

Title: Physicians as change agents to facilitate tobacco cessation in clinical practice.

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Dates of Project: October 2014-June 2016

Federal Project Officer:

Acknowledgment of Agency Support: We wish to acknowledge the support of the Pfizer Independent Grants for Learning and Change who provided the financial support for this project. In addition, we appreciate the efforts of the Global Bridges

team for their technical support.

Grant Award Number: 13503941

Structured Abstract:

Purpose: The aim of this project was to increase physician-assisted tobacco cessation among patients in tertiary hospitals by identifying, reaching, training and working with emerging leaders (resident doctors) to prioritize and practice tobacco cessation within their local work settings.

Scope and methods: This was a group-randomized controlled intervention study in three geographically distinct hospitals in Nigeria. We sought to identify, recruit and train at least 20 primary tobacco cessation change agents (PTCCA) in each of the three collaborating institutions using the 5A's(Ask, Advise, Assess, Assist, Arrange) approach to tobacco dependence treatment (TDT). This was followed up with text message and electronic mail reminders over a six-month period. We also sought to reach at least 1000 other physicians, our secondary tobacco cessation change agents (STCCA). These physicians received only informative text messages and e-mails to promote the Ask Advise and Refer (AAR) approach to TDT over a three-month period.

Results: We trained 94 resident doctors and reached an additional 1242 other physicians using informative text messages and electronic mails. For both the PTTCCA'S and STCCA'S, we observed statistically significant increases in our key outcome indicators. We also observed statistically significant differences in the documentation of brief intervention practices in clinical case notes in the intervention group compared with the control group. Majority of the physicians rated the messages as useful or very useful for promoting TDT within their clinical practices.

Conclusion: Face-to-face training followed up with informative text messages and emails resulted in an increase in knowledge and practices regarding the 5A's approach to TDT. Text messages and electronic mails only may also be a simple and low-cost measure effective for improving knowledge and practices of the AAR approach to brief intervention. Efforts to scale up these interventions should be highly considered.

Key Words: Physicians, Brief intervention, Tobacco cessation, Text messages, Emails

Overall goal of the project: To increase physician-assisted tobacco cessation among patients in tertiary hospitals by identifying, reaching, training and working with emerging leaders (resident doctors) in medical and dental teams to prioritise and practice tobacco cessation within their local work settings.

Objectives:

1. To identify and recruit 20 physicians in each of the three collaborating institutions as primary tobacco cessation change agents (PTCCA)
2. To motivate and train these primary change agents as focal persons for tobacco cessation within their respective departmental units using a traditional intensive two-day face-to-face training session and innovative mobile phone technologies such as SMS and internet based approaches like emails over a six-month period.
3. To support the PTCCA's to promote tobacco cessation among other physicians in their respective departmental units (Secondary Tobacco Cessation Change Agents) using SMS and internet based technologies over a three-month period.

Background and context: There is considerable evidence that physician-led tobacco cessation interventions increases quitting among smokers. Even when doctors provide brief advice about quitting smoking, it increases the likelihood that smokers will successfully quit and remain non-smokers 12 months later.¹ More intensive advice and pharmacological interventions may result in slightly higher rates of quitting.¹ Majority of the smokers in Nigeria desire to quit and have expressed the need for assistance with quitting.² Smoking cessation is not included in the curriculum of most medical schools in Nigeria and there is evidence that knowledge of tobacco dependence treatment is poor among Nigerian physicians.³ With more than five billion mobile phone users worldwide, text-messaging technology has changed the face of communication globally. Since the introduction of the GSM (Global System of Mobile communication) technology in Nigeria in 1999, many Nigerians now have access to mobile phones and the Internet. The Nigerian Communications Commission reported that, as at January 2014, there were more than 23 million active mobile lines in the country.⁴ Short messaging systems (SMS) and internet-based technologies are increasingly being used to promote health and to prevent disease. A study in Kenya demonstrated that SMS was effective in promoting behavioural change among health care workers in government settings.⁵ Mobile phone and internet use is particularly high among Nigerian physicians. One study reported that majority (70.7%) of physicians in Nigerian teaching hospitals use mobile phones and almost all (99%) use the internet for e-mails.⁶ These figures might open up a window of opportunity for the use of mobile and internet-based technology to promote behavioural change among health care workers. In addition, these technologies are comparatively low cost and have a wide reach. The costs of SMS and Internet bundles have been decreasing due to competitive market forces in Nigeria and are

currently relatively low (about 3 cents per SMS). These interventions may therefore have an additional cost advantage in low-resource settings like Nigeria.

In Nigeria, according to the 2012 Global Adult Tobacco Survey (GATS) there are 4.7 million Nigerian adults aged 15 years or older who currently use tobacco products: 10.0% of men and 1.1% of women.² Nigeria signed the FCTC in 2004 and ratified it in 2005 however efforts at implementing Article 14 have been sparse. Many Nigerian smokers desire to quit smoking and often make unassisted and unsuccessful quit attempts. In 2012, almost half (45.4%) of Nigerian adult smokers reportedly made unassisted and unsuccessful quit attempts in the past year.² A similar study, using purposive sampling, conducted among smokers patronizing “pubs” in Bayelsa state, southern Nigeria, showed even higher rates where 72% of smokers had made attempts to quit smoking in the past. Eighty percent found it difficult or impossible to quit smoking and majority of the smokers (91.5%) felt they needed help to quit smoking.⁷ The level of awareness of smoking cessation products among these respondents was very low. For instance, only 25.3% and 11.9% were aware of the nicotine gum and patch respectively and less than 1% had ever used either of these cessation products. Even lower figures were reported for awareness of varenicline and bupropion, where less than 10% were aware of these drugs and only 5.4% had ever had these drugs prescribed for them.⁷

Poor knowledge has been cited as the major barrier to physician-led smoking cessation interventions, with only 30.3% of physicians having good knowledge of smoking cessation in one multi-centre, cross sectional, self-administered, questionnaire-based, Nigerian study among physicians.³ Also, majority of the physicians in that study reported that tobacco education in the medical school curriculum in Nigeria is inadequate. Furthermore, while majority (86.2%) of physicians asked about patients smoking status, prescription of tobacco cessation medication was extremely low with only 6.6% prescribing smoking cessation medications for smokers.³ Few teaching hospitals in Nigeria have effective systems for the identification and treatment of tobacco using patients.

Study setting: The study was conducted in three tertiary hospitals in Nigeria, the most populous country in Africa. Nigeria is a signatory to the WHO FCTC and passed a National Tobacco Control bill in May 2014 however no national policy designed to domesticate the implementation of Article 14 of the WHO FCTC exists. The hospitals we used for the survey are tertiary hospitals which are traditionally referral centers from primary and secondary levels of care, however patients are also able to walk in to receive care in some units. They offer a wide variety of preventive and curative health services and cater to patients from all socio-economic classes of the society. The selected hospitals are teaching hospitals, which offer specialist training to resident doctors (specialists in training) and house officers (interns). Interns spend

a minimum of twelve months on rotational postings while residents spend between four and seven years in training. Both residents and interns are monitored by supervising consultants during the period of their training.

Study participants

The participants consisted of physicians employed in the selected tertiary hospitals in Nigeria.

Study design

This was a quasi-experimental study aimed at assessing the effect of an intervention program designed to promote brief intervention tobacco cessation activities among physicians in three tertiary hospitals in Nigeria. We offered two separate levels of engagement with the physicians.

For the PTCCA's, it involved an initial two-day training followed up with informative text messages and emails while for the STCCA's it involved sending informative txt messages and emails to promote the AAR approach to tobacco cessation

Selection of study sites and participants

Selection of teaching hospitals: For the intervention group, we purposively selected three tertiary hospitals in three of the six geographically distinct geo-political zones of the country. Hospitals were also selected because they had a relatively large number of patients and resident doctors. The three intervention teaching hospitals selected were: Lagos University Teaching Hospital (LUTH), Federal Teaching Hospital, Abakaliki, Ebonyi state (FETHA) and University of Abuja Teaching Hospital (UATH). For each intervention hospital, we selected an appropriate control hospital. Control hospitals were similar to the intervention hospital in terms of geographical location, size and the type of services rendered.

Selection of study participants:

Primary tobacco cessation change agents: To determine the PTCCA's i.e. the physicians that would participate in the face-to-face trainings, we obtained a list of all departments where physicians have the opportunity to come in contact with patients who may be tobacco users in each intervention hospital. We considered only departments where physicians attended to living and conscious patients above the age of 12 years. Then, we sent letters to the heads of department requesting a nomination of two resident doctors to participate in the program. Nominated residents had to be employed by the hospital and have at least one year to the completion of their training. In addition, they had to be willing to participate in the program. Once we obtained the details of each nominated resident, we sent letters to each of them informing them of the program and requested information on their

willingness to participate. In all, 94 physicians were nominated and contacted. Two of them were unwilling to participate in the program and were promptly replaced by their respective heads of department/chief resident.

Secondary tobacco cessation change agents: These are the colleagues of the PTTCCA's in their respective departments. Their details were obtained from the PTCCA's after an informed consent and thereafter, a database of these physicians was created hereafter referred to as the secondary tobacco cessation change agents. We communicated with them using text messages and electronic mails only.

THE INTERVENTION:

Phases of the study: The study was divided into three phases

- Phase One: Identification and recruitment of the primary tobacco cessation change agents.
- Phase Two: Training and follow up text messages and e-mails for the primary tobacco cessation change agents using the 5A's approach to tobacco dependence treatment.
- Phase Three: Intervention for the secondary tobacco cessation change agents i.e. informative text messages and electronic mails using the AAR approach.

Phase One:

Identification and recruitment of the primary tobacco cessation change agents: Firstly, in each intervention institution, we identified relevant departments within the hospital. A department was considered relevant if it had physicians who had the opportunity to come in contact with patients who are tobacco users in the course of their routine daily work. We excluded departments where physicians do not deal directly with patients or who deal with unconscious patients only or patients less than 12 years of age. Then, we sent letters to all the heads of the identified departments informing them about the project and requesting them to nominate at least two physicians to serve as a part of our PTCCA group. Nominated physicians (at least a MBBS or BDS degree) had to be currently in the employ of the teaching hospital and be willing to attend the training program. In addition, they must have been working in the teaching hospital for at least one year and must have at least one year left to the completion to their residency training.

Once we obtained the details of each nominated resident, we sent letters to each of them informing them of the program and requested information on their willingness to participate. Thereafter, the selected physicians were invited to attend a two-day training aimed at increasing their knowledge and skills in tobacco dependence treatment. After a written informed consent, they were recruited as the

primary tobacco cessation change agents for the study. In all, 94 physicians were nominated and contacted. Two of them were unwilling to participate in the program and were promptly replaced with similarly eligible physicians by their respective heads of department.

Phase Two

Training and follow up text messages and emails for the PTCCA's using the 5A's approach to tobacco dependence treatment: The second phase of the project involved an initial two-day training program followed up with informative text messages and emails designed to promote brief intervention activities among the physicians.

The training program: This was a two-day workshop designed to improve the physicians knowledge and skills in carrying out brief intervention tobacco cessation strategies using the 5A's approach (Ask, Advise, Assess, Assist and Arrange); Improving knowledge and skills in motivational interviewing techniques and tobacco cessation dependence treatment. The two-day training covered aspects of tobacco epidemiology, brief intervention, pharmacotherapy, motivational interviewing, appropriate referral systems and advocacy for tobacco control in hospital-based settings. Training was carried out using didactic lectures, interactive sessions, case studies, role-plays and participant discussions. The principal investigator and the team members bore the primary responsibility for developing the training content. (Training slides are available as supplementary materials). We conducted three separate training programs for participants in each of the three hospitals using the same training content and methodology. The PI and site co-PI's coordinated the training sessions and delivered the lectures. Prior to each training session, an informed consent was obtained and a pre-test was conducted for participants. They were also informed that they would be receiving follow up text messages and email reminders over a six-month period. Participants were provided with workshop materials and a small allowance for their participation in the program.

Selected training participants were expected to do the following:

- i. Attend and participate in the two-day training session.
- ii. Over the next three months, attend an online course on global tobacco control offered by the Johns Hopkins University. They were also expected to submit evidence of certificates of participation to the training coordinator.
- iii. Upon return to work, inform their colleagues (consultants, resident doctors and interns) of the project. They were expected to provide a brief description of the project and its aims and objectives. They were also

expected to obtain an informed consent after which, they would collect collate and submit the email addresses and phone numbers of their colleagues to the project coordinator.

- iv. Fill in online project evaluation forms six months after the training.

Follow-up informative SMS and electronic mails: Using the training slides as a guide, we developed simple informative text messages designed to serve as reminders of the highlights of the training sessions. One or two text messages were delivered to participants every week over a six-month period. The same messages were also sent by electronic mail to the participants. Please see appendix for a list of the messages.

Phase three

Text messages and electronic mails to the secondary tobacco cessation change agents:

This phase was designed to promote the brief intervention approach to tobacco dependence treatment (using the AAR approach) to a wider number of physicians practicing in the intervention hospitals using low-cost media like electronic mails and text messages. We obtained and collated the phone numbers and email addresses of the larger group of physicians in the three intervention hospitals received from the PTCCA'S. This group was referred to as the secondary tobacco cessation change agents. Then, we developed similar informative brief messages for this group of physicians using the AAR approach to brief intervention as a guide. We initially sent an initial introductory message informing the physicians of the project and the purpose of the study. Thereafter, one or two messages were sent to each physician every week over a 13-week period using text messages and electronic mails. Baseline and post-intervention questionnaires to assess the effect of the intervention on their brief intervention practices were sent out using survey monkey® At no point during the intervention did we engage with the STP's face to face. All communication with the STTCCA's was carried out by electronic mails and text messages.

Inclusion and exclusion criteria for the STCCA's: All other physicians in the relevant departments currently practicing in the teaching hospitals. This included the supervising consultants, medical officers, all other resident doctors in training and house officers (interns).

The entire intervention lasted for six months. Baseline and follow-up data will be collected in the intervention and control sites before and after the intervention.

Study measures, outcome indicators, data collection and analyses:

Study measures and sources of data

The primary outcome was an improvement in the knowledge, attitudes and practices of brief intervention strategies for tobacco cessation among the physicians over the intervention period. We assessed the effect of the intervention using the following outcome measures:

1. Self-reported knowledge, attitudes and practices of physicians regarding brief intervention strategies for tobacco cessation.

For the primary tobacco cessation change agents, we developed a questionnaire aimed at assessing the knowledge, attitudes and practices of the PTCCA's. The questionnaire was a 45-item tool, which assessed information based on the following themes: Knowledge of smoking cessation methods including basic pharmacotherapy and motivational interviewing; perceived self-efficacy and self competency to deliver tobacco dependence treatment; knowledge on brief intervention approaches to tobacco cessation i.e. the 5A's approach. In addition, we collected information on the socio-demographic details and smoking status of the participants.

The questionnaire was designed by the research team after a relevant literature review and using the content from the training sessions as a guide. After developing the initial draft, it was checked for content validity by the other team members and pre-tested. Appropriate adjustments were made thereafter.

We administered the questionnaire at four time points:

1. Baseline (before the two-day training) This served as a pre-test.
2. Immediately after the training (Post-test)
3. Three months into the intervention
4. At the end of the intervention (Six months after)

The first two surveys were conducted in person before and after the training. The other two were conducted online and administered via Survey Monkey®. Because the data was not linked, we performed the analysis only using data from two time points, before the intervention and at the end of the intervention.

For the secondary tobacco cessation change agents, a similar questionnaire was designed to assess their knowledge and practices regarding the AAR approach to tobacco cessation. This tool was administered using Survey Monkey® before and after the intervention.

2. Documentation of brief intervention techniques for tobacco cessation in patients' case records by physicians:

In all teaching hospitals in Nigeria, it is customary for physicians attend to patients and document their findings and plan of action in patients' case-files. These files are domiciled with the medical records unit of each hospital. For in-patients i.e. while a patient is currently on ward admission, the case files are temporarily with the

nursing officer in charge of the ward and can be accessed therein. Out-patient case-files are domiciled with the medical records unit. The case-files of registered patients with clinic appointments are retrieved of the morning of the clinic day and sent to the respective clinic.

A simple checklist was designed to assess the level of tobacco cessation services offered to patients and documented in the case files by the physicians. We selected three “control” hospitals with similar features and in similar geographical areas with the intervention hospitals. The checklist was divided into two sections; the first collected information on the patients’ socio-demographic details, diagnosis and the presence of tobacco-related morbidities. The second section assessed the level of documentation of the brief intervention strategies for tobacco cessation i.e the 5A’s and the AAR (See Appendix).

Trained data collectors with a minimum of MBBS degree visited the out-patient clinic of each relevant department. Using a systematic sampling method, they selected ten case-files from each clinic/ward and assessed these files for documentation of tobacco cessation activities by attending physicians. This was done prior to the start of the study in both intervention and control hospitals to serve as baseline data. At the end of the intervention, this exercise was repeated in the same manner for the collection of post-intervention data.

Data analyses: All data was entered using a uniform template on Epi info version 3.5.1. data was analysed using SPSS 17.0 and presented as frequency tables, charts and cross tabulations where necessary. Percentage scores and standard deviations were developed for each key outcome indicators and compared at baseline and at the end of program. Similarly the brief intervention practices of the physicians were also compared. The student’s t-test was used to compare percentage scores between groups. The Chi-square and Fisher’s exact tests were used for comparison of proportions. The level of significance was set at 0.05.

Output indicators: Number of PTCCA’s who started and remained in the program over the 6-month period; Knowledge and self-efficacy/confidence scores of brief intervention, pharmacotherapy and motivational interviewing techniques at baseline & 6 months evaluation; Proportion of physicians who received (admitted to opening and reading) our tobacco cessation SMS and emails; Proportion of physicians who (were motivated to) either ask, advice or refer patients based on SMS and/or emails received; Proportion of physicians who asked at least 50% of their patients about tobacco use; proportion of physicians who advised at least 50% of identified tobacco users to quit; Proportion of physicians who referred at least 50% of identified tobacco users for follow up; Proportion of hospital patient case-records with documentation of the tobacco status and brief intervention activities (if applicable) at baseline and 6 months follow up at intervention and control sites;

Proportion of hospital patients who use tobacco who were referred to referral clinics in the 6-month period; Number of referred patients who actually visited the referral clinics within the study period.

Ethical considerations: Ethical approval was obtained from the Research and Ethics Committee of the College of Medicine, University of Lagos, Idi-Araba (IRB number 00004041) and also from all the teaching hospitals used in the study. A written informed consent was collected from all the PTCCA's and an initial verbal consent followed by a written consent from the STCCA's that were included in the STCCA database. They were also given the option to opt out of the program if they so desired. All the information collected was anonymous and treated with confidentiality.

Study limitations

1. Industrial strike action: There was an industrial strike action during the study period, hence, we were compelled to request for a three month extension.
2. Low response rate using the survey monkey evaluation tool by the STCCA's, 17.8% and 13.4% before and after respectively therefore the findings from this aspect of the survey may have to be interpreted with some caution.
3. Many of the PTCCA had technological challenges with completing Johns Hopkins online tobacco cessation course. This was responsible for the very low number of PTCCA's who participated in the online course.
4. There might have been possible under-reporting of the brief intervention activities resulting in an underestimation of the impact of the intervention. This may be because of a possible low level of documentation of physicians activities in patients case records hence the low figures observed in the patients clinical files.

Main findings

Knowledge, attitudes and practices promoting brief intervention approaches to tobacco cessation among the respondents

Primary tobacco cessation change agents: Eighty-six physicians filled the questionnaire at baseline and 85 of them after the intervention. We observed a statistically significant increase in the mean scores for the key outcome indicators. We observed a statistically significant increase in the mean percentage scores for the key outcome indicators i.e. Epidemiology of tobacco use;(increased from 15.6-29.9;p<0.001); Knowledge of the 5A's and AAR approaches to tobacco cessation

(increased from 8.7-79.4;p<0.001); Knowledge of pharmacotherapy (increased from 43.4-79.4;p<0.001); Knowledge of tobacco cessation techniques (increased from 53.8-64.7;p<0.001); Knowledge of the stages of change (increased from 50.4-66.2;p<0.001); Knowledge of motivational interviewing techniques (increased from 62.2-87.7;p<0.001); Perceived self-efficacy to provide brief intervention for patients using tobacco (increased from 44.3-54.7;p<0.001); Tobacco cessation competency at baseline and at the end of the intervention (increased from 83.9-95.4;p<0.001). Similarly, key indicators for the 5A's approach to tobacco cessation also increased. We observed that the proportion of physicians that inquired of tobacco use among at least half of their patients increased from 50%-74.1%(p<0.001); Proportion who offered some advise to at least half of all identified tobacco users increased from 26.7% to 69.4%(p<0.001); Proportion who assessed willingness to quit in at least half of all identified tobacco users increased from 9.3% to 50.6% (p<0.001); the proportion who assisted at least half of all identified tobacco users increased from 8.1% to 65.9% while the proportion who refereed or arranged for follow up for at least half of all identified tobacco users increased from 4.7% to 65.9%(p<0.001). (Table 1).

Secondary tobacco cessation change agents: Two hundred and eleven physicians filled the surveys at baseline and 165 after the intervention. Majority of them opened and read the messages and felt that the messages motivated them to carry out brief intervention tobacco control activities for their patients. The proportion of physicians who were aware of and could correctly define the AAR approach to tobacco cessation increased from 14% to 58.2% p<0.001; while those who asked at lest half of all their patients about tobacco use increased from 26.3% to 31.8% p<0.05; those who advised at least half of patients who used tobacco about quitting increased from 43.9% to 59.5% p<0.01); while those who referred patients who were tobacco users for further care increased from 6.4% to 22.2% p<0.01. Other details are noted in Table 3

Physicians' documentation of tobacco cessation activities in patient clinical records in the intervention and control groups.

We observed statistically significant differences in the proportion of patient records with documentation of tobacco cessation activities in the intervention hospitals versus the control hospitals.

Number of patients referred to the tobacco cessation clinics: Up to 70.6% of the PTCCA's and 22.2% of the STCCA's admitted to referring at least 50% of identified tobacco users for follow up at the designated tobacco cessation clinics in each

hospital. In all three hospitals, a total of 14 referred patients actually visited the referral centres and were given further treatment.

Previous attendance of training for the promotion of tobacco cessation within clinical practice: Only 4/86 (4.7%) of the respondents had attended a course promoting tobacco cessation treatment within their clinic practice prior to this project.

Physicians' attitudes and perception of the various media used for the intervention: All the 85 respondents who took part in the end of project survey admitted to receiving messages related to the project. Almost all (84:98.5%) admitted to receiving the emails and the text messages. Many (67:78.8%) also admitted to receiving messages on the what's app® platform. Majority (71:84.5%) opened and read the text messages either all the time or most of the time. Only few (5:5.8%), rarely or never read/opened the text messages. Regarding the emails, many (58: 69%) opened and read the emails either all the time or most of the time. Only 6:7.1%) never or rarely read/opened the emails.

We also assessed their attitudes towards the use of low-cost electronic media i.e. emails, text messages and what's app® in promoting tobacco cessation practices in their clinical practices. We observed that many of them rated these messages as being either 'very useful' or 'useful' for promoting brief intervention practices for tobacco dependence treatment. Majority (77:91.6%) rated the messages as either very useful or somewhat useful in helping them carry out tobacco cessation interventions for patients while 80 respondents (95.2%) rated the messages as being either very useful or somewhat useful in improving their knowledge of tobacco cessation interventions. Sixty-five respondents (77.3%) said, on the whole, the messages motivated them to take action to help patients quit tobacco either every time or often times.

We also attempted to compare the rated usefulness of the different media by the respondents. The face-to-face training had the highest mean score of 4.65±0.8. This was followed by the Johns Hopkins course online course (3.82±0.9), text messages (3.75±1.0) and the emails (3.3±0.8). Other details are in table 2.

Table 1: Changes in mean scores of key outcome indicators among the primary tobacco cessation change agents before and after the intervention

Outcome Indicator			
<i>Knowledge/Attitude domains</i>	Mean (SD) scores at baseline (n=86)	Mean (SD) scores 6 months after (n=85)	p

Epidemiology of tobacco use	10.7(15.6)	49.4(29.9)	<0.001
Knowledge of the 5A's and AAR approaches to tobacco cessation	8.72(21.6)	79.4(32.1)	0.015
Knowledge of pharmacotherapy	43.4(18.1)	70.85(18.5)	<0.001
Knowledge of tobacco cessation techniques	53.8(271)	64.7(30.6)	
Knowledge of the stages of change	50.4(28.3)	66.2(29.8)	<0.001
Knowledge of motivational interviewing techniques	46.9(31.6)	71.4(28.2)	<0.001
Attitudes towards physician-assisted tobacco cessation	62.2(15.6)	87.8(22.5)	<0.001
Perceived self-efficacy to provide brief intervention for patients using tobacco	44.3(14.8)	54.7(24.0)	<0.001
Tobacco cessation competency	83.9(6.1)	95.4(22.2)	<0.001
<i>Brief intervention practices</i>	Freq.(%)	Freq.(%)	p
Proportion of all patients ASKED about tobacco status			
<50%	86(100.0)	22(25.9)	<0.001
>50%	43(50.0)	63(74.1)	
Proportion of tobacco using patients ADVISED to quit			
<50%	86(100.0)	26(30.6)	<0.001
>50%	23(26.7)	59(69.4)	
Proportion of tobacco using patients ASSESSED for readiness to quit			
<50%	86(100.0)	42(49.4)	<0.001
>50%	8(9.3)	43(50.6)	
Proportion of tobacco using patients ASSISTED with quitting			
<50%	86(100.0)	29(34.1)	<0.001
>50%	7(8.1)	56(65.9)	
Proportion of tobacco using patients who received a follow up or in which a referral was ARRANGED for.			
<50%	86(100.0)	25(29.4)	<0.001
>50%	4(4.7)	60(70.6)	

Table 2: The use of text messages and email reminders to promote brief intervention strategies among the primary tobacco cessation change agents.

<i>Outcome measure</i>	<i>Freq. (%) n= 85</i>
<i>Respondent received tobacco-cessation related information via:</i>	
Electronic mail	83(97.6)
Text message	79(92.9)
What's app®	66(77.6)
<i>Frequency with which the respondents opened and read the text messages</i>	
All of the time	48(56.5)
Most of the time	23(27.1)
Sometimes	9(10.6)
Rarely	3(3.5)
Never	2(2.4)
<i>Frequency with which the respondents opened and read the emails</i>	
All of the time	29(34.1)
Most of the time	29(34.1)
Sometimes	21(24.7)
Rarely	5(5.9)
Never	1(1.2)
<i>Rated usefulness of the information received for increasing their knowledge</i>	
5(Very useful)	46(54.1)
4(Somewhat useful)	34(40.0)
3(Uncertain)	3(3.5)
2(Not really useful)	2(2.4)
1(Not at all useful)	0(0.0)
<i>Rated usefulness of the information received for treating tobacco dependence</i>	
5(Very useful)	49(57.6)
4(Somewhat useful)	27(31.8)
3(Uncertain)	7(8.2)
2(Not really useful)	1(1.2)
1(Not at all useful)	1(1.2)

<i>How often did the messages motivate you to take action to help patients quit tobacco</i>	
Every time	22(25.9)
Often	43(50.6)
Uncertain	10(11.8)
Very few times	9(10.6)
Extremely few times	1(1.2)
<i>Rating of the usefulness of the following media as communication for educating physicians about tobacco cessation interventions on a scale of 1 to 5 with 1 being "Not at all useful" and 5 being "Very useful"</i>	
<i>Text Messages (n=79)</i>	
5	28(35.4)
4	13(16.5)
3	33(41.8)
2	4(5.1)
1	1(1.3)
<i>Electronic mails.(n=83)</i>	
5	8(9.6)
4	21(25.3)
3	44(53.0)
2	10(12.0)
1	0(0.0)
<i>What's app® (n=66)</i>	
5	20(30.3)
4	18(27.3)
3	24(36.4)
2	2(3.0)
1	2(3.0)
<i>Two-day face to face training</i>	
5	65(76.5)
4	15(17.6)
3	3(3.5)

2	0(0.0)
1	2(2.4)

Table 3: Brief intervention awareness and practices (AAR) among the secondary tobacco cessation change agents.

Outcome measure	Before (n=221)	After (n=167)	P
Awareness of the “AAR” approach to tobacco cessation	42(19.0)	111(67.3)	<0.001
Can correctly define “AAR”	31(14.0)	96(58.2)	<0.001
Proportion of all patients:			
Asked			
<25%	98(44.3)	51(30.5)	0.026
25%-50%	28(12.7)	19(11.4)	
51-75%	22(10)	23(13.8)	
>75%	73(16.3)	74(18.0)	
Proportion of tobacco using patients:			
Advised			<0.001
<25%	115(57.5)	54(32.4)	
25%-50%	19(8.6)	14(8.4)	
51-75%	13(5.9)	22(13.2)	
>75%	84(38.0)	77(46.1)	
Proportion of tobacco using patients:			
Referred			
<25%	201(90.9)	115(68.9)	<0.001
25%-50%	6(2.7)	15(9.0)	
51-75%	1(0.5)	10(6.0)	
>75%	13(5.9)	27(16.2)	
Awareness of the existence of a tobacco cessation clinic within your hospital	40(18.1)	116(69.5)	<0.001

Table 4: The use of text messages and email reminders to promote the AAR approach to tobacco cessation among the secondary tobacco cessation change agents.

Outcome measure	Freq.(%) n=167
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<i>Frequency of opening and reading the project related text messages</i>	
All of the time	64(38.3)
Most of the time	54(32.3)
Some of the time	33(19.8)
Rarely	8(4.8)
Never	8(4.8)
<i>Reported usefulness of the SMS in helping you offer tobacco cessation services to your patients quit</i>	
Very useful	67(40.1)
Somewhat useful	77(46.1)
Never useful	14(8.4)
Don't remember receiving any text message related to tobacco cessation	9(5.4)
<i>Frequency of opening and reading the project related emails</i>	
All of the time	55(32.9)
Most of the time	58(34.7)
Some of the time	34(20.4)
Rarely	11(6.6)
Never	9(5.4)
<i>Reported usefulness of the emails in helping you offer tobacco cessation services to your patients</i>	
Very useful	64(38.3)
Somewhat useful	80(47.9)
Never useful	16(9.6)
Don't remember receiving any text message related to tobacco cessation	7(4.2)
Respondent believes that the messages sent definitely:	
Increased his/her knowledge of tobacco cessation	120(71.9)
Increased his/her inquiry of patients tobacco status	87(52.1)
Increased the number of times he/she offered brief advice to identified tobacco using patients	97(58.1)
Increased the number of tobacco-using patients followed up or referred for further assistance	59(35.3)

Increased the number of documentation	84(50.3)
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Table 5: Physician documentation of brief intervention strategies for patients in the intervention and control groups

	Before		p	After		p	%diff	%dif f.	p
	Interv. n=831 Freq.(%)	Control n=760 Freq. (%)		Interv. n=557 Freq.(%)	Contrl. n=605 Freq.(%)				
Response:							Inter v.	Con trol	
Patient smokes	178(21.4)	92(12.1)	0.001	122(21.9)	98(4.8)	0.202	0.5	-7.3	<0.001
Physician asked patient about smoking status	241(29.0)	284(37.4)	0.019	241(43.3)	181(29.9)	<0.001	14.3	-7.5	<0.001
Physician advised smoker to quit	11(6.2)	37(40.2)	<0.001	6(4.9)	3(3.1)	0.490	-1.3	- 37.1	<0.001
Physician assessed willingness to quit	3(1.7)	6(6.5)	0.035	5(4.1)	0(0.0)	0.042	2.4	-6.5	<0.001
Physician assisted smoker with quitting	1(0.6)	5(5.4)	0.010	6(5.7)	0(0.0)	0.026	5.1	-5.4	<0.001
Physician provided counselling	2(1.1)	3(3.3)	0.216	6(5.7)	0(0.0)	0.026	4.6	-3.3	<0.001
Physician prescribed medication	2(1.1)	2(2.2)	0.498	7(5.7)	0(0.0)	0.015	4.6	-2.2	<0.001

Physician arranged for follow up	1(0.6)	4(4.3)	0.028	7(5.7)	0(0.0)	0.015	5.1	-4.3	<0.001
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Discussion: This is one of the first few studies to evaluate the effect of training in addition to informative text messages and emails in promoting tobacco dependence treatment in clinical practice in Nigeria. This supports the assertion that physician training does improve brief intervention practices as has been observed in other parts of the world. The physicians also found the training and the messages to be of value and felt it promoted the identification and treatment of patients who use tobacco in their clinical settings.

In this study, we had two levels of physician engagement, as expected, the intervention was successful at improving the practices of the physicians who received the training, and this effect appeared to be sustained over time. We also observed that the physicians who received a lower level of engagement i.e. text messages and electronic mails also showed some increase in their brief intervention knowledge and practices suggesting that these low-cost, low engagement measures may be effective in promoting tobacco cessation activities among physicians.

We also observed relatively low rates of documentation of the brief intervention practices in the patients clinical notes in both intervention and control hospital. On the whole, physician documentation of tobacco use inquiry was low in both groups. However extremely low rates were observed for physician advise, assessing willingness to quit, assistance with quitting and arrangements for follow up. This may be because, the number of identified tobacco using patients may have been low, and so the actual denominator was actually unknown. Also, traditionally physicians may not be used to documenting tobacco related activities in their clinical notes.

Conclusions: Face-to-face training followed up with informative text messages and emails showed an increase in knowledge and practices regarding the 5A's approach to TDT. Text messages and electronic mails only may also be a low-cost measure effective at improving knowledge and practices of the AAR approach to brief intervention. Efforts to scale up these interventions should be highly considered.

Significance and implications:

The implications of this study is that in low resource countries like ours, engaging physicians via face-to-face training followed up with informative text messages and emails to promote tobacco cessation in teaching hospitals is associated with an increase in brief intervention activities. Simple low cost, low engagement methods

of promoting tobacco cessation may also be effective at improving tobacco cessation activities among a larger number of physicians further increasing the reach of our intervention.

List of Publications and Products:

Two papers have emanated from this research, one has been sent to

Sent to the Nicotine and Tobacco Research Journal and is currently under review, while we are currently finalizing the second paper and plan to send it to the Tobacco control journal.

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