Web-based versus in-person methods for training lay community health advisors to implement health promotion workshops: participant outcomes from a cluster-randomized trial

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Abstract

Project HEAL (*Health through Early Awareness and Learning*) is an implementation trial that compared two methods of training lay peer community health advisors (CHAs)—in-person (“Traditional”) versus web-based (“Technology”)—to conduct a series of three evidence-based cancer educational workshops in African American churches. This analysis reports on participant outcomes from Project HEAL. Fifteen churches were randomized to the two CHA training methods and the intervention impact was examined over 24 months. This study was conducted in Prince George's County, MD, and enrolled 375 church members age 40–75. Participants reported on knowledge and screening behaviors for breast, prostate, and colorectal cancer. Overall, cancer knowledge in all areas increased during the study period ($p < .001$). There were significant increases in digital rectal exam ($p < .05$), fecal occult blood test ($p < .001$), and colonoscopy ($p < .01$) at 24 months; however, this did not differ by study group. Mammography maintenance (56% overall) was evidenced by women reporting multiple mammograms within the study period. Participants attending all three workshops were more likely to report a fecal occult blood test or colonoscopy at 24 months ($p < .05$) than those who attended only one. These findings suggest that lay individuals can receive web-based training to successfully implement an evidence-based health promotion intervention that results in participant-level outcomes comparable with (a) people trained using the traditional classroom method and (b) previous efficacy trials. Findings have implications for resources and use of technology to increase widespread dissemination of evidence-based health promotion interventions through training lay persons in community settings.

Keywords

Implementation, Web-based learning, Community health advisors, Cancer early detection, African Americans

The significant gap between establishment of evidence-based interventions (EBIs) and implementing these interventions into routine practice is well documented [1]. This challenge has become the focus of increased research interest including but not limited to the area of cancer control, with growing support from sources such as the National Cancer Institute

Implications

Practice: Those involved in training lay peer community health advisors should consider using online methods, in conjunction with live technical assistance.

Policy: Those involved in legislation in community health workforce development should be aware of both the strengths and limitations of online methods for training lay individuals with little or no health background.

Research: Future studies in this area should test models to disseminate and/or scale up evidence-based community health advisor training approaches and interventions.

[2]. It is not sufficient to just make EBIs available and believe that they will disseminate themselves into practice [3]. Although much dissemination and implementation research occurs in clinical or health care settings, increased research is needed to learn the best ways to translate evidence into practice in community settings, using a range of community-engagement approaches [4].

In an effort to reach those who might not have regular access to the health care system, public health researchers and practitioners have worked with community settings such as faith-based organizations, particularly in medically underserved or racial/ethnic minority communities [5]. A number of previous church-based efficacy trials have established EBIs for topics such as cardiovascular risk factors [6], smoking [7], breast cancer screening [8, 9], prostate cancer screening [10], and colorectal cancer screening [11]. The question then becomes how to more widely promote these EBIs to reach more people that they could benefit, in an effort to make a sustained impact on health inequities.

Technology's role in training peer health educators

Using lay individuals or those indigenous and trusted members of a community has been an increasingly popular method to reach people who might be medically underserved or otherwise “hard-to-reach” [12–14]. These roles can range from basic health education to referral to local health services to intensive patient navigation [15]. Whether volunteer or paid, such lay health educators need to be trained to be able to fulfill their expected roles. Training of these individuals has historically been delivered in a didactic in-person format. With the ever-growing role of technology in people's everyday lives (e.g., internet, tablets, smart phones), more people are using technology to access health information, reflecting a closing digital divide [16]. Research on eHealth initiatives continues to grow, with effective interventions targeting a wide array of health topics including, but not limited to, smoking cessation, weight management, anxiety and depression, and asthma management [17]. The Centers for Disease Control and Prevention has used a web-based e-learning course to promote engagement of community health workers [18]. However, we are aware of no previous studies that have systematically compared newer online training methods with historical in-person training. Based on the growing role of technology in health promotion, and the idea that technology could be used to expand the reach of EBIs, the current project used the Internet to train and certify community health advisors (CHAs) [19], and aimed to determine the relative efficacy of a new technology-based training as compared with the traditional in-person approach.

Project HEAL overview

Project HEAL (Health through Early Awareness and Learning) is a community-based implementation trial that compared two strategies for training lay peer CHAs to implement an evidence-based cancer communication intervention in African American churches in Prince George's County, MD from 2012 to 2016 [20]. The intervention implements materials and strategies tested in our previous efficacy trials [11, 21–24]. Using a cluster randomized design, 15 churches were assigned using computerized randomization to the CHA training using an in-person “Traditional” or web-based “Technology” method, with all other aspects of the intervention being equal. CHAs in both groups received more than 6 hr of training by completing 13 modules (e.g., Overview of Cancer, Breast Cancer, Prostate Cancer, Colorectal Cancer, Conducting Your Workshop). CHAs in the Traditional group were trained in person in a group format, while those in the Technology group completed all training modules using a self-paced online system where they could log in and out until they had reviewed each of the narrated PowerPoint sessions. CHAs became

certified by passing a knowledge examination that included items on sex-specific cancers (e.g., only the women received breast cancer knowledge items). After certification, CHAs accessed Project HEAL intervention materials (e.g., recruitment materials, PowerPoint presentations) which they used to implement a series of three monthly educational workshops in their churches on cancer early detection (cancer overview, breast/prostate, colorectal). A detailed description of the CHA training process, including feasibility, is described elsewhere [25].

The present study

Project HEAL is a church-based cluster randomized implementation trial designed to compare a Traditional (in-person classroom, with high technical assistance) versus a Technology (web-based, with low technical assistance) approach to training lay CHAs to implement an evidence-based cancer early detection workshop series in their churches. We report here on participant outcomes, comparing cancer-related knowledge and screening across the 24-month study period between participants who attended workshops given by CHAs trained by the Traditional or the Technology approach. We aimed to determine whether CHAs trained in the new Technology approach could produce comparable outcomes (e.g., knowledge and self-reported cancer screening increases over time) or if we would observe an attenuation of intervention effects relative to the Traditional approach. The Traditional (in-person) CHA training has been utilized historically and can be viewed as the “gold standard.” We developed a new Technology-based training using an online system, which was previously untested as compared with the gold standard. The new Technology approach could be as, more, or less effective than the Traditional training. Realizing the importance of in-person contact, we felt that the Technology approach would be promising but we were not sure if it could produce the participant-level outcomes of the Traditional approach. Therefore, we hypothesized that the CHAs trained in the Traditional approach might produce better outcomes than those trained using Technology. However, if participant outcomes were comparable, suggesting that both CHAs were equally effective, this would have significant implications for extending the reach and scalability of EBIs to community settings through use of technology.

METHODS

Recruitment and data collection

This study involved human data and was supported and approved by the University of Maryland institutional review board. Data for this analysis were collected in 2014–2016, and the analysis was conducted in 2016.

Randomization

The study biostatistician independently randomized churches to study groups using matched pairs based on membership size. Then the statistician developed SAS syntax to randomly assign a code of 1 to one church, and 2 to another church within each pair. Once two groups of churches were randomly generated, the statistician submitted the two sets of codes to the project manager who then randomly assigned a group to the treatment and another group to the control condition by flipping a coin.

Churches

Church eligibility criteria included identifying as a predominately African American mid-size (e.g.,

200–800 member) church, and not having previously hosted a similar cancer educational intervention. Our community partner recruited 15 churches from Prince George's County, MD. Twenty-one additional churches declined to participate (see CONSORT flow diagram, Fig. 1).

CHAs

Two CHAs in each church (one male, one female) were recruited primarily through the Pastors. CHA eligibility criteria included being at least 21 years old, a member of the church, regular access to the Internet and able to complete web-based training activities, and self-identifying as African American.

^aChurch dropped out before first workshop date; church not replaced due to late drop out

^bParticipants completed baseline survey upon enrollment in workshops 1–3

^cDropout = participant refused to continue on study; Lost to follow-up = study team was unable to contact participant for data collection. These events could occur at any of the follow-up intervals. Numbers at follow-ups are not cumulative.

Fig 1 | Project Health through Early Awareness and Learning (HEAL) CONSORT flow diagram. Previously cited in Santos et al. [25].

^aChurch dropped out before first workshop date; church not replaced due to late dropout. ^bParticipants completed baseline survey upon enrollment in workshops 1–3. ^cDropout = participant refused to continue on study; Lost to follow-up = study team was unable to contact participant for data collection. These events could occur at any of the follow-up intervals. Numbers at follow-ups are not cumulative.

CHAs received a store gift card of \$50 for training completion and a second gift card of \$49 for completing the three-workshop series. Of the 15 enrolled churches, 14 completed the three-workshop series, with strong fidelity to delivery of the workshop content [25].

Workshop participants

Recruitment methods were tailored to each church. Active recruitment strategies included the CHAs attending ministry meetings to announce the intervention and answer questions. We also used pastor announcements, workshop sign-ups before and after service, and one-on-one recruitment through the CHAs. Individuals were eligible to participate in the workshops if they (a) self-identified as African American, (b) were between the ages of 40 and 75, (c) had no personal history of breast, prostate, or colorectal cancer, (d) could attend all remaining workshops, and (e) were able to complete project surveys. Each eligible participant received a \$25 gift card incentive for completing each baseline, 12-month, and 24-month follow-up survey. The target sample size for the study was based on a power and sample size calculation. The 12-month retention rate was 82% and the 24-month retention rate was 84%.

Measures

The self-administered baseline and follow-up surveys assessed participant cancer-related knowledge and self-reported screening behaviors.

Breast cancer knowledge

Knowledge about breast cancer was assessed using an established instrument previously used with African American women [21, 26]. Knowledge was assessed in three areas including six items on breast cancer knowledge (e.g., “Are older women more likely to get breast cancer than younger women?”) with a possible score of 6, five items on knowledge about mammograms (e.g., “Do mammograms find all breast cancers?”) with a possible score of 5, and three items on breast cancer treatment knowledge (e.g., “Can breast cancer be treated without removing the breast?”) with a possible score of 3. The survey used a yes/no/not sure response scale. Correct responses were summed to form all knowledge scale scores. These three scales had modest alpha reliability in the present data (.32, .46, and .45, respectively).

Prostate cancer knowledge

Knowledge about prostate anatomy and function, risk factors, and benefits of screening was assessed using items from an established instrument [27] and used in our previous research [24]. These five items use a yes/no/not sure format to assess knowledge (e.g., “More African American men are diagnosed with prostate cancer than Whites”) with a possible score of 5. Internal reliability in the present data was 0.63.

Colorectal cancer knowledge

Knowledge about colorectal cancer was assessed based on a validated instrument previously used with African Americans [28]. The seven knowledge items (e.g., “Colorectal cancer screening is not necessary if there are no symptoms”) are in agree/disagree/don’t know format with a possible score of 7. Internal reliability was acceptable in the present study (0.72).

Self-reported screening

This was assessed as in previous studies [21, 24, 29]. The screening tests were defined, and participants were asked if they had ever had the test (yes/no/not sure), with a follow-up question to determine whether their last test fell within the recommended screening interval. Mammography maintenance was calculated based on women’s responses to an item asking when the woman had her last mammogram (among women indicating they had ever had a mammogram). Women were considered to have maintained screening at 12 months if they had had a mammogram within 12 months after baseline, and were considered out of screening compliance if they had not had a mammogram during the past 12 months or never had a mammogram.

Statistical analyses

Descriptive statistics characterized sample demographics and *t*-tests and chi-square tests examined baseline study group differences (none were significant). Continuous outcomes were compared between study groups using general linear mixed models accounting for the church clustering study design and controlling for baseline values of the dependent variables, age, and education (see Table 1). One set of models examined study group differences at Workshop 3, a second at 12 months, and a third at 24 months. Intraclass correlation coefficients ranged from 0 to 0.025, and all were nonsignificant which would be characterized as a negligible effect [30]. A general linear model repeated measures technique was applied separately to examine the time main effect.

Mixed model logistic regression was used to compare binary cancer screening outcomes at 12 and 24 months between the study groups controlling for age, education, and baseline values (see Tables 2 and 3). McNemar change test was applied to examine the time main effect. Screening was analyzed as ever had versus never had due to participant difficulties in recall of screening test time frames [31] including telescoping, when people report having tests more recently than they actually had them [32, 33]. For model comparative purposes, secondary analyses were conducted on screening data in accord with recommended screening intervals. Finally, we used logistic regression models to examine whether study outcomes differed for those participants who attended one, two, or three workshops. All analyses were conducted using SPSS version 23.0.

Table 1 | Knowledge outcomes from Project Health through Early Awareness and Learning (HEAL)—study group comparisons

Table 1 Knowledge outcomes from Project Health through Early Awareness and Learning (HEAL)—study group comparisons																					
	Baseline			Workshop 3			Baseline to Workshop 3			12 months			Baseline to 12 months			24 months			Baseline to 24 months		Time main effect ^b F value
	Trad. M (SD)	Tech. M (SD)		Trad. M (SD)	Tech. M (SD)		F value (n) ^a			Trad. M (SD)	Tech. M (SD)		F value (n) ^a			Trad. M (SD)	Tech. M (SD)		F value (n) ^a		
Mammogram knowledge /5	3.82 (1.09)	4.03 (1.02)		4.34 (0.66)	4.48 (0.75)		0.76 (154)			4.07 (0.93)	4.33 (0.71)		4.25 (182)*			4.25 (0.84)	4.41 (0.70)		1.43 (178)	8.43***	
Breast cancer knowledge /6	3.40 (1.34)	3.64 (1.18)		4.05 (1.27)	4.25 (1.07)		0.13 (141)			4.08 (1.22)	4.43 (1.16)		2.62 (173)			4.15 (1.32)	4.13 (1.21)		0.06 (168)	13.60***	
Breast cancer treatment knowledge /3	2.06 (0.80)	2.15 (0.65)		2.38 (0.66)	2.43 (0.67)		0.01 (155)			2.10 (0.91)	2.17 (0.56)		0.11 (164)			2.34 (0.69)	2.37 (0.54)		0.01 (178)	9.77***	
Prostate cancer knowledge /5	2.67 (1.42)	3.00 (1.58)		3.64 (1.40)	4.18 (1.00)		1.63 (73)			2.60 (1.34)	3.34 (1.53)		2.97 (86) ^{c***}			3.18 (1.45)	3.69 (1.21)		0.59 (80)	8.13***	
Colorectal cancer knowledge /7	5.35 (1.84)	6.06 (1.17)		6.24 (0.98)	6.68 (0.69)		6.42 (204)*			6.34 (0.81)	6.57 (0.91)		1.63 (239)			6.27 (1.07)	6.60 (0.71)		2.25 (228)	11.38***	
Analysis controlled for age, education, and baseline values; unadjusted means are presented. Boldface indicates statistical significance ($p < .05$). Slashes indicates total possible score. <i>Trad.</i> , Traditional; <i>Tech.</i> , Technology.																					
F value by study group.																					
*From GLM analysis.																					
Indicates marginal significance.																					
* $p < .05$; ** $p < .01$; *** $p < .001$.																					

Table 2 | Cancer screening percentages and mixed model logistic regressions comparing groups at 12 months

	Baseline			12 months			Odds ratio (95% CI)			Time p-value ^a
	Trad. (%)	Tech. (%)		Trad. (%)	Tech. (%)	N	Age	Education	Baseline screening	Group
Mammography	93.4	96.9		96.9	97.1	191	0.99 (0.90–1.08)	0.86 (0.33–2.25)	189.81 (14.3–2517.45)***	0.76 (0.15–3.93)
Mammography maintenance	61.8	61.2		49.6	49.3	191	1.01 (0.97–1.05)	1.02 (0.00–110.60)	40.93 (20.25–82.68)***	1.06 (0.53–2.13)
PSA	48.5	54.9		45.8	68.2	90	1.05 (0.99–1.11) [†]	1.16 (0.72–1.86)	8.97 (3.19–25.23)***	2.64 (0.99–7.00) [†]
DRE	54.4	64.0		66.7	75.0	89	1.10 (1.02–1.17)*	1.09 (0.63–1.89)	4.70 (1.52–14.57)**	1.14 (0.38–3.44)
FOBT	35.6	57.7		45.5	62.4	189	1.04 (1.00–1.08)*	1.29 (0.91–1.83)	15.32 (7.39–31.72)***	0.73 (0.36–1.47)
Flexible sigmoidoscopy	35.8	34.4		30.6	30.7	116	1.05 (0.99–1.11) [†]	0.74 (0.45–1.22)	10.27 (3.80–27.74)***	0.76 (0.32–1.83)
Colonoscopy	56.4	62.9		63.3	68.8	251	1.05 (1.00–1.10)*	1.00 (0.66–1.51)	43.03 (17.25–107.45)***	1.51 (0.67–3.39)

Logistic regressions controlled for age, education, and baseline values. Boldface indicates statistical significance ($p < .05$). PSA prostate specific antigen, DRE digital rectal examination, FOBT fecal occult blood test.^aFrom McNemar change test.[†] $p < .10$; * $p < .05$; ** $p < .01$; *** $p < .001$.

RESULTS

A total of $N = 375$ eligible participants were enrolled (32% men; 68% women); in general, they were middle aged ($M = 55$), with a median education level of some college, and nearly all had health insurance coverage (93%; see [Supplementary Table](#)).

Knowledge

The mixed models in [Table 1](#) examined study group differences at Workshop 3, 12 months, and 24 months. The only significant study group difference at Workshop 3 was for colorectal cancer knowledge, where the Technology group reported greater knowledge than the Traditional ($p < .05$). At 12 months, there were study group differences again favoring those in the Technology group for mammography knowledge ($p < .05$) and marginally for prostate cancer knowledge ($p < .10$). By 24 months, there were no significant study group differences. The time main effect was significant, indicating increases in all cancer knowledge from baseline values ($p < .001$).

Screening

[Table 2](#) shows a mixed model logistic regression for cancer screening outcomes at 12 months by study group. Overall, mammography reports were very high at baseline making for a ceiling effect. Therefore, we conducted a secondary analysis that examined mammography “maintenance” over time [34], because most screening tests are not recommended just one time but at regular intervals (e.g., every 12 months). We used the American Cancer Society guidelines [35] to develop two maintenance outcomes during the 24-month study period where women had an opportunity to obtain repeat mammograms every 12 months (see [Tables 2](#) and [3](#)). Based on this, 62% of women were considered adherent at baseline, and these rates dropped to 50% at 12 months ($p < .001$) and increased to 56% at 24 months ($p < .05$). The study group effect was not significant.

Only one marginally significant study group effect was detected, which was for ever having had a PSA test at 12 months, which again favored the Technology group over the Traditional group ($p = .05$). We also examined screening within recommended intervals, for example, 5 years for flexible sigmoidoscopy and 10 years for colonoscopy (data not shown), and results were comparable with those shown in [Table 2](#). The overall pre-post change over time indicated a marginal increase for digital rectal examination ($p < .10$) and a significant increase in colonoscopy ($p < .01$). [Table 3](#) shows the analysis of cancer screening at 24 months. Although there were no study group differences, the overall pre-post change over time indicated significant increases in digital rectal examination ($p < .05$), fecal occult blood test ($p < .001$), and colonoscopy ($p < .01$).

Table 3 | Cancer screening percentages and mixed model logistic regressions comparing groups at 24 months

	Baseline		24 months			Odds ratio (95% CI)					Time <i>p</i> -value ^a
	Trad. (%)	Tech. (%)	Trad. (%)	Tech. (%)	N	Age	Education	Baseline screening	Group		
Mammography	93.4	96.9	97.5	98.6	191	1.00 (1.04–1.04)	1.05 (0.01–152.32)	7.68 (1.26–46.99)*	0.96 (0.47–1.96)	n.s.	
Mammography maintenance	61.8	61.2	54.2	60.0	191	1.05 (1.01–1.10)*	11.48 (0.10–1285.62)	6.23 (2.84–13.67)***	1.29 (0.60–2.76)	*	
PSA	48.5	54.9	50.0	61.8	90	1.05 (0.98–1.12)	1.36 (0.04–41.72)	4.92 (1.65–14.70)**	1.27 (0.44–3.70)	n.s.	
DRE	54.4	64.0	68.0	75.0	89	1.07 (0.99–1.15)	0.76 (0.00–1164.45)	7.52 (2.18–26.02)**	0.91 (0.27–3.00)	*	
FOBT	35.6	57.7	56.3	63.6	189	1.01 (0.96–1.06)	90.11 (0.55–14705.84) [†]	20.91 (8.68–50.35)***	1.33 (0.33–1.71)	***	
Flexible sigmoidoscopy	35.8	34.4	30.4	37.9	116	1.07 (1.01–1.13)*	9.37 (0.01–6680.85)	6.25 (2.15–18.17)**	1.58 (0.58–4.31)	n.s.	
Colonoscopy	56.4	62.9	66.9	71.6	251	1.03 (0.99–1.08)	0.39 (0.01–14.04)	20.07 (9.68–41.60)***	0.94 (0.50–1.77)	**	

^aLogistic regressions controlled for age, education, and baseline values. Boldface indicates statistical significance (*p* < .05). *PSA* prostate-specific antigen, *DRE* digital rectal examination, *FOBT* fecal occult blood test.

From McNemar change test.

[†]*p* < .10; **p* < .05; ***p* < .01; ****p* < .001.

Logistic regressions controlled for age, education, and baseline values. Boldface indicates statistical significance ($p < .05$). *PSA* prostate specific antigen, *DRE* digital rectal examination, *FOBT* fecal occult blood test.

^aFrom McNemar change test.

[†] $p < .10$; * $p < .05$; ** $p < .01$; *** $p < .001$.

Outcomes by workshop attendance

Although participants were encouraged to attend all three workshops, attendance—or “dosage”—was variable as study staff records indicated 42.4% attended only one workshop, 33.9% attended two workshops, and 23.7% attended all three. This secondary analysis examined whether workshop attendance was associated with the intervention outcomes. There were no bivariate relationships between workshop attendance and cancer knowledge and therefore no further models were examined for knowledge (data not shown).

There were significant relationships between workshop attendance and several of the cancer screening outcomes (data not shown). Logistic regression models indicated that at 12 months, men who had attended all three workshops were marginally more likely than those who only attended one to report having had a PSA test ($p = .069$; OR = 2.94, CI = 0.92–9.39), and the same pattern was true for participants reporting a flexible sigmoidoscopy ($p = .014$; OR = 2.98, CI = 1.25–7.12) or colonoscopy ($p < .05$; OR = 2.25, CI = 1.14–4.43). At 24 months, participants attending all three workshops were significantly more likely than those who attended only one to report having had an FOBT ($p = .014$; OR = 2.67, CI = 1.23–5.81; $p = .019$; OR = 2.45, CI = 1.16–5.19 for two vs. one workshop) or colonoscopy ($p < .05$; OR = 2.14, CI = 1.07–4.30).

DISCUSSION

These analyses compared participant outcomes from an implementation trial where lay peer CHAs were trained using a Traditional classroom or a new web-based Technology approach, and then implemented an educational three-workshop series on cancer early detection in African American churches. Project HEAL contributed to cancer knowledge gains during the 24-month study period among participants who attended workshops led by CHAs trained in both methods. With regard to screening, there were no significant study group differences, and participants overall reported increases in several types of cancer screenings over the 24-month period.

With regard to cancer knowledge, early study group differences favored those in the Technology group; however, these differences abated by 24 months. Examination of the means over the study period suggests that knowledge about cancer continued to increase over time even though workshops occurred relatively early in the study period. It is possible that the CHAs in both groups continued discussions around cancer and conducted cancer educational activities in their churches, as suggested by sustainability activities reported in Scheirer et al [36]. In addition, 92% of participants reported talking to family or friends about the program by 12 months. These activities might have led to the observed increases in cancer knowledge and

attenuation of the modest study group differences by the 24-month follow-up.

There were no study group differences in reports of cancer screening at either 12 or 24 months. This implies that participants who attended workshops conducted by CHAs trained by either Traditional or Technology methods were equally likely to report having a cancer screening at follow-up. We found that marginally more men overall reported having a digital rectal examination by 12 months than at baseline, and this difference became significant by 24 months. The intervention appeared to make an impact on colorectal cancer screening, in particular by the 24-month follow-up. Relative to mammography, prostate and colorectal cancer screening rates were lower at baseline, suggesting more room for improvement. Following participants over 24 months provided an opportunity to observe change in reports of cancer screening. Tables 2 and 3 show increased reports of screening from 12 to 24 months. However, without a control group, it is possible that increases were due to factors other than the intervention. Because the current initiative was an implementation study of existing EBIs previously showing impact on screening, the purpose of the current study was to determine whether lay CHAs with little or no health background trained using a new, untested, web-based system could produce participant-level outcomes comparable with previous classroom trained CHAs. In the current case, the data support this idea based on these outcomes. However, they do not support the initial hypothesis that the Traditional approach might perform better than the Technology-based training. Even the seemingly disappointing lack of study group findings is encouraging given that it suggests that CHAs trained using this new web-based system get results comparable with previous EBIs where the CHAs were trained using a more intensive in-person method [11, 24]. In fact, the current findings have important implications for the scalability of the intervention.

Rates of women reporting ever having had a mammogram were high at baseline (greater than 90%), limiting our ability to make a significant impact at follow-up. The convenience sample of churches consisted of a middle-class, college-educated, health-insured group of African Americans that reflects the demographics of the study setting. However, the 24-month follow-up period afforded the opportunity to examine mammography maintenance, or women having repeat mammograms over time in accord with screening recommendations [35]. The current data suggest that even if women have had a mammogram at some point, clearly more work needs to be done to encourage women to have regular mammograms. The challenge is that with changing and conflicting guidelines, women become uncertain when to initiate and how often to have mammograms.

Finally, we took the most conservative interpretation of mammography screening guidelines due to the American Cancer Society's guidelines at the start of the project. Had we used a more liberal guideline of every 2 years, we would have captured more women as adherent.

The current findings are comparable with previous efficacy trials, where we found significant increases in colorectal cancer knowledge [22]; in fecal occult blood test, flexible sigmoidoscopy, and colonoscopy [11]; and in prostate cancer knowledge [24], each of which were church-based CHA-led interventions similar to Project HEAL. These trials were comprised of African American samples with a more modest socioeconomic profile, lower rates of health insurance coverage, and lower baseline screening rates than the present sample.

It is notable that though participants were encouraged to attend all three workshops, attendance showed considerable variability with roughly 40% of participants only attending one workshop. Although disappointing from an implementation perspective, that the intervention was delivered over three workshops makes the current results more robust considering that many people missed two-thirds of the intervention and only about 25% received the full "dose." Although degree of workshop participation did not appear to affect cancer knowledge, it was associated with reports of screening. This is an intuitive implementation finding given that the intervention content around screening was delivered through the CHA workshops and the more exposure to the workshops participants received, the more likely they were to report screening. This also reinforces the importance of repeated exposure in community-based interventions.

Limitations

The current findings are limited by a number of factors. First, while we aimed to reach a disparities-affected population through African American churches, the participants that we succeeded in drawing from the churches were middle-class African Americans with fairly high educational levels and were mostly health insured. This resulted in limited opportunity for the intervention to affect mammography screening behavior due to the already high rates at baseline. There will likely be challenges to future scale-up of an online-only training system for this particular study population, due to issues around trust, the need for relationship building, technical assistance, and the closing but still present digital divide. Without a no-treatment control group, the observed changes over time in cancer knowledge and screening might not have been attributable to the intervention but to historical effects or exposure to other influences. However, as discussed, the current findings are consistent with

previous efficacy trials of a comparable intervention. Finally, the patterns of increases in screening reports in these data were greater than any increases observed during the study period for African Americans in Prince George's County [37] which does not rule out reporting bias but it does help rule out historical effects.

CONCLUSIONS

The present findings suggest that in general, African American men and women who attended cancer education workshops given by lay peer CHAs trained using web-based methods learned just as much and were as likely to report behavior change as those who attended workshops given by CHAs trained in the classroom. Future CHA trainings might consider a hybrid model that contains the “best of both worlds,” starting the training with an in-person orientation that would include critical modules in-person and cover others online. Inclusion of an in-person portion of the training could increase the personal touch, help build relationships and trust between study staff and CHAs, provide greater technical assistance, and might reduce initial hesitancy of persons to engage in an online training. Future studies should also investigate what it will take to disseminate such a lay CHA training so that it could reach more churches, what technical assistance from the developers would be needed for such a model, what costs are involved, and how such a training system could be used to disseminate evidence-based health programming in both cancer and other chronic disease. This could be a helpful dissemination/implementation tool in the continued initiative to eliminate health disparities.

SUPPLEMENTARY MATERIAL

Supplementary material is available at *Translational Behavioral Medicine* online.

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Compliance with Ethical Standards

Ethical Approval: All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committees and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. This work was approved by the University of Maryland Institutional Review Board (#10–0691). This article does not contain any studies with animals performed by any of the authors.

Informed Consent: Informed consent was obtained from all individual participants in the study.

Primary Data: The current findings have not been previously presented or published, and this manuscript is not being simultaneously submitted elsewhere. The authors have full control of all primary data and agree to allow the journal to review the data if requested.

Conflict of Interest: The team has no actual or potential conflicts of interest to report. No financial disclosures were reported by the authors of this article.

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