FACTORS AFFECTING FAILURE TO QUIT SMOKING AFTER EXPOSURE TO PICTORIAL CIGARETTE PACK WARNINGS AMONG EMPLOYEES IN THAILAND

Dusit Sujirarat[1], Pimpan Silpasuwan[2], Chukiat Viwatwongkasem[3] and Nithat Sirichothiratana[4]

[1]Department of Epidemology, [2]Department of PublicHealth Nursing, [3]Department of Biostatistics, [4]Department of Public Health Administration,Faculty of Public Health, Mahidol University, Bangkok, Thailand

Abstract. This study was carried out to determine whether health warning pictures(HWP) affect smoking cessation using a structured equation model for intending-to-quit smokers in work places. Data from a 1-year longitudinal follow-up of attempt-to-quit employees was obtained to determine if pack warnings affect tobacco cessation rates. Stratified simple random sampling, and Structured Equation Modeling (SEM) were employed. Approximately 20% of intending-to-quit smokers were successful. The integrated model, combining internal, interpersonal factors and health warning pictures as external factors, fit the fail to quit pattern of the model. Having a smoking father was the most significant proximate indicator linked with failure to quit. Although HWL pictures were an external factor in the decision to stop smoking, the direct and indirect causes of failure to quit smoking were the influence of the family members. Fathers contributed to the success or failure of smoking cessation in their children by having an influence on the decision making process. Future HWP should include information about factors that stimulate smokers to quit successfully. The role model of a father on quitting is also important.

Keywords: health warning pictures, workplace cessation, failure to quit smoking, structured equation modeling, employee, Thailand

INTRODUCTION

The World Health Organization (WHO) Framework Convention on Tobacco Control (WHO, 2008) specifies health warning pictures (HWP) as a crucial requirement for tobacco control. This WHO health treaty was ratified by over 170 countries, with aims to reduce the appeal of tobacco products, limit disease and reduce the economic impact of tobacco use worldwide. Research shows effective health warning labels increase knowledge of the risks associated with smoking and can influence both immediate smoking and intention to quit (WHO, 2008).

The International Tobacco Control Policy Evaluation for Southeast Asia Survey (Elliott and Shanhan Research, 2008) results showed HWP increased attention on health risks of smoking and led to more quit attempts and success in quitting.

Correspondence: Pimpan Silpasuwan, Department of Public Health Nursing,Faculty of Public Health, Mahidol University, 420/1 Ratchawithi Road, Ratchathewi, Bangkok 10400, Thailand. Tel: 66 (0) 1923 4201; Fax: 66 (0) 2354 8542 E-mail: phpsl @mahidol.ac.th.

The Thai government tobacco control policy mandates HWP to increase awareness of the dangers of cigarette smoking and to promote smoking cessation (Thai Health Promotion Institute, 2003). Many studies have examined smokers' motivations to quit; the results suggest health concerns are the primary motive for attempts to quit smoking. Personal health should emphasize the negative health consequences of cigarette smoking (Thai Health Promotion Institute, 2003), However, a recent publication found smokers with a low socioeconomic status have other motives to stop smoking and other reasons for relapse. There are many reasons for failure to quit smoking; 49% failed to quit due to unhappy circumstances and 24% failed to quit due to inability to resist temptation. Smoking cessation is not easy; only 20% are successful even with professional treatment (Department of Labor Protection and Welfare, 2004). Many studies have shown few smokers are able to stop for more than a few days. Up to 70% of smokers want to quit, but fewer than 10% succeed each year (Velicer *et al*, 1998). The majority of quit attempts fail due to underestimating the nature of the various factors affecting failure to quit or causes for relapse. Therefore, it is necessary to investigate the various factors associated with smoking cessation success. Previous studies have shown behavioral or psychological support, combined with medication, improve smoking cessation success rates (Velicer *et al*, 1998; Silpasuwan *et al*, 2008). Failure to stop smoking may not be done to poor will power. Cigarette smoking become a permanent part of a smoker's life. Knowledge disseminated through HWP has not yet been systematically evaluated to determine its effect on the bio-psycho-social aspects of smoker's life. The present study is the first longitudinal investigation of the effect of HWP on these bio-psychosocial factors. Considering the low socioeconomic status of the workers intending to quit smoking, the process of smoking cessation in relation to these psychosocial factors needs to be further explored. This would provide useful information for developing appropriate risk communication messages.

There is a high prevalence of tobacco use amongThai adults, especially among factory employees (Department of Labor Protection and Wellfare, 2004). Generally, factory workers have less education, lower incomes and encounter more frequent health problems from work (Velicer *et al*, 1998; Department of Labor Protection and Wellfare, 2004). These workers were the focus of this study.

Factors affecting failure to quit smoking were divided into 3 aspects: 1) external factors, such as legal regulations, including policies regarding HWP ; 2) internal factors from within the individual, such as coping mechanisms; 3) intention to quit, including interpersonal factors, such as persons in the same family or friends at work (Velicer *et al*, 1985). This was done to create a predictive model for the selected factors. The model evaluated internal, interpersonal and external factors, with HWP as one external factor. The hypothesis that these are significant factors was tested using structural equation modeling.

MATERIALS AND METHODS

This study was a follow-up study to investigate a model for smoking cessation. This was conducted after mandatory color graphic health warnings were put on cigarette packs in Thailand in 2007. The labels written in Thai had messages, such

as, "cigarette smoking causes lung cancer". There are 6 colored warning pictures and messages comprising the following topics:cigarette smoke harms people nearby, smoking causes bad breath, cigarette smoking causes lung cancer, cigarette smokers get old prematurely, cigarette smoking causes an odoriferous mouth, cigarette smoking harms children.The sample consisted of employees who cooperated voluntarily and signed a consent form to participate in the project. Subjects had been cigarette smokers for at least 3 months and worked in one of 22 factories througout Thailand. Utilizing information provided by the Department of Labor Protection and Welfare from 2003, a sampling frame was developed. Two thousand two hundred workers were included in the first survey to explore their perceptions and experiences regarding HWP on cigarette packs. Data from the 1,637 subjects who completed the questionnaires, (comprised of smokers, exsmokers, non- smokers) were analyzed and have been published elsewhere (Silpasuwan *et al*, 2008). Seventy-five point four percent of subjects intended to quit smoking. One thousand three hundred employees completed the follow-up survey after 1 year. Six hundred nine of the subjects who intended to quit smoking were followed-up; 555 of these had been exposed to HWP. Five hundred twenty-one workers, who were able to quit at least 1 month and completed questionnaire were included in the final evaluation.

The research instrument had 5 parts: demographic data, perceptions about the health warning labels (11 items), cigarette smoking behavior (16 items), the changing process of smoking cessation (33 items), and decision making about smoking cessation or continuing to smoke (20 items). Survey items were developed and selected based on application of the trans-theoretical model (Prochaska *et al*, 1983; James *et al*, 1994; Lafferty *et al*, 1999). Reviews of a tobacco control survey were considered (CDC Foundation, 2005). A 5 point rating scale was used for scoring; normative references were used to classify and judge the scores and interpreted them.

The reliability of the research questionnaire was tested with thirty smokers in Bangkok. The reliability coefficients of the questions on perceptions about the HWP, changes in the process of smoking cessation, and decision making concerning smoking cessation were 0.67, 0.87, and 0.93, respectively.

The self-administered questionnaire was distributed in 2007. The present study (n=521) comprised a second wave of 1,637 cases (Silpasuwan *et al*, 2008).

Two participants from each of the twenty-two factories volunteered for in-depth interviews. The interviews explored various dimensions of the new HWP and intent to quit, from the worker's perspective. Data from the respondents were analyzed using descriptive statistics. A model, including important factors for failure to quitt, was developed from the full survey results of the final 521 respondents using Structured Equation Modeling (SEM).

RESULTS

Sample characteristics

The five hundred twenty-one workers ranged in age from 17-65 years. They had an average age of 32.2 years, with majority in the 25-49 year old age group. Seventy -one percent had secondary school education or higher, and 83.9% had a low income. The average income was 9,025 Bath/ month. Sixty-five point eight percent said they were in debt due to their low income.

Table 1
Number and percent of respondents who quit smoking at the 1-year follow-up.

Smoking status	No.	%
Failed to quit smoking	416	79.8
Quit smoking	105	20.2
Total	521	100.0

Cigarette smoking behavior

The average age of initiating smoking among respondents was 18 years. For most respondents this was before the HWP appeared on cigarette packs. The average number of cigarettes smoked was 10/day. The average length of smoking was 14.4 years; 65.3% of respondents were daily smokers. The average cost for cigarettes was 520 Baht/ month. Fifty-one point two percent bought cigarettes in a pack and 35.3% bought single cigarettes (loosies).

Success in quitting smoking

One hundred five respondents (20.2%) quit smoking at the 1-year follow-up (Table 1).

Failed to quit smoking model

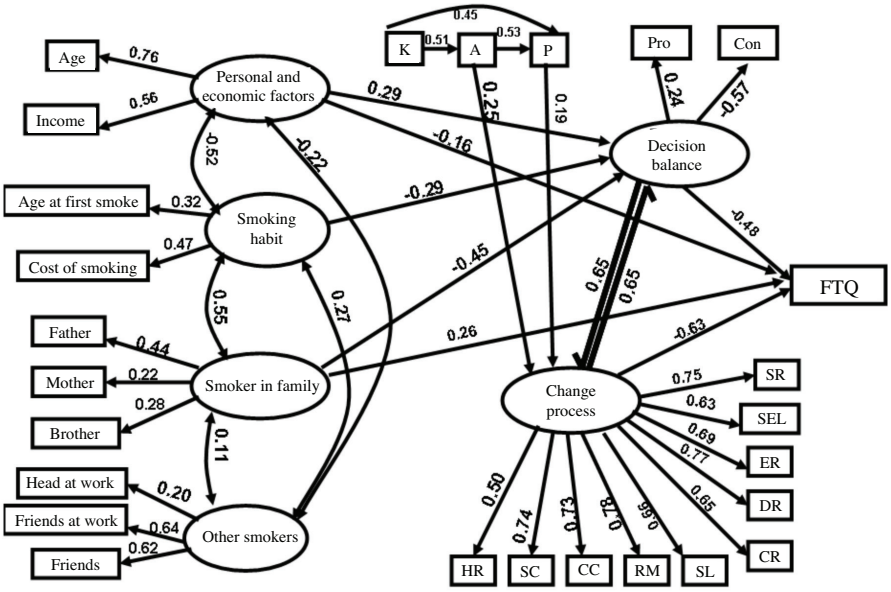
A model of selected factors, including internal and interpersonal factors affecting cigarette smoking cessation, was tested by structure equation modeling as shown below:

Factors related to unsuccessfully quitting smoking among employees who intended to quit are internal factors and interpersonal factors (Fig 1). Internal factors (age, income, smoking behavior, age at first smoking, cigarette cost) directly affects the "decisional balance" in smoking cessation. External factors (father, brother or mother who smokes) had direct and indirect effects on failure to quit by affecting the internal psycho-social factor that is "decisional balance". Failure to quit was influenced by the process of change for each stage of quitting smoking, directly and indirectly,via "decisional balance" in terms of negative relationships. Increasing the decisional balance and/or change process for cigarette smoking reduces the failure to quit. The decisional balance had a direct effect on failure to quit, along with knowledge and attitude, representing internal factors, which had a direct influence on the change process. The direct and indirect effects of each variable related to failing to quit are categorized in terms of total weight in Table 2.

The change process and decision balance, as internal factors, negatively affect failure to quit directly and indirectly (-0.94 and -0.89, respectively). Interpersonal factors, such as smoking by family members and peers, directly and indirectly effect, via decisional balance, failure to quit. These results demonstrate a satisfactory model fit. The empirical result confirms the hypothesis (Fig 1). A statistically significant correlation among variables was derived from the covariance of independent variables, directly and indirectly affecting decisional balance and failure to quit.

DISCUSSION

The study subjects were in the same demographic and socio-economic status as the subjects from the first survey; however, cigarette smoking behavior may have been different because these study subjects had an intent to quit. Only 2.8% of subjects quit smoking, and only 20 % of employees surveyed stopped smoking for at least 1 month. These results are consistent with those from various states of the United States (CDC. foundation, 2005). In



HR, helpful relationships; SC, stimulus control; CC, counter conditioning; RM, reinforcement management; SL, social liberate; CR, conscious raising; DR, dramatic relieve; ER, environmental reevaluation; SEL, self liberation; SR, social reevaluation

Fig 1–Selected factors affecting cigarette smoking cessation among employees who intend to quit.

Table 2

The total effect of the internal and intrapersonal factors on failure to quit cigarette smoking.

Factors	Direct effect	Indirect effect	Total effect	*p*-value
Change process	-0.63	-0.31	-0.94	<0.0001
Decision balance	-0.48	-0.41	-0.89	<0.0001
Smoker in family	0.26	0.56	0.82	<0.0001
Age	-0.12	-0.32	-0.44	<0.0001
Income	-0.09	-0.24	-0.33	<0.0001
Cost of smoking	0.00	0.31	0.31	<0.0001
Age at first smoking	0.00	0.22	0.22	0.0001
Friends at work	0.00	0.18	0.17	0.0018
Friendships	0.00	0.17	0.17	0.0024
Head at work	0.00	0.07	0.07	0.1294

the USA, a 2-year follow-up study found only 18 % were able to stop smoking, and only 12% stopped smoking because of printed media distributed. It is possible individual smokers intending to quit were exposed to external anti-smoking messages. The messages may provide knowledge, and/or influence attitudes, discouraging smoking and reinforcing quitting (Boardman *et al*, 2005). Therefore,

the messages may have increased motivation for smoking cessation. However, the effect of interpersonal factors, such as smoker's parents and their friends had a significant influence. Subjects with parents or friends who were active smokers were more likely to fail to quit smoking. This finding is consistent with other studies. Persons who quit smoking and subsequently relapse often report their return to smoking was triggered by stressful or negative experiences (Boardman *et al*, 2005; Herd *et al*, 2009).

According to one environmental perspective, symbolic interaction theory, individuals construct meanings from messages through communication processes found in their environment. This theory posits that people create and share meaning via social networking (Patterson *et al*, 2009). Thus, success or failure in quitting smoking can be explained by integrating the communication process of symbolic interaction between smokers and the message of the HWL. The message may improve their knowledge, or change their attitudes towards smoking behaviors. These factors then interact with the process of change to make sense of and elaborate factors influencing smoking behavior. This study included external (HWP), internal and interpersonal factors, in a model explaining failure to quit smoking among factory workers intending to quit smoking.

Statistical differences were present in regard to internal factors. These included knowledge and attitudes about the dangers of smoking, and decisional balance for success or failure at one year. The decisional balance for smoking cessation take into consideration increased awareness and self-evaluation of the pros and cons of smoking for making behavioral changes (Prochaska *et al*, 1994).

A limitation of this study was it did not measure the self efficacy of the subjects to reflect the psychological confidence involved in a smoking cessation attempt. Close family members influences are important for sharing meaning and supporting employee in making this behavior change. Our results are consistent with previous studies (Cohen *et al*, 1990; Minh *et al*, 2008).

Employees with a relative or father who smoked had both direct and indirect influences on failure to quit. Smoking friends were the most important factor in an employee's failure to quit. Workers who had parents or peers who smoked were less likely to successfully quit smoking. This supports the fact that "biological, psychological, behavioral, and cultural factors, all play a role in tobacco addiction, with many people returning to smoking even after years of not smoking" (Westmaas and Langsam, 2005; Abdullah *et al*, 2006; A.D.A.M, 2009).

The relationships and meanings through communication can affect smoking behavior. This can provide a powerful theoretical framework to better understand an integrated model about smoking cessation. Studying these issues is important to know what information is most effective in helping smokers quit. The smoking populations need this essential knowledge in order to updated HWP. This study points out relationships between external, internal and interpersonal factors and quitting smoking among workers. These results add to the literature by examining these interrelationships. Of particular note is that subjects with parental or peer smokers had both direct and indirect paths to fail to quit. HWP is an external influence, stimulating people to make correct decisions regarding their smoking behavior.

In conclusion, this study shows knowledge, attitude and practice factors were not the only factors that had a direct influence on behavioral change. The influence of individual variables from within the family, especially from fathers, and close relatives and friends, contributes to the success or failure of attempts to quit smoking. In Thailand HWP on cigarette packs only focus on the negative effects of cigarette smoking by increasing fear. This does not educate people in a positive way. It does not provide guidance on how to quit smoking, or address the effect of parental or peer role models. HWP should include the benefits of quitting smoking. It may do this by communicating with and attracting those who are the most vulnerable. Health professionals seeking health behavior change should focus on multiple factors and multicultural approaches, specifically with psychosocial factors. The importance of smoking among parents and friends needs to be considered. The clinical implications of health risk communication and modification of an integrative model should be further researched and implemented. This should target peers and parents who are smokers.

ACKNOWLEDGEMENTS

We would like to express our deep appreciation to Dr Hatai Chitanondh, the president of Thai Health Promotion Institute, for his kind support and mentoring with this research. We would also like to thank the Thailand Health Promotion Foundation (Thai Health) for funding support for this research.

REFERENCES

Abdullah MS, Lam HT, Chan CS, *et al*. Smoking cessation among Chinese young smokers: does gender and age difference matters and what are the predictors? *J Addict Behav* 2006; 31: 913-21.

Boardman T, Catley D, Mayo SM, *et al*. Self-efficacy and motivation to quit during participation in a smoking cessation program. *J Behav Med* 2005; 12: 266-72.

CDC Foundation. National youth tobacco survey–Part I. Atlanta: CDC Foundation, 2005. [Cited 2010 Jun 15]. Available from: URL: http://www.cdcfoundation.org.news

Cohen S, Lichtenstein E. Perceived stress, quitting smoking, and smoking relapse. *Health Psychol* 1990; 4: 466-78.

Department of Labor Protection and Welfare. Thailand yearbook of labor protection and welfare statistic 2003. Bangkok: Bangkok Blocks, 2004.

Elliott & Shanahan Research. Evaluation of the effectiveness of the graphic health warnings on tobacco product packaging 2008. Sydney: Ellioff & Shanahan Research, 2008. [Cited 2010 Jan 18]. Available from: URL: www.health.gov.au

Herd N, Borland R, Hyland A. Predictors of smoking relapse by duration of abstinence: findings from the International Tobacco Control (ITC) Four Country Survey. *J Addiction* 2009; 104: 2088-99.

James OP, Wayne FV, Rossi J, *et al*. Stages of change and decisional balance for 12 problem behaviors. *J Health Psychol* 1994; 13: 39-46.

Lafferty KC, Heancy AC, Chen SM, *et al*. Assessing decisional balance for smoking cessation among Southeast Asian males in the US. *J Health Educat Res* 1999; 14: 139-46.

Minh TD, Huy VN, Phong ND. Smoking among Vietnamese health professionals: knowledge, beliefs, attitudes, and health care practice. *Asia Pac J Public Health* 2008; 20: 7-15.8.

National Statistic Institute of Thailand. Tobacco consumption situation survey in 2007. Bangkok: Office of the Prime Minister, 2007.

Norton Healthcare. Failure to quit smoking. Louisville: Norton Healthcare. [Cited 2009

Dec 21]. Available from: URL: http://nortonhealthcare.adam.com/content.aspx?productId=10&pid=10&gid=000041

Patterson JS, Rattle MJ. Strategic communication for nonprofit organizations: a practical guide and workbook. 2nd ed. Chichester: John Willy and Son, 2009.

Prochaska JO, Velicer WF. Stages and processes of self-change of smoking: toward an integrative model of change. *J Consult Clin Psychol* 1983; 51: 390-5.

Prochaska JO, Velicer WF, Rossi JS, *et al*. Stages of change and decisional balance for 12 problem behaviors. *J Health Psychol* 1994; 13: 39-46.

Silpasuwan P, Ngoenwiwatkul Y, Viwatwongkasem C, *et al*. Potential effectiveness of health warning labels among employees in Thailand. *J Med Assoc Thai* 2008; 91: 551-8.

Thai Health Promotion Institute. The chronology of regulations on labeling and packaging. Bangkok: Thai Health Promotion Institute,2003. [Cited 2005 Jun 15]. Available from: URL: http://www.thpinhf.org

The International Tobacco Control Policy Evaluation.Project: ICT Mexico Summary. 2009. [Cited 2010 Jan 18]. Available from: URL: http:/www.itc project.org

Velicer WF, Prochska OJ, DiClemen CC, *et al*. Smoking cessation and stress management: application of the Trans Theoretical Model of Behavior Change. *J Homeostasis* 1998; 38: 216-33.

Velicer WF, DiClemen CC, Prochska OJ, *et al*. Decisional balance measure for assessing and predicting smoking status. *J Personal Soc Psychol* 1985; 43: 1279-8.

Westmaas JL, Langsam K. Unaided smoking cessation and predictors of failure to quit in a community sample: effects of gender. *Addict Behav* 2005; 30: 1405-24.

World Health Organization (WHO). WHO Framework Convention on Tobacco Control. Geneva: WHO, 2008. [Cited 2008 Apr 30]. Available from: URL: http://www.who.int/fctc/en/index.html

World Health Organization(WHO). WHO Framework Convention on Tobacco Control. Geneva: WHO, 2005. [Cited 2006 Jun 11]. Available from: URL: http://www.who.int/fctc/en/index.html