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Community Health Workers in Brazil's Unified Health System: A Framework of their Praxis and Contributions to Patient Health Behaviors

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Abstract

Community Health Workers (CHWs) play a pivotal role in primary care, serving as liaisons between community members and medical providers. However, the growing reliance of health care systems worldwide on CHWs has outpaced research explaining their praxis – how they combine indigenous and technical knowledge, overcome challenges and impact patient outcomes. This paper thus articulates the *CHW Praxis and Patient Health Behavior Framework*. Such a framework is needed to advance research on CHW impact on patient outcomes and to advance CHW training. The project that originated this framework followed Community-Based Participatory Research principles. A team of U.S.-Brazil research partners, including CHWs, worked together from conceptualization of the study to dissemination of its findings. The framework is built on an integrated conceptual foundation including learning/teaching and individual behavior theories. The empirical base of the framework comprises in-depth interviews with 30 CHWs in Brazil's Unified Health System, Mesquita, Rio de Janeiro. Data collection for the project which originated this report occurred in 2008–10. Semi-structured questions examined how CHWs used their knowledge/skills; addressed personal and environmental challenges; and how they promoted patient health behaviors. This study advances an explanation of how CHWs use self-identified strategies – i.e., empathic communication and perseverance – to help patients engage in health behaviors. Grounded in our proposed framework, survey measures can be developed and used in predictive models testing the effects of CHW praxis on health behaviors. Training for CHWs can explicitly integrate indigenous and technical knowledge in order for CHWs to overcome contextual challenges and enhance service delivery.

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Keywords

Brazil; Community Health Workers' Praxis; Patient outcome; CBPR

Introduction

Community Health Workers (CHWs) are key liaisons between professional care providers – physicians, nurses, social workers, etc. – and patients in primary health care settings worldwide (Abbatt, 2005; Brownstein, Hirsch, Rosenthal, & Rush, 2011; Lewin, Dick, Pond, Zwarenstein, Aja, Van Wyk, Bosch-Capblanch, & Patrick, 2005). The global number of CHWs has grown in the past decade and their pivotal role in primary care has been widely acknowledged (Pan American Health Organization, 2007; World Health Organization, 2011). CHWs are recruited chiefly for their indigenous knowledge about their communities' geographies, cultural norms, and health resources and needs (Gilkey, Garcia, & Rush, 2011; Standing & Chowdhury, 2008). The majority of CHWs are low-income women trained in health promotion and disease prevention (Haines, Sanders, Lehmann, Rowe, Lawn, Jan, Walker, & Bhutta, 2007; Nascimento & Correa, 2008). The combination of indigenous and technical skills places CHWs in the strategic position of “experience-based experts” whose strategies for health promotion reflect their social positions (e.g., their gender, race and economic status) (Collins & Evans, 2002; Popay & Williams, 1996).

CHW praxis – how CHWs combine indigenous and technical knowledge, overcome personal and environmental challenges and impact patient outcomes – represents a serious gap in the literature (Spencer, Gunter, & Palmisano, 2010; Swider, 2002). Though CHW effectiveness is abundantly known, a theoretically- and empirically-based framework to describe and explain CHW praxis is not yet available. Therefore, an explanatory framework of CHW praxis is both a theoretical and empirical matter addressed by this paper. Such a framework is needed to advance research on CHWs' impact on patient behavioral changes and to optimize CHW training (Gilkey, et al., 2011; Spencer, et al., 2010; Swider, 2002).

Community Health Worker praxis and effectiveness

CHWs derive their effectiveness from an ability to impart health information to patients using interpersonal strategies known to promote patient health. For example, communication between health providers and patients is improved by demonstrated concern, respect and empathy (Travaline, Ruchinkas, & D'Alonzo Jr, 2005). Jargon-free communication promotes patients' understanding of health information given by health professionals (United States Department of Health and Human Services, 2005). Empathy enhances patients' adherence to behavioral and medical treatments (Dziopa & Ahern, 2009; Howgego, Yellowlees, Owen, Meldrum, & Dark, 2003). Though praised for these valuable interpersonal skills, CHWs are also perceived by patients as less credible than professional providers because they lack formal education and access to medical resources, e.g., medications needed by their patients. However, perseverance in helping patients has shown to improve patients' attitudes toward providers (Alcock, More, Patil, Porel, Vaidya, & Osrin, 2009; Franco, Bennett, & Kanfer, 2002).

Two comprehensive reviews (Lewin, et al., 2005; Swider, 2002) show that by using interpersonal strategies to communicate health-related information, CHWs can help patients prevent diseases, manage chronic illnesses, access health care and adhere to health promotion and disease prevention behaviors (i.e., “health behaviors”). For example, CHWs help parents adhere to their children's immunization schedules (Macinko, de Fátima Marinho de Souza, Guanais, & da Silva Simoes, 2007), patients adhere to hypertension treatments (McCormick, Brooks-Gunn, Shorter, Holmes, Wallace, & Heagarty, 1989;

Perino, 1992), HIV prevention (Centers for Disease Control and Prevention, 1998), and to practices designed to prevent infectious diseases (Clarke, Dick, Zwarenstein, Lombard, & Diwan, 2005). Though informative, these studies have used different measures of CHW effectiveness. Lacking a theoretical framework upon which hypotheses could be based, previous studies are un-replicable across different contexts. Having a strong CHW praxis framework will be thus beneficial in measuring CHW effectiveness in future research.

Community Health Worker praxis and training

The literature suggests that CHWs are encouraged to teach medical staff about community members' realities while, in turn, learning technical information from these professionals. However, a review of 109 articles shows that CHWs and medical providers are seldom trained together and thus are denied opportunities to acquire knowledge and skills from diverse sources and perspectives (Bhui, Warfa, Edonya, McKenzie, & Bhugra, 2007). Most training for health care providers includes participant observation and analysis of case reports. Role play exercises have been used in acute care settings (Hadwiger, 1999). Moreover, provider training is often disease- and intervention-focused; it frames social conditions as pathological, stigmatizes disadvantaged populations and discourages interdisciplinary exchanges (Leipzig, Hyer, Ek, Wallenstein, Vezina, Fairchild, Cassel, & Howe, 2002; Mayfield-Johnson, 2011; Simoni, Franks, Lehavot, & Yard, 2011; Spencer, et al., 2010)

CHWs, hired mainly for their indigenous knowledge, are trained by medical staff to use technical skills to administer prescribed medications, conduct blood pressure screenings, help patients acquire and prepare foods, etc. CHWs' trainers are themselves encouraged to use strategies CHWs commonly use to optimize patient outcomes, such as empathic communication and perseverance (Farmer & Gastineau, 2002; Lewin, et al., 2005; Mahler, 1978; Pérez & Martinez, 2008; Satterfield, Burd, Valdez, & Hosey, 2002; Swider, 2002). CHWs and medical staff thus have distinct but complementary knowledge and skill sets, suggesting that training health providers in both indigenous and technical knowledge may optimize patient outcomes. Such training would emphasize a team-based approach to health care delivery (Hamilton, Yuan, Lachman, Hellyer, Krause, Hollman, Youdas, & Pawlina, 2008; World Health Organization, 2011). Regrettably, diverse care providers seldom train jointly or mutually train one another.

CHW Praxis and Patient Health Behavior Framework

The absence of a theoretically- and empirically-based framework connecting CHW praxis to patient outcomes has challenged both the advancement of CHW training and of research showing CHW effectiveness (Gilkey, et al., 2011; Spencer, et al., 2010; Swider, 2002). Without a unifying framework of CHW praxis, research measuring CHW effectiveness and describing CHW roles and responsibilities has been unsystematic across countries and social contexts. CHW training also has not followed any systematic trend that could be replicated and evaluated across different contexts. This paper helps fill this gap by introducing the *CHW Praxis and Patient Health Behavior Framework*. In order to develop such a framework, we used an integrated theoretical foundation including teaching/learning (Freire, 2000, 2005) and individual behavior (Ajzen, 1991; Bandura, 1977, 1989) theories. We used in-depth interview data from 30 CHWs in Brazil's Unified Health System as the empirical basis for the framework. The framework reflects CHWs' efforts to help oppressed, low-income individuals develop positive health behaviors. This focus on CHW data is novel, as previous research has privileged the voices of researchers and policy makers in matters concerning CHW praxis and training. The focus on Brazil's health system has implications for CHW praxis and training globally.

CHWs in Brazil's Unified Health System

CHWs (Agentes Comunitários da Saúde) are an integral part of Brazil's Unified Health System (Sistema Único de Saúde – SUS), meant to provide free primary care to all citizens. According to Brazil's Ministry of Health (Ministério da Saúde, 2011a, 2011b), the SUS seeks to achieve this goal through its Family Health Program (Programa de Saúde da Família – PSF), a nationwide strategy implemented in 1994, funded by federal, state and local governments. By 2009, PSF was one of the largest community-based primary health strategies in the world, caring for 61% of Brazil's population, approximately 115 million people. The PSF comprises community-based clinics whose transdisciplinary teams comprise at least one physician, one nurse and up to 15 or more CHWs. The size and concentration of PSF clinics reflect the needs and size of local populations. The PSF serves the poorest populations in Brazil and employs some 234,767 CHWs. Each CHW is assigned up to 150 families or 750 individuals. The key criteria used to select CHWs are: residence in the community; understanding of local geography and culture; and endorsement by residents. CHWs receive training in basic health concepts, healthy lifestyles, sanitary living conditions and public health strategies (Nascimento & Correa, 2008; Nunes, Trad, Almeida, Homem, & Melo, 2002; Silva & Dalmaso, 2002).

CHW praxis framework's conceptual foundation

Research on CHWs' impact on patient health behaviors has not been grounded in a unifying theoretical framework showing how CHWs' indigenous and technical skills relate to patient health behaviors. This conceptual issue can be best addressed by an integrated conceptual foundation, including learning/teaching and individual behavior theories, as follows.

Freire's philosophy of learning and teaching emphasizes the value of indigenous knowledge combined with technical information in transforming the lives of low-income and illiterate individuals, including positive changes in health behaviors (Freire, 2000, 2005). Though these concepts are reflected in the work of experiential learning theorists (Borzak, 1981; Houle, 1981; Itin, 1999; Kolb, 1984), the integration of indigenous and technical information has not been linked to health service delivery and patient behaviors in previous conceptualizations. Freirian educational philosophy helps make this connection by suggesting that CHWs' learning processes influence how they educate patients. CHWs' expertise develops through a cyclical process of experiential learning and teaching involving indigenous knowledge and technical training. Their expertise is refined by consistent contact with patients whose social and health realities mirror those of CHWs. CHWs' expertise can be therefore used to inform the training and subsequent services of professional care providers, such as physicians and nurses.

Freire argues that individuals whose socioeconomic and political realities disempower them have difficulty changing and maintaining behaviors (e.g., health promotion) that could mitigate their oppressed conditions (e.g., health disparities). Freire's philosophy suggests that oppressed individuals can best learn and use new information to achieve desired behavioral changes when such information is delivered with empathy and patience and in language that can be easily understood. This approach has been used in myriad countries and contexts by educators and service providers. For example: to deliver sexual health education to Mayan indigenous communities in Chiapas and Afro-Caribbean communities in Honduras and Guatemala (Savdié & Chetley, 2009); to address issues of racism, violence and drugs through hip-hop performances in the United States (Miller, Brown, & Hopson, 2011); and to help rural workers obtain land, credit and technical agricultural support in Brazil (Wittman, 2009). Similarly CHWs in diverse communities and regions of Brazil have used Freirian teachings to help community members develop health-related behaviors. CHWs' capacities to teach patients are enhanced because their own learning occurs in the

environment where they teach patients by using empathic communication and perseverance (Mayfield-Johnson, 2011)

It is important to stress that individual behavior theories have been developed to help describe and explain patients' behavioral changes. A Freirian analysis clarifies that behavioral changes can be challenging for individuals living under oppressed conditions (e.g., poverty, racism, illiteracy, etc.). However, this analysis does not provide a conceptual bridge between CHWs' usage of indigenous and technical knowledge and patient health behaviors. Therefore, individual behavior theories are needed to fill this gap. Though care providers are trained to help patients change and maintain health behaviors, these behaviors are strongly influenced by patients' attitudes toward health behavior changes; self-efficacy or patients' perceived abilities to practice those health behaviors; and subjective norms or perceived value of behavioral change (Ajzen, 1991; Montaña, Kasprzyk, & Taplin, 1997). Theories of behavioral change (e.g., reasoned action and planned behavior) suggest that CHWs would need various teaching methods to help enhance patients' confidence and attitudes/values toward health behaviors (Ajzen, 1985; Bandura, 1977, 1989; National Institutes of Health, 2003). For example, during a home visit, a CHW may use jargon-free communication and perseverance (patience and repetition) to educate family members on how to avoid HIV infection, encourage adults to update their children's immunizations, demonstrate how to dispose of water containers so as to avoid mosquitoes and explain how a low-salt diet can help control hypertension.

METHODS

Background

Community-Based Participatory Research (CBPR) is a paradigm guided by principles suggesting that collaboration between researchers and community members (and/or their chosen representatives) can generate findings more meaningful to community members than traditional research (Cashman, Adeky, Allen, Corburn, Israel, Montano, Rafelito, Rhodes, Swanston, Wallerston, & Eng, 2008; Green, 2010; Israel, Schulz, Parker, & Becker, 1998; Pinto, 2009; Pinto, McKay, & Escobar-Chavez, 2008). Starting in 2007, we used CBPR principles to guide the development of a partnership between US- and Brazil-based researchers, CHWs, and their supervisors (for details, see (Pinto, Schimdt, Rodriguez, & Solano, 2007) and (Pinto, da Silva, Penido, & Spector, in press)). We conducted brainstorming sessions to learn which specific research aims were most important to CHWs. Researchers made several visits to community sites and spent formal and informal time with local health partners.

Seldom have CHWs been included as research partners. However, by shadowing CHWs on their visits to patients, we learned that CHWs were very familiar with Freirian philosophy and understood the value of their indigenous knowledge in helping community members. We learned, from observation, specifically how they engaged patients, established rapport and provided health education. CHW partners provided specific insights on questions and prompts we used in the interview protocols, on recruitment strategies and interview procedures. Most importantly, they used indigenous knowledge to help interpret and corroborate the findings that originated the *CHW Praxis and Patient Health Behavior Framework*.

CBPR focuses on filling conceptual and empirical gaps in the literature while producing findings that have practical implications in the lives of those participating in the research (Israel, et al., 1998). Therefore, as per CHWs' request, we developed a framework to advance research connecting their praxis and patient health behaviors and to optimize both their training and improve CHWs' effectiveness.

Sampling and recruitment

This study was approved by IRBs at Columbia University, New York, USA, Pontificia Católica University, Rio de Janeiro, Brazil, and by the local Ministry of Health. The municipality of Mesquita, where the study took place, was chosen because the Brazil team had an ongoing professional relationship with the local PSF. Being of moderate size, the PSF consisted of 10 clinics, which made it feasible to recruit three CHWs (N = 30) from each clinic. We recruited CHWs responsible for distinct catchment areas. Since we were interested in understanding their praxis, we recruited experienced CHWs. The average length of employment was 19 months. They were recruited by nurses, with permission from the PSF Coordinator and the Secretary of Health. CHWs were given time off from work to participate. Even though it is part of their job to provide evaluation information to PSF officials, their participation was voluntary.

Design and data collection

This study includes in-depth interviews with 30 CHWs in Brazil's Unified Health System, Mesquita, Rio de Janeiro. Data collection for the project which originated this report occurred in 2008–10. Four master's or doctoral level, Portuguese-speaking, Brazilian interviewers conducted the one-time interviews; the first author conducted three interviews and supervised the training of all interviewers. Interviews were conducted in Portuguese in private offices. Because interviews included only work-related questions, with IRB approval, participants were not required to sign consent forms. They received information sheets addressing their rights, risks and benefits, and confidentiality issues. Brazil does not allow financial compensation to participants; however, CHWs received refreshments. Interviews lasted 60–75 minutes, were digitally recorded and transcribed by Portuguese-speaking transcriptionists for entry into NVivo software for managing, retrieving and coding qualitative data. The interviews were not translated into English because all personnel involved in this project were bilingual. However, quotes used herein were translated and back-translated by an independent interpreter.

The interview protocol was grounded in key concepts of the conceptual foundation above: grounded in their indigenous knowledge/skills and technical training, CHWs develop teaching strategies that help them promote patient health behaviors. Therefore, semi-structured questions were used to examine how CHWs use their knowledge/skills to promote observable patient health behaviors.

Analytic approach and data Interpretation

Two Portuguese/English-speaking Brazilian coders, the first and second authors, read the transcripts independently. Both have extensive experience providing health services and/or conducting research. Each analyzed the same two transcripts chosen randomly from among the 30 interviews. They met to discuss initial findings and to develop preliminary codes which followed the interview protocol. Codes included types of CHW knowledge/skills and challenges they faced. Each coder then coded the next three transcripts, adding and refining codes. Through co-coding and consensus (Silverman, 2000; Strauss & Corbin, 1990), they created codes that were used to guide the analysis of remaining interviews. Coders came to an agreement about which passages best depicted CHWs' knowledge/skills and the challenges they faced. Next, coders identified text depicting changes in patient health behaviors observed by CHWs. Quotes were selected independently and compared for accuracy; the coders achieved 100% agreement.

Since the focus of this research was to develop a framework of CHW praxis emphasizing the integration of indigenous and technical knowledge, coders looked for text showing how CHWs integrated indigenous and technical knowledge/skills, how they addressed social and

environmental challenges, and influenced patient health behavior. Codes captured practical concepts found across all interviews, explaining day-to-day CHW practice. In order to create the *CHW Praxis and Patient Health Behavior Framework*, we supported the findings from these analyses with the theories discussed above.

Adhering to the tenets of CBPR and to add rigor to the qualitative data analysis, the Principal Investigator presented preliminary results to 21 CHWs who participated in the study and subsequently volunteered to attend the presentation. As a group, they reviewed the results, provided feedback and “member checking” in a discussion that lasted 90 minutes (Lincoln, 1985). CHWs were presented several coded interview passages and asked to comment on their meaning (Janesick, 2000) and to verify the core components of CHW praxis.

RESULTS

Study's sample

Most CHWs are female, with overall demographic backgrounds (e.g., educational levels and socioeconomic status) similar to community members to whom they provide services. In this study, 28 were females and two males. Eleven identified as multiracial, 12 as “*Negros*” (Blacks) and seven as “*Branços*” (Whites). The mean age was 32 years (range = 20–49). Only three participants had attended some college-level courses, 15 completed high school, nine junior high, and three had primary education. All received the same monthly salary, approximately one minimum wage monthly salary, R\$580.00 (Brazilian *reais*) = US\$366.

CHW Praxis and Patient Health Behavior Framework

We sought to develop a mid-level explanatory model of CHW praxis by using CHWs' own interview data (Charmaz, 2006). First, we present a graphic depiction of key empirical concepts emerging from the data, anchored by theoretical underpinnings discussed above. We then provide illustrative data (quotes) to demonstrate, from CHWs' perspectives, what represents their praxis. This framework was conceptualized in collaboration with CHWs as explained in the data interpretation section above. Our collaboration added relevance to the conceptual and empirical issues addressed in this research, a lack of a framework articulating how CHWs use strategies they identified to promote patient health behaviors.

Figure 1 shows the *CHW Praxis and Patient Health Behavior Framework*. In order to describe the structure of the framework, we provide a summary of the results presented below. CHWs revealed, through their in-depth interviews, that community members doubt CHWs' capacities to help them with health-related matters because CHWs often lack formal education, and the PSF lacks certain resources such as telephones, medications and ambulances. CHWs explained that, though they reside in the same geographic communities as their patients, many patients are not easily accessed. CHWs highlighted the use of personal resources and advocacy to overcome these challenges. Moreover, CHWs identified strategies to engage community members in learning health information that could promote health behaviors. CHWs identified jargon-free communication and the use of local idioms as critical to imparting technical knowledge/skills. They contended that the CHW-patient relationship should focus on empathy, persistence and patience, attributes perceived as necessary to bring about patient health behaviors. Grounded in theories of behavioral change, we included patients' attitudes about behavioral change, self-efficacy and subjective norms in our framework.

Below we provide data illustrating the key concepts of the framework. Participant identification numbers (i.e., “CHW #”) follow each quote.

Knowledge and skills possessed by CHWs—CHWs explained their positions as “experience-based experts.” They confirmed receiving ongoing training from physicians and nurses along with didactic materials as part of this training. They reported that their training focused on general information about health and on specific information about conditions and diseases (e.g., hypertension, AIDS, diabetes). Moreover, they said that to impart technical knowledge, they used the “indigenous knowledge” they possessed prior to becoming CHWs. Two brief definitions below capture the sensibility of all participants.

“The best training I got was from life itself...from the moment I was born and raised in this community, I knew everyone's reality” (CHW # 16)

“I'm spontaneous, I talk, I smile. We don't learn this in school, only with the day-to-day work...getting to know people” (CHW # 04)

CHWs characterized empathic communication and perseverance (patience and repetition) as strategies that stemmed from their understandings of community members' histories, cultural norms and values, and health-related resources and needs. CHWs contended that these were the strategies they most often used to bring about patient health behaviors and which reflected their shared life experiences with community members. *Friendly engagement and rapport* were described as the foundation upon which CHWs engage patients in *empathic communication*, which discourages the use of jargon while encouraging the use of local idioms. CHWs reported that *patience* and *repetition* were important for succeeding in helping community members initiate or maintain positive health behaviors.

“We use dialogue, chit-chat, being friendly, so that the patient can open up to us with confidence...then they talk to us” (CHW # 08)

“I speak the language of my patients. I can't say, for example, ‘STD’ to mean ‘Sexually Transmitted Disease.’ They don't know it. They barely understand the word vagina; they use other terms, like ‘pussy.’ We use words that are most popular” (CHW # 01)

“I talk to patients a lot, because it's the only way to succeed, by explaining things with patience, not condescension” (CHW # 18)

Challenges CHWs face on the job—CHWs reported personal and environmental challenges that may hinder their abilities to foster health behaviors. CHWs reported that they often experience from their patients a *lack of credibility* in CHWs' authority and/or capacity to help them with health matters. They identified *lack of resources* and *hard-to-reach patients* as critical challenges in their praxis.

“Sometimes the women want to schedule a preventive consultation, and I offer to schedule it. They smile in disbelief, thinking [a CHW] cannot even do that” (CHW # 16)

“Patients associate the PSF with politicians and think services end after a politician's term, and they end up not trusting us” (CHW # 05)

“We still don't have landlines in the clinics; we must use our own phones to connect patients with the clinic” (CHW # 07)

“It's difficult because sometimes we have no condoms to give” (CHW # 12)

“Accessing patients is hard, knowing the best times to visit the families is hard. At times you get [to patients' homes] and the person is cooking something and can't stop, the father is at work, etc.” (CHW # 08)

Observable patient health behavior—CHWs' interviews suggested that their praxis consists of strategies to engage *all* patients, including those hard to reach, and to bring about health behaviors even when they lack resources and credibility. Below, we use text from two separate interviews to illustrate how CHWs used indigenous and technical knowledge/skills, how they addressed challenges, and influenced patient HIV/AIDS-related behavior.

“In my catchment area, there is a girl with HIV. She had tuberculosis and her immune system was low. I helped to get her to the hospital and take [antiretroviral combination therapy] [*technical knowledge*]. But many people don't want to hear from CHWs; they want to talk with the doctor or nurse. So I asked the nurse to come with me once [*overcoming lack of credibility*] and I then continued to visit and educate that girl [*persistence*] and now she gained weight and is taking her medication as prescribed” [*observed health behavior*] (CHW # 21).

“We engage people by showing how we work [*friendly rapport*]. We explain STIs, the importance of condoms to prevent HIV [*technical knowledge*]. It's difficult because sometimes we have no condoms to give [*lack of resources*]. We keep advocating getting condoms [*overcoming lack of resources*]. With our help, people change and start to use condoms once they are available” [*observed behavior*] (CHW #15).

These examples focus on the role of CHWs in preventing HIV and treating patients with AIDS. However, CHWs gave numerous examples about how they used diverse knowledge and skill sets to promote myriad other health behaviors as they related to different disease and conditions. To stress the scope of CHW praxis, we present three other examples in Table 1.

DISCUSSION

This paper aimed to fill a serious gap in the literature by developing a theoretically- and empirically-based framework to explain CHW praxis – how CHWs combine indigenous and technical knowledge, overcome challenges and impact patient outcomes. Using an integrated theoretical foundation and in-depth interviews with CHWs, the *CHW Praxis and Patient Health Behavior Framework* was created. This framework is based on CHW data, which suggest that CHWs convey health promotion and disease prevention messages learned through training and didactic materials. They use strategies – empathic communication and perseverance – derived from indigenous knowledge to help oppressed individuals make positive changes in their health (Freire, 2000, 2005). Based on numerous examples provided by participants, we deduced that CHWs' interpersonal skills facilitate engagement, rapport and counseling of community members on health matters (Rowe, de Savigny, Lanata, & Vitoria, 2005; Schneider, Hlophe, & Van Rensburg, 2008; Vitoria, Knauth, & Oliveira, 2008). Grounded in individual behavior theories, we contend that CHWs use identified strategies to influence patients' attitudes, self-efficacy, and subjective norms as do other care providers such as physicians and nurses (Perkins, Jensen, Jaccard, Gollwitzer, Oettingen, Pappadopoulos, & Hoagwood, 2007). Upon establishing rapport, CHWs then use technical knowledge and skills to promote desired health behaviors. Below we discuss how researchers and policy makers can use the framework to advance future research and CHW training.

Implication for research

We formulated a framework depicting associations between indigenous and technical knowledge *and* patient health behaviors, those CHWs observe in their day-to-day work. The framework suggests that CHWs influence patient behavior by enhancing patients' confidence and their attitudes and values toward behavioral change. Future research will be

needed to estimate which strategies best influence these precursors of patient health behavior. CHWs reported using their own personal resources to meet patients' needs and advocating for more resources. This indicates that personal and environmental challenges may moderate the influence of indigenous and technical knowledge on patient behavior.

There is a need to identify how CHWs distinctly use indigenous and/or technical knowledge to overcome challenges they experience in their practices, something this study did not accomplish. Future survey research will be needed to test both associations between CHWs' praxis and patient behavior and the possible moderating effect of contextual challenges. We hypothesize that when CHWs lack either indigenous knowledge or technical training, and when they face challenges as outlined above, they will observe fewer behavioral changes in patients. Survey research is needed to test this hypothesis.

Research on the effectiveness of primary health care often focuses on associating patient health behaviors with either geographic coverage of primary care programs or the number of physicians affiliated with such programs (see, for example, (Macinko, et al., 2007; Macinko, Guanais, & Marinho de Souza, 2006). However, an ecological approach to research is recommended that acknowledges the roles of all care providers (Stein & Harzheim, 2006). It is important to account for CHW praxis when conducting research on how to help patients develop health behaviors. Grounded in the *CHW Praxis and Patient Health Behavior Framework*, survey questions can be developed and data collected about the impact of CHWs on patient health behavior. Survey data can be used in predictive models testing the effects of CHW praxis on health behaviors. Future research should examine specific assets (i.e., indigenous knowledge/skills) CHWs have to offer which are not derived from their technical training. This research will further define CHWs' unique knowledge and skills.

Implications for CHW praxis and training

Although this paper focuses on CHWs in Brazil, we acknowledge that many other countries have identified the value of and need for CHWs as part of their health care systems. Different terms have emerged in different countries for CHWs. In Brazil, for example, they are called *Agentes Comunitários da Saúde*. Nonetheless, CHWs have similar roles and responsibilities in many parts of the world and have been shown to ameliorate myriad health and social problems (Clarke, et al., 2005; McCormick, et al., 1989; Perino, 1992). Freire's educational philosophy (Freire, 2005), which guided our research, has a global appeal demonstrated by projects with low-income populations in myriad areas of research and practice (Savdié & Chetley, 2009; Wittman, 2009). However, CHWs must address local health problems and challenges. Therefore, the framework which emerged from CHWs in Brazil can be used to explain basic strategies used by CHWs across the globe. Strategies used by CHWs to address personal and environmental challenges in Brazil can be modified by CHWs elsewhere and used to help patients develop health behaviors to address local diseases and social conditions. Similarly, development of training curricula can follow the theoretical and empirical constructs proposed here.

The World Health Organization recommends the use of transdisciplinary teams in primary care (World Health Organization, 2011). Brazil's Unified Health System employs physicians and nurses responsible for training and ongoing support of CHWs. CHW training often privileges technical information at the expense of training in how indigenous knowledge and skills can best serve community members (Martin, Catrambone, Kee, Evans, Sharp, Lyttle, Rucker-Whitaker, Weiss, & Shannon, 2009; Rowe, et al., 2005; Swider, Martin, Lynas, & Rothschild, 2010). We recommend training that explicitly encourages CHWs to integrate indigenous knowledge and technical training to overcome contextual challenges. Training may be more effective by reflecting methods of teaching and learning CHWs use to educate patients. To this end, Freire's concept of mutual learning and teaching (Freire, 2000),

discussed above, is recommended to emphasize continual, mutually empowering dialogue between CHWs and physicians and nurses.

CHWs have ambiguous roles as both service providers and representatives of their communities (Victora, et al., 2008). Nonetheless, such ambiguity sets CHWs apart from other medical professionals and elevates their status in an otherwise imbalanced relationship. CHWs' expertise and personal understanding of the communities where they live and work are their key assets and these must be valued accordingly. Medical staff can be encouraged to learn interpersonal skills from CHWs and to use these assets to engage patients in diagnoses and treatments (Longtin, Sax, Leape, Sheridan, Donaldson, & Pittet, 2010; Taylor, 2009; Yedidia, 2007). CHWs' involvement in training physicians and nurses on matters of community needs, resources and culture is both desired and needed to help address imbalances of power between CHWs and medical staff. CHWs can contribute to the training of professional providers by helping them improve communication with patients and demonstrate empathy, both strategies extensively recommended in the literature (Bhui, et al., 2007; Bonvicini, Perlin, Bylund, Carroll, Rouse, & Goldstein, 2009). Indeed, training teams of care providers as units has been recommended since the 1970's (Rubin & Beckhard, 1972).

Compared to CHWs, physicians and nurses have higher levels of education, income and socioeconomic status. Nurses, particularly in Brazil's Unified Health System, hold administrative positions and are responsible for supervising and training CHWs. Training of medical staff would benefit from having CHWs convey information about community members while simultaneously learning technical knowledge from medical professionals. This kind of training – where diverse groups of adults learn and teach one another inextricably reflects Freire's philosophy and has the potential to deepen both medical professionals' and CHWs' critical awareness (Freire, 2005) of the degree to which integrating indigenous and technical knowledge can affect community health. Moreover, training that encourages CHWs and medical staff to teach and learn from one another may generate more agreement about how best to engage, diagnose, treat and follow up with patients, as well as how to define and measure patient health behaviors. This would explicitly acknowledge CHWs' roles as providers of health care and as bridges between community members and medical providers.

CONCLUSION

Following CBPR principles, a research partnership between US- and Brazil-based partners was built to develop the *CHW Praxis and Patient Health Behavior Framework*. We built the framework grounded in learning/teaching and behavioral theories and on data from CHWs in Brazil's Unified Health System. The data collected reflect CHWs' cyclical processes of learning and teaching, out of which they develop strategies to help community members acquire health promotion and disease prevention behaviors. By pursuing a research agenda mutually defined by CHWs and research partners, this study generated additional evidence that CHWs have well-defined knowledge and skills. Reflecting CBPR principles that suggest research findings can be useful to research participants, CHWs can use this study: as evidence of their pivotal role in primary care; and as evidence of how their unique knowledge and skills improve health behaviors of the poorest, most oppressed populations worldwide.

It is, however, important to acknowledge that the *CHW Praxis and Patient Health Behavior Framework* has limitations. CHWs worldwide face myriad challenges. Their technical training can be uneven, and the strategies based on their indigenous knowledge/skills may vary by location. There may be other components of CHW praxis not identified here.

Successful CHW praxis is evidenced by the patient health behaviors that CHWs observe. Ideally, these behaviors should be confirmed by the patients themselves. Given these issues, CHW praxis can be generalized only with caution. Nonetheless, the perspectives and working conditions of CHWs in this study reflect the realities of a large workforce in Brazil and have global relevance as indicated above.

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Research Highlights

1. Provides a theoretical and empirical framework to describe and explain Community Health Workers' (CHWs) praxis.
2. Grounded in Freirian philosophy, provides the Community Health Worker Praxis and Patient Health Behavior Framework.
3. Uses qualitative data to depict associations between CHWs' indigenous and technical knowledge *and* patient health behaviors.
4. Advances research on CHWs' impact on patient behavioral changes and offers concepts to optimize CHW training.
5. Focuses on Brazil's health system, with nearly 300,000 CHWs, thus offering implications relevant worldwide.

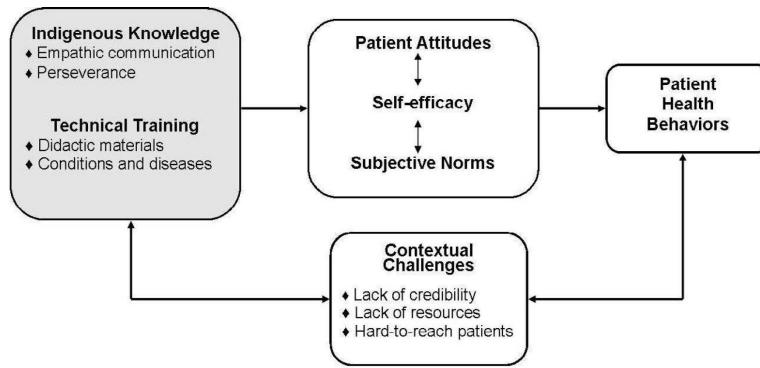


Figure 1.
CHW Praxis and Patient Health Behavior Framework

Table 1

CHW Praxis and Patient Health Behavior

Disease or Condition	Selected passages
Dengue fever prevention	“I always remind patients and explain the importance of what I’m teaching [<i>patience</i>]: “Be careful with the dengue, make sure to empty out the water from the bottles and the tires...” [<i>technical knowledge</i>]. Sometimes I bring the nurse to reinforce what I’m saying [<i>overcoming lack of credibility</i>]. It’s important the way you approach and talk with each person [<i>empathetic communication</i>]. For sure we see changes; I no longer see stagnant water and the house is cleaner [<i>observed behavior</i>]” (CHW # 2).
Hypertension prevention	“We had training on hypertension; we learned how to teach patients to moderate their use of salt, to exercise daily, to watch their diet and make sure they take medication [<i>technical knowledge</i>]. I had an elderly patient that the nurse told me to visit every day until he was there [<i>accessing hard-to-reach patients</i>]. So, I’m always talking to him [<i>patience</i>]. After I give the information with patience, I see that he is getting better and doing what we instructed him to do [<i>observed behavior</i>]” (CHW # 22).
Immunization	“With some mothers we have to insist; we keep telling them to take the child to get their vaccinations [<i>patience</i>]. We explain that if the children don’t get their shots, it can bring more complications [<i>technical knowledge</i>]. Many mothers work and don’t have time. We have to insist and come many times until we find them at home [<i>accessing hard-to-reach patients</i>]. We explain things in a way they understand [<i>empathic communication</i>]. When we go back the following month, we see a difference; the child’s vaccination is up to date [<i>observed behavior</i>]” (CHW # 3).