

Engaging Community Members as Health Advocates in a Peer Driven Intervention—A Cervical Cancer Prevention Pilot in Punjab, India

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Abstract

Purpose: In India, cervical cancer is the second leading cause of cancer-related death in women. We piloted a cervical cancer prevention intervention in a rural town in southeastern Punjab, India to test the feasibility of a peer-driven intervention (PDI) model. **Methods:** Sixty-eight women (18-50 years) attended workshops with pre-post evaluation. Women learned skills of community health workers (CHWs), including strategies to engage women from the community for subsequent workshops. **Results:** Workshop 1 attendees (n=35) referred 33 women for Workshop 2, confirming the feasibility of PDI. Mean age was 29.48 (SD=8.2). Paired T-tests showed increased knowledge (19.41 vs

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29.25, $p < .001$), and confidence (2.67 vs 3.70, $p < .001$) in imparting information to others. **Conclusions:** This PDI is a feasible, culturally specific approach in which community women took on the role of CHWs to reach others. They successfully acquired knowledge and confidence in discussing cervical cancer prevention at low cost and minimal resources.

KEY WORDS

Cervical Cancer; HPV; HPV Vaccination; Peer Driven Intervention; Social network

Introduction/Purpose

The last two decades have seen enormous growth in the use of community health workers (CHW) to supplement the scarcity of health care providers and health workers in low income countries (de Vries & Pool, 2017; Lehmann & Sanders, 2007; Olaniran, Smith, Unkels, Bar-Zeev, & van den Broek, 2017; Perry & Crigler, 2014). One important role that CHWs play is to conduct outreach to at-risk individuals in the community, provide needed education, and make linkages to care. A less common modification of the CHW model is to recruit community members to act as health promotion catalysts in their community by taking on some aspects of the CHW role sometimes with minimal training or on a temporary basis. Such minimally trained community members may be an effective way to provide community education, encourage health promotion, and provide service navigation without committing to an enduring CHW role (Ingram 2012; Rosenthal, Wiggins, Ingram, Mayfield-Johnson, De Zapien, 2011; Olaniran, et al., 2017). The term Community Health Worker subsumes many categories of people who are typically defined by the roles they take on, the tasks they perform, the educational background they have, and in some instances, the compensation they receive (Lehmann & Sanders, 2007; Olaniran, et al., 2017; Perry & Crigler, 2014; South, Meah, Bagnall, & Jones, 2013). The definition and roles of CHWs are not consistent and the work CHWs perform can vary widely.

One feature of CHW work that does seem universal is that it provides community members the opportunity to focus on projects and issues that might be personally important to them, and allows adaptable working hours and conditions. The role develops community members' self-perception as leaders in the community, the belief that they can influence health decisions, and the skill of how to and who to talk to in the community to instill change (Ingram, 2008; Grange, 2008, Rosenthal et. al., 2011). The focus of this pilot research project was to promote cervical cancer prevention through using a peer-driven intervention (PDI) that adopts aspects of the CHW role. In a 2-hour plus workshop,

we provided education on cervical cancer and skills on network outreach, and asked women to recruit other women for the same workshop. The goal of the study was to assess the ability of community members to reach women in their social network, talk effectively about cervical cancer to engage them, and mobilize women to engage in health promoting behavior, specifically, to attend an identical workshop on cervical cancer. The workshops provided education about cervical cancer and promoted Human Papillomavirus (HPV) vaccine and Pap testing; all women who attended a workshop were trained to talk to other women about cervical cancer and to refer other women to attend. We refer to these women as “health advocates (HAs)” rather than community health workers to reflect their more restricted role, but their focus was identical to that of CHWs.

Literature Review

Cervical Cancer in India. Cervical cancer has been called “the preventable gynecologic cancer” due to the effectiveness of regular screening and HPV vaccination (Andrae, Kemetli, Sparén, Silfverdal, Strander, Ryd, Dillner, & Törnberg, 2008; Nour, 2009; Senapathy, Umadevi, & Kannika, 2011). However, even with the significant advances in the prevention, treatment, and cure of cervical cancer, Indian women shoulder a heavy burden of incidence and mortality. In India, the second most populous country in the world, over 432 million women aged 15 years and older are at risk for developing cervical cancer (Bruni, Barrionuevo-Rosas, Albero et.al. 2015; Sreedevi, 2015). Cervical cancer is the second leading cause of death from cancer in women aged 15-44, is 14% of all cancers in the country (Bruni, Barrionuevo-Rosas, Albero et.al. 2015; Sreedevi, 2015; Chatterjee, Chattopadhyay, Samanta, & Panigrahi, 2016), accounts for 25.9% of all new cancer cases, and is responsible for 23% of deaths in women. (Kawana, Yasugi, & Taketani, 2009; Sreedevi et al 2015; Bruni, Barrionuevo-Rosas, Albero et.al., 2015). Evidence suggests that the incidence of cervical cancer is higher among women of lower social economic status (SES) who are less educated, and have a higher number of children, as they are generally not screened for cervical cancer (Sreedevi, 2015). The estimated prevalence of HPV is 7.5% to 16.9% among Indian women without cervical cancer (Kamalesh, Reshmi, Baishali, Bibhuti, & Subhasish, 2011; Sahasrabuddhe et al., 2010; Sreedevi, Javed, & Dinesh, 2015). Cervical cancer is a major public health concern in India despite the fact that it is preventable and HPV vaccination and Pap testing are available at no or low cost.

Interventions to Reduce Cervical Cancer in India. In developed countries, cervical cancer prevention (Pap tests and the HPV vaccine) have been effective at reducing incidence and prevalence of cervical cancer (Jemal, Bray, Center, Ferlay, Ward & Forman 2011; Torre, Bray, Siegel, Ferlay, Lortet-Tieulent, & Jemal, 2015). In developing countries, cervical cancer prevention has had mixed

success due to social, logistical, and monetary challenges (Sankaranarayanan, Budukh, & Rajkumar, 2001; Denny, Quinn, & Sankaranarayanan, 2006; Torre et al., 2015). In India, efforts to reduce the incidence of cervical cancer have not been very successful (Sreedevi, et al. 2015; Yeole, 2008; Nandakumar, Ramnath, Chaturvedi, 2009). The Indian government supports and implements prevention of cervical cancer at low or no cost, however, physician and community acceptance are low due to lack of knowledge and awareness (Sreedevi, et al. 2015). In addition, 70% of the population lives in rural areas and faces significant financial and logistic access barriers to general health care and even more challenges to accessing sexual and reproductive health care (Ismail, Shajahan, Rao and Wylie, 2015). The Indian government is implementing school-level outreach for HPV vaccines and community-level campaigns to raise awareness of the importance of Pap testing and HPV vaccines. Recent studies have reported that immunization of young girls in India is becoming acceptable among the more educated (Akoijam, Oinam, Rushitha, & Sougajam, 2016; Rashid, Labani, & Das, 2016), however, uptake among less educated Indians lags far behind due to lack of knowledge and awareness regarding prevention of cervical cancer (Akoijam, et al., 2016; Chatterjee, et al., 2016; Rashid, et al., 2016; Sreedevi, et al., 2015).

We identified no evidence-based interventions for Indian women to learn how to prevent cervical cancer, specifically through HPV vaccination and Pap testing. We had experience with a community-focused cervical cancer prevention program called Cervical Health in the Community (CHIC), in the Bronx, New York (Chhabra, Rivera-Edwards, & Bauman, 2016; Chhabra et al., 2015). Project CHIC developed an adaptable culturally-specific health promotion strategy that enlists women to conduct outreach in their social networks to increase awareness and knowledge of cervical cancer and HPV vaccination, and increase intention to receive a Pap test and/or HPV vaccine (Chhabra, et al., 2016; Chhabra, et al., 2015). In Project CHIC, forty women were trained to communicate effectively about cervical cancer prevention with other women in their social network and to encourage them to engage in preventive activities using the strength of personal connection. They were asked to refer other women from their social network. The initial group of 11 women referred 29 other women to attend the workshop, which confirmed the feasibility of PDI (75% of the sample was recruited through referral). The mean age was 33.64 years (SD=9.8) with 43% under age 30; 65% had some college education; 70% were employed. Paired T-tests showed significant increases in Knowledge ($p<.001$) and increased Confidence ($p<.01$) in imparting learned information about cervical cancer and HPV vaccination. At three months follow-up, these women had retained their knowledge, confidence and self-efficacy in being Health Advocate for their community, altogether each HA had reached out to an average of 7 women (Chhabra et al., 2015).

Cervical cancer preventive interventions need to be scaled up in India to reach a population of 436.76 million women over the age of 15 years, most of whom live in rural underserved areas. These interventions also must be designed to fit the standards of cancer care in each Indian state, which differ significantly in culture, geography, education attainment, economic status, and accessibility to health care. The National Programme for Prevention and Control of Cancer, Diabetes, Cardiovascular Disease and Stroke (NPCDCS), initiated in 2010, advocates for comprehensive cancer care in district-level care centers. However, there is a noticeable absence of nationwide screening programs, which results in wide disparities in screening, cancer treatment, and mortality (Chatterjee, et al., 2016; Sreedevi, et al., 2015).

Peer Driven Interventions. Many successful behavioral interventions utilize peer pressure and persuasion to affect group norms.(D. D. Heckathorn, Broadhead, Anthony, & Weakliem, 1999). The theory of Peer Driven Intervention (PDI), based on sociological theories of group mediated social control (D.D. Heckathorn, 1990), suggests that the likelihood of adoption of positive behaviors (e.g., taking care of oneself) strengthens as social network members share experiences, knowledge and encourage each other. PDIs are ideally suited for populations that are not well connected to care and have strong community and individual level privacy concerns (Broadhead et al., 2002; Broadhead et al., 1998; Valente, 1996; Valente, 2010). We used this model for the current project to educate women about cervical cancer prevention and provide skills to conduct successful outreach to their family, friends and neighbors to learn about the importance of Pap testing and HPV vaccination.

Method

The purpose of the study was to assess the feasibility, acceptability, efficacy, and referral potential of a PDI-based intervention in which women referred their friends, family, and peers to attend a health promotion workshop. The culturally specific health promotion intervention was designed to improve awareness of cervical cancer, increase knowledge about HPV and HPV vaccination, improve self-efficacy to get cervical cancer screening, and confidence in their ability to persuade women in their social networks to take action to prevent cervical cancer. For this paper, the analysis used data from the two workshops completed in the Women's Studies Centre of Punjabi University (in Patiala, India). The study was approved by Population Research Centre (PRC) of H.P. University Shimla, through letter No. PRC/HPU (IRB)-2016 and receive approval from the Women's Study Centre of Punjabi University.

Intervention: We collaborated with two universities in northern India (Himachal Pradesh University in Shimla, HP and Punjabi University in Patiala, Punjab) to pilot the feasibility and acceptability of an Indian-adapted version of CHIC we called Cervical Health Action and Intervention (CHAI). The inter-

vention is a 2-hour cervical cancer prevention workshop that combines cervical cancer awareness and knowledge to encourage women to seek cervical cancer screening. It was first tested in Patiala, a rural northern Indian university town in southeastern Punjab. Patiala district is predominantly rural: 65% live in rural areas and 35% in urban areas. According to the 2011 census report, average literacy rate in Patiala district is 75.28% (a little higher than the national average of 74.04%) with a male literacy rate of 80.20% and female literacy of 69.80% (Administration of Patiala website, 2016). Project CHAI utilized similar PDI principals to CHIC but more deliberatively incorporated elements of the CHW role by providing education and skills in community outreach.

To assure that the adaptation of Project CHAI was socially and culturally appropriate, we conducted a needs assessment in Patiala (Sharma-Uppal & Chhabra, 2016), which consisted of four focus groups (FGs) with local women in Patiala (n=30) that included a brief, self-administered questionnaire about their awareness of cervical cancer, Pap testing, HPV, and the HPV vaccine. We stratified attendance of each focus group to include employed, college educated women, college students, and women who worked as domestic help and had not attended college. FG findings demonstrated that participants identified the need to provide cervical cancer screening information in a socially and culturally acceptable manner and identified elder peers or other women they trusted as an appropriate vehicle to deliver information about sexual and reproductive health issues. Women reported that cervical cancer and STIs are rarely discussed and are considered taboo subjects. The FGs also identified the need for education about cervical cancer prevention through Pap tests and HPV vaccination for all women at the community level (schools, community centers, and clinics/hospitals) to increase awareness and knowledge. Questionnaire findings collected before the FGs highlighted that, while all the participants had heard of cervical cancer, the majority of them had never heard about Pap testing, HPV, and/or the HPV vaccination. Moreover, all the attendees reported never having wellness gynecological visits or routine screenings. Visits to the gynecologist were experienced only in the context of reproductive health when trying to conceive, during pregnancy, and/or childbirth.

The CHAI workshop curriculum was grounded in the Health Belief Model (HBM). The curriculum incorporated the main constructs of the HBM: (1) knows that a negative health condition (e.g., HPV or cervical cancer) can be avoided; (2) has a positive expectation that by taking a recommended action(s), the negative consequences will be avoided/reduced; and (3) is confident in their ability to successfully adopt (and promote) a recommended health action.

Study Design and Sample: Eligibility criteria were age 18-50 years, female, speaks English or Punjabi (the local language), and a fifth-grade reading level. Recruitment was conducted over two days at Punjabi University through recruitment flyers posted at university residential halls. The flyers invited

women to attend an interactive workshop called CHAI “Cervical Health and Intervention” to learn about the importance of cervical cancer screening and HPV vaccination and to learn how to share the workshop information with other women. The 2-hour workshop used a standardized curriculum developed for Project CHIC (R. Chhabra, et al., 2015). The workshops were facilitated by two trained facilitators (RC and NS). Participants that completed Workshop 1 were asked to refer friends and family that meet the eligibility criteria to attend Workshop 2 being held the following day. Guided by principles of our existing ‘train-the-trainer’ (TOT) model for peer-focused education programs (Chhabra, Springer, Leu, Ghosh, Sharma, Rapkin, 2010; Chhabra, Springer, Rapkin, Merchant, 2008), the workshop engaged attendees to ask questions about cervical cancer, Pap testing, and HPV infection and vaccination. The workshop curriculum encourages discussion among participants, uses questions from the audience to guide the discussions, and provides opportunity to address cultural/social norms and beliefs that can hinder sexual health interventions. However, workshop content about cervical cancer, Pap testing, and HPV was standardized. In addition, the workshop provided training on effective communication skills, including how to talk to peers about sensitive topics and how to ask and answer questions in a non-judgmental manner, so they could share information about cervical cancer (a taboo subject) and motivate their peers to attend the workshop. Prior to each workshop, research staff answered study inquiries and obtained informed consent from the women.

Data Collection Tools: A self-report questionnaire, administered pre-and post-workshop included measures of knowledge about HPV, cervical cancer, and pap testing; subjective norms about HPV and cervical cancer screenings; health practices history; opinions and beliefs about vaccines; demographics; and an assessment of the workshop and suggestions for improvement. The pre-test had 8 scales (70 multiple choice items) and took 10-15 minutes to complete. The post-test had 6 scales (45 items) and took 10 minutes to complete. Data were collected anonymously; an identification number was assigned to each participant and listed on the questionnaires. Participants were told not to write their names on the data collection tools.

Measures: Knowledge of HPV, reproductive system, and cervical cancer were measured using a 35-item scale validated in India (Montgomery, Dune, Shetty, & Shetty, 2015). Knowledge of Pap testing was measured with 12 items adapted from a scale by Fernandez et al. (2009). Subjective norms about cervical cancer screening, HPV, and HPV vaccination was measured with a 9-item scale adapted from a survey by Khanna and his associates (Khanna et al., 2015). Self-efficacy was measured with the General Self-Efficacy Scale, a 10-item well-validated scale that assesses general ability to cope with life challenges and situations ($\alpha = .88$) (Schwarzer & Jerusalem, 1995); using the same item format, we added items on self-efficacy to talk about cervical cancer with

other women. Health practices history was measured with 15 items on health insurance status; availability and accessibility of health care; and specific health practices regarding doctor's visits; procedures specific to cervical cancer prevention and logistics to maintain health (Montgomery, et al., 2015). "Social Network Referral" was adapted from the General Social Survey name generator and asked participants to describe women they knew between the ages of 18-50 who they might ask to participate in the same cervical cancer prevention workshop they had just attended. Demographic questions included age, education, employment, income, marital status, and household composition.

Results

A total of 68 women attended the two workshops. Workshop 1 was held in the evening and 35 women attended. Workshop 2 was held the following day in the afternoon and 33 women attended; Workshop 1 participants referred all the participants for Workshop 2. In addition, over 40 women showed up after the workshop had started and stayed in the back of the balcony (standing room only) to hear the information and discussion. The enrolled Workshop 2 participants were given a choice to keep the door closed to other non-enrolled participants but they opted to keep it open so that others could benefit. Many of the women had come to learn about cervical cancer from outside of the university community as they were invited by their friends, acquaintances, and family members who had attended the first workshop. Non-enrolled spectators were given a chance to ask questions after the workshop.

Participant demographic characteristics are presented in Table 1. The mean age was 29.48 years ($SD=8.20$); half were 18-26 years. Most (94%) were college graduates; 24% were currently employed and 32% were married. A quarter of the women (25.4%) reported 'ever' being pregnant.

Only 17% reported ever having had a Pap test and few (17%) had ever been encouraged to get a Pap test by their provider; almost all of those who were encouraged by a provider did have a Pap test. More than a third (39%) reported knowing about the cervical cancer vaccine and 50% had heard about HPV before attending the workshop. One-third of the women (31.2%) worried what their medical provider would think of them if they asked for a Pap test. Only 21% ($n=33$) of women age eligible (i.e. 9-26 years of age) for the HPV vaccine were ever encouraged by their medical providers to be vaccinated. Only two women had tried to obtain the vaccine; and both received at least one of the three required HPV shots, none had completed the series.

Paired T-tests were used to analyze the pre-and-post test data. Attending the workshop significantly increased knowledge of cervical cancer, HPV, HPV vaccine, a Pap test, and reproductive health (19.41 vs 29.25, $p<.001$); confidence in one's ability to talk to friends and family about cervical cancer prevention (2.67 vs 3.70, $p<.001$); confidence in one's knowledge about HPV vaccine, Pap

Table 1*Demographic Characteristics of the Sample***Sample Characteristics (n=68)**

Age (mean \pm S.D)	N=67* 29.48 (\pm 8.20)
18-26 years	49.3% (n=33)
27-50 years	50.7% (n=34)
Education	N=66*
Less than high school	3% (n=2)
Some college	3% (n=2)
College graduate	94% (n=62)
Occupation	N=67*
Employed	24% (n=16)
Student	70% (n=47)
Other	6% (n=6)
Family Income (Monthly)	N=68
< than Rs. 20,000 (\$300)	11.5% (n=7)
Rs. 21,000-50,000 (\$315-750)	17.4% (n=12)
>Rs. 50,000 (>\$750)	51.5% (n=35)
Don't Know/Don't want to say	20.6% (n=14)
Marital Status	N=65*
Married	32.3% (n=21)
Single (never married)	67.7% (n=44)
Ever Been Pregnant	N=67*
Yes	25.4% (n=17)
Have Children	25.4% (n=17)

*Total sample size was 68, item or question missing data

test, and cervical cancer (.57 vs 2.70, $p < .001$); and increased positive opinions and beliefs regarding the HPV vaccine efficacy and safety.

Participants were asked on the pre-test how many women they knew between the ages of 18-50 and on the post-test how many women they intended to talk to about cervical cancer screening, HPV and the HPV vaccine. Of the women who answered these questions, one in three reported knowing over 50 women in their social network between the ages of 18-50 years who they could talk to about getting a Pap test and about the HPV vaccine who were age appropriate (Table 2).

Table 2

Women they know between 18-50 yrs. and intend to talk to about the HPV Vaccine and the Pap test

PRE-TEST	POST-TEST
Number of women you know between the ages of 18-26 years? (N=48)	How many women between the ages of 18-26 years do you intend to talk about getting HPV Vaccine? (N=47)
20 or less 33.3% (n=16)	20 or less 46.8% (n=22)
21-50 33.3% (n=16)	21-50 27.7% (n=13)
51-100 18.7% (n=9)	51-100 17% (n=8)
>101 14.6% (n=7)	> 101 8.5% (n=4)
	How many women between the ages of 18-26 years do you intend to talk about getting Pap test? (N=42)
	20 or less 47.6% (n=20)
	21-50 26.2% (n=11)
	51-100 16.7% (n=7)
	> 101 9.5% (n=4)
Number of women you know between the ages of 27-50 years? (N=49)	How many between the ages of 27-50 years do you intend to talk about the importance of HPV Vaccine? (N=45)
20 or less 38.8% (n=19)	20 or less 48.9% (n=22)
21-50 32.6% (n=16)	21-50 40% (n=18)
51-100 16.4% (n=8)	51-100 5% (n=2)
>101 12.2% (n=6)	> 101 6.7% (n=3)
	How many between the ages of 27-50 years do you intend to talk about getting Pap test? (N=40)
	20 or less 42.5% (n=20)
	21-50 45% (n=18)
	51-100 16.7% (n=7)
	> 101 7.5% (n=3)

Some women associated sexual behavior with obtaining the HPV vaccine. The workshop openly discussed and answered questions about sexual health, which is in serious contrast with many of the social, religious, and cultural values in the Indian population. Post-workshop data showed an increase in positive views about the HPV vaccine, and increased acceptability of its use on children and adults. Even though 85% of women in our sample agreed that "it is acceptable to have a vaccine against a sexually transmitted infection (STI)," at pre-test less than half of the participants found it acceptable to use the HPV vaccine with young girls 9-14 years of age (47%) and with young boys 9-14 years of age (42%). After attending the workshop acceptability of using the HPV vaccine with children almost doubled for girls and was more than double for boys (90% vs. 92% respectively) and the acceptability of using the HPV vaccine in women increased pre-and-post from 77% to 96% and 63% to 90% for men. There was no difference between women who had children and those who did not in their opinion about the age at which the HPV vaccine should be given.

Discussion

The purpose of the study was to assess the feasibility, acceptability, efficacy, and referral potential of a PDI-based intervention that used elements of the CHW role to reach women at risk for cervical cancer, particularly by engaging community members to educate and motivate women to attend a workshop. Reaching women in India to reduce cervical cancer requires an intervention that overcomes stigma of this taboo topic, challenges with population outreach in poor communities, and lack of awareness and knowledge about cervical cancer all with low cost and replicability.

Research shows that removing structural barriers to access health care is pivotal. The Indian government is currently addressing this barrier by conducting outreach to low-income populations, but it is not sufficient (Han, 2010). It is also essential to address individual-level barriers (Baron, Rimer, Breslow et al., 2008; Paskett, Tatum, D'Agostino et al., 1999; Dietrich, Tobin, Cassells et al., 2006; Dietrich, Tobin, Cassells et al., 2007). CHAI successfully addressed many of these—low motivation, lack of intention, fear, embarrassment and lack of knowledge about "whys" and "hows" of accessing services or asking for information, particularly around reproductive health. (Byrd, Chavez, Wilson, 2007; Ackerson, Gretebeck, 2007; Carter, Park, Moadel, Cleary, Morgan, 2002; Breitkopf, Pearson, Brietkopf, 2005). In particular, it addressed lack of reliable health information. Although focus groups participants knew about cervical cancer, they were unaware of available cervical cancer prevention services and most had never heard about HPV. In addition, there was a low level of knowledge regarding STIs and poor health communication with providers and family members.

Most important, the pilot demonstrated that CHAI's PDI model combined with elements of CHW work successfully reached women at risk for cervical cancer. Given the geography and limited in-person reach of rural populations for health care facilities, the most common strategies to accomplish awareness and behavior change for health promotion rests on media campaigns and community outreach in India. However, when the health promoting behavior is considered taboo, like sexual health, and low priority because women do not consider themselves at risk, peers educated as health advocates may be more successful for increasing awareness, motivation, and intention to engage in health prevention (Kelly, 2004). This was demonstrated among intervention participants with the significant increase in women's knowledge about cervical cancer, Pap testing and HPV, intention to get HPV vaccination, and engaging in preventative health care such as regular Pap test.

The data showed that CHAI was a low cost feasible approach to educate women at risk about cervical cancer, and to use women's existing personal networks to reach other women. The approach is acceptable and well received. Within four days, the study recruited and enrolled 68 participants and implemented 2 workshop interventions as well as had an audience of over 40 women who would have liked to participate. The interest demonstrated by the 68 enrolled women from within and outside of the university community and the additional 40 observers attests to the feasibility and acceptability of the workshop and PDI intervention strategy.

The findings supported the hypothesis that our PDI/CHW intervention can be effective. Interventions are frequently derailed due to enrollment failure with the concomitant lack of power to demonstrate efficacy and feasibility. The CHAI reached a large number of women in a short period of time without any incentive. The pilot also demonstrated that women could be taught to communicate effectively with other women in their community and to be comfortable sharing sexual health related information.

There were some limitations of this study. One methodological limitation was that the study relied on self-report in gathering information from the participants. Participants were given a choice to not answer any questions they did not want to, as a result, some of the questions were missing answers. The social network referral measure was missing about 30% of the responses. More research is needed to understand whether the measure was confusing or whether women were reluctant to share the data. Second, the pilot was in a university town with a rural small city population. We cannot extrapolate the results of this pilot to urban women or to those who are not very educated. The variation in literacy rates nationally would necessitate adaptation of multiple strategies and varied outreach to raise awareness about cervical cancer among women all over India. Third, the original CHIC project had a three-month follow-up with women after participation in the workshop, which we were unable to do in this

pilot. It would be useful to assess knowledge retained, information about their outreach to their social network, follow-up on successful and unsuccessful attempts to engage women in their network, initiation of conversation about cervical cancer prevention with their provider for themselves and their children, receipt of HPV vaccine (if eligible), and if they received a Pap test. Finally, due to funding and resources this study had a pre-posttest design and would have been stronger with a control group.

Conclusion

This pilot study found that women in India, an especially vulnerable group for cervical cancer, are eager for information about cervical health, and significantly benefit in gaining information and self-efficacy from attending a two-hour culturally informed interactive workshop. Given the incidence of cervical cancer and HPV prevalence in the country, there is an urgent need for community-level interventions to increase knowledge and address misconceptions about HPV and cervical cancer. The PDI/CHW workshop model is a promising way to reach women and educate them about cervical cancer prevention.

The results of the pilot warrant further research to test the PDI/CHW workshop model. Future studies should be conducted in multiple states, different languages, and with women of varied literacy. In addition, a follow-up should be conducted to test whether women are effective in influencing their peers' access to and actual use of reproductive health services, and whether workshop attendees act upon the information and obtain a Pap test and/or the HPV vaccine for themselves. We also plan to test whether involving parents of adolescents and community gatekeepers in the interventions might affect awareness, improve perceptions regarding HPV vaccine, and encourage preventive behavior.

One issue needs to be addressed in order to fully scale up and test this intervention approach in other populations: the HPV vaccine is not universally available at low or no cost. It is not always readily available at government funded hospitals or agencies, and the cost of the vaccine privately is about \$60 (Rs.4000) for each dose, which is not affordable for the general population, particularly for most young women who do not have their own health insurance. Most women do not access regular preventive care for themselves, and have no idea where to go or whom to ask about the vaccine. This makes this preventative, optional, irregularly available and expensive vaccine a low priority. Thus, a system-level intervention to increase accessibility of the HPV vaccine would be a useful addition to this individual-level intervention.

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