary care teaching hospitals through a training program created by a team of public health professionals and physiotherapists (Gupta et al., 2020). India's mobile telephone health (mHealth) expansion connects CHWs with expert medical advice and other professional services, to create a channel that offers specialist medical advice, blood on-call services, attention to grievances, and mental health support (Hedge et al., 2018).

The Extension for Community Healthcare Outcomes (ECHO) intervention, by a multidisciplinary team of specialists from the University of New Mexico Health Sciences Center, enabled collaboration through mentorship of healthcare workers, such as diabetes specialists and educators, social workers, and other health specialists. Their collaboration contributed to extended services to underserved communities (Bouchonville et al., 2018). Other models of collaboration have also been successfully implemented. The integration between pharmacists and CHWs has ensured effective management of chronic diseases in a variety of communities (Hall-Lipsy et al., 2020).

South Africa's primary healthcare (PHC) teams include a visiting physician, a nurse, an assistant nurse, and four to six CHWs. In rural settings, these CHWs contributions are acknowledged as key to effective service rendering based on their knowledge of the local communities (Müller, 2019). The Stellenbosch University in South Africa's unique rural clinical school in Worcester, Western Cape (Millar, 2019) offers another example of CHWs contributions to providing contextually appropriate PHC clinical education. The interprofessional education approach of this PHC clinical training platform includes CHWs, undergraduate and postgraduate students, and local academic coordinators in a collaborative care project (Millar, 2019). Together, physiotherapy, speech and hearing therapy, human nutrition, and medical students learn with, from, and about the different professions (Millar, 2019). Student groups are allocated to CHWs who facilitate the

students' learning about the community and ensure their safety. Patients referred by CHWs are assessed by the inter-professional teams (Millar, 2019).

A preliminary literature search on 1 May 2019 about how the knowledge, skills, and training of CHWs contribute to IPE, delivered no results on the EBSCOHost database platform. The objective of this scoping review, thus, was to investigate the knowledge, skills, and training of CHWs that could contribute to IPE.

Method

Review question

We conducted a scoping review to map the literature related to the research question: "What is known about the knowledge, skills, and training of CHWs that could contribute to inter-professional education?"

Type of participant

Participants investigated were CHWs who formed part of, or were involved in, IPE. IPE was considered to transpire when health professionals and CHWs collaborated and contributed to health outcomes.

Concept

The core concepts examined by the scoping review were the knowledge, skills, and training of CHWs that could contribute to IPE.

Context

The context, as an element of a scoping review, allowed for an "open" approach to the selection of evidence pertaining to the objective stated for this review (Aromataris & Munn, 2020).

Types of evidence sources

Sources of evidence relating to the objective of this scoping review included primary research studies and articles published in English between 1 January 2009 and 3 February 2020. Systematic reviews related to the topic were added during Step 3 of the search strategy. (Aromataris & Munn, 2020). The limits or exclusion criteria imposed on the type of evidence meant sources, such as conference proceedings, editorials, secondary data, articles not published in English, and reports of CHWs involved with children younger than 12 years or pregnant women were excluded from the review. Children under 12 years and pregnant women have specialized needs that could potentially not be translated to the basic knowledge, skills, and training within IPE.

Although this review was influenced by Arksey and O'malley (2005), it followed PRISMA-ScR guidelines. The search strategy followed is depicted as steps, with the source of evidence screening and selection depicted as phases. Extracted data is followed by results obtained from the scoping review (Aromataris & Munn, 2020).

Search strategy

Step 1: Initially, a limited search of relevant database platforms, namely, EBSCOhost database platform, and an analysis of concepts related to the research objective, were done. *Step 2:* In each database, the core concepts or controlled vocabularies contained in the titles and abstracts of retrieved papers were identified. A comprehensive search of the core concepts on all databases was then undertaken using the following search string: (Inter-professional* or interprofessional* or interdisciplinary* or multidisciplin* or multi-disciplin* or team*) and (“village worker*” or chw or “Community Health Worker*” or “lay worker*” or “lay person*” or “home based carer*” or “lay health*” (n4) (Train* or Instruct* or teach* or coach* or tutor* or schooling or educat* or preparation or guidance or lesson* or Knowledge or fact or facts or information or procedur* or Skills or skill or Expertis* or competen* or abilit* or capabilit*). *Step 3:* The reference lists of systematic reviews were searched to locate additional sources (Aromataris & Munn, 2020). Sources were limited to those published in English, due to limited funding for the research.

Sources of evidence

A comprehensive electronic search of the EBSCOHost database platform (number of search results in brackets after each platform name) included Africa-Wide Info [$n = 140$], APA Psycinfo [$n = 151$], CAB Abstracts [$n = 232$], CINAHL with full text [$n = 395$], ERIC [$n = 5$], GreenFile [$n = 6$], Health Source Nursing: Academic Edition [$n = 128$], Health Source: Consumer Edition [$n = 13$], MEDLINE [$n = 557$], Academic Search Ultimate [$n = 414$], and Sociology Source Ultimate [$n = 60$]. Most records [$n = 557$] were available from MEDLINE, followed by Academic search ultimate [$n = 414$], and CINAHL with full text [$n = 395$]. The Health Source Nursing [$n = 128$], and the Health Source: Consumer Edition [$n = 13$] records were added.

The authors then applied a phased approach to identify, screen, and review the records for eligibility (Millar, 2019). Sources of evidence had to reflect the concepts stated in the research question.

Phase 1: identification

Both authors independently numbered the 2,113 abstracts located through an electronic database search and based on the titles, selected those records that addressed the objective of the study. Duplicate and non-English records [$n = 1,145$] were removed, and 968 records were included for further screening (refer to Figure 1).

Phase 2: screening

Both authors were involved throughout the review process. Screening of the 968 records resulted in the removal of an additional 872 sources, resulting in 96 records being included for further screening. A librarian retrieved the selected full-text articles. Eventually, 57 full-text articles were subjected to eligibility screening (refer to Figure 1).

Phase 3: eligibility, exclusion and inclusion

Following a discussion, the authors made collaborative decisions to either include or exclude a record. If a record was excluded, a reason for the decision was stipulated. Any discrepancies between authors were resolved by obtaining consensus.

Although systematic reviews were excluded from the literature search, the reference lists of 12 scoping review articles were added to the search to identify possible additional sources. Thirteen abstracts were requested from these scoping review references, of which six were selected. The seven abstracts that were excluded were three systematic reviews, a randomized controlled trial, a report of evidence, a community-based rehabilitation program, and a peer support study. The same process described for Phases 1 and 2 was followed to select relevant articles. Application of the criteria

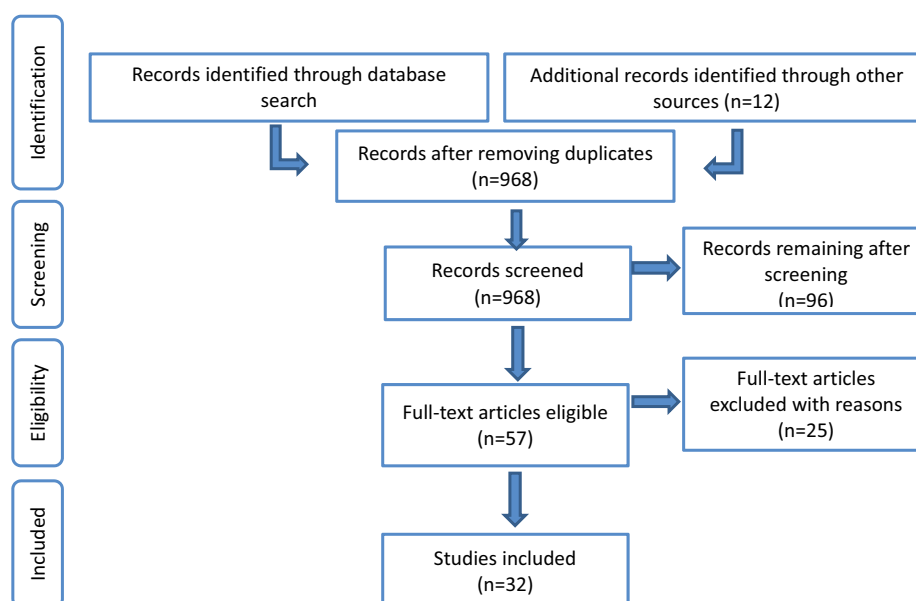


Figure 1. Flow figure depicting the sources of evidence screening and selection.

resulted in 25 full-text articles being excluded with reasons (refer to Figure). Full references are available in the reference list.

The full-text articles [$n = 25$] that were excluded after eligibility assessment involved 18 through the initial screening process, and seven from the 11 scoping review articles selected using the reference list of these articles. Thirty-two [$n = 32$] studies remained for data extraction.

Data extraction

The content extrapolated from each full-text article [$n = 32$] focused on the knowledge, skills, and training CHWs are required to possess to contribute to IPE. The authors extracted data from the selected articles using guidelines from standardized data-charting forms (Millar, 2019) and maintained the main concepts in each article in the extracted content.

Results

The articles [$n = 32$] in the dataset are presented in descriptive and in Microsoft Word table formats. Regardless of the quality of the scoping review results, we mapped the available evidence in this article. The evidence relates to our study objective, namely “what is known about the knowledge, skills, and training of CHWs that could contribute to interprofessional education?”

Firstly, a description of the objectives, participants’ concepts, and context extracted from the selected articles were given (refer to Supplement 1). Then, we shifted our focus to the characteristics of concepts, specifically evidence on the knowledge, skills, training and outcomes depicted in the selected articles (refer to Table 1). Lastly, a selection of articles that we subjectively classified as conventional [$n = 3$] or innovative training approaches [$n = 5$], including the outcomes related to the implementation of these approaches, was presented (refer to Table 2).

Analyzed studies/studies selected/time and location

A variety of journals had published 14 of the selected full-text articles between 2009 and 2014, and 18 from 2015 to 2020. In addition, most of the studies that were selected were published in 2012 [$n = 5$], 2015 [$n = 4$], 2018 [$n = 4$], and 2019 [$n = 6$]. A total of [$n = 32$] studies were included in the final.

Objectives, participant characteristics, concepts, and contexts

The objectives stipulated in the selected articles were categorized according to the concepts mentioned in the review question. It was possible for a study to fit under more than one concept. In total 18 study objectives ((2009); Chae et al., 2019; Colleran et al., 2012; Cueva et al., 2019; Ferguson et al., 2012; Findley et al., 2012; Kunz et al., 2017; Laktabai et al., 2018; Lorenzo et al., 2015; Lumsden et al., 2019; Musoke et al., 2019; Najafizada et al., 2019; Plowright et al., 2018; Ritvik et al., 2013; Schachter et al., 2014; St John et al., 2015; Tseng et al., 2019; Wennerstrom, Hargrove, et al., 2015) were

categorized as knowledge related to CHWs, whilst 18 studies ((2009); Benzian et al., 2015; Brownstein et al., 2011; Chae et al., 2019; Colleran et al., 2012; Ferguson et al., 2012; Findley et al., 2012; Gilmore et al., 2017; Kunz et al., 2017; Lorenzo et al., 2015; Lumsden et al., 2019; Najafizada et al., 2019; Pinto et al., 2012; Ritvik et al., 2013; Schachter et al., 2014; St John et al., 2015; Wennerstrom, Hargrove, et al., 2015; Wennerstrom, Tap Bui, et al., 2015) reflected on the skills required by CHWs. Twenty-two studies (Armstrong et al., 2011; Bouchonville et al., 2018; Chae et al., 2019; Colleran et al., 2012; Chen et al., 2014; Cherrington et al., 2015; Cueva et al., 2012; Early et al., 2019; Ferguson et al., 2012; Findley et al., 2012; Klimmek et al., 2012; Kunz et al., 2017; Laktabai et al., 2018; Lumsden et al., 2019; McAlearney et al., 2020; Musoke et al., 2019; Powell & Yuma-Guerrero, 2016; Rule, 2013; Schachter et al., 2014; St John et al., 2015; Wennerstrom, Hargrove, et al., 2015; Wennerstrom, Tap Bui, et al., 2015) described training approaches and/or training techniques.

Different participants were included in the selected studies. Twenty-one studies (APHA American Public Health Association, 2009; Armstrong et al., 2011; Bouchonville et al., 2018; Cherrington et al., 2015; Cueva et al., 2019; Ferguson et al., 2012; Findley et al., 2012; Klimmek et al., 2012; Kok et al., 2018; Kunz et al., 2017; Laktabai et al., 2018; Lumsden et al., 2019; McAlearney et al., 2020; Musoke et al., 2019; Pinto et al., 2012; Plowright et al., 2018; Ritvik et al., 2013; St John et al., 2015; Tseng et al., 2019; Wennerstrom, Hargrove, et al., 2015; Wennerstrom, Tap Bui, et al., 2015) specifically mention CHWs, and nine of the 32 selected studies (Bouchonville et al., 2018; Cueva et al., 2019; Ferguson et al., 2012; Findley et al., 2012; McAlearney et al., 2020; Musoke et al., 2019; Schachter et al., 2014; St John et al., 2015; Wennerstrom, Hargrove, et al., 2015) mention multiprofessional teams, professionals, practitioners, experts and supervisors as participants. Only two studies used either a database or a case study (Early et al., 2019; Kunz et al., 2017) and three studies (Cherrington et al., 2015; Laktabai et al., 2018; Musoke et al., 2019) used the community or patients. Two studies mentioned community health centers (Chen et al., 2014; Ferguson et al., 2012).

The contexts mentioned in the selected articles could be classified broadly as Academic institutions: multidisciplinary teams (Benzian et al., 2015; Bouchonville et al., 2018; Gilmore et al., 2017; McAlearney et al., 2020; Najafizada et al., 2019); Healthcare: community health, health centers, health systems, primary healthcare, global and public health (APHA American Public Health Association, 2009; Armstrong et al., 2011; Brownstein et al., 2011; Chen et al., 2014; Ferguson et al., 2012; Pinto et al., 2012; St John et al., 2015; Wennerstrom, Hargrove, et al., 2015); Settings: district, rural, slums, townships, and urban (Bouchonville et al., 2018; Chen et al., 2014; Cueva et al., 2019; Klimmek et al., 2012; McAlearney et al., 2020; Najafizada et al., 2019; Ritvik et al., 2013; Rule, 2013; Tseng et al., 2019) and Income: low and high-income countries (Armstrong et al., 2011; Gilmore et al., 2017). The studies were conducted in countries such as Alaska, Botswana, Ethiopia, Korea, Malawi, Mozambique, New Mexico, Nigeria, Uganda, and Ohio (Chae et al., 2019; Colleran et al., 2012; Cueva et al.,

Table 1. Characteristics of concepts related to knowledge, skills, and training of CHWs [*n* = 32].

CONCEPT [NUMBER OF SOURCES]	SOURCES	CHARACTERISTICS OF CONCEPTS
Knowledge [16]	Musoke et al. (2019) Brownstein et al. (2011) Benzian et al. (2015) Bouchonville et al. (2018) Chen et al. (2014) Colleran et al. (2012) Ferguson et al. (2012) Findley et al. (2012) Klimmek et al. (2012) Kok et al. (2018) Lumsden et al. (2019) McAlearney et al. (2020) Powell and Yuma-Guerrero (2016) Schachter et al. (2014) St John et al. (2015) Wennerstrom, Hargrove, et al. (2015)	Oral health (<i>n</i> = 1: Benzian et al., 2014); Diabetes management (<i>n</i> = 2: Bouchonville et al., 2017; Colleran et al., 2012); CHWs "101" (<i>n</i> = 1: Brownstein et al., 2011); Upper respiratory tract infections (<i>n</i> = 1: Chen et al., 2014); Health promotion/education (<i>n</i> = 3: Ferguson et al., 2012; Findley et al., 2012; Lumsden et al., 2019); Care coordination/case management, (<i>n</i> = 3: Ferguson et al., 2012; Findley et al., 2012; McAlearney et al., 2020); Self-management (<i>n</i> = 1: Ferguson et al., 2012); System navigation (<i>n</i> = 2: Ferguson et al., 2012; Schachter et al., 2014); Research (<i>n</i> = 1: Klimmek et al., 2012); Administration (<i>n</i> = 1; Kok et al., 2018); Early childhood caries (<i>n</i> = 1: Lumsden et al., 2019); Etiology (<i>n</i> = 1: Lumsden et al., 2019); Behavioral risk factors (<i>n</i> = 1: Lumsden et al., 2019); Social determinants of health (<i>n</i> = 1: Lumsden et al., 2019); Water, sanitation and hygiene (<i>n</i> = 1: Musoke et al., 2019); Communicable and non-communicable diseases (<i>n</i> = 1: Musoke et al., 2019); Communication (<i>n</i> = 2: Musoke et al., 2019; Wennerstrom, Hargrove, et al., 2015); Record keeping and reporting/referral (<i>n</i> = 3: Musoke et al., 2019; Schachter et al., 2014; Wennerstrom, Hargrove, et al., 2015); Coping strategies (<i>n</i> = 1: Schachter et al., 2014)
Skills [18]	Brownstein et al. (2011) Pinto et al. (2012) Benzian et al. (2015) Cherrington et al. (2015) Colleran et al. (2012) Early et al. (2019) Ferguson et al. (2012) Findley et al. (2012) Gilmore et al. (2017) Kok et al. (2018) Kunz et al. (2017) Laktabai et al. (2018) Lorenzo et al. (2015) Lumsden et al. (2019) McAlearney et al. (2020) Ritvik et al. (2013) St John et al. (2015) Wennerstrom, Hargrove, et al. (2015)	Disease prevention; health promotion; research monitoring, and evaluation (<i>n</i> = 3: Benzian et al., 2014; Findley et al., 2012; Kunz et al., 2017); CHWs "101" (<i>n</i> = 1: Brownstein et al., 2011); Self-management (<i>n</i> = 1: Cherrington et al., 2015); Competencies: Diabetes/cultural/social/emotional/interprofessional/time management/procedures (<i>n</i> = 7: Benzian et al., 2014; Colleran et al., 2012; Early et al., 2019; McAlearney et al., 2020; Pinto et al., 2012; Ritvik et al., 2013; Wennerstrom, Hargrove, et al., 2015); Communication (<i>n</i> = 2: Colleran et al., 2012; Lumsden et al., 2019); Technology/app/computer (<i>n</i> = 3: Early et al., 2019; Findley et al., 2012; McAlearney et al., 2020); Critical thinking/problem-solving (<i>n</i> = 2: Ferguson et al., 2012; Kok et al., 2018); Support/resources/referrals (<i>n</i> = 2: Gilmore et al., 2017; Lorenzo et al., 2015); Advocacy (<i>n</i> = 1: Gilmore et al., 2017); Digital storytelling (<i>n</i> = 1; Kunz et al., 2017); Motivational interviewing (<i>n</i> = 1: Kunz et al., 2017); Nutrition (<i>n</i> = 1: Kunz et al., 2017); Counselling (<i>n</i> = 2: Kunz et al., 2017; Lorenzo et al., 2015); Community-level testing (<i>n</i> = 1: Kunz et al., 2017); Information gathering/sharing (<i>n</i> = 1: Laktabai et al., 2018); Screening (<i>n</i> = 2: Pinto et al., 2012; Wennerstrom, Hargrove, et al., 2015)
Training [29]	Brownstein et al. (2011) Pinto et al. (2012) Bouchonville et al. (2018) (2009) Armstrong et al. (2011) Chae et al. (2019) Chen et al. (2014) Cherrington et al. (2015) Colleran et al. (2012) Cueva et al. (2019) Early et al. (2019) Ferguson et al. (2012) Findley et al. (2012) Gilmore et al. (2017) Klimmek et al. (2012) Kok et al. (2018) Kunz et al. (2017) Laktabai et al. (2018) Lumsden et al. (2019) McAlearney et al. (2020) Musoke et al. (2019) Plowright et al. (2018) Powell and Yuma-Guerrero (2016) Ritvik et al. (2013) Rule (2013) Schachter et al. (2014) St John et al. (2015) Tseng et al. (2019)	Tailored on-the-job comprehensive skills training (<i>n</i> = 1: (2009)); Standardized curriculum/national training (<i>n</i> = 3: (2009); Musoke et al., 2019, Tseng et al., 2019); Basic Package of Oral Care (<i>n</i> = 2: Benzian et al., 2014; Lumsden et al., 2019); Video conferencing virtual clinics/telementoring (<i>n</i> = 1: Bouchonville et al., 2017); CHWs "101" Communication protocols (<i>n</i> = 1: Brownstein et al., 2011); Four-day training using facilitators/training manual (<i>n</i> = 2: Armstrong et al., 2011; Kok et al., 2018); e-Learning cultural competence program by multidisciplinary experts/blended e-learning (<i>n</i> = 1: Chae et al., 2019); Tailored text messages via mobile phone (<i>n</i> = 3: Chen et al., 2014; Early et al., 2019; Lumsden et al., 2019); Interactive mHealth web-based application (<i>n</i> = 2: Cherrington et al., 2015; Laktabai et al., 2018); Project Extension for Community Healthcare Outcomes distance and hands-on-learning (<i>n</i> = 1: Colleran et al., 2012); Framework for culturally relevant online learning (<i>n</i> = 1: Cueva et al., 2019); Core competencies (<i>n</i> = 2: Ferguson et al., 2012; Lumsden et al., 2019); Five scope of practice elements (<i>n</i> = 1: Findley et al., 2012); Soft skills, such as advocacy/supportive and structured supervision by professionals (<i>n</i> = 7: Gilmore et al., 2017; Klimmek et al., 2012; Kok et al., 2018; Laktabai et al., 2018; Musoke et al., 2019; Ritvik et al., 2013; Schachter et al., 2015); Train the Trainers program (<i>n</i> = 2: Klimmek et al., 2012; Müller, 2019); Digital storytelling (<i>n</i> = 1: Kunz et al., 2017); Multisector partnerships (<i>n</i> = 1: Müller, 2019); Integrated Management of Health Conditions and Impairments; Adult learning (<i>n</i> = 1: Lumsden et al., 2019); A forum for CHWs to share best practices (<i>n</i> = 1: McAlearney et al., 2020); Role playing (<i>n</i> = 1: Pinto et al., 2012); Case report/analysis (<i>n</i> = 1: Armstrong et al., 2011); CHWs involved in design of training/local needs (<i>n</i> = 1: Plowright et al., 2018); Workshops (<i>n</i> = 1: Plowright et al., 2018); Psychoeducation: Resilience and Coping for the Healthcare Community (<i>n</i> = 1; Powell & Yuma-Guerrero, 2016); Dialogue, codes and praxis (<i>n</i> = 1: Rule, 2013); Action learning, teamwork, real-world projects, reflection (<i>n</i> = 1: Schachter et al., 2015)

Table 2. Conventional and innovative training approaches, and implementation outcomes.

CONVENTIONAL TRAINING APPROACHES		INNOVATIVE TRAINING APPROACHES			
SOURCE	TRAINING	OUTCOMES	SOURCE	TRAINING	OUTCOMES
Colleran et al. (2012)	Distance and hands-on learning Supervisor training; Conference calls; Formal presentations; Design workshops; Case-based learning;	The ECHO training model is an effective mechanism for training CHWs in the specialty field of diabetes care. Most changes occurred in communication and professionalism skills. A one-hour orientation prior to the first class would have prepared trainees better. The interactive design of the 48-hour curriculum, inclusive of roleplaying and group discussions, real-life examples and case studies used during workshops, and the use of photos and videos as instructional methods received positive feedback from trainees. However, trainees mentioned that the days were too long and that the objectives were too ambitious.	Bouchonville et al. (2018)	Video/teleconferencing technology	Participation in ENDO ECHO for two years significantly improved confidence regarding complex diabetes management. Application of the ECHO model may be useful in resource-poor communities with limited access to specialist diabetes services.
Ferguson et al. (2012)	Participatory education/interactive learning; Pairing a licensed clinician and an experienced CHW as co-instructor; Sequence training		Chen et al. (2014)	mHealth text messages	Text messages to transmit health information and change health workers' behavior can be effective.
Kok et al. (2018)	Supportive supervision; Training manual		Cherrington et al. (2015)	mHealth Digital storytelling	The iterative, user-centred design approach allowed the team to create a user-friendly tool to assist CHWs to track patients' progress toward their self-management goals, and interactions between CHWs and patients. The secure messaging system kept CHWs connected to the healthcare team by enabling them to pose questions and seek support.
Lumsden et al. (2019)	Oral health intervention program; Core competencies; Interactive approach; PowerPoint presentations; discussions; hands-on activities; Sufficient training without developing CHWs into paraprofessionals.		Laktabai et al. (2018)		The standalone nature of the system could benefit community-based CHW organizations that wish to collaborate with multiple clinics and patient-centered medical homes and could close the loop between health services and the community.
McAlearney et al. (2020)	A forum for CHWs to share "best practices" and training for clinical providers to understand their unique role.	Supportive group, individual or peer supervision can improve CHWs' motivation and performance. Supervision should support problem-solving; joint responsibilities; teamwork, cross-learning and skill sharing.	Kunz et al. (2017)		mHealth strategies for monitoring and quality control can ensure quality within a large-scale implementation of community-level testing by lay health workers.
		Implementing a facilitating and coaching role, and empowerment and participation of supervisees in decision-making, could strengthen the impact. CHW programs and supervision interventions should be based on broader health system strengthening. The research confirmed the effectiveness and acceptability of a short training program to prepare CHWs to deliver an oral health intervention. CHWs could effectively engage populations in which the impact of interventions delivered by traditional oral healthcare team members had shown limited success. CHWs were able to extend clinic services, increase utilization of community resources, improve patient compliance, increase patient support, do patient education, and render overall better care.			Considering the <i>Vivir Mejor!</i> model, federally qualified health centers should contemplate multisector partnerships, including collaborating with critical access hospitals to manage and prevent diabetes.
					Use different types of CHWs to implement programs that target populations at risk. The programs should be adapted to address different chronic conditions in other rural, Hispanic populations.

2019; Kok et al., 2018; Kunz et al., 2017; Lorenzo et al., 2015; McAlearney et al., 2020; Musoke et al., 2019).

Certain concepts that arose from the analysis of full-text articles [$n = 32$] could, to some extent, be depicted as knowledge, skills, and training of CHWs that could contribute to IPE. Acknowledging that concepts related to knowledge, skills, and training overlap, the article numbers that mostly reflect a specific concept are as follows:

- Knowledge, such as Community health workers “101,” ambulatory care, chronic diseases and care (diabetes mellitus, tuberculosis), mental and dental health, rehabilitation (Bouchonville et al., 2018; Armstrong et al., 2011; Benzian et al., 2015; Cherrington et al., 2015; Colleran et al., 2012; Ferguson et al., 2012; Gilmore et al., 2017; Kunz et al., 2017; Lorenzo et al., 2015; Najafizada et al., 2019; Plowright et al., 2016).
- Skills, such as ambulatory care, basic skills, including measuring blood pressure, chronic disease care, coping, fall prevention, self-efficacy, stress management, and technology use (Armstrong et al., 2011; Bouchonville et al., 2018; Chen et al., 2014; Cherrington et al., 2015; Early et al., 2019; Ferguson et al., 2012; Kunz et al., 2017; Laktabai et al., 2018; Najafizada et al., 2019; Ritvik et al., 2013). Training related to CHWs produce the following classification: Firstly, training in terms of certification, curriculum, evaluation, programs, scope of practice, standards, and quality assurance (APHA, 2009; Musoke et al., 2019; St John et al., 2018) and, secondly, training approaches such as eLearning, mHealth, telementoring, web applications, and supportive supervision (Bouchonville et al., 2018; Cherrington et al., 2015; Laktabai et al., 2018; Musoke et al., 2019).

Concept characteristics

Table 1 depicts the characteristics related to the core concepts stated in our study objective, namely, knowledge, skills, and training CHWs require to contribute to IPE, which are followed by a description of these characteristics.

Knowledge

Regarding knowledge as it relates to IPE, health promotion and/or health education [$n = 3$], care coordination and case management [$n = 3$], and record keeping, reporting and referral [$n = 3$] were the most prominent topics. Diabetes [$n = 2$] and systems management [$n = 2$] were mentioned by two resources each. A variety of other topics, such as CHWs “101,” upper respiratory infections, social determinants of health, and communicable and non-communicable diseases were identified in single [$n = 1$] resources.

Skills

Eight full-text articles referred to diabetes mellitus, cultural, social, emotional, interprofessional, time management, and clinical procedures, as skills required by CHWs. Disease prevention, health promotion, research monitoring, and evaluation are listed as important skills listed in three articles, whilst the ability to use technology, and different applications for

mobile devices were mentioned in another three articles reviewed. Although it is identified in only two studies each, critical thinking, counseling, problem-solving, screening, support and referrals are important skills required by CHWs. In addition to these skills, advocacy, community-level testing, sharing and gathering of information, and nutrition were identified in one article each, and these skills could be added to the list of skills required by CHWs if they are to contribute to IPE.

Training

Regarding training required by CHWs, advocacy, and supportive and structured supervision provided by healthcare professionals were extracted from seven of the selected resources. Several articles [$n = 3$] mentioned that training for CHWs requires a standardized curriculum or national-level training. Tailored text messages via mobile phones as a mode of training was mentioned in three studies. Other training modes included blended eLearning [$n = 1$], an eLearning cultural competence program offered by experts [$n = 2$], and interactive mHealth web-based applications [$n = 2$]. A forum where CHWs could share best practices [$n = 2$], and involvement of CHWs in the design of training to address local needs [$n = 2$], were also mentioned. Examples of training strategies included in one resource each were action learning, case reports and analysis, digital storytelling, real-life projects, reflection, video conferencing, virtual clinics or telementoring, teamwork, and workshops.

Conventional or innovative training approaches

Table 2 depicts a selection of full-text articles referring to training approaches that we classified as conventional or innovative. In addition, the outcomes related to the implementation of such approaches are stated. Table 2 Conventional and innovative training approaches, and implementation outcomes.

Outcomes related to conventional training approaches

We subjectively selected five full-text articles (Colleran et al., 2012; Ferguson et al., 2012; Kok et al., 2018; Lumsden et al., 2019; McAlearney et al., 2020) to represent conventional training approaches since the authors, as educators, have applied many of these approaches.

According to the resources mentioned, conventional training approaches, such as distance learning, hands-on learning, formal presentations; case-based learning, learning through pairing a licensed clinician and CHW with a co-instructor, supportive supervision, discussions, and forums, resulted in the following outcomes: Effective training (Colleran et al., 2012), changes in communication, and professionalism (Ferguson et al., 2012) improved CHW motivation and performance (Kok et al., 2018), acceptance of short training programs (Lumsden et al., 2019), and extension of clinic services provided by CHWs, including increased the use of community resource and, patient adherence, and improved healthcare (McAlearney et al., 2020).

However, long training days and too ambitious objectives, hampered positive outcomes related to approaches to train CHWs. A further requirement to ensure positive training

outcomes is to base CHW programs and supervision interventions on a “broader health system strengthening” (Kok et al., 2018).

Outcomes related to innovative training approaches

Six full-text articles (Benzian et al., 2015; Bouchonville et al., 2018; Chen et al., 2014; Cherrington et al., 2015; Colleran et al., 2012; Laktabai et al., 2018) were subjectively selected to represent innovative training approaches, based on our interpretation of the scoping review results that approaches such as mHealth and digital storytelling have not been entrenched in IPE involving CHWs. These studies refer to video or teleconferencing technology (Bouchonville et al., 2018; Colleran et al., 2012), mHealth (Chen et al., 2014; Cherrington et al., 2015, Laktabai et al., 2008), digital storytelling (Benzian et al., 2015) and evidence-based text messages (Chen et al., 2014) as training approaches. Using video and teleconferencing resulted in significantly improved confidence of CHWs in complex diabetes management, especially in resource-poor settings with limited access to specialist services (Bouchonville et al., 2018; Colleran et al., 2012). The implementation of mHealth technology enabled quality care, the transmission of health information, and an improvement in CHW behavior (Chen et al., 2014; Laktabai et al., 2018).

Discussion

The objective of our scoping review was to map what is known about the knowledge, skills, and training of CHWs that contribute to IPE. We deduced that the objectives and participants depicted in the full-text articles [$n = 32$] aligned well with the objective of and core concepts related to our study.

Diverse scope of knowledge, skills, and training

Through our analysis of the full-text articles, we noted a global trend in the diverse scope of knowledge, skills, and training of CHWs. This diverse scope could either contribute to or hamper CHWs’ contributions to IPE initiatives. Firstly, due to the broad scope, CHWs might be equipped to contribute to some aspects of students’ learning through IPE. These aspects include CHWs’ lived experiences of the communities they serve, their communities’ burden of disease, and the healthcare challenges faced by patients. However, specific knowledge about conditions, and soft skills, such as value and role clarification, ethical issues, and reflective practice that are required to contribute to IPE, might require attention.

Training approaches and outcomes

We could conclude that, if carefully selected to fit the purpose of training CHWs in various settings, most of the training approaches mentioned, whether more conventional, such as workshops (Cherrington et al., 2015), role playing (Chen et al., 2014; Gilmore et al., 2017), case reports and/or case analysis (Ajeani et al., 2017; Gilmore et al., 2017) or approaches that we classified as innovative, that is, video or teleconferencing (Ludwick et al., 2018), interactive mHealth or web-based

applications (Millar, 2019; Najafizada et al., 2019), and digital storytelling (Benzian et al., 2015), would contribute to positive learning outcomes.

Broad scope of practice

We also noted the variety of skills, and the broad scope of knowledge CHWs require to render services in their communities. Knowledge and skills received equal attention in 19 of the studies. We considered knowledge, such as self-management, coping strategies, and emotional resilience (Ferguson et al., 2012; Powell & Yuma-Guerrero, 2016), as important for CHWs’ based on the challenges they face when rendering service in their communities.

Tailored training and standardization

Considering the broad scope of practice of CHWs in terms of knowledge and skills, the calls for tailored on-the-job training (APHA American Public Health Association, 2009) and standardized curricula and/or national training (APHA American Public Health Association, 2009; Musoke et al., 2019; St John et al., 2015), should not be ignored. Issues related to curricula for training CHWs, their scope of practice, standards and quality assurance were the focus of 11 studies.

Interprofessional education and collaboration

Aligned with our initial intention to determine the knowledge, skills, and training of CHWs that would enable them to contribute to IPE, only one study (Benzian et al., 2015) mentioned interprofessional skills in relation to CHWs. We noticed that, although ten articles included concepts such as multiprofessional teams, professionals, practitioners, experts and/or supervisors of CHWs, none of these studies elaborate on how collaboration amongst the teams and CHWs are facilitated or sustained. Studies that mentioned collaborative research between academic institutions and service providers (Lumsden et al., 2019; Wennerstrom, Tap Bui, et al., 2015) were, however, important sources of information for our research.

Practice points

Despite the stipulation of practice points is not required as part of reporting on a scoping review (Aromataris & Munn, 2020), the valuable information deduced through our data analysis enabled us to state certain principles that we could apply to the knowledge, skills, and training CHWs would require to contribute to IPE. These principles, are to some extent, aligned with the (2018) guideline on health policy and system support to optimize community health worker programs. Key messages in the WHO guidelines include, for example, a call for the application of evidence-based models for education, diverse skills mix, and optimizing the ability of CHWs to operate in interprofessional primary care teams. The guidelines also address CHWs scope of work, responsibilities and roles, and preexisting knowledge, and skills as criteria for determining the length of CHWs pre-service training. Our principles are to:

- Align CHW training with the scope of practice stipulated by health departments;
- Keep in mind that CHWs are not paraprofessionals;
- Build on CHWs' existing knowledge and skills, and adjust training approaches accordingly;
- Focus training activities on those that could strengthen CHWs' roles, specifically those roles they require to contribute to IPE;
- Follow a culturally sensitive approach in both the design of training material, and its implementation;
- Incorporate activities that will ensure that CHWs enjoy or have fun whilst learning;
- Provide interactive learning, problem-solving, peer and group learning opportunities;
- Use social and electronic media to communicate and sustain CHWs' learning post-training.

We recommend that people who are responsible for implementing IPE build on the existing knowledge, skills, and training of CHWs. We also recommend an approach that will identify gaps in CHWs' knowledge, skills, and training, and embed their contributions in a fit-for-purpose methodology, keeping in mind their scope of practice. We furthermore recommend that CHWs' contributions are structured according to the requirements of a specific IPE initiative.

Limitations

Due to funding constraints, records were limited to publications in English. The suitability of the arbitrary decision to limit the search to the last decade may be debatable. We might have missed potentially relevant articles, even though explicit inclusion and exclusion criteria were set up with both authors and research librarian. Because scoping reviews do not require grading evidence, the implications for practice need to be applied cautiously.

Conclusion

Our scoping review contributed to a better understanding of the knowledge, skills and training of CHWs. We deduced that, although a standardized scope of practice of CHWs was not evident from our scoping review, it would be possible to use existing scopes to identify the knowledge, skills, and training CHWs require to contribute to IPE. We consider the option of applying a fit-for-purpose approach to the training of CHWs. Building on existing knowledge of CHWs should be the point of departure when applying a fit-for-purpose approach.

Research that aims to describe the knowledge, skills, and training of CHWs could be beneficial to faculties of health sciences where IPE is applied in a variety of settings, and where the principles of collaborative and reflective practice and co-creation are valued in rendering health services and improving health outcomes for all.

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