THREE INTERVENTION LEVELS FOR IMPROVING SMOKING BEHAVIOR AMONG ROYAL THAI ARMY CONSCRIPTS

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Abstract. We evaluated a smoking cessation program based on an ecological model among Royal Thai Army conscripts with three levels of behavioral change intervention: intrapersonal level, interpersonal level and organizational level. The program applied processes of change in the Transtheoretical Model for intervention at the intrapersonal level; social support from the family at the interpersonal level; strengthening policies and activities to support quitting, including providing a smoke-free workplace at the organizational level. Eighty-nine participants were purposively selected from the first regiment of conscripts at the King's Royal Guard, recruited into the Army in 2009. The behavioral change intervention was conducted during their first six months of duty. A self-administered questionnaire was used to collect data between May and November 2009. Individual interviews and checklist observations were employed to collect data. Data was analyzed using inferential statistics, comparing means by paired *t*-test and the chi-square test was used to analyze correlations. Qualitative data were analyzed thematically. Sixty-three percent of participants significantly ($p<0.001$) reduced the number of cigarettes smoked, and 4.5% quit smoking. There was significant improvement in self-efficacy for improving smoking behavior ($p=0.002$) and making an effort to quit ($p<0.001$).

Keywords: ecological model, smoking behavior, conscripts

INTRODUCTION

Tobacco use is an important risk factor for many non-communicable diseases in both developed and developing countries (WHO, 2002). In Thailand, smoking is the second most important risk factor affecting Thai health, with approximately 42,000 Thais dying from smoking-related diseases annually over the last two decades (Sittipan, 2008).

Cigarette smoking prevalence is higher among military employees than in the general population (Bushnell *et al*, 1997; Joseph *et al*, 2005). The groups at greatest risk are non-commissioned officers and privates (Tekbas *et al*, 2002). Smoking rates

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among conscripts in Thailand are higher than 50% (Prommobol, 2003; Ketgudee, 2004).

Campaigns against tobacco consumption aimed at youths and females, reduce the number of male smokers and assist people who want to quit (Mackay *et al*, 2006; Supawongse, 2007). A smoking cessation program is an activity used to reduce the number of people who smoke. Most smokers relapsed within 90 days after program completion (Bushnell *et al*, 1997; Conway *et al*, 2004). However, an effective smoking cessation program is essential for changing smoking behavior.

Extensive multilevel interventions targeting individuals, social norms, policies, regulatory changes, and environmental changes by reducing the availability of cigarettes have led to long term changes in smoking rates (CDC, 1999). Of the 333 papers published regarding tobacco control during 2001-2006, the majority of interventions were individual oriented (Kothari *et al*, 2007).

A ban on smoking during basic training in the US Navy reduced smoking among recruits (Conway *et al*, 2004). Interventions among Thai military conscripts were less effective, especially in the Army. Previous research showed smoking cessation programs focused on interventions at the intrapersonal and interpersonal levels did not affect smoking cessation rates but did reduce the number of cigarettes smoked, but many conscripts relapsed by three months (Suansomjit *et al*, 1998; Prempasai, 2008).

To improve smoking behavior among conscripts, smoking cessation programs should be developed based on the ecological model. This model focuses on the interaction and integration of biological, behavioral, environmental and social determinants, as well as the influence of organizations, other persons and public policies (McLeroy *et al*, 1988). According to Broffenbrenner's ecological model, patterned behavior, including smoking, is determined by specific factors. The ecological frameworks has been used with success for prevention of smoking among youth (Corbett, 2001).

We conducted a study to evaluate the effectiveness of a smoking cessation program among Army conscripts using intrapersonal, interpersonal and organizational interventions.

MATERIALS AND METHODS

Study sample and procedure

One hundred five current smokers were purposely recruited into the smoking cessation program from conscripts of the first infantry regiment of the King's Royal Guard in May 2009. After 6 months 15.3% of the subjects had dropped out of the study because the conscript left the military or was assigned to another military unit. Eighty-nine conscripts remained in the study for 6 months. Quantitative data and qualitative data were collected from these subjects at onset and 6 months. The intervention was conducted at three levels during the 6 month study. The research protocol was approved by the Ethics Committee for Human Research, Mahidol University (MUPH2009-098).

Intervention

The intervention applied the ecological model for health behavior change and consisted of three levels: intrapersonal, interpersonal and organizational. The processes of change in the Transtheoretical Model (TTM) included social support, strengthening of policies and providing organizational support were used to guide

the intervention. The TTM for intrapersonal change included seven sessions: applying observational learning, modeling, brain storming, participatory learning, mastery learning, role playing and group discussions. Patient education materials and 0.5% sodium nitrate were distributed to the sample group during each of the seven health education sessions. Telephone counseling was used to follow up the sample group during the 4th to 6th months of the study. At the interpersonal level, families were trained face to face, by telephone or by educational booklet how to provide the subject with social support with smoking cessation. At the organizational level, smoking was banned in collective areas among conscripts.

Data collection

Quantitative data were collected by questionnaire at onset and 6 months after intervention. The data consisted of smoking behavior, stages of change, perceived self-efficacy to control smoking behavior, perceived social support to control smoking behavior and attempts to quit smoking. Checklist observations were used to evaluate activities at the organizational level. Qualitative data were collected from conscripts and their families by individual interviews and checklist observations.

Measurements

The research instruments consisted of questionnaires for data collection, and an instrument for smoking cessation intervention. The questionnaires used in this study were the "socio-demographic data questionnaire, the stages of change algorithm" (DiClemente *et al*, 1991) the "decisional balance" evaluation of the perceptions regarding the pros and cons of smoking (translated from Velicer *et al*, 1985), "self-efficacy to control smoking behavior" translated and adapted from the self-efficacy/temptations scale of Velicer *et al* (1990) and the "social support to control smoking behavior" [translated and adapted from the Partner Interaction Questionnaire (PIQ) of Mermelstein *et al*, 1986].

Instrument validation

Content validity of the questionnaires was approved by 6 specialists and content validity of the smoking cessation guidelines was checked by 3 experts. The questionnaires were tested for reliability on conscripts of the 3rd infantry battalion. Cronbach's alpha coefficient for pros and cons of smoking, self-efficacy to control smoking behavior, social support to control smoking behavior and attempts to quit behavior had coefficients of 0.8261, 0.9123, 0.8870 and 0.8171, respectively.

Data analysis

A paired *t*-test and a chi-square test were used to evaluate variable changes between onset and at 6 months.

RESULTS

In the present study, the mean (±SD) age of the conscripts was 20.94 (± 1.85) years. Fourty-four point nine percent of the conscripts come from northeastern provinces. Eighty point nine percent of conscripts were single and 85% lived with their families. Thirty-nine point three percent had a secondary school education and 52.8% were employees before entering military service. The average income was 7,219.85 Baht/month. Seventy-eight point six percent drank alcohol at least one time per week. Sixty point seven percent had family members who smoked, particularly fathers and elder brothers.

The average age at onset of smoking was 15.7(±2.3) years and the average duration smoked was 5.2(±2.2) years. Eighty-

Table 1
Comparison of attitudes and behavioral changes at baseline and six months by paired *t*-test (*n*=89).

Attitudes and behavioral changes	Baseline Mean (SD)	Six months Mean (SD)	*t*	*p*-value
Pros of smoking	25.76 (6.86)	27.92 (7.28)	2.56	0.012
Cons of smoking	36.28 (7.49)	35.29 (6.64)	-1.05	0.296
Perceived self-efficacy	51.78 (11.49)	57.31 (12.80)	3.23	0.002
Perceived social support	42.87 (13.06)	42.78 (12.11)	-0.06	0.955
Attempt to quit behavior	33.81 (12.25)	38.62 (9.39)	3.64	<0.001

Table 2
Transitional stages of conscripts from baseline to six months.

Transitional stages from baseline to six months	Conscripts	
	(*n*)	(%)
1. Same stage	38	42.7
2. Moved forward	32	36.0
3. Moved backward	19	21.3
Total	89	100.0

five point one percent were daily smokers; the average numbers of cigarettes smoked per day was 12.5 (±7.4) cigarettes. Seventy-one point nine percent smoked filtered cigarettes. Sixty-one point eight percent had previously tried to quit smoking, of whom 75.6% had tried between 1 and 3 times. Sixty-two point nine percent had a low nicotine dependence.

By 6 months, 62.9% of conscripts had reduced the number of cigarettes smoked per day, 4.5% had quit smoking and 32.6% smoked the same or more cigarettes per day.

At the organizational level of intervention, there was increased awareness of the harmful effects of smoking among the commander and staff officers. The ban on smoking during basic training and at the workplace applied to both officers and conscripts. A specific smoking zone was designated. The commander of the 1st infantry regiment was a non-smoker and acted as a role model. After three months of basic training, the conscripts were under control of the company commander who ordered activities to enable the conscripts to remain abstinent, such as warning conscripts not to smoke, maintaining a smoke-free workplace and providing recreational activities when the conscripts had leisure time.

Regarding intrapersonal factors, perceived self-efficacy for smoking cessation improved with the program; however, the perceived pros of smoking worsened over time and the perceived cons also worsened significantly (Table 1). Perceived

self-efficacy and attempt to quit behavior significantly improved over time but perceived social support did not change significantly (Table 1).

Most of the conscripts in this study stayed in the same transitional stage of the TTM over the length of the program (Table 2). The conscripts who quit smoking moved from the preparation stage at the onset of the program to the action stage by six months.

DISCUSSION

Our study results show a smoking cessation program based on an ecological model can improve smoking behavior among conscripts. Some conscripts in our study reduced the frequency of or quit smoking, but the cessation rate was low compared to other studies (Suansomjit *et al*, 1998; Klesges *et al*, 1999). One reason for the poor cessation rate was the conscripts in our study were young and had a poor perception of the negative effects of smoking. Stress and boredom in the military also contributed to their smoking; the perceptions of the pros of smoking 6 months after the intervention had increased significantly from baseline (p=0.012). When the new conscripts saw the older conscripts smoking in the company, they wanted to return to smoking. Most subjects were able to significantly reduce the number of cigarettes smoked per day which is consistent with several other studies (Borland *et al*, 1990; Prommobol, 2003; Premprasai, 2008).

Forty-two point seven percent of conscripts remained in the same TTM stage and some moved backward to an earlier stage. The intervention may not have had time to effect a change due to the limited time in basic training when the intervention was carried out. According to TTM, stage-matched interventions have a greater impact on smoking cessation than stage-mismatched interventions (Prochaska *et al*, 2001; Goldberg *et al*, 2002).

The three level intervention, particularly the organizational and intrapersonal levels, influenced smoking behavior. The organizational level intervention increased the knowledge of the harmful effects of smoking among the commander and staff officers, encouraging them to create a smoke free environment. Banning smoking at the workplace and during basic military training was strengthened and a smoke-free workplace was created. Activities regarding tobacco control and support quitting in the organization were also conducted. The conscripts who reduced or quit smoking were those who stayed in a good organization with a company commander who ordered activities and services for smoking cessation among conscripts. Our results are consistent with smoking bans in the workplace based on the ecological model showing a reduction in cigarette consumption (Borland *et al*, 1990; Stillman *et al*, 1990).

Intrapersonal interventions resulted in improved perceived self-efficacy and attempt to quit smoking. Successful quitters have a higher self-efficacy than relapsers (Kowalski, 1997). After the intervention, conscripts attempted to carry out behavior to reduce or quit smoking, such as not buying cigarettes and developing alternate behaviors when urged to smoke.

At the interpersonal level, the perceived social support scores did not change between baseline and at six months (p=0.955), so this probably did not affect smoking behavior, unlike previous studies (Fisher *et al*, 1994 ; Murray *et al*, 1995) which found social support can strengthen worksite smoking cessation

programs and affect success in quitting. However, there was limited use of social support because the families of the conscripts often lived far from the army unit. Interventions may need to use the support of other persons to influence the conscripts, such as training officers or peer groups.

In summary, this study shows the ecological model can be applied to smoking cessation programs for changing smoking behavior among military conscripts. Organizational and intrapersonal levels interventions can help conscripts reduce or quit smoking. The organization should set policies, promote a smoke-free workplace in all areas and involve the commander in solving smoking problem in the Army. Future research may explore other techniques to increase self-efficacy and emphasize policy formation to enhance tobacco control in the Thai Army.

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