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Tobacco cessation in Vietnam: exploring the role of Village Health Workers

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Abstract

Purpose—The purpose of this study was to explore current tobacco use treatment (TUT) practice patterns, and attitudes and beliefs among Village Health Workers (VHWs) about expanding their role to include delivering smoking cessation interventions and the perceived barriers.

Methods—We conducted a survey of 449 VHWs from 26 communes in Thai Nguyen province, Vietnam. We assessed TUT practices patterns including asking about tobacco use, advising smokers to quit, offering assistance (3As) and attitudes, self-efficacy, and norms related to TUT.

Results—Seventy two percent of VHWs reported asking patients if they use tobacco, 78.6% offered advice to quit, and 41.4% offered cessation assistance to few or more patients in the past month. Self-efficacy was low, with 53.2% agreeing that they did not have the skills to counsel

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Competing interests

The authors declare that they have no competing interests.

Authors contributions

NN, DS, KP, and VN conceived the study, developed the study protocol and questionnaire. LN and NN assisted with oversight of the study locally in Vietnam, including providing oversight of participant recruitment and conduct of the questionnaire. NN, TN, and JC conducted the data analysis and wrote the manuscript. All authors read and approved the final manuscript.

patients about smoking cessation. The most commonly reported barriers to offering TUT were a lack of training and perceived lack of patient interest. Greater awareness of their commune health center's smoke-free policy and higher levels of self-efficacy were associated with screening and offering cessation assistance.

Conclusion—VHWs support an expanded role in tobacco cessation but require additional resources and training to increase their self-efficacy and skills to provide effective treatment.

Keywords

Tobacco use treatment; Village Health Workers; smoking cessation; evidence-based guidelines; Vietnam

BACKGROUND

It is estimated that by 2030 tobacco use will be responsible for 8 million deaths per year. Eighty percent of these deaths will occur in low and middle-income countries (LMICs) where nearly two thirds of the world's smokers live (WHO, 2016). In Vietnam, 45% of adult men are current smokers, a prevalence that is the second highest among Southeast Asian countries (SEACs). The smoking rate among women is only 1.1% (GATS, 2015) which reflects a persistent gender norm that cigarette smoking is unacceptable among women (Morrow, Do, Truong, & Tran, 2002). Cigarette smoking rates are highest among low income, less-educated populations (Morrow, Do, Truong, & Tran, 2002; Global Adult Tobacco Survey, 2010). It is estimated that if current smoking rates are not addressed within the next 10 years in Vietnam, tobacco will be responsible for nearly 25% of adult male deaths (The Tobacco Atlas, 2015).

To address the growing epidemic of tobacco use and tobacco-related illnesses, in 2005 the World Health Organization (WHO) adopted the Framework Convention on Tobacco Control (FCTC), an evidence based public health treaty that in Article 14 states "each country shall take effective measures to promote cessation and adequate treatment for tobacco dependence" (WHO, 2015). Vietnam, like other SEACs, is a signatory to the FCTC. Although there is variation in the pace and degree to which SEACs are implementing the FCTC recommended policies and programs, most have implemented to some extent smoke free air laws, warning labels, cigarette taxes and anti-tobacco advertising (The Tobacco Atlas, 2015). However, few LMICs, including those in SEA, have fully adopted WHO endorsed guidelines for implementing Article 14. A recent survey of 163 of the 174 Parties to the FCTC found that LMICs were significantly less likely to have provisions for tobacco use treatment (TUT) than high-income countries (HICs) (Pine-Abata, McNeill, Murray, Bitton, Rigotti, & Raw, 2013). For example, only 21% of LMICs, compared with 79% of HICs, had a national treatment guideline.

The funding for tobacco control has been prioritized for mass media and other interventions that promote quitting at a population level rather than at an individual level. This may be associated with the lag in implementing tobacco use treatment (Chapman & MacKenzie, 2010; McRobbie, Raw, & Chan, 2013). However, there is strong evidence that counseling, delivered by a range of health care providers, can significantly increase the likelihood of

smoking abstinence (Fiore et al., 2009; West et al., 2015). Barriers to implementing Article 14 also include a lack of training, funding, and infrastructure to support recommended activities (McRobbie, Raw, Chan, 2013; Raw, Regan, Rigotti, & McNeill, 2009; Kruse et al., 2016; Shelley et al., 2014). Finally, there is a lack of research to inform cost effective strategies for adapting evidence-based approaches to treating tobacco use in the context of public health systems in LMICs.

Several studies, conducted in HICs, have demonstrated effective strategies for implementing tobacco use treatment guidelines in primary care settings. For example, adding a system to refer tobacco users to state and national quitlines which allows providers to delegate the more time intensive counseling to a quitline or other cessation service, can enhance rates of provider guideline adherence and increase smoking abstinence rates beyond that of training alone (Shelley & Cantrell, 2010; Cantrell, & Shelley, 2009; Sheffer et al., 2012). Noting that this type of referral resource is often lacking in LMICs, the WHO's guidelines for implementing Article 14 recommended leveraging existing resources and infrastructure to promote tobacco cessation across public health systems (WHO, 2010).

In Vietnam, as in other LMICs, there are infrastructural elements, including a robust public health delivery system with an extensive network of community health workers (CHWs), referred to as village health workers (VHWs) in Vietnam, that could be leveraged to enhance tobacco use treatment (Singh & Chokshi, 2013).

CHWs are highly respected members of the community and health care system, and have a successful record of effectively delivering preventative services and increasing the reach of health programs (Bittencourt & Scarinci, 2014; Ogedegbe et al., 2014; Balcazar et al., 2011; Wewers et al., 2016; Rosenthal et al., 2010; Holtrop, Dosh, Torres, & Thum, 2008; Landers, 2011; de Heer, Balcazar, Castro, & Schulz, 2012). The literature also supports the effectiveness of integrating CHWs as members of the health care team to improve access to preventive services in the US and globally (Ogedegbe et al., 2014; Rosenthal et al., 2010). Additionally, studies have shown the important role CHWs play in reaching hard to access communities including the poor and marginalized who have higher rates of tobacco use and lower tobacco quit rates (Lacey, Tukes, Manfredi, Warnecke, 1991; Andrews, Felton, Wewers, & Heath, 2004). In the US, two recent studies demonstrated that in person CHW counseling and the use of CHWs to link tobacco users to a state quitline may increase abstinence rates and offers a promising approach to improving access to cessation services in low resource settings (Wewers et al., 2016; Suarez et al., 2013).

We are not aware of any studies that have evaluated a CHW-led tobacco use treatment intervention in LMICs. However, qualitative research conducted with VHWs in Vietnam suggested the feasibility of a team approach to treating tobacco use that would allow providers to refer smokers to VHWs for further counseling and assistance, and thus extend treatment beyond primary care settings and increase access to evidence-based care (Shelley, Nguyen, Pham, VanDevanter, & Nguyen, 2014). The aim of this paper is to present data from surveys of VHWs to further characterize their attitudes towards treating tobacco use, current practice patterns and barriers and facilitators to integrating cessation services into their current responsibilities. The survey was part of a baseline assessment conducted prior

to implementing a National Cancer Institute funded two-arm cluster randomized controlled trial (RCT) comparing the effectiveness of two multi-component strategies for implementing tobacco use treatment guidelines in community health centers (i.e. health communes) in Vietnam (Shelley, VanDevanter, Cleland, Nguyen, Nguyen, 2015).

METHODS

Study design

This survey was conducted as baseline for the RCT in 26 communes in Thai Nguyen province (the explanation of selection of this province and these communes was provided in Shelley et al. 2015). The RCT is being conducted in three waves; therefore surveys were completed in August 2014, August 2015, and April 2016. In total, we conducted surveys with 449 VHWs working in the 26 communes that participated in the RCT. All VHWs in the 26 communes were invited to participate in the survey.

The surveys were administered in person using a structured questionnaire in Vietnamese. Informed consent was obtained from all respondents. Participants received \$3 (60,000 VND) as compensation for their time. The institutional review boards of the Institute of Social Medical Studies (ISMS) and the New York University School of Medicine approved this research.

Study Setting

The Vietnamese health care system is organized into four administrative levels: central, province, district, and commune level. Within districts the commune health centers (CHCs), which are comparable to community health centers in the US, serve as the primary access point for public health and preventive care services in Vietnam. Each CHC provides services for an average of 5,000–10,000 people in its surrounding community. CHCs are staffed with five to six health providers and 15–25 VHWs. The role of the VHW is to conduct outreach in the villages where their CHC is located. This outreach includes: 1) delivering health information; 2) delivering counseling on disease prevention; 3) promoting maternal and child health and family planning; 4) providing first aid care and referring patients to the CHC; and 5) implementing national health programs at the village level. In addition, they bridge the CHC with the community by providing home-based follow-up to ensure patients are adhering to their clinical care plans.

Thai Nguyen province is located in Vietnam's mountainous northeastern region about 80 kilometers from Hanoi. The province has a population of about 1.1 million people which includes primarily the Kinh ethnic group with several other ethnic minority groups. Although one in four households is poor, Thai Nguyen is a hub of economic activity in the region with a GDP growth rate of 7 to 9% in recent years. The province consists of one city, one town, and seven districts which are divided into 181 communes. Public health infrastructure includes the Thai Nguyen general hospital, 12 referral hospitals, nine district hospitals, and 181 commune health centers.

Measures

The survey measured demographic characteristics, smoking status and knowledge of smoke-free air and tobacco use treatment policies at the CHC. Current practice patterns related to tobacco use treatment were assessed using a validated tool that included the following questions: In the past month how many patients did you: 1) ask about tobacco use, 2) advise to quit, and 3) provide assistance (i.e., brief counseling). Using a 5-point likert scale responses included none, few, half, more than half, and all or most (Shelley et al., 2014).

The survey also measured attitudes, self-efficacy, and norms related to tobacco use treatment using a 4 point likert scale: 1-strongly disagree, 2-disagree, 3-agree, and 4-strongly agree. These questions were guided by the Theory of Planned Behavior (TPB), which posits that a behavior, such as treating tobacco use, is largely influenced by attitudes and beliefs about the behavior, subjective norms and self-efficacy (Ajzen, 1991), and modified based on selected subscales from established survey tools developed by Park et al. (2001), Francis et al. (2008) and Grimshaw et al. (2007).

Barriers to treating tobacco use were assessed using a 4-point likert scale ranging from not a barrier to major barrier. The survey was translated from the English version to the Vietnamese version and then back-translated to English (Shelley et al., 2014).

Approaches to reducing response bias were embedded in the design of the questionnaires (i.e., wording of questions and responses, response scales, showcard for scales), in training interviewers (i.e., interviewing skills, using showcards for scales), and in the informed consent process (i.e ensuring participants understood that their responses were confidential).

Data Analysis

Data were analyzed using Stata (version 12.0). Descriptive statistics were used to summarize the VHW characteristics, responses to questions about barriers to treatment, attitudes/beliefs, norms and self-efficacy and current practice patterns related to screening and treatment.

We conducted factor analysis to develop a scale for each of the TPB constructs (attitude, self-efficacy, norms). Scores on individual items within each scale were averaged to produce a composite measure for each construct and then combined within each TPB-related construct for analysis. We used chi square analysis and t-test and multivariate logistic regression to assess the correlates of VHW adherence to guidelines for asking smokers about tobacco use and offering advice to quit. The dependent variable was defined as those VHWs who screened patients or offered TUT to few or more patients in the past month.

RESULTS

Participant characteristics and patterns of tobacco use treatment

Table 1 shows characteristics of the participating VHWs. Consistent with national data, 86% were female and 96.2% were non-smokers. The average age of VHWs was 43; most described themselves as nurse trained (90%). Participants had worked an average of 11.4 years as a VHW. Almost all had not participated in formal training on tobacco use treatment (99.3%), and 18.5% were aware that their CHC has, by national law, a smoke-free policy.

Table 1 also shows current tobacco use treatment practice patterns among VHWs. Seventy two percent reported that in the last month they screened ‘few’, ‘half’, ‘more than half’, or ‘all or most’ patients for tobacco use, 78.6% of those identified as tobacco users were offered advice to quit, and 41.4% reported that they offered brief counseling for ‘few’, ‘half’, ‘more than half’, or ‘all or most’ patients. Among those VHWs that reported screening, offering advice to quit or providing brief counseling to ‘few’, ‘half’, ‘more than half’, or ‘all or most’ patients in the past month, the majority of the responses were in the ‘few’ category. For example, 65% reported they screened ‘few patients’ in the last month compared to 5.6% who reported screening half of patients and 1.6% more than half. Less than 5% reported screening or providing cessation assistance to more than half or all patients (data not shown).

Attitudes/beliefs, self-efficacy, and norms related to treating tobacco use towards smoking cessation services and barriers to treatment

Most VHWs endorsed their role in providing smoking cessation services. Ninety two percent agreed or strongly agreed that they could be effective in helping people stop smoking, and 92.2% agreed or strongly agreed that smokers want their help to quit. However, 40.5% agreed or strongly agreed that patients in the CHC have more pressing problems than smoking cessation (Table 2). Self-efficacy was low with 53.2% agreeing or strongly agreeing that they did not have the skills to counsel patients about smoking cessation and 70.4% agreeing/strongly agreeing that they were not aware of the best strategies for helping patients to stop smoking. However, 72.8% of VHWs agree that smoking cessation treatment is a top priority in their health centers.

Barriers to smoking cessation services

We do not show data on the reported barriers to offering smoking cessation services, however, VHWs reported that the most common barriers (i.e., scored as moderate and/or major) were lack of adequate referral resources (78.4%), lack of training knowledge (78.4%) and lack of patient interest (82.9%).

Correlates of adherence to guideline recommended tobacco use treatment

Table 3 shows results of the bivariate analysis examining the correlation between practice patterns and VHW characteristics, knowledge of smoke free policies and TPB constructs. VHWs who were aware of the CHC’s smoke-free policy, and reported higher levels of self-efficacy were more likely to screen for tobacco use, offer advice to quit and offer brief counseling than those with a lack of knowledge about the policies and with lower levels of self-efficacy. In the multiple logistic regression analysis (Table 4) VHWs with a high school education were twice as likely to screen for tobacco use as those with less than a high school education. Those who were aware of their clinics’ smoking policies were more likely to ask about tobacco use (OR 3.7, $p<0.01$), advise patients to quit (OR 2.2, $p<0.05$), and offer assistance (OR 3.1, $P<0.001$), compared to VHWs who were not aware of their clinic smoking policy. Self-efficacy was associated with advising smokers to quit (OR 1.2, $p<0.05$). Female VHWs were more likely than male VHWs to advise patients to quit smoking (OR 2.1, $P<0.05$) and to assist patients to quit (OR 1.9 $P<0.05$).

DISCUSSION

VHWs reported rates of tobacco use screening and cessation assistance that were higher than reported in previous surveys of health care providers (i.e., physicians, nurses) including a recent survey in Vietnam (Shelley et al., 2014; CDC, 2013). Among health care providers working in CHCs in the same province, 23% reported screening half or more patients in the past three months in that survey (Shelley et al., 2014). The difference in findings is in part due to the broad definition of screening and assistance we used in this analysis which included any positive response (i.e. ‘few’, ‘half’, ‘more than half’, or ‘all or most’ in the last month). It is also important to reiterate that the majority of responses were in the ‘few’ category in our study, suggesting that although VHWs reported that they are raising this issue with patients and community members, it is not part of their routine preventive care activities. The high frequency of reported engagement with tobacco users may also reflect the fact that VHWs interact more regularly with community members, both in the CHC and outside the CHC settings, compared with CHC health care providers. Therefore, they are more likely to know who the smokers are in the community and have more opportunities to engage patients and community members in these conversations.

Focus groups with VHW may provide an additional explanation for our findings (Shelley, Nguyen, Pham, VanDevanter, & Nguyen, 2014). In a qualitative study of VHW attitudes and practices related to TUT, VHWs strongly endorsed their role in delivering cessation services, saying that it ‘fit well’ with their current responsibilities. They further endorsed the feasibility of serving as a referral resource for providers in local CHCs expressing the belief that VHWs were ‘more suitable than their clinical colleagues’ to offer cessation assistance. This survey provided additional evidence, among a larger sample of VHWs, that this workforce supports playing a central role in reaching tobacco users to offer cessation assistance.

Consistent with previous literature, self-efficacy was associated with higher rates of providing advice to quit smoking (Cabana et al., 2004; Borrelli et al., 2001; Jiang et al., 2007). Our findings of relatively low rates of self-efficacy are likely due to a lack of training. Over 90% of VHWs reported no previous training related to tobacco use treatment, and that was cited as a common barrier to providing cessation assistance. Training can facilitate both short-and long-term changes in attitudes and behaviors regarding smoking cessation counseling among health care providers (Borrelli, Lee, & Novak, 2008). Therefore, training and evaluation of training outcomes is needed to build confidence and skills to deliver evidence-based treatment and ensure that methods for capacity building are effective. Trainings should not only focus on providing knowledge and skills but also work to solidify conceptualizations of the health worker role in the overall national plan for increasing access to tobacco use treatment (Shelley, Nguyen, Pham, VanDevanter, & Nguyen, 2014).

Besides providing adequate training for VHWs, findings suggest that there is a need to increase awareness of smoke-free policies. Studies have demonstrated an association between smoke-free regulations and change in beliefs, attitudes and behaviors among both the public and health care providers (Yang et al., 2013; Gonzalez, Sanders-Jackson, Glantz, 2014). For health care workers, smoke-free air policies may work to denormalize smoking

and increase the salience of addressing tobacco use. In 2000, Vietnam passed a resolution that prohibited smoking in all health facilities, including CHCs. In 2012 this law was expanded to include workplaces, schools and other public spaces. Relatively few VHWs in this study were aware of the smoke-free policy; but awareness of this policy was associated with asking about tobacco use and advising smokers to quit. Suboptimal enforcement has led to inconsistent implementation of smoke free policy in CHCs (Dao et al., 2015), however, our findings suggest that raising awareness of this policy, alone, could have a positive impact on the provision of smoking cessation services.

The lack of training and integration of tobacco cessation services in the community-based health care delivery system is not due to a lack of commitment to tobacco control. Since ratifying the FCTC Vietnam and has made tremendous progress towards meeting the FCTC recommendations. In 2009 the government enacted a comprehensive National Tobacco Control Action Plan (Decision No. 1315/QĐ-TTg) for implementing the FCTC. They have implemented comprehensive smoke free policies; counter advertising campaigns and a recent cigarette price increase. Moreover, the National Action Plan calls for integration of cessation services into national health and education programs. Support for this plan was enhanced by a recent analysis of tobacco control policies in Vietnam, which found that, similar to previous research in HICs, brief provider advice was ‘very cost effective’ (Ronckers & Ament, 2003; Higashi & Barendregt, 2012). However, until recently, investments in building workforce capacity and infrastructure (e.g., system changes) to support consistent screening for tobacco use and delivery of cost effective smoking cessation services has lagged. In 2013 this began to change when Vietnam’s Ministry of Health (MOH) created a “Tobacco Fund” which was based on Articles 28–30 of the Law on Prevention and Control of Tobacco Harms passed by the National Assembly in 2012 (Vietnam Government, 2013). The Fund is administered by the MOH’s Vietnam Steering Committee on Tobacco and Health. The Fund provided resources to launch a national Quitline. Without this type of designated funding for tobacco control efforts in other LMICs, expanding treatment services will continue to be challenging.

Quitlines, which are expanding globally, are only one part of the solution; they do not negate the need to increase health care provider and VHW capacity to identify tobacco users and offer cessation assistance (North American Quitline Consortium <http://www.naquitline.org/>). Our findings suggest an important role for VHWs in helping to tackle the growing burden of tobacco use and are relevant to other LMICs in which health workers are also a critically important member of the public health care system. Consistent with WHO Guidelines for implementing Article 14, VHWs offer a sustainable resource for ensuring wide access to support for tobacco users who wish to quit.

However, national guidelines are needed that establish standards for an integrated model of care for treating tobacco use that explicitly includes VHWs and defines their scope of services. In addition, there is a tremendous need for integration of standardized curriculum into health professional training programs (Kruse et al., 2016; Shelley et al., 2014).

Attention to the growing epidemic of non-communicable diseases in LMICs, which is largely propelled by high rates of tobacco use, is creating greater momentum to implement

the FCTC (NCD Alliance, 2014). Given competing priorities in Vietnam and other LMICs, research is essential to provide local evidence of the impact of these policies and to inform further policy development and implementation. Effective interventions exist; therefore research priorities should focus on translating evidence-based interventions into local context.

This study has limitations. First, the study was conducted with VHWs from CHCs in only two districts in Vietnam. We therefore cannot be sure that the findings are generalizable. However, VHWs' level of training and scope of work, and the systems they work in, are standardized across the national public health system. Therefore, the barriers are likely similar to settings in other geographic location, but this requires additional confirmation. Second, the questionnaire was translated into and analyzed in English. However, bilingual members of the research team conducted all translations. Their fluency in English and Vietnamese address concerns about ensuring 'conceptual equivalence' (Mangen, 1999; Van Nes, Abma, Jonsson, & Deeg, 2010).

CONCLUSION

VHWs are at the front lines of delivering preventive services in Vietnam and have a strong track record of increasing the reach of these programs. Moreover, consistent with WHO Guidelines for implementing Article 14, VHWs offer a sustainable resource for ensuring wide access to support for tobacco users who wish to quit. Building capacity among VHWs to engage in TUT may provide a cost-effective strategy for adapting evidence-based interventions to the local context in LMICs. Finally, national guidelines for treating tobacco use should include policies that ensure the availability and dissemination of standardized training for the entire health care workforce, and should outline models of care that include a clear role for VHWs in tobacco-related prevention and treatment efforts.

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List of abbreviations

LMIC	Low and Middle Income Countries
CHW	Community Health Worker
TUT	Tobacco use treatment
VHW	Village Health Workers
CHC	Commune Health Center
SEAC	Southeast Asian Countries

MOH	Ministry of Health
FCTC	Framework Convention on Tobacco Control

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Table 1

Village health workers and practice characteristics

Characteristic (N=449)	N	%/Mean (SD)
Gender		
Male	63	14.0
Female	386	86.0
Age (mean years)	449	43.2 (8.4)
Position/staff grade at CHC		
Physician	0	0
Nurse	8	1.8
Midwife	2	0.4
Physician's assistant	7	1.6
Nurse (Short-term training)	404	90.0
Other	28	6.2
Smoking status		
Current	17	3.8
Never	407	90.6
Former	25	5.6
Years working as VHW	449	11.4 (5.1)
Have NOT participated in tobacco use treatment training	446	99.3
Aware of CHC smoking policy		
No	323	71.9
Yes	83	18.5
Don't know	43	9.6
Tobacco use screening and treatment patterns *		
Ask about smoking status	323	71.9
Advise tobacco users to quit smoking	353	78.6
Assist: Offered brief counseling	186	41.4

* defined as screening or offering advice or assistance to few or more patients in the last month

Table 2

VHW attitudes/beliefs, self-efficacy, norms and barriers related to treating tobacco use

Variables (N=449)	Agree/Strongly Agree (%)	Mean (SD)
Attitudes^a		
Village health workers can be effective in helping people stop smoking	91.5	3.1 (0.6)
Patients want me to help them stop smoking.	92.2	3.1 (0.5)
Advice from a village health worker is one of the best ways to help people stop smoking.	92.9	3.2 (0.6)
Smoking cessation counseling is a difficult task.	84.6	3.1 (0.7)
Patients want to stop smoking.	88.0	3.1 (0.6)
Smoking cessation counseling is not a good use of my time.	16.3	2.0 (0.6)
Patients appreciate it when I provide smoking cessation counseling.	90.0	3.1 (0.5)
Smoking cessation counseling is not an important task to me.	16.5	2.0 (0.6)
Counseling patients about smoking is frustrating.	27.4	2.2 (0.7)
Smoking cessation intervention delivered by village health workers do not work.	33.4	2.3 (0.6)
The patients we see in our health center have so many other problems in their lives that stopping smoking use is a very low priority for them.	40.5	2.4 (0.7)
Attitudes total score (range 22–44)		31.4 (3.1)
Self-efficacy^b		
I don't have the skills to effectively counsel patients about smoking cessation.	53.2	2.6 (0.8)
I am unaware of the best strategies for helping patients to stop smoking	70.4	2.8 (0.7)
I am not confident in my ability to help patients stop smoking.	41.9	2.4 (0.8)
Self-efficacy total score (range 3–12)		7.1 (1.7)
Norms^c		
Patients expect me to counsel them about smoking.	88.9	3.1 (0.6)
Smoking cessation treatment is a top priority in this health center.	72.8	2.9 (0.7)
Norms total score (range 2–8)		5.9 (1.0)

^aCronbach's alpha =0.63,

^bCronbach's alpha =0.64,

^cCronbach's alpha =0.35

Bivariate analysis of factors related to tobacco use screening and advice and counseling delivered by VHWs

Table 3

Independent Variables	Asked (%/Mean)		Advised (%/Mean)		Assisted (%/Mean)	
	None (N=126)	Few/Half or more (N=323)	None (N=96)	Few/Half or more (N=353)	None (N=263)	Few/Half or more (N=186)
Age (mean, SD)	44.1 (8.5)	42.9 (8.3)	43.5 (8.9)	43.2 (8.2)	43.6 (8.6)	42.8 (8.1)
Gender						
Male	22.2	77.8	27.0	73.0	63.5	36.5
Female	29.0	71.0	20.5	79.5	57.8	42.2
# Years worked as VHW	11.0 (5.7)	11.6 (4.9)	10.7 (5.3) ⁺	11.6 (5.1)	11.1 (5.4)	11.8 (4.7)
Education						
Primary and secondary school	33.9 [*]	66.1	22.3	77.7	62.0	38.0
High school	21.1	78.9	19.3	80.7	54.4	45.6
Vocational/College/university	22.2	77.8	25.0	75.0	55.6	44.4
Aware of clinic smoking policy						
Yes	9.6 ^{***}	90.4	10.8 [*]	89.2	36.1 ^{***}	63.9
No	29.7	70.3	23.8	76.2	63.8	36.2
Mean score Attitudes (mean, SD)	31.0 (3.1) ⁺	31.6 (3.1)	31.1 (2.9)	31.5 (3.2)	31.3 (3.1)	31.6 (3.1)
Mean score Self-efficacy (mean, SD)	6.9 (1.7) [*]	7.2 (1.7)	6.7 (1.7) ^{**}	7.3 (1.7)	7.0 (1.7) [*]	7.3 (1.8)
Mean score Norms (mean, SD)	6.0 (1.0)	5.9 (1.0)	5.9 (0.9)	5.9 (1.0)	6.0 (1.0)	5.9 (1.1)

p<0.001,

**
p<0.01,

*
p<0.05,

⁺
<0.2

Table 4

Logistic regression of VHW's adherence to tobacco use treatment guidelines (screening, advice to quit, and assist)

Independent variables	Asked (n=406) None vs. Few or Half or more		Advised (n=406) None vs. Few or Half or more		Assisted (n=406) None vs. Few or Half or more	
	OR	95% CI	OR	95% CI	OR	95% CI
Gender						
Male (ref)	1	-	1		1	
Female	0.9	0.5–1.9	2.1 [*]	1.0–4.0	1.9 [*]	1.0–3.5
Education						
Primary and secondary school (ref)	1		1		1	
High school	2.1 ^{**}	1.2–3.5	1.2	0.7–2.0	1.2	0.8–1.9
Vocational/College/university	1.8	0.7–4.5	1.1	0.4–2.6	1.5	0.7–3.2
Aware of clinic smoking policy						
No (ref)	1		1		1	
Yes	3.7 ^{**}	1.7–8.1	2.2 [*]	1.0–4.7	3.1 ^{***}	1.9–5.3
Self-efficacy total score	1.0	0.9–1.2	1.2 [*]	1.0–1.4	1.0	0.9–1.2

^aThe regression model included all variables with a p-value < 0.2 in bivariate. The model controlled for other demographic characteristics but insignificant results are not shown in the table.

p<0.001,

**
p<0.01,

*
p<0.05