

Community health workers' non-technical skills for delivering primary healthcare in low-income areas

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Abstract.

BACKGROUND: To overcome the poor conditions of low-income areas in developing countries like Brazil, Community Health Workers (CHWs) are required to exceed the regular set of formal skills they are used to employ.

OBJECTIVE: In this study, we aim at identifying the non-technical skills CHWs must develop to cope with the extraordinary situations that occur in vulnerable communities.

METHODS: 41 CHWs based in two primary healthcare clinics in Brazil underwent two rounds of in-depth interviews. The analysis was carried out using the Analytical Hierarchy Process, resulting in the prioritization of social skills according to their calculated importance to house calls.

RESULTS: Among the ten higher-scored skills, we find communication and advocacy skills being of high importance. Civility was found to be the most important attribute, confirming that community action relies strongly on the relationship between health professionals and the community.

CONCLUSION: The results of our study contribute primarily to the improvement of community-based primary care programs as it helps to identify major skills required for community action.

Keywords: Social skills, resilient healthcare, grounded theory, knowledge elicitation

1. Introduction

Many countries comprise Community Health Workers (CHWs) in their health systems as front-line primary carers entitled to promoting health, disease prevention, and maintaining patient health.

Although their profiles vary, in most countries, especially the ones with universal health systems like Canada, United Kingdom, and Brazil, CHWs usually work very close to communities, visiting patients' residences, carrying initial health procedures, and bridging the gap between the population and the health services [1, 2].

In developing countries like Brazil, CHWs' work is significantly challenging due to diverse social,

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cultural, economic, and medical conditions. Moreover, in Brazil most CHWs are based in low-income communities usually inflicted by urban violence, poor infrastructure, low-quality housing and sanitation, among other issues that make residents difficult to care for. In addition, the only requirement for becoming a CHW in Brazil is to be a resident in the community where they are going to work, thus most CHWs start their work either poorly recruited, minimally trained, or in some cases without any training at all [3–5].

Previous studies have shown that patient engagement relies on deep understanding of the community and its rules [6, 7]. Such cultural and interpersonal nuances can only be learned by staying in the territories and bonding with their residents through social means. This highlights the importance of non-technical skills (NTS) in the CHW's work.

NTSs are the cognitive and social skills that complement technical skills to enhance efficiency and safety [8, 9]. They relate to specific behaviors employed to accomplish a task. Therefore, non-technical skills do not characterize a specific person, but rather her/his behavior. In healthcare, non-technical skills are additional to clinical and procedural knowledge. They form the gamut of cognitive, social, and interpersonal skills that facilitate the effective delivery of safe care [10, 11].

Despite the wide recognition on the importance of NTS in health care, very little is known about how CHWs develop and adopt them in their regular performance. Significant literature is found on the work of physicians and nurses [12–14], while the use of NTS by CHWs remain almost unexplored.

Thus, this study aims at identifying the major NTS developed by CHWs to deliver healthcare in diverse, low-income, and poorly developed communities. Recent occurrences like the COVID-19 pandemic illustrate the increasing importance of CHWs in the frontline healthcare workforce in vulnerable communities. This study then contributes to better recruitment and earlier development of NTS in novice CHWs, in a scenario of scarce literature in this topic.

2. Methods

This study follows an qualitative exploratory design, underpinned by the Grounded Theory [15]. Data collection procedures were based on in-depth interviews with CHWs based on two primary care

clinics, while the data analysis followed the Analytical Hierarchy Process (AHP) [16].

Observing the relationship between workers and the context in which they perform their regular activities is paramount to describe the strategies to cope with extraordinary events and explicit the tacit knowledge they employ. Thus, a qualitative approach showed to be useful in this exploratory study. Moreover, given the qualitative nature of this study, a large sample of participants would bring repetitive data and not necessarily present new information regarding the structure of the object observed [17].

It is also important to highlight that the grounded theory relies on adequate representations of the object of analysis, its culture, and symbols, rather than frequencies – encompassing its subjectivity and complexity, which cannot be quantified [15, 18].

The study was carried out with according to Brazilian regulations regarding research with human participants. Prior to its beginning, the present study underwent review and obtained clearance by the Institutional Review Board.

2.1. Research settings and recruitment of participants

As of late 2016, the two clinics explored in this study were involved with approximately 45,000 patients from 12,000 families. Both clinics are in low-income communities afflicted by poor infrastructure, urban violence, drug traffic, and recent epidemic surges (Dengue Fever, Zika Virus, Chikungunya, and COVID-19). These locations also face endemic diseases such as hepatitis, tuberculosis, hypertension, diabetes, prenatal issues, and malnutrition.

The two participant clinics host 14 healthcare teams. Each team consists of:

- One family physician;
- One nurse;
- One nursing assistant;
- 6 to 12 CHWs.

Only CHWs participated in this study. The two clinics together add up to 82 CHWs. The saturation of participants was accomplished as 41 CHWs (50%) agreed to participate, which showed to be sufficient to ensure the most perceptions of the participants have been encompassed [15]. Firstly, clinic managers were contacted by the research team and asked to select by convenience the first CHWs to be interviewed. The following participants were recommended by the first interviewees, in a “snowball” procedure [19].

The participants were diverse in age, experience, and education, as one single inclusion criterion was determined: all participants should have been working as a CHW for at least one year.

In total, 280 h of fieldwork were carried out in this study. Interviews occurred for 6 months. Only one member of the research team and the interviewed CHW were present on each interview session, which were conducted in Portuguese, and no research team member held any kind of relationship with the participants prior to this study. Fieldwork was organized in two steps (mapping; and weighing), as presented in the next subsections.

2.2. Mapping constraints and strategies

The first step followed a semi-structured script with objective and open-ended questions. The script comprised the major aspects and constraints faced by CHWs is based on the EAMETA tool [20], as follows:

- Context
 - Weather
 - Confidence
 - Locations
 - Circulation
 - Safety
- Environment
 - Lighting
 - Noise
 - Smell
 - Ventilation
 - Garbage disposal
 - Sanitation
- Resources
 - Backpacks
 - Shoes
 - Raincoat
 - Clothing
- Equipment
 - Computers
 - Tablet
 - Cell phone
 - Software

EAMETA is a participatory ergonomics assessment tool used to describe the effects of the working environment over practitioners' performance. Additional information on the strategies used to overcome the regular constraints could be provided by interviewees during the conversation, and such comments were registered in field notes. Giving the interviewee

the possibility to speak freely during the interviews showed to be important in building a trustful relationship with the researchers. This first round involved all the 41 CHWs recruited.

The NTSs resulting from the first step were analyzed and categorized by the research team in Civility, Work, Communication, Confrontation, Empathy, and Advocacy [21].

2.3. Weighing NTSs

The resulting list of major problems and corresponding skills served as the basis for a second round of interviews with the 10 most experienced CHWs. Firstly, the participants were asked to compare skills mutually, in a process called Pairwise Comparison [22]. The categories were also scored, and the relative importance of each skill was obtained by the mathematical normalization of the opinions of each CHW.

Secondly, the 10 most experienced CHWs were asked to weigh the use of each skill on the list using the following scale: never used (NU), little used (LU), eventually used (EU), regularly used (RU), or strongly used (SU).

The opinions of the participants were analyzed using an AHP model written in Microsoft Excel. To express the opinion of the participants with greater accuracy, the AHP model employed in data analysis uses triangular fuzzy numbers [23].

As all NTSs were given a relative importance based on their pairwise comparisons (λr), the scores given by participants to of each NTS (S) are multiplying by their respective relative importance and the corresponding categories' scores (λc), resulting in the final importance score ($R = \lambda r \times S \times \lambda c$). As the results are given in triangular fuzzy numbers, a defuzzification using the Centroid method [24] is carried out, and the list is obtained by ordering the final results.

3. Results

Given the NTSs mapped, Table 1 summarizes the results of the pairwise comparisons carried out to calculate the relative importance of each NTS. Thus, Table 2 shows the scores given by each interviewed CHW, as well as the final score resulting of the aggregation of the opinions of CHWs. Finally, Table 3 presents the NTSs in order of importance, from the most to the least important one.

Table 1
Assessment of skills and respective categories

Category	Category weight (λ_c) (fuzzy)	Skill	Skill weight (λ_s) (fuzzy)
Civility	(0.34; 0.32; 0.33)	Introduce themselves	(0.85; 0.86; 0.77)
		Salute	(0.11; 0.11; 0.17)
		Say please, and thank you	(0.04; 0.03; 0.05)
Work	(0.31; 0.31; 0.30)	Speak in public	(0.42; 0.38; 0.34)
		Negotiate	(0.29; 0.27; 0.25)
		Suggest	(0.12; 0.13; 0.16)
		Disagree with the group	(0.06; 0.07; 0.09)
		Cope with bullying within the group	(0.04; 0.06; 0.07)
		Support other members of the group	(0.04; 0.04; 0.05)
		Make demands	(0.03; 0.04; 0.04)
Communication	(0.17; 0.17; 0.17)	Compliment others	(0.27; 0.26; 0.27)
		Thank compliments	(0.17; 0.17; 0.18)
		Participate in conversations	(0.29; 0.29; 0.28)
		Sustain conversations	(0.18; 0.19; 0.17)
		Finish conversations	(0.05; 0.05; 0.05)
Confrontation	(0.04; 0.05; 0.04)	Ask questions	(0.04; 0.05; 0.04)
		Approach authorities	(0.30; 0.30; 0.30)
		Ask favors	(0.22; 0.21; 0.22)
		Disagree authorities	(0.16; 0.16; 0.17)
		Handle critics	(0.16; 0.15; 0.15)
		Show displeasure	(0.07; 0.07; 0.08)
		Refuse absurd requests	(0.06; 0.06; 0.06)
		Request change of behavior	(0.03; 0.04; 0.03)
		Stand for their own rights	(0.03; 0.04; 0.03)
		Recognize mistakes	(0.02; 0.03; 0.02)
Empathy	(0.04; 0.04; 0.04)	Empathy	(1.00; 1.00; 1.00)
Advocacy	(0.11; 0.11; 0.11)	Positivity	(0.81; 0.77; 0.81)
		Offer help	(0.19; 0.23; 0.19)

Table 2
CHW's responses and calculated priority

Category	Skill	Responses										Priority
		CHW 1	CHW 2	CHW 3	CHW 4	CHW 5	CHW 6	CHW 7	CHW 8	CHW 9	CHW 10	
Civility	Introduce themselves	SU	RU	SU	EU	EU	SU	SU	SU	SU	RU	1.91
	Salute	EU	EU	EU	EU	EU	SU	SU	EU	EU	RU	0.20
	Say please, and thank you	SU	RU	SU	SU	RU	SU	SU	SU	SU	SU	0.09
Work	Speak in public	RU	SU	EU	EU	LU	LU	EU	LU	LU	EU	0.50
	Negotiate	SU	SU	RU	SU	SU	SU	RU	SU	SU	SU	0.67
	Suggest	SU	SU	LU	EU	LU	SU	LU	SU	LU	EU	0.23
	Disagree from the group	EU	SU	RU	RU	RU	SU	EU	EU	SU	EU	0.14
	Cope with bullying	LU	EU	EU	EU	EU	SU	EU	EU	EU	EU	0.09
	Support other members of the group	RU	SU	SU	SU	SU	SU	SU	SU	SU	RU	0.11
	Make demands	RU	EU	EU	EU	EU	NU	EU	EU	EU	EU	0.06
Communication	Compliment others	LU	LU	LU	LU	LU	LU	EU	LU	LU	LU	0.14
	Thank compliments	EU	EU	EU	EU	EU	EU	EU	EU	EU	EU	0.14
	Participate in conversations	SU	EU	SU	SU	RU	EU	SU	SU	RU	SU	0.37
	Sustain conversations	SU	EU	SU	SU	SU	SU	EU	EU	EU	SU	0.22
	Finish conversations	LU	LU	LU	LU	LU	LU	LU	LU	LU	LU	0.02
Confrontation	Ask questions	EU	SU	SU	SU	SU	SU	EU	LU	EU	LU	0.05
	Approach authorities	RU	RU	RU	RU	RU	RU	SU	RU	RU	RU	0.11
	Ask favors	EU	RU	EU	EU	EU	EU	EU	EU	EU	EU	0.06
	Disagree authorities	EU	EU	EU	EU	EU	EU	EU	EU	EU	EU	0.04
	Handle critics	EU	SU	EU	SU	EU	SU	EU	SU	SU	SU	0.05
	Show displeasure	RU	RU	RU	RU	RU	RU	RU	RU	RU	RU	0.03
	Refuse absurd requests	RU	RU	RU	SU	RU	RU	RU	SU	RU	SU	0.02
	Request change of behavior	EU	EU	EU	EU	EU	EU	EU	EU	EU	EU	0.01
	Stand for their rights	RU	SU	SU	EU	SU	RU	SU	SU	RU	SU	0.01
	Recognize mistakes	RU	EU	EU	EU	EU	EU	EU	EU	EU	EU	0.01
Empathy Advocacy	Positivity	SU	SU	SU	SU	SU	SU	SU	SU	SU	SU	0.32
	Offer help	EU	SU	SU	EU	SU	SU	SU	SU	EU	SU	0.61
		SU	SU	SU	SU	SU	SU	SU	SU	RU	SU	0.21

Table 3

CHW's skills ordered according to their calculated importance	
Non-technical skill	Priority
Introduce themselves	1.91
Negotiate	0.67
Positivity	0.61
Speak in public	0.50
Participate in conversations	0.37
Empathy	0.32
Suggest	0.23
Sustain conversations	0.22
Offer help	0.21
Salute	0.20
Compliment others	0.14
Disagree with the group	0.14
Thank compliments	0.14
Support other members of the group	0.11
Approach authorities	0.11
Say please, and thank you	0.09
Cope with bullying within the group	0.09
Make demands	0.06
Ask favors	0.06
Handle critics	0.05
Ask questions	0.05
Disagree authorities	0.04
Show displeasure	0.03
Finish conversations	0.02
Refuse absurd requests	0.02
Stand for their own rights	0.01
Request change of behavior	0.01
Recognize mistakes	0.01

4. Discussion

Recent literature suggests that the most critical abilities for coping with local contexts are the ones related to understanding symbols and meanings of the shared space, and being able to generate knowledge from such information [25–27]. Such symbols and meanings of the space are formed in what Santos [27] defines as “banal space” – the space and time directly linked to people’s everyday life.

In the banal space, the daily coexistence allows to identify and analyze neighborhood relations, conflicts, and differences, as well as the construction of specific rules of coexistence that must be respected by everyone, otherwise they would be subject to punishments for violating local rules [27]. As such rules are usually defined by a “local authority” – which in many locations in which CHWs are based consists of criminals, for example – adequate performance relies on making knowledge of such rules and how to cope with them as explicit as possible.

Enforcing the formal education background of CHWs has been a recurring topic in academia, not only in Brazil [26, 28–30], but also in Australia, the

USA, and other countries, disregarding the model in which their health systems are based on [31–35].

Research on other healthcare professions have shown that especially physicians and nurses are more likely to explicit knowledge on their work, which entails the increasing description of their NTSs [12, 14, 36, 37]. Moreover, the results of this research show that work-based skills involving collaborative performance were an essential point of focus, with four of the seven work-based skills being related to group cohesion (*i.e.*, disagreeing with the group, coping with bullying within the group, supporting other members of the group, negotiation). The importance of enforcing collaborative competencies in CHWs is confirmed by recent literature and has shown that collaboration with other CHWs, and with the rest of the healthcare team, is essential for improving health outcomes [38–40].

This study shows that, among the ten highest scored NTS, two are related to communication (Participating in conversations; Sustaining conversation), and one is related to advocacy (offering help). This corroborates with recent literature highlighting the importance of such skills for CHWs [41–43]. Other skills, namely ‘Introducing themselves’ and ‘Speaking in public’, were also highly ranked and relied heavily on the CHWs’ ability to communicate.

Regarding civility, a CHW’s ability to introduce themselves to other people was deemed to be of very high importance as introductions are typically the first action taken by CHWs while approaching communities or entering patients’ homes. Poor abilities in civility may hinder the consent a patient provides to access their home, thus delaying or even denying care. Previous studies have also highlighted the difficulties by CHWs in obtaining patients’ permissions to perform house calls. This is especially true in low-income and violent areas, where gaining the trust of people takes time, patience, and requires acute communication abilities [44–46].

The work of CHWs is essential to improving health outcomes, but their efficiency is tied to the understanding of local context, culture, and traditions. This is especially true when communities may present cultural or infrastructure barriers that hamper communication, logistics or technology use [47, 48].

5. Conclusions

One contribution of this study is the identification of major NTSs to deliver primary care in low-income

303 areas. With accurate identification of NTSs provided
 304 by the participatory methods adopted in this arti-
 305 cle, recruitment, and training of novice CHWs can
 306 encompass the challenges that expose workers to
 307 harmful situations or affect the quality of health out-
 308 comes.

309 Furthermore, the results present a categorized set
 310 of socially applied skills commonly used to reinforce
 311 relationships in the workplace and prioritize the skills
 312 according to the weighted opinion of specialists fol-
 313 lowing interviews of CHWs.

314 Regarding the limitations of the research, the
 315 results of this study contribute primarily to the
 316 improvement of community-based primary care pro-
 317 grams as it helps to identify major skills required
 318 for community action. Moreover, managers and pol-
 319 icymakers could take advantage of the results of
 320 our study by incorporating the selected skills into
 321 their training regimes for CHWs. Future research
 322 may expand our results by employing the meth-
 323 ods we use in this study for other community-based
 324 primary healthcare scenarios, thus providing new
 325 empirical evidence on essential requirements for
 326 CHWs.

327 The second limitation of this study regards the
 328 broad scope of CHWs' work, and the different con-
 329 figurations these professionals have worldwide. This
 330 study is based on Brazilian CHWs, as they oper-
 331 ate mostly outside primary care clinics, visiting
 332 residences, and performing non-clinic procedures,
 333 differently from some other countries.

334 Conflict of interest

335 The authors have no conflicts of interest to declare.

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