The Ask–Advise–Connect Approach for Smokers in a Safety Net Healthcare System

A Group-Randomized Trial

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Background: Because smoking has a profound impact on socioeconomic disparities in illness and death, it is crucial that vulnerable populations of smokers be targeted with treatment. The U.S. Public Health Service recommends that all patients be asked about their smoking at every visit and that smokers be given brief advice to quit and referred to treatment.

Purpose: Initiatives to facilitate these practices include the 5A's (ask, advise, assess, assist, arrange) and Ask–Advise–Refer (AAR). Unfortunately, primary care referrals are low, and most smokers referred fail to enroll. This study evaluated the efficacy of the Ask–Advise–Connect (AAC) approach to linking smokers with treatment in a large, safety net public healthcare system.

Design: The study design was a pair-matched group-randomized trial with two treatment arms.

Setting/participants: Ten safety net clinics in Houston TX.

Intervention: Clinics were randomized to AAC (n=5; intervention) or AAR (n=5; control). Licensed vocational nurses (LVNs) were trained to assess and record the smoking status of all patients at all visits in the electronic health record. Smokers were given brief advice to quit. In AAC, the names and phone numbers of smokers who agreed to be connected were sent electronically to the Texas quitline daily, and patients were proactively called by the quitline within 48 hours. In AAR, smokers were offered a quitline referral card and encouraged to call on their own. Data were collected between June 2010 and March 2012 and analyzed in 2012.

Main outcome measures: The primary outcome was impact, defined here as the proportion of identified smokers that enrolled in treatment.

Results: The impact (proportion of identified smokers who enrolled in treatment) of AAC (14.7%) was significantly greater than the impact of AAR (0.5%), $t(4)=14.61$, $p=0.0001$, OR=32.10 (95% CI=16.60, 62.06).

Conclusions: The AAC approach to aiding smoking cessation has tremendous potential to reduce tobacco-related health disparities.

Trial registration: This study is registered at ISRCTN78799157.

(Am J Prev Med 2013;45(6):737–741)

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0749-3797/$36.00
http://dx.doi.org/10.1016/j.amepre.2013.07.011

Background

Smoking is becoming increasingly concentrated among individuals with the lowest levels of education, income, and occupational status,[1–6] and it has a profound impact on socioeconomic disparities in the U.S.[7–9] Therefore, it is crucial that vulnerable populations of smokers be targeted with evidence-based cessation treatment.[10] Because evidence-based treatments delivered by quitlines are underutilized,[10–16] formalizing partnerships with healthcare systems has been identified as a critical strategy for enhancing their reach and overall impact.[16,17] Despite initiatives such as the 5A's (i.e., ask, advise, assess, assist, arrange) and AAR (Ask–Advise–Refer),[11,12,18–21] treatments have not been well integrated within healthcare systems.[10,16,22–25] Thus, there is a critical need to address treatment barriers.

The authors recently evaluated[26] the efficacy of a new, electronic health record (EHR)–based approach to connect smokers in healthcare settings with a treatment called "Ask–Advise–Connect" (AAC). In AAC, the contact information of smokers interested in talking with the quitline was sent directly to the quitline through the EHR, and the quitline staff proactively contacted each of these individuals. Results of the initial trial, conducted in a private healthcare system, indicated that AAC (vs AAR) was associated with a 13-fold increase in treatment enrollment.[26] The current study utilized similar methodology and was intended to replicate the findings in a safety net healthcare system.

Methods

Study Design

A pair-matched group-randomized design in ten Harris Health System community health clinics was utilized. The clinics serve nearly 200,000 unique adult patients per year; 90% are members of racial/ethnic minority groups, and nearly half have incomes below the federal poverty level. Five clinics were randomized to AAC (intervention) and five were randomized to AAR (control condition). The dissemination period was 18 months. Data were collected between June 2010 and March 2012 and analyzed in 2012. The protocol was published in 2010.[27]

Participants

Participants were current smokers aged ≥18 years who were seen at the clinics. There was no racial or gender bias in participant selection. IRB approval was obtained from MD Anderson Cancer Center, Harris Health System, and the Texas Department of State Health Services. A waiver of written informed consent and a waiver of authorization was obtained, and participants were provided with a written information sheet about the study and gave verbal consent to have their contact information sent to the quitline. Verbal consent for each participant was documented in the EHR.

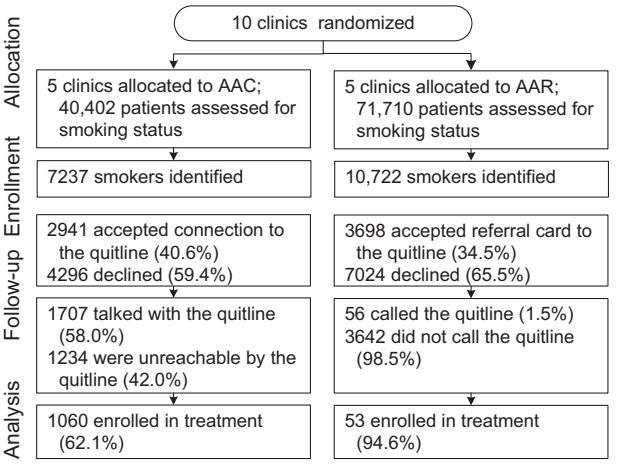

Figure 1. Study flow diagram

Randomization

Randomization occurred at the clinic level (Figure 1). Clinics were initially paired by the investigators based on patient volume, average age, gender, race/ethnicity, and percentage below the poverty level. One clinic within each pair was then randomly assigned to one of the two arms.

Procedures

In AAC and AAR, licensed vocational nurses (LVNs) were trained to assess and record the smoking status of all patients at all visits in the EHR when vital signs were collected. They were also trained to provide smokers with brief advice to quit, consistent with the *Guideline*.[11] A 30-minute training session on how to assess smoking status, deliver brief advice to quit, and connect (AAC) or refer (AAR) patients to the quitline was held at the beginning of the trial. In AAC, LVNs directly connected patients with the quitline through clicking an automated link in the EHR that sent smokers' names and phone numbers to the research team, who then sent the information to the quitline within 24 hours. Patients were contacted by the quitline within 48 hours. In AAR, LVNs gave smokers willing to accept assistance a quitline referral card.

Smoking status and willingness to be connected (in AAC) or referred (in AAR) were recorded using the EHR. An Excel data file was automatically and securely sent to the research team daily, and forwarded to the quitline daily. Treatment enrollment was tracked and recorded by the quitline. Data were maintained in an Access database.

Outcome Measures: Reach, Efficacy, and Impact

Reach, efficacy, and impact were evaluated using the RE-AIM framework.[28] **Reach** is defined as the number of smokers that talked with quitline/total number of identified smokers. **Efficacy** is defined as the number of smokers that enrolled in quitline treatment/total number of identified smokers that talked with quitline. **Impact** is defined here as Reach × Efficacy. These definitions are consistent with the framework. The definition of the "I" as impact (versus implementation, as used in Glasgow[28]) was initially suggested by Abrams et al.[29]

Data Analysis

Proportions for Reach, Efficacy, and Impact were calculated, and the magnitude and significance of differences between AAC and AAR were evaluated using Donner and Donald's weighted empirical logistic transformation approach. This approach accounts for nesting of individuals within clinics and induced intraclass correlation and was used because the data were generated using a pair-matched group randomized trial with two treatment arms.[30] This method accounts for the probability of imbalance between treatment groups on participant characteristics and provides estimated ORs for assessing the significance of the intervention effects over all strata.

Results

Smoking prevalence was 16.0% (17,959/112,112), and higher in AAC (7237/40,402=17.9%) versus AAR (10,722/70,710=15.2%); Pearson's $\chi^2(1)=142.8$, $p=1.3\times10^{-33}$. However, Donner and Donald's[22] approach accounts for such imbalances and yields results robust to such potential biases.

Reach

In AAC, 7237 smokers were identified, and in AAR, 10,722 smokers were identified. In AAC, 23.6% of identified smokers talked with the quitline (1707/7237); in AAR, 0.5% of identified smokers talked with the quitline (56/10,722). The empirical logistic transformation approach indicated that the Reach was significantly greater in AAC (vs AAR), $t(4)=18.60$, $p=0.00005$.[30] The overall estimated OR and 95% CI for assessing the intervention on Reach over all strata was equal to 56.19 (95% CI=30.79, 102.53; Figure 2).

Efficacy

Of the 1707 smokers that talked with the quitline in AAC, 1060 enrolled in treatment (62.1% enrollment rate). Of the 56 smokers in AAR that talked with the quitline, 53 enrolled in treatment (94.6% enrollment rate). The unconditional test for equivalence of two binomial proportions was used to compare treatment enrollment in AAR versus AAC. The Efficacy of AAR (vs AAC) was significantly greater (standardized z-statistic=4.97, $p=3.4X10^{-7}$; Figure 2).

Impact

Impact was significantly greater in AAC (23.6% X 62.1%=14.7%) than in AAR (0.5% X 94.6%= 0.5%), $t(4)=14.61$, $p=0.0001$.[30] The overall estimated OR for assessing the effect of the intervention on impact over all strata was equal to 32.10 (95% CI=16.60, 62.06; Figure 2).

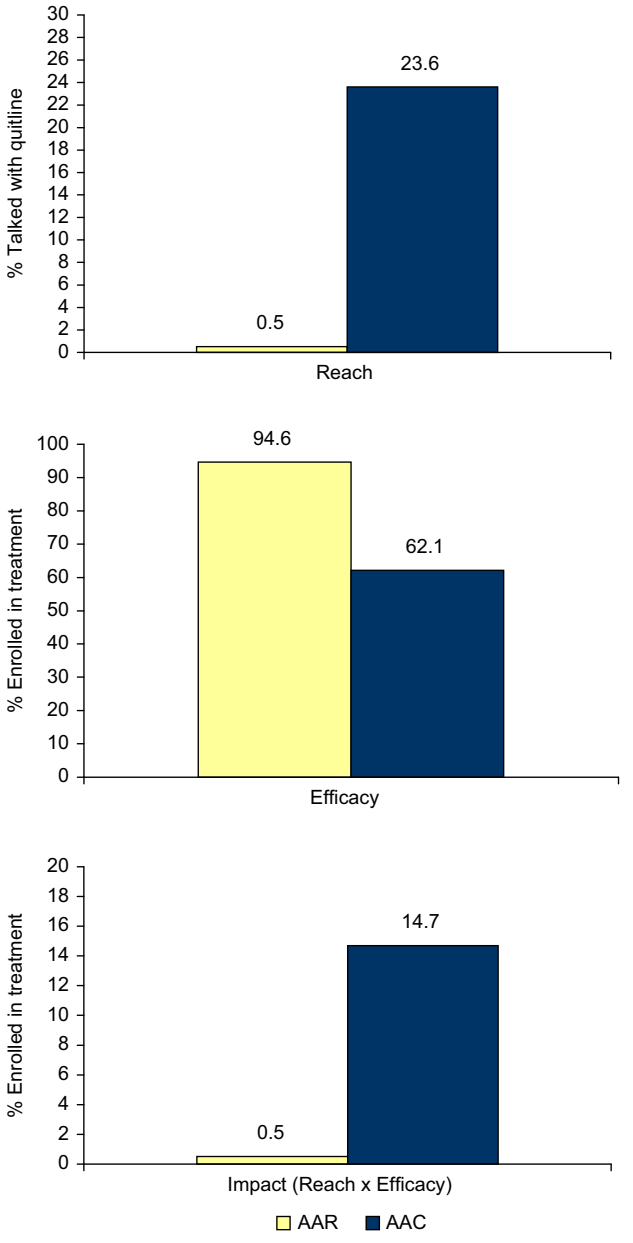

Figure 2. Reach, Efficacy, and Impact for the AAC and AAR approaches

Note: Reach = proportion of smokers identified who talked with the quitline; Efficacy = proportion of smokers who talked with the quitlline that enrolled in treatment; Impact = Reach × Efficacy.
AAC, Ask, Advise, Connect; AAR, Ask, Advise, Refer

Discussion

Directly connecting low-income, racially/ethnically diverse smokers to the quitline via an automated link in the EHR resulted in a nearly 30-fold increase in treatment enrollment compared to providing referral cards and asking smokers to call on their own. This treatment enrollment rate is larger than in any study previously reported. AAC yielded a larger effect size in

a safety net healthcare system than a private healthcare system (a 30-fold vs 13-fold increase in treatment enrollment).[26] Recent healthcare reform legislation has created an environment in which programs such as AAC could be integrated and sustained within healthcare settings.[31–33]

A strength of the study is that AAC was evaluated in a setting representative of real-world healthcare systems that serve smokers disproportionately burdened by tobacco. Additionally, AAC could be implemented broadly in other healthcare settings. A limitation is that smoking outcome data were not collected, and smokers who called the quitline may have been more motivated to quit.

Another limitation is the absence of a fidelity check on LVNs. The fact that smoking prevalence (16%) was lower than would be expected in this population, and differed between AAC (17.9%) and AAR (15.0%) clinics, suggests that all patients were not assessed for smoking status, and that AAC (vs AAR) clinics may have more systematically screened and documented smoking status. Finally, the national infrastructure for supporting quitlines would need to be expanded to be sufficient to support widespread adoption of AAC. Overall, however, the study indicates that widespread adoption of AAC could reduce tobacco-related morbidity and mortality, and the large effect obtained in a safety net healthcare system supports the potential of AAC to reduce tobacco-related health disparities.

The project described was supported by Grant Number R18DP001570 (PI: Vidrine) from the CDC. Its contents are solely the responsibility of the authors and do not necessarily represent the official views of the CDC. This work was also partially supported by the NIH through MD Anderson's Cancer Center Support Grant CA016672. MD Anderson's Patient-Reported Outcomes, Survey, and Population Research (PROSPR) Shared Resource also provided support through MD Anderson's Cancer Center Support Grant. Support was also provided by a grant from The University of Texas MD Anderson Cancer Center Duncan Family Institute for Cancer Prevention and Risk Assessment–Center for Community-Engaged Translational Research.

Dr. Jennifer Irvin Vidrine was awarded a grant from the CDC to support the study described in this paper (R18DP001570). Her work has also been supported by the NIH and the Cancer Prevention Research Institute of Texas (CPRIT). Dr. Sanjay Shete's work has also been supported by the NIH and CPRIT. Dr. Yisheng Li's work has been supported by the CDC and the NIH. Dr. Vance Rabius has served as a consultant on a CDC contract awarded to RTI International and has received funding from the CDC, NIH, and the American Cancer Society. Ms. Penny Harmonson and Mr. Barry Sharp are with the Texas Department of State Health Services, Tobacco Prevention & Control Program, which receives funding from the Texas legislature appropriation of state tobacco settlement and general revenue funds, the CDC, and the FDA. Ms. Cao, Dr. Alford, and Ms. Galindo-Talton have no financial disclosures. Dr. Susan Zbikowski's work has been supported by the NIH, state agencies, and the CDC. Dr. Zbikowski is an employee of Alere Wellbeing, the service provider for the Texas quitline. Ms. Lyndsay Miles's work has been supported by the NIH, the Centers for Medicare and Medicaid Services, and CPRIT. Ms. Miles is an employee of Alere Wellbeing, the service provider for the Texas quitline. Dr. David Wetter has received grants from the NIH and CPRIT.

No other financial disclosures have been reported by the authors of this paper.

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