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Cervical Cancer Screening among Underscreened and Unscreened Brazilian Women: Training Community Health Workers to be Agents of Change

Nádia Kienen, PhD¹, Lorna Bittencourt, MS², Sandra M. Pelloso, PhD³, Marcia E. L. Consolaro, PhD³, Philip E. Castle, PhD, MPH⁴, Edward E. Partridge, MD², Vânia R. S. Silva, PhD¹, Isabel C. Scarinci, PhD, MPH²

(1) Universidade Estadual de Londrina; (2) University of Alabama at Birmingham; (3) Universidade Estadual de Maringá; (4) Albert Einstein College of Medicine

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Abstract

Background: Despite the availability of cervical cancer screening programs in Brazil, some women do not participate in these programs owing to structural and/or interpersonal/intrapersonal barriers, resulting in high cervical cancer incidence and mortality. Integrating community health workers (CHWs) into the delivery of cervical cancer screening interventions is potentially a feasible strategy to address these barriers.

Objectives: This study aimed to implement and evaluate a CHW training to deliver a brief intervention to promote cervical cancer screening among underscreened and unscreened women in Brazil.

Methods: The curriculum addressed cervical cancer and screening, behavioral intervention strategies, and protection of human subjects in research. Pretest and post-test questionnaires assessed changes in CHW objective and perceived knowledge as well as perceived skills and confidence ($N = 15$).

Results: There was a significant increase in objective and perceived knowledge about cervical cancer, behavior change strategies, and protection of human subjects in research between pretest and post-test, but not in self-perception about skills and confidence to motivate women to engage in cervical cancer screening.

Conclusions: Improvements in CHW knowledge about cervical cancer screening and behavior change represents a step forward toward successful interventions, but adaptations are needed to boost their self-confidence and perceived skills with regard to their ability to promote behavior change at the community level.

Keywords

Cervical cancer, capacity building, women's health, community health workers, behavior change

Cervical cancer is the fourth most common cancer in women worldwide, and its incidence and mortality are disproportionately high (>80%) in low- and middle-income countries as compared with high-income countries.¹ Cervical cancer is the second most frequent cancer among women in Brazil with an age-standardized incidence rate of 16.3 in 100,000 and ranks fourth in cancer mortality among women (7.3/100,000).²

Brazil has one of the largest comprehensive public health systems in the world and aims to provide universal access to its population.³ There is a wide range of women's health

programs that are available, including breast and cervical cancer screening.⁴ Brazil has an organized public national cervical cancer screening program with cytology as the main strategy for primary screening.² The estimated cervical cancer screening coverage (within the last 3 three years) was 81.5% among women between the ages of 25 and 64 in 2014.² However, despite the availability of no-cost cytology screening (Pap test) at Basic Health Units (BHUs; decentralized health clinics), and home visits by CHWs, who are employed by the Brazilian health care system, some women do not participate in regular cervical cancer screening. This lack of participation is

due mostly to structural or interpersonal/intrapersonal barriers such as difficulties in accessing services at public health clinics, embarrassment, fear of the results, and lack of symptoms.⁵⁻⁷ Therefore, alternative strategies must be explored to reach these women who are not coming in for their regular cervical cancer screening. One such strategy may be further training of CHWs to address the structural and interpersonal/intrapersonal barriers, and, consequently, promote behavior change.

The introduction of the CHW model in Brazil occurred in the 1970s as part of a social and political movement to honor one of the constitution amendments that states that health is a right and it is the government's responsibility to provide health care to all.^{8,9} The first CHWs were engaged community members who were supported by social groups and the Catholic church as catalyst of change but with a primary focus on social justice.¹⁰ As such, their training focused on leadership, political activism, and popular education.¹⁰ The institutionalization of CHWs within the public health system did not occur until the 1990s in the context of a Family Health Program where BHUs were specifically charged to provide care to the entire family.¹¹ This program includes multidisciplinary health care professionals, including CHWs.¹¹ However, it was not until 2002 that the CHWs were officially recognized as a profession with specific roles and responsibilities.¹²

CHWs are specifically placed to reach individuals who have not been reached through the programs offered in health clinics. Because they are considered trusted members of the targeted community,¹³ they can provide effective social support,^{14,15} which leads to increased access to care, especially in underserved populations.¹⁶ With adequate training, CHWs can actively engage in interventions that aim to promote behavior change, including cervical cancer screening.^{15,17-21} However, the majority of studies that have demonstrated the effectiveness of CHWs' interventions do not provide a detailed description of the CHW training, and it is not clear whether or not they have focused on skills development to promote behavior change.^{14,15,17-19,21-24} The few studies about CHW training to promote breast and/or cervical cancer screening focused only on increasing knowledge about breast and/or cervical cancer^{20,25,26} or increasing knowledge and perceived self-efficacy in the delivery of screening interventions.²³ There are few studies focusing on behavioral skills-related intervention delivery^{22,27-29} and/or in protection of human subjects in

research.³⁰ Therefore, although the importance of engaging CHWs in cervical cancer screening interventions has been clearly demonstrated, there remains a paucity of studies that describe the capacity building process and the skills needed to promote behavior change.²⁹

OBJECTIVE

This study describes the implementation and evaluation of a training program to equip CHWs who are already engaged in the health care system in the delivery of a brief educational intervention to promote cervical cancer screening among underscreened/unscreened women in Maringá, Paraná, Brazil, as a partnership between four universities and the municipal public health system.

METHODS

Partnership

This study is part of a larger research project to compare three cervical cancer screening modalities (self-collection and human papilloma virus [HPV] testing, Pap testing at the public health clinic, and choice between self-collection and HPV testing and Pap testing) among women who have not undergone cervical cancer screening within the past 4 years. It was conceptualized, developed, implemented, and evaluated as a partnership between four universities (University of Alabama at Birmingham [UAB], Albert Einstein College of Medicine, Universidade Estadual de Maringá [UEM], and Universidade Estadual de Londrina) and a municipal health care system (Maringá Municipal Health Department). The focus of this paper is on the training of CHWs.

As described, Brazil has a socialized and decentralized health care system where the municipalities have some autonomy on how services are provided, including cervical cancer screening. One of the challenges presented by the Municipal Health Care System in Maringá was their difficulty in reaching women who were not coming to the clinics for regular cervical cancer screening despite all of their ongoing efforts. As such, the partners came together bringing their unique areas of expertise: (1) UAB and Albert Einstein College of Medicine have expertise in organizing cervical cancer screening in low-resource settings, including self-collection for HPV testing and working with CHWs; (2) UEM has

expertise in cytology and public health nursing, including a longstanding relationship with the public health care system; (3) Universidade Estadual de Londrina has expertise in behavior analysis and training of CHWs; and (4) the Municipal Health Care System in Maringá has experience in the delivery of public health services, including cervical cancer screening and employment of CHWs. During the establishment of the partnership, all partners come together to design, implement, and evaluate the program. To implement such a program in the “real world,” a number of compromises are needed. For instance, the health care system released four to five CHWs in each of the BHUs to specifically work on this project for 2 months. Researchers committed to training other health care professionals and CHWs in cervical cancer screening and overall behavior change strategies outside the context of research to build capacity among the health care professionals.

Setting

Three BHUs within the public health system were randomly assigned to one of the three screening modalities described above (Pap test only, self-collection for HPV testing, and choice between Pap test and self-collection for HPV testing). These BHUs were chosen owing to the estimated population served (approximately 20,000 people per BHU), the number of women within the study age range (25–64 years), and cervical cancer incidence rates in the geographic areas served by these clinics. CHWs were chosen by BHUs managers based on the following criteria: must be at least 18 years of age, a woman, and responsible for a geographic area within the BHU. All study participants provided written informed consent. This study received approval from the institutional review boards at the University of Alabama at Birmingham (UAB–X150303007) and the Universidade Estadual de Maringá (UEM–43513515.7.1001.0104).

Training Content and Implementation

The training content was divided into four key components: knowledge about cervical cancer, knowledge regarding behavior change, skills development, and knowledge and skills regarding the protection of human subjects in research, because CHWs would be consenting participants in the research study. Table 1 presents the knowledge and skills topics addressed in the training. The training sessions were

aimed at both knowledge acquisition and skills development, with specific activities proposed for each component following the 12 principles of adult learning proposed by Vella,³¹ and consistent with our previous training of volunteer Community Health Advisors and paid CHWs.^{28,29} For example, to reinforce behavior modification strategies, we showed videos of movies and/or commercials in which participants were asked to identify specific strategies such as positive reinforcement and modeling. Or, after learning about the importance of cervical cancer screening and about the stages of behavior change, participants were asked, in groups of four to five people, to identify strategies to promote behavior change based on scenarios of women at different stages of change (precontemplation, contemplation, preparation, action, and maintenance).

Although knowledge acquisition regarding cervical cancer and screening was a relevant topic, most of the training focused on behavioral strategies to promote behavior change. Training began by providing basic concepts so CHWs could understand why people behave as they do as well as provide a rationale for the use of different strategies to promote behavior change. Training focused on two behavior change models—the transtheoretical model³² and the health belief model.³³ For instance, we presented the stages of change in written and graphic forms as a color ladder with a woman and respective facial expression for each stage walking up the ladder (e.g., precontemplation as red, contemplation as orange, preparation as yellow, action as a light green, and maintenance as darker green). Once participants understood the concepts, strategies to be used to promote behavior change (moving to the next stage), such as maintaining the color and facial expressions connections to facilitate retention of the concepts were added. This activity was followed by role playing. Similar strategies were used when discussing the health belief model followed by the integration of these two models in their daily work.

The next step was to build on this knowledge and skills by addressing how. This step was accomplished by focusing on communication, problem solving skills, and basic motivational interviewing strategies. To further develop these skills, we used strategies such as group work and role playing integrated with the acquired knowledge. These strategies are in accordance with popular education philosophy and methodology, which is a widely recognized approach in CHW training.³⁴

Table 1. Components of the CHWs training to deliver the educational session

Length	Learning Objectives	Themes	Teaching Strategies
8 hours	Describe cervical cancer and HPV. Identify and describe cervical cancer screening methods. Identify the basic principles of behavior change. Identify basic strategies of behavior change to be used during the visits in the community. Identify in which stage of change women are regarding cervical cancer screening. Define basic strategies to promote behavior change based on the stages of change. Identify and apply problem solving skills. Identify basic aspects of effective communication with community members and health care professionals. Describe and apply the principles of protection of human subjects in research.	Introduction to the study: CHWs' roles Do's and Don'ts. Cancer knowledge: cancer and cervical cancer. Cervical cancer risk factors. HPV and cervical cancer. Cervical cancer prevention (screening and HPV vaccination). Guidelines for cervical cancer screening. HPV testing and Pap testing. Behavior modification: Stages of Change and Health Belief Model. Intervention skills: Communication skills (active listening, how to communicate with patients and with the team work). Problem solving. Basic principles of behavior change. Protection of human subjects in research (research vs. community intervention). Belmont report. Ethics. Informed consent.	Lectures Movie segments to identify key behaviors and strategies. Group exercises integrating knowledge and skills.
4 hours	Describe the research' logistics and documentation.	Study's logistics and documentation (eligibility' questionnaire, informed consent, pretest, intervention's folders).	Oral explanations and interactive discussion.
4 hours	Apply research documentation. Apply the educational session using the intervention materials.	Educational session' delivery.	Intervention role playing. Observation of intervention delivery researchers' feedback.

Abbreviations: CHWs, community health workers; HIV, human immunodeficiency virus; HPV, human papilloma virus.

In addition, CHWs were trained in the protection of human subjects in research (adapted from the National Center for Professional & Research Ethics),³⁵ and the research protocol. In our study, CHWs were responsible for obtaining women's consent, baseline assessments, and intervention delivery. Therefore, during the training, CHWs were exposed to practical learning conditions (e.g., role playing and/or modeling) in which they had to perform those activities with subsequent feedback from researchers and other CHWs.

The training sessions were delivered over 16 hours in 3-day sessions (one 8-hour session and two 4-hour sessions). The first and second sessions occurred on 2 consecutive days. The third session occurred immediately before they began the intervention 2 months later to give them time to process the content and have the opportunity to implement some of the skills in their day-to-day work. The training sessions were administered by two of the authors (N.K., I.C.S.). CHWs also received a training manual that was developed by a

professional graphic designer based on extensive formative assessments among underscreened/unscreened women in the community, health care professionals, and CHWs serving this population.

Assessments

Pretest and post-test questionnaires were administered to evaluate changes in four key components: objective knowledge, perceived knowledge, perceived skills, and perceived confidence. In addition to demographic information, the assessments consisted of a set of 22 multiple choice knowledge questions and 12 Likert scale questions pertaining to these four key components. Topics under objective knowledge included cervical cancer, behavior change principles and strategies to promote behavior change, and basic principles about protection of human subjects in research. Response options to the objective knowledge statements were yes, no, maybe, do not know/not sure (e.g., cervical cancer can be prevented, behavior

change is a process). Answers to the knowledge questions were coded as correct or incorrect. For the purpose of this analysis, the objective knowledge questions were divided into three categories: 10 questions assessing knowledge about cervical cancer (e.g., Pap test), 7 questions assessing knowledge about behavior change (e.g., behavior change as a process, strategies to motivate others to change a particular behavior), and 5 questions regarding protection of human subjects in research (e.g., benefits/risks of participating in research).

Perceived knowledge about cervical cancer, behavior change principles, and behavior change strategies were also assessed. Participants were asked to rate themselves in each area on a scale from 1 (lowest) to 5 (highest). Perceived skills (e.g., problem solving, communication, behavior change) and confidence were assessed using the same Likert scale. Perceived knowledge was classified into two categories: three questions about cervical cancer and two questions about behavior change. Perceived skills to promote behavior change were classified into one category containing five questions. Perceived confidence to promote behavior change and motivate women to engage in cervical cancer screening was addressed through two questions.

The pretest was administered after consenting procedures during the first day of training. The post-test was administered after the third training session in which the CHWs went through one of three scenarios, according to their preference: (1) performing an educational session through a home visit with an unscreened woman, while being observed by one of the authors and two or three other CHWs, (2) being an observer of this educational session, or (3) performing an educational session through role playing. It should be noted that because the intervention has three conditions (Pap test only, self-collection for HPV testing, and choice between Pap test and self-collection for HPV testing), the second and third days of training were implemented separately by a BHU.

Paired *t* tests were conducted to assess the statistically significant differences between the baseline and post-training answers. The significance level was set at 0.05, and all statistical analyses were conducted using SPSS version 16 (SPSS, Inc, Chicago, IL).

The pretest also included questions regarding if they had heard about cervical cancer, Pap test, and HPV, and if they

perceived themselves to be at risk for cervical cancer. The post-test included additional questions about satisfaction with the training through three open-ended questions (what they most liked about the training, what they did not like about the training, and suggestions to improve the training).

RESULTS

Sociodemographic Characteristics

As shown on Table 2, 15 CHWs were trained. The mean age was 49 years and the average work experience as a CHW was 9.9 years. Although all CHWs reported that they worked in the promotion of cervical cancer screening, less than one-half reported they received any training on cervical cancer. In contrast, the majority (86.7%) reported previous participation

Table 2. Sociodemographic characteristics of CHWs (N = 15)

Demographics	n (%)
Age (y)	
Mean $\pm$ SD	49.2 $\pm$ 7.98
Range	35–67
Education	
Some high school	1 (6.7)
High School graduate	11 (73.3)
Some college	2 (13.3)
College	1 (6.7)
Marital status	
Single	3 (21.4)
Married/living together	8 (57.2)
Separated/divorced/widowed	3 (21.4)
Live in the same neighborhood where they work as CHW	
Yes	14 (93.3)
No	1 (6.7)
Time been a CHW (mo)	
Mean $\pm$ SD	118.5 $\pm$ 63.9
Range	6–196
Previous training in cervical cancer	
Yes	6 (40)
No	9 (60)
Previous training behavior change	
Yes	13 (86.7)
No	2 (13.3)
Work/have worked in cervical cancer screening	
Yes	15 (100)
No	—

Abbreviations: CHWs, community health workers; SD, standard deviation.

in behavior change training. All participants reported that they had heard about cervical cancer, Pap test and HPV, and 86.7% ($n = 13$) indicated that they perceived themselves to be at risk for cervical cancer.

Objective and Perceived Knowledge, Perceived Skills, and Confidence Assessment

Objective knowledge about cervical cancer, behavior change, and the protection of human subjects in research increased significantly between pretraining and post-training as well as their perceived knowledge about behavior change and cervical cancer (Table 3). There were no significant changes in their perceived skills to promote behavior change and motivate women to be screened for cervical cancer.

All participants responded positively to training satisfaction questions. When asked what they most liked about the training, they mentioned more in-depth cervical cancer knowledge, highlighting information about HPV and the Pap test. When asked what they did not like about the training, some reported that there were too many papers and materials to manage and that they disliked the taping of them practicing the skills learned. Some participants suggested training all CHWs to deliver this type of intervention.

RESULTS

Although some studies have described CHWs training to promote cervical cancer screening,^{20,22,23,25–27,30} this study focused on implementing and evaluating CHWs training to deliver a brief educational session to promote cervical cancer screening among underscreened/unscreened women. Results show that the training resulted in significant improvements in both objective and perceived knowledge regarding cervical

cancer, protection of human subjects in research, and behavior change among the CHWs.

Studies have shown the effectiveness of CHW-based interventions, especially when these interventions are informed by behavior change theories.^{36–38} Despite CHWs' participation in cancer screening activities, they indicated that they had not received any training or information on cervical cancer screening, which was confirmed by the significant differences in objective knowledge about cervical cancer and screening between pretest and post-test. There were also significant pretraining and post-training changes in objective knowledge with regard to behavior change strategies and protection of human subjects in research. In our experience in training CHWs in a variety of settings, we have found that these individuals tend to have very low health literacy, which requires a balance on how much knowledge should be provided as well as how this knowledge is delivered.^{29,39} It has been shown that low health literacy individuals have worse short-term memory and working memory than individuals with high literacy.^{40–42}

Although information on cervical cancer and screening seems to be “simple” and straightforward, major mental effort in the working memory (cognitive load) is necessary to integrate knowledge ranging from basic anatomy knowledge to how to “translate” this new information to the community members. This is particularly true when the recipients have less education and health literacy than the CHWs. Therefore, we limited our presentation and discussion to the most salient information to minimize the cognitive load in the working memory. We also sequenced the information in “pieces” or “chunks” that built on each other over time and paired them with practical applications and direct positive reinforcement to assure that participants could acquire and “translate” the

Table 3. Pretest and Post-test Mean Scores

Categories	Pretest, Mean (Range)	Post-test, Mean (Range)	<i>p</i> Value
Knowledge about cervical cancer	7.27 (5–10)	8.80 (8–10)	.003
Knowledge about behavior change	2.60 (1–4)	4.53 (2–5)	<.0001
Knowledge about research	2.87 (1–5)	4.53 (4–5)	<.0001
Self-perception about knowledge related to cancer cervical	2.73 (2–3.33)	3.33 (2.33–4.67)	.001
Self-perception about knowledge related to behavior change	3.13 (1.5–4)	3.57 (2.50–4.5)	.027
Self-perception about skills to promote behavior change	3.32 (2.2–4)	3.39 (2.6–4.6)	.695
Self-perception about confidence to promote behavior change	3.37 (2–4)	3.43 (3–4)	.582

knowledge while building their self-confidence in doing so.⁴³ This also served as a model on how they could implement the behavior change strategies to motivate underscreened/unscreened women to be screened for cervical cancer as well as engagement in other behaviors that they encountered in their day-to-day work (e.g., adherence to medication, prenatal care). That is, it was important for them to understand the why behind the behavior change strategies used (e.g., use of different strategies among women in different stages of change, problem-solving skills).

Consistent with the results obtained by Dumbauld et al.,⁴⁴ we demonstrated that CHWs can be trained in the protection of human subjects in research. Dumbauld et al. highlighted that their training caused some reflections about their dual roles as health educators and researchers. Although the focus of this article is not on the intervention implementation component of the study, we also experienced some difficulties with dual roles. CHWs expressed being overwhelmed with the “paperwork” component of the consenting procedures and assessments, and that conduction of research was not part of their work as CHWs. This issue is relevant and needs to be further addressed, because we are training CHWs to be health educators and promote behavior change. Engagement in research requires a different set of skills and knowledge. Future studies should address this dual role and how to best integrate (or not) these different components in the CHW training.

Although we obtained significant pretraining and post-training changes in objective and perceived knowledge, there was no significant increase in perceived skills and confidence to promote behavior change. We posit that this lack of significant changes may be due to two reasons. First, most participants had been active CHWs for a number of years (average of approximately 10 years) and, therefore, perceive that they already have the skills as they scored “average” on these questions in the pretests and post-tests. Second, the post-test was administered after the training when they had not had a chance to promote cervical cancer screening within the planned community-based intervention. Although the intervention results are beyond the scope of this article, preliminary results indicate an adherence to screening of greater than 90%. It should be noted that these are women served by the CHWs and that, despite multiple efforts, they had not

been able to engage these underscreened/unscreened women in cervical cancer screening before the training.

This study has some limitations that should be acknowledged. First, the sample size is small ($N = 15$), and consisted of CHWs already working in this role. Second, training effectiveness was assessed through a pretraining and post-training design, which precludes us from examining the long-term impact of the training. There remains a need to evaluate the CHWs’ skills to perform the intervention, which include videotaping their performance in the intervention delivery to ensure they accurately display the acquired knowledge and skills and linking this data with the expected outcome (cervical cancer screening). Third, we do not have estimates of costs associated with this type of training. Although CHWs are part of the health care system, they took time off from their daily activities to attend a 3-day training. However, as described, the acquired knowledge and skills can be generalized to other behaviors (e.g., adherence to medication, diabetes management), and, consequently, can improve their effectiveness as CHWs. Fourth, little is known about the sustainability of this approach, because this training was conducted in the context of a research project with a short duration.

Overall, the primary contribution of this study is a detailed description of the CHW training process to promote cervical cancer screening among underscreened/unscreened women in the context of an academic–public health sector partnership. Another major contribution is the focus on promoting capacity building among CHWs to promote behavior change. CHWs are the critical link between the health care system and the community as they have the ability to “translate” medical knowledge to a language that community members can understand and they can provide the social support needed to promote and maintain behavior change. To be successful, they must be appropriately trained to perform these roles.

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