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Knowledge dissemination and evaluation in a cervical cancer screening implementation program in Nigeria

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Abstract

Objectives. Our goals were to train health professionals in Nigeria using the text, “Planning and Implementing Cervical Cancer Prevention and Control Programs: A Manual for Managers”, and then evaluate the knowledge dissemination process using a pre- and post-test assessment. The manual was developed by the ACCP, WHO, IARC, PATH, Engender Health, JHPIEGO, and PAHO with funding from the Gates Foundation. It is an inclusive guide to implementation and maintenance of screen-and-treat cervical cancer prevention clinics and is ideally suited for programs operating in the developing world.

Methods. Training took place at a conference in Ibadan, Nigeria. Participants included teams of physicians, nurses, bioengineers, data managers, and administrators who met in joint and parallel sessions to “train the trainers”. This meeting was designed to provide both training and equipment to personnel to be involved in the implementation of a cervical cancer control initiative in Nigeria. A 36 item pre-test was administered prior to a group study sessions. A slide presentation summarized salient points before the post-test was given. The results were entered into an MS Excel spreadsheet for descriptive statistics about (1) the participants, (2) the test, (3) an examination of profession, years of work experience, years of education, and gender as predictors of two outcomes (low pre-test score and large difference between pre- and post-tests) and (4) overall performance on the exam.

Results. There were 70 participants and trainers, of which 53 took the exam. Most of the examinees were physicians. Some participants did not fill out the post-test, leaving their tests inevaluable. A closer look at the test revealed eight questions that were confusing and nine that were too easy. All participant subgroups performed better on the post-test than the pre-test; the improvements were statistically significant. While profession impacted the results, profession was not statistically significant. Years of work experience, years of education, and gender did not affect test results.

Conclusions. While the study suffers from a small sample size, a few ambiguous questions, and the need for pilot testing the instrument prior to the meeting, the report evaluates the manual very favorably. The authors showed a significant gain in knowledge. The manual gives “the big picture” and does so with clarity. The text and supplementary material outline the work that needs to proceed in an organized program, and the material was easily understandable in Nigeria. Future evaluations could benefit from more participants and varied learning structures.

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Keywords: Cervical screening programs; Cervical cancer screening; Use of the WHO manuals in training; Cervical cytology; Cervical cancer; Squamous intraepithelial lesions (SIL); Cervical intraepithelial neoplasia (CIN); Human papillomavirus

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Introduction

Cervical cancer screening programs have proven effective in reducing regional mortality from that disease [1–15]. The British Columbia Cancer Centre has achieved a well-documented decrease in both cervical cancer incidence and mortality through an early detection program based on the traditional Papanicolaou smear [3]. The screening program was initiated in the early 1950s and both incidence and mortality in the region showed a steady decline within the first 20 to 25 years. The levels began at 35/100,000 new cases and 8 deaths per 100,000 annually. The rates have steadied for about the last 15 years at remarkably low levels of 7–8/100,000 new cases and less than 2 deaths per 100,000. Currently, approximately 140 cancers are detected yearly and all in women who have not been screened. Thus, even with superb resources, there still remain unscreened patients [8,9].

Fahey reported a sensitivity of 60% and specificity of 60% for the Pap smear in a meta-analysis [4]. In some settings in the United States, HPV tests are being used to triage ASCUS Pap smear results [5]. Arbyn reports on the usefulness of HPV testing in predicting recurrence [6]. Sankaranayanan studied the use of Visual inspection with Acetic Acid (VIA) and Visual Inspection with Lugol's Iodine (VILI) versus Pap smear screening in India. He reports that the advantage of these tests is that treatment can be instituted immediately [10–12].

This level of cervical cancer screening is not present in the developing world, where 80% of cervical cancers arise [1]. The HPV vaccine is not yet cost-effective for the developing World [2]. Nigeria is home to nearly 25% of the population on the continent of Africa. Pap smear screening there remains expensive and fraught with cultural barriers, hence few women have been screened. In fact, at the University College Hospital in Ibadan, it is estimated that as few as 10% of female physicians have had a Pap smear. It is currently estimated that 8000 women in Nigeria have advanced cervical cancer. Following the WHO/IARC guidelines, the most productive policy in this setting would be to screen women aged 30 to 40 years old, once or twice in their lifetime, hoping to find precancerous lesions that could be cured with simple treatments like cryotherapy or loop excision.

With 16 medical schools, 6 schools of public health, over 50 nursing schools, 20 graduate programs in engineering, and a growing number of information technology programs, Nigeria is one of the most educated countries in Africa. Given the investment in education, the size of the population, and the commitment of those who stay in Nigeria, it is becoming a place of great opportunities. Furthermore, health professionals in developing countries such as Nigeria can learn from the 50 years of screening experience in the US and Canada. New screening programs can provide a more ethical and creative medical education that is not at the expense of patients, as often can be the case in training programs. There is an opportunity for making faster progress by using the latest existing technologies to bypass the need for unnecessary infrastructure [7,13,15].

Mobile phones are a good example of such an advance. While telephone lines are sparse, cell towers are widespread in Nigeria. Nigerians have several cell phones per person to deal with the intermittent cell tower outage. Fax machines are forgone in favor of scanning and emailing documents. Again, technology has allowed steps to be skipped and lessened the need for expensive infrastructure projects. New cancer screening technologies can provide similar advantages. The CytoSavant is an automated Pap smear screening system that uses a Feulgen stain to assess DNA ploidy and has been under study in the US and Canada for 20 years. This system has proved cost-effective in China where it was recently introduced [13,14].

In Nigeria, Pap smears are currently not subsidized and cost ~\$2–6 USD. Because most Nigerians live on \$1 USD per day, only educated and employed Nigerian women can afford a Pap smear. The ExxonMobil Foundation is providing seed funding for a program of cervical cancer screening, detection, and treatment in conjunction with the University of Ibadan, the M.D. Anderson Cancer Center, and the British Columbia Cancer Research Centre. Two meetings have been organized with health professionals in Ibadan, Lagos, Enugu, Port Harcourt, Jos, and Zaria. During the first meeting, we discussed the barriers to screening programs in Nigeria and the particular needs of each geopolitical region. The conference produced a list of training needs for clinicians, nurses, pathologists, bioengineers, data managers, and administrators. The second meeting was thus planned to deliver needed equipment along with the requested training through parallel training sessions for each professional group. These sessions were designed to disseminate the material in the inclusive manual, "Planning and Implementing Cervical Cancer Prevention and Control Programs: A Manual for Managers". Here we describe the pre- and post-testing of key learning objectives in the manual, the reaction of attendees, exercises used during the conference, and a discussion of plans for broader dissemination of this manual in Nigeria.

Materials and methods

Both conferences were held in Ibadan, Nigeria; the first from January 31 to February 4, 2006 and the second one July 7–16, 2006. At the second conference, the organizing committee reviewed the details of the program on July 7. That evening, all conference participants were registered by a team of five personnel, so that correct contact information, title, email address, telephone and fax, cell phones, and pronunciation of names could be entered into a database. Teams including clinicians, nurses, pathologists, bioengineers, data managers, and administrators came from the six geopolitical regions and the Oyo state hospital in Ibadan. There were 53 Nigerian participants, 3 Canadian participants, and 12 US participants.

An introductory session was held to give participants news of the purchase of requested equipment and teaching materials and to explain the format of the meeting. A subsequent session introduced the "Planning and Implementation" manual, a guide developed by a consortium of the ACCP, WHO, IARC, PATH, Engender Health, JHPIEGO, and PAHO, with funding from the Gates Foundation. The manual presents a guide to implementation, patient care, and administration with regard to cervical cancer control programs, and is targeted toward low-resource settings in the developing world. A description of the material covered in the manual can be found in Table 1.

The group took a pre-test that was designed before the meeting and had not been previously used or tested. The training sessions that followed were structured to make maximum use of limited time by taking advantage of group learning methods. Conferees were given a number and a letter to divide them into

Table 1

Review questions provided with the manual, "Planning and Implementing Cervical Cancer Prevention and Control Programs: A Manual for Managers"

Questions	
<i>Chapter One</i>	<i>Chapter Six</i>
1. Is cervical cancer preventable?	20. Reducing the number of clinic visits will help patients.
2. What is true of the preclinical stage of cervical cancer?	21. State-supported Health Centers should be part of the effort.
3. What screening tests are currently available?	22. Linkages to the community are important for the cervical cancer prevention program.
4. What does the feasibility of screening depend on?	23. Laboratory delays are inevitable.
5. Who should perform cryotherapy?	
<i>Chapter Two</i>	<i>Chapter Seven</i>
6. Effective cervical screening can be done in developed and developing countries.	24. Information and education plan should consult...
7. What should policy makers be doing to help?	25. Ways to reach out to the community are...
8. What age group should be targeted in low resource settings for screening?	26. Clients needs to include...
	27. Provider contact is important.
<i>Chapter Three</i>	<i>Chapter Eight</i>
9. Cervical cancer needs a team approach to treatment.	28. Sufficient number of staff should be hired for this effort.
10. Cervical cancer programs need...	29. Clinical training needs to be done.
11. What does the management team need to do?	30. Audits should be conducted for quality assurance.
<i>Chapter Four</i>	<i>Chapter Nine</i>
12. What does the management team need to plan the intervention?	31. Effectiveness is enhanced by a strategy for continuous quality improvement.
13. Should many or few people participate in the process?	32. Valid and measurable indicators are difficult to develop.
14. What perspectives are important?	33. Health information systems are important.
<i>Chapter Five</i>	<i>Chapter Ten</i>
15. What amount of time does it take to plan and implement a good program?	34. Cervical cancer prevention programs should be ready to treat invasive cervical cancer.
16. What is the single most important thing the team needs to assure?	35. Cervical cancer treatment includes surgery or radiotherapy or chemotherapy/XRT.
17. Is cost-effectiveness important?	36. Palliative care means hospice.
18. Should an inaugural event be scheduled?	
19. How should resources be used?	

two different study groups. Initially, groups of trainees were divided by number and assigned to study a single chapter from the "Planning and Implementation" text. There were either six or seven participants in each group. They were given 30 min to individually read and then discuss as a group the assigned chapter. The groups were then reorganized by letter into teams that had representation from each of the chapter study groups. They were given 40 min to discuss the content of the whole book. A conference leader then reviewed the salient points of each chapter with the overall conference audience. After the training session, the post-test was administered. The answers were then given and discussed as needed.

Each participant was asked to indicate their profession, enumerate years of work experience, and to specify gender and nationality. The test was designed to follow the format of the manual, touching on key learning points from each chapter. There were 36 questions, yielding three to four questions per chapter. Some responses were yes/no and others were multiple choice. The full questionnaire is reproduced in Appendix A.

The data from the questionnaire and the responses from the pre- and post-tests were entered into an EXCEL database. Frequencies and descriptive statistics were generated to: (1) describe the participants, (2) examine the test responses to learn about the test itself, (3) examine pre- and post-test scores, and (4) evaluate whether years of experience, profession, gender, or years of education influenced the pre-test score (as a surrogate of knowledge) and the difference in pre- and post- test scores (the smaller the difference and better the pre-test score, the greater the knowledge). Histograms of relevant results were plotted. Comparisons of variables were carried out using 95% confidence intervals.

Results

There were 70 conference participants including the trainers. Details specific to the examinees can be found in Table 2. In this table, pre- and post-incorrect items are noted as well as the profession, years of experience, nationality, race, gender, and exam performance. Conferees belonged to

professions including physicians, nurses, engineers, professors (denoted PhD), data managers, administrators, and others. Others were those who did not indicate their profession. By comparing the registration list with the training participants, we are certain the "others" are physicians. Work experience in years was recorded from the questionnaire, as were nationality and gender. Missing answers were noted in the pre- and post-tests. Exam performance was classified as "worse", "no change", "?", or "improved". The performance of those participants who did not fill in the post-test cannot be determined, and were denoted as "?".

Table 2 shows that most of the examinees were Nigerian. The largest representation by a single profession was from the 28 physicians. Following physicians were nine nurses, seven engineers, four data managers, three administrators, and two professors. There were 31 males and 22 females. The range of work experience was between 1 and 35 years, with a median of 11 years. The years of education ranged from 16 for nurses, engineers, data managers, and administrators; to over 23 years for physicians.

Twelve participants (12/53=23%) did not follow instructions and thus their test performance was considered invaluable, leaving 41 evaluable exams. One participant scored worse (1/41=2%), 9 saw no change (9/41=22%), and the remaining 31 (31/41=76%) showed improvement in the post-test score. A few participants omitted one to two questions in the post-test. Where participants omitted answers to a small number of questions but followed other procedures correctly, omitted questions were not counted.

Table 2
Demographic data and test results by participant

Profession	Gender	Citizen	Ethnicity	Experience (years)	Incorrect		Omitted		Result
					Pre-test	Post-test	Pre-test	Post-test	
Nurse	F	N	A	15	6	3	0	0	Improved
Nurse	F	N	A	4	8	7	0	6	Improved
Nurse	F	N	A	29	4	2	0	2	Improved
Nurse	F	N	A	26	8	6	0	0	Improved
Nurse	F	N	A	30	7	4	0	0	Improved
Nurse	F	N	A	20	5	4	0	0	Improved
Nurse	F	US	W	8	5	0	0	36	Inevaluable
Nurse	F	US	AA	2	1	0	0	36	Inevaluable
Nurse	F	N	A	20	8	4	0	0	Improved
			Means	17.11	5.78	3.33			7/9 improved
Engineer	M	N	A	18	9	5	0	0	Improved
Engineer	M	N	A	35	9	4	2	23	Inevaluable
Engineer	M	N	A	4	7	3	0	0	Improved
Engineer	M	N	A	6	9	7	0	7	Improved
Engineer	M	N	A	17	3	3	0	0	No change
Engineer	M	N	A	7	6	4	0	0	Improved
Engineer	M	N	A	18	6	4	1	0	Improved
			Means	15.00	7.00	4.29			5/7 improved
Professor	M	N	A	6	4	0	2	36	Inevaluable
Professor	M	N	A	10	7	6	0	36	Inevaluable
			Means	8.00	5.50	3.00			0/2 improved
Data manager	M	N	A	6	4	1	0	0	Improved
Data manager	M	N	A	10	1	1	11	2	No change
Data manager	F	N	A	11	8	4	0	0	Improved
Data manager	F	N	A	4	2	2	5	1	No change
			Means	7.75	3.75	2.00			2/4 improved
Administrator	M	N	A	20	4	3	3	6	Improved
Administrator	F	N	A	10	7	0	0	36	Inevaluable
Administrator	M	N	A	5	8	2	0	23	Inevaluable
			Means	11.67	6.33	1.67			1/3 improved
Family practitioner	F	N	A	11	4	1	0	0	Improved
Gyn. oncologist	F	CAN	C	15	2	1	0	0	Improved
Gyn. oncologist	M	N	A	26	3	1	0	0	Improved
Obstetrician	M	N	A	15	2	0	0	0	Improved
Obstetrician	F	N	A	1	1	0	1	1	Improved
Obstetrician	F	N	A	9	6	5	0	0	Improved
Obstetrician	F	N	A	21	8	4	1	1	Improved
Obstetrician	F	N	A	10	1	1	0	0	No change
Obstetrician	M	N	A	7	6	3	0	0	Improved
Obstetrician	M	N	A	15	3	3	0	0	No change
Obstetrician	M	N	A	8	3	3	0	0	No change
Obstetrician	F	N	A	14	1	1	0	0	No change
Obstetrician	M	N	A	8	6	4	0	0	Improved
Obstetrician	M	N	A	6	6	2	0	0	Improved
Obstetrician	M	N	A	6	7	5	0	0	Improved
Obstetrician	M	N	A	10	7	1	0	0	Improved
Obstetrician	F	N	A	8	8	5	0	0	Improved
Pathologist	M	N	A	10	8	2	0	3	Inevaluable
Pathologist	M	N	A	10	6	2	0	8	Inevaluable
Pathologist	M	N	A	15	1	0	1	11	Inevaluable
Pathologist	M	N	A	14	5	3	0	0	Improved
Pathologist	F	N	A	23	3	3	0	0	No change
Physician (unspecified)	M	N	A	25	1	0	0	0	Improved
Physician (unspecified)	M	N	A	21	9	6	0	0	Improved
Physician (unspecified)	M	N	A	17	5	6	0	0	Worse
Physician (unspecified)	F	N	A	15	8	0	0	36	Inevaluable
Physician (unspecified)	M	N	A	10	7	7	0	0	Improved
Physician (unspecified)	M	N	A	20	10	0	1	36	Inevaluable
			Means	13.21	4.89	2.46			17/28 improved
	% female	% Nigerian	% African	Mean	Mean	Mean	Total		41/53 improved
	0.42	0.94	0.94	13.42	5.34	2.79	Evaluable		32/41 improved

Fig. 1 shows the frequency of question items missed on the pre-test (A) and post-test (B). Questions #3, #4, #5, and #36 were the most frequently missed by the all participants including

physicians. Since physicians would ordinarily be expected to be most familiar with the material, these questions were thought to be confusing and that was confirmed in discussions during the

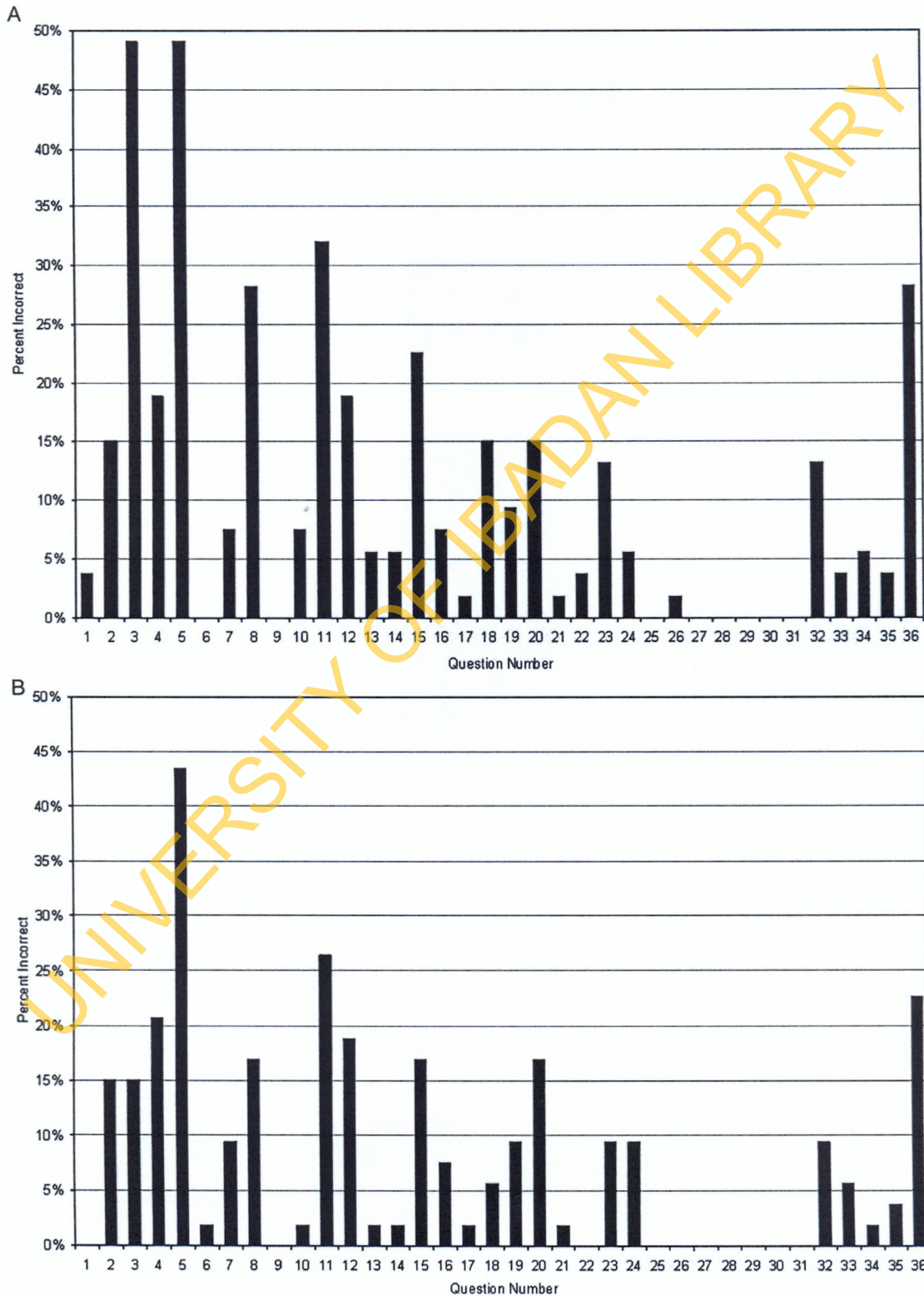


Fig. 1. Frequency of incorrect responses on the pre-test (A) and post-test (B).

session. Question #3 asked about various screening methods and used abbreviations for the answers including: Direct Visual Inspection (DVI), the Papanicolaou smear (Pap), Visualization with Acetic acid (VIA), Visualization with Lugol's Iodine (VILI), and Visualization with Acetic Acid and Magnification (VIAM). Many participants were not familiar with the abbreviations and thus did not understand the question. Question #5 asked which clinical personnel could perform cryotherapy, and examinees were unfortunately expected to check each of the multiple answers. There was no single answer "all", thus examinees found this confusing. Question #36 focused on palliative care and asked if the term was interchangeable with hospice care. The question was to be answered no, since palliative care includes pain therapy, counseling, anesthetic procedures, spiritual conference, and family support. Many found this confusing because end-of-life care is usually discussed as a subset of the broader category of palliative care. Again, many examinees answered this question incorrectly. Our conclusion about questions #3, #5, and #36 is that they were poorly understood and should be significantly revised.

Question #4 asked about the feasibility of screening program, hoping to elicit the response that the resources available were the most important variable. Many participants said in discussion that they found the other answers logical. Since the question did not ask to specify the single most important variable, nor did the question allow for multiple answers; the question may be considered ambiguous. Because mainly physicians and nurses missed this question, we concluded that they may have been slightly less familiar with resource planning (or far more familiar with other factors) than other professional groups.

Questions #11 and #15 were most frequently answered incorrectly by physicians. Question #11 inquired about the role of the management team; the correct answer was, "define and ensure good quality work". The management team does not "organize research" as their primary effort. Many participants who selected the answer, "organize research" felt the question had two answers, since the management team could be the leaders of efforts in a number of areas, including research. Question #15 asked about how long it would take to plan and implement a good cervical screening program. The manual indicated that probably a year would be reasonable; however, ranges were also mentioned. Examinees thought that the intervals listed (6 months to 2 years) were too short in a densely populated country like Nigeria, thus it would take longer than 1 year. This is an example of not designing a question well for this country and culture.

Question #8 was correctly answered by most physicians and nurses but not by trainees from non-medical professions. Question #8 asks, "What age group should be targeted in low resource settings for screening?" The manual is quite specific about targeting women aged 30–40 to be screened once or twice. It is hoped that pre-invasive lesions found at these visits can be treated, thus preventing invasive cervical cancer.

Question #9 was similarly answered correctly by physicians, nurses, administrators, and data managers but not by all engineers or professors. The question read, "Cervical cancer

needs a team approach to treatment (yes/no)?" We believe this material, which may be construed as subjective, was unknown to the engineers and possibly one of the two professors. Many of the same questions remained confusing in the post-test.

These figures also demonstrate eight questions that were always or nearly always answered correctly on the pre-test: #6, #21, #25, and #27–#31. Question #6 asks if effective cervical screening can be done in developed and developing countries (yes). Question #21 asks if state-supported Health Centers should be part of the effort (yes). Question #25 asks about information and education plan consultations involving key parties like community members, the media, and key stakeholders (all). Question #27 asks if provider contact is important for the patient (yes). Question #28 asks if a sufficient number of staff should be hired for this effort (yes). Question #29 asks if clinical training needs to be done (yes). Question #30 concerns the necessity of quality assurance in clinical care (yes). Question #31 asks about effectiveness being enhanced by a strategy for continuous quality improvement (yes). Since these items were missed by no one, they are likely too basic for persons of the education level represented. These questions should thus be revised.

The main question that we sought to answer through the administration of the pre- and post-tests was whether the intensive group learning session was effective in disseminating knowledge. The number of items answered incorrectly on the post-test is significantly lower than on the pre-test.

Table 2 demonstrates that participants from all professions saw an increase in their respective post-test scores. This shows that, even with a relatively abbreviated intervention, discussion and review of training material worked to increase knowledge in all subgroups.

Finally, several variables were evaluated to see if they predicted a lower pre-test score or a smaller difference between pre- and post-test scores. Factors such as (1) years of work experience, (2) years of education, and (3) gender were analyzed. None of these three factors, or two of them in combination, impacted scores in a statistically significant way. Profession impacted knowledge consistently but also was not statistically significant in predicting a lower pre-test score or a smaller difference in pre- and post-test scores.

Discussion

There are several important conclusions from this exercise. The most important finding is that the manual is clearly written and was universally appreciated by both trainers and participants. Overall the reception of the manual was very extremely positive. All participants and trainers evaluated the manual as being clearly written, having clear figures, and helpful appendices. An assignment of tasks is underway following the structure of the manual. Representatives from each geopolitical region are preparing suitable program materials according to the appendices included with the manual for the state government in which their academic center is located. This manual, we believe, is a good use of the donor's funds.

We discussed the book in further detail over the course of nine sessions with the administrators and public health professors. Despite the inclusion in text of information on many screening methodologies, all participants agreed that they must be tested in the Nigerian setting. Since resource allocation is critical, leaders want the resources to be put to the best use in this setting. It was thus considered critical to study and appreciate barriers unique to Nigeria and to implement screening modalities best suited to this environment, following guidelines given in the manual.

The participants responded well to the team learning approach used in our initial training session. All large tasks are eventually accomplished by teams of volunteers, private or public employees, and leaders. The training and evaluation session gave all conferees exposure to the experience of working as a part of multi-disciplinary health care teams.

This knowledge test has now been evaluated in a setting that used the instrument in groups from the three major tribal areas in Nigeria. Further work using a revised instrument and its translations will be published and accessible on a Web site soon. The WHO has an impressive collection of reading, lecture, and digital video materials that are free to users. We hope to test them in this setting and make the results available to others interested in mounting cervical screening programs. Despite little foundation funding, the WHO/IARC has managed to generate a great deal of impressive work (both educational and research) in the area of cervical screening. We hope to partner with the WHO/IARC to extend the generosity of the Gates Foundation to those settings in Nigeria in which it will have the most impact.

In this sample, some participants (23%) did not fill out the post-test, preventing the evaluation of their response to the training session. In retrospect, perhaps a better way to administer this test in the future would be to assign facilitators to each group. The test could be given and collected for the pre-test and post-test using separate copies. Prior to accepting each copy, the test checker could review the test and ask each participant to complete the missing items. One choice could be added to each question that says "I do understand the question but do not know the answer" and another could be added to say "I do not understand the question because of (A) unfamiliarity with abbreviations, (B) unfamiliarity with terms, or (C) lack of personal knowledge in this subject area". This would provide additional information for trainers and test evaluators in the future. We will be developing software so that those trainers who lead similar efforts in the future will be able to better evaluate the test instrument in their setting and in one or two languages appropriate in Nigeria. Being able to interpret test results is critical if we are to ensure the program be administered well and ethically. Thus resources that administer and evaluate the dissemination of educational materials are critical to the success of the effort. Additionally, since low resource settings have the additional burden of using resources effectively, measuring training becomes an essential part of the cost-effectiveness and clinical effectiveness measures of the program.

In the next administration of this exercise, we would recommend more time be given to reading during the exercise or that participants be asked to read the entire manual prior to arrival. While the materials can be downloaded from the WHO Web site, some participants would find it easier to read if there were printed copies. Even paper to print the copy is a resource here that not all members of the health care team have access to for the exercise, thus trainers need to think about how to administer the reading prior to their conference. In future studies, we will determine whether expenditures on printing are worthwhile. Realizing that the reaction to using written or computer-based materials may depend upon age and access to computers and printers, we will collect that information as we study the use of the manual.

The major limitation of this study is the small sample size, the lack of data collection concerning sources of ambiguity except through discussion, and finally the lack of pilot testing the instrument prior to its use in this setting. The major strength of this study is that the work of implementation has begun, tools are in use that were developed by Nigerians for a regional program, and resources have already been delivered to lay the groundwork for an effective screening program.

In this group, all participants showed an increase in knowledge after the intervention of group discussion and a review of salient points. This increase was appreciated across all professions, both genders, both dichotomized educational years of experience, and finally irrespective of the years of work experience. This is a tribute to: (1) the high education level of the participants, (2) their interest in learning, and (3) the clarity and scope of the manual.

Nigeria affords an incredible opportunity to partner with a highly educated population of health care professionals in a developing world setting. Medical personnel there view this as an opportunity to streamline; using what has worked well and avoiding the use of what has not been effective. For the developed world, it is similarly an opportunity to share both the successes and failures and the good and poor uses of resources seen over a 50 year period of cervical screening.

Conflict of interest statement

We declare that we have no conflict of interest.

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Appendix A*A.1 Pre and post tests for implementing program for cervical cancer*

Role: (Circle one) MD, PhD, Engineer, Ob-gyn, Gyn Onc, Nurse doing patient care, Nurse doing administration, Administrator, Data manager

Years of experience: (Fill in number of years) _____

Male or Female: (Circle one)

Nigerian or from elsewhere (Circle one). Where: (fill out country of origin) _____

All test results are confidential

Questions	Pre-test answer	Post-test answer
Chapter One		
Is cervical cancer preventable?	Yes or No	Yes or No
What is true of the preclinical stage of cervical cancer?	a. 10–20 year transition to cancer b. Cervix is accessible c. Screening tests exist d. All of the above	a. 10–20 year transition to cancer b. Cervix is accessible c. Screening tests exist d. All of the above
What screening tests are currently available?	a. DVI b. Pap c. VIA d. VILI e. VIAM f. all	g. DVI h. Pap i. VIA j. VILI k. VIAM l. all
What does the feasibility of screening depend on? *	a. the resources available b. the screening test c. the equipment d. the number of patients	e. the resources available f. the screening test g. the equipment h. the number of patients
Who should perform cryotherapy?	a. doctors b. nurse practitioners c. nurses d. medical assistants e. midwives f. physician assistants	g. doctors h. nurse practitioners i. nurses j. medical assistants k. midwives l. physician assistants
Chapter Two		
Effective cervical screening can be done in developed and developing countries?	Yes or No	Yes or No
What should policy makers be doing to help?	a. commit resources b. help with advertising campaign c. dedicate staff d. all of the above	e. commit resources f. help with advertising campaign g. dedicate staff h. all of the above
What age group should be targeted in low resource settings for screening?	a. 30–40 b. 20–30 c. 10–20 d. all	e. 30–40 f. 20–30 g. 10–20 h. All
Chapter Three		
Cervical cancer needs a team approach to treatment? Cervical cancer programs need...?	Yes or No	Yes or No
What does the management team need to do?	a. community information and education b. screening and diagnostic services c. engaging key stake-holders d. all e. have a party f. define and ensure good quality work g. organize research d. go on vacation e. all	e. community information and education f. screening and diagnostic services g. engaging key stake-holders h. all f. have a party g. define and ensure good quality work h. organize research i. go on vacation j. all
Chapter Four		
What does the management team need to plan the intervention?	a. a census b. number of children c. understand local barriers d. all	e. a census f. number of children g. understand local barriers h. all

Should many or few people participate in the process? What perspectives are important?	Many or Few a. stake-holders b. patients c. providers d. all	Many or Few e. stake-holders f. patients g. providers h. all
Chapter Five		
What amount of time does it take to plan and implement a good program?	a. 6 months b. 1 year c. 18 months d. 2 years	e. 6 months f. 1 year g. 18 months h. 2 years
What is the single most important thing the team needs to assure?	a. gifts for participants b. that all people with positive results get treated c. that participants names are published d. all	e. gifts for participants f. that all people with positive results get treated g. that participants names are published i. all
Is cost-effectiveness important?	Yes or No	Yes or No
Should an inaugural event be scheduled?	Yes or No	Yes or No
How much resources be used?	a. with care b. strategically c. minimally d. all	e. with care f. strategically g. minimally h. all
Chapter Six		
Reducing the number of clinic visits will help patients?	Yes or No	Yes or No
State-supported Health Centers should be part of the effort?	Yes or No	Yes or No
Linkages to the community are important for the cervical cancer prevention program?	Yes or No	Yes or No
Laboratory delays are inevitable?	Yes or No	Yes or No
Chapter Seven		
Information and education plan should consult...?	a. community members b. media people c. stakeholders d. all	e. community members f. media people g. stakeholders h. all
Ways to reach out to the community are ...?	a. materials development b. outreach activities c. local action planning d. all	e. materials development f. outreach activities g. local action planning i. all
Clients needs include?	a. information b. emotional needs c. motivation d. all	e. information f. emotional needs g. motivation h. all
Provider contact is important.	Yes or No	Yes or No
Chapter Eight		
Sufficient number of staff should be hired for this effort?	Yes or No	Yes or No
Clinical training needs to be done?	Yes or No	Yes or No
Audits should be conducted for quality assurance?	Yes or No	Yes or No
Chapter Nine		
Effectiveness is enhanced by a strategy for continuous quality improvement?	Yes or No	Yes or No
Valid and measureable indicators are difficult to develop?	Yes or No	Yes or No
Health information systems are important?	Yes or No	Yes or No
Chapter Ten		
Cervical cancer prevention programs should be ready to treat invasive cervical cancer.	Yes or No	Yes or No
Cervical cancer treatment includes surgery or radiotherapy or chemotherapy/XRT	Yes or No	Yes or No
Palliative care means hospice.	Yes or No	Yes or No

Appendix B

B.1 Pre and post tests for implementing program for cervical cancer

Role: (Circle one) MD, Ob-gyn, MD, Gyn Onc, MD, other, Nurse doing patient care, Nurse doing administration, Administrator, Public Health Professional, PhD, Engineer, Data manager

Years of experience: (Fill in number of years) _____

Gender: (Circle one) Male or Female

Citizenship: (Circle one) Nigerian or from elsewhere. Please specify (country of origin) _____

All test results are confidential

Questions	Pre-test answer	Post-test answer
Chapter One		
Is cervical cancer preventable?	Yes or No	Yes or No
Which statement is true regarding the preclinical stage of cervical cancer?	e. 10–20 year transition to cancer f. cervix is accessible g. screening tests exist h. all of the above	e. 10–20 year transition to cancer f. cervix is accessible g. screening tests exist h. all of the above
What screening tests are currently available?	i. DVI m. Pap n. VIA o. VILI p. VIAM q. all of the above	a. DVI b. Pap c. VIA d. VILI e. VIAM f. all of the above
What single limitation ultimately controls the feasibility of screening?	j. the resources available k. the screening test l. the equipment m. the number of patients	a. the resources available b. the screening test c. the equipment d. the number of patients
Who should perform cryotherapy?	i. doctors m. nurse practitioners n. nurses o. medical assistants p. midwives q. physician assistants r. all of the above	a. doctors b. nurse practitioners c. nurses d. medical assistants e. midwives f. physician assistants g. all of the above
Chapter Two		
Effective cervical screening can be done in developed and developing countries?	Yes or No	Yes or No
What should policy makers be doing to help?	i. commit resources j. help with advertising campaign k. dedicate staff l. all of the above	a. commit resources b. help with advertising campaign c. dedicate staff d. all of the above
What age group should be targeted in low resource settings for screening?	i. 30–40 j. 20–30 k. 10–20 l. all of the above	a. 30–40 b. 20–30 c. 10–20 d. all of the above
Chapter Three		
Planning of a cervical cancer prevention program needs a team approach?	Yes or No	Yes or No
Cervical cancer programs need to...?	i. offer community information and education j. offer screening and diagnostic services k. engage key stake-holders l. all of the above	a. offer community information and education b. offer screening and diagnostic services c. engage key stake-holders d. all of the above
What does the cervical cancer program's management team need to do?	k. have a party l. define and ensure good quality work m. organize research n. go on vacation o. all of the above	a. have a party b. define and ensure good quality work c. organize research d. go on vacation e. all of the above

Chapter Four

What information is overall most important to the management team for program planning?

- i. a census
- j. number of children
- k. understand local barriers
- l. all of the above

- a. a census
- b. number of children
- c. understand local barriers
- d. all of the above

Should many or few people participate in the process? What perspectives are important?

- Many or Few
- i. stake-holders
- j. patients
- k. providers
- l. all of the above

- Many or Few
- a. stake-holders
- b. patients
- c. providers
- d. all of the above

Chapter Five

What amount of time should it take to plan and initially implement an effective program?

- j. >6 months
- k. 6 to 18 months
- l. 18 months to 3 years
- m. >3 years

- a. >6 months
- b. 6 to 18 months
- c. 18 months to 3 years
- d. >3 years

What is the single most important thing the management team needs to assure?

- h. gifts for participants
- i. that all people with positive results get treated
- j. that participants names are published
- k. all of the above

- a. gifts for participants
- b. that all people with positive results get treated
- c. that participants names are published
- d. all of the above

Is cost-effectiveness important?

Yes or No

Yes or No

Should an inaugural event be scheduled?

Yes or No

Yes or No

Appropriate use of resources is best described as?

- i. carefully
- j. strategically
- k. minimally
- l. all of the above

- a. carefully
- b. strategically
- c. minimally
- d. all of the above

Chapter Six

Minimizing the number of clinic visits needed to provide care is preferable?

Yes or No

Yes or No

State-supported Health Centers should be part of the effort?

Yes or No

Yes or No

Linkages to the community are important for cervical cancer prevention program effectiveness?

Yes or No

Yes or No

Laboratory delays are inevitable?

Yes or No

Yes or No

Chapter Seven

Information and education planners should consult...?

- j. community members
- k. media people
- l. stakeholders
- m. all of the above

- a. community members
- b. media people
- c. stakeholders
- d. all of the above

Ways to reach out to the community include ...?

- i. materials development
- j. outreach activities
- k. local action planning
- l. all of the above

- a. materials development
- b. outreach activities
- c. local action planning
- e. all of the above

Clients needs include?

- h. information
- i. emotional needs
- j. motivation
- k. all of the above

- a. information
- b. emotional needs
- c. motivation
- d. all of the above

Printed materials can be considered equivalent to provider contact for patient education efforts.

Yes or No

Yes or No

Chapter Eight

At a minimum, program staff should be competently trained to ____ patients?

- a. educate & inform
- b. attract & recruit
- c. screen & treat
- d. all of the above

- a. educate & inform
- b. attract & recruit
- c. screen & treat
- e. all of the above

When should clinical training for the cervical cancer prevention program be done relative to the program's launch?

- a. well before
- b. immediately before
- c. during
- d. just after

- a. well before
- b. immediately before
- c. during
- f. just after

Outside experts are preferable in maintaining training systems?

Yes or No

Yes or No

Audits should be conducted for quality assurance?

Yes or No

Yes or No

Chapter Nine

Effectiveness is enhanced by a strategy for continuous quality improvement?

Yes or No

Yes or No

Valid and measurable indicators are difficult to develop?

Yes or No

Yes or No

Health information systems are an optional program component?

Yes or No

Yes or No

Chapter Ten

Cervical cancer treatment and palliative services should be linked and integrated with prevention care services?

Yes or No

Yes or No

Cervical cancer prevention programs should be ready to treat invasive cervical cancer?	Yes or No	Yes or No
Cervical cancer treatment includes surgery or radiotherapy or chemotherapy/XRT?	Yes or No	Yes or No
Information and education that cervical cancer is frequently curable with appropriate treatment should target...?	d. patients e. physicians f. nurses g. mid-wives h. all of the above	g. patients h. physicians i. nurses j. mid-wives k. all of the above
Palliative care means...?	d. hospice e. pain management f. spiritual support g. links to treatment h. all of the above	a. hospice b. pain management c. spiritual support d. links to treatment l. all of the above

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