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# Smoking Cessation Program in Outpatient Clinics of Family Medicine Department in Taiwan: A Longitudinal Evaluation

Kuang-Chieh Hsueh,<sup>1</sup> Chih-Yin Chen,<sup>2</sup>  
Yi-Hsin Yang,<sup>3</sup> and Chih-Ling Huang<sup>2</sup>

## Abstract

The Government of Taiwan has imposed a tobacco health tax of NT\$5 (US\$0.14) per pack of cigarettes since January 2002. The Department of Health has now begun to fund a smoking cessation program that provides nicotine-replacement therapy (NRT) and brief counseling by physicians in outpatient clinics. The purpose of the current study was to evaluate the

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<sup>1</sup> Department of Family Medicine, Kaohsiung Veterans General Hospital, and Shu-Zen College of Medicine and Management, Taiwan

<sup>2</sup> Department of Nursing, Chang Jung Christian University, Tainan, Taiwan

<sup>3</sup> Graduate Institute of Oral Health Science and Biostatistic Center, Kaohsiung Medical University, Taiwan

## Corresponding Author:

Chih-Ling Huang, Department of Nursing, Chang Jung Christian University, 396 Sec. I, Chang Jung Road, Kway Jen, Tainan 71101, Taiwan.

Email: [chhuang@mail.cjcu.edu.tw](mailto:chhuang@mail.cjcu.edu.tw)

smoking cessation program with a 3-year follow-up review implemented at outpatient clinics, which were run by the Family Medicine Department in a medical center, with a total of 772 adult participants. The abstinence rates were 99.7%, 49.2%, 37.7%, 30.2%, and 22.7%, at the 1-, 3-, 6-, 12-, and 36-month points, respectively. The frequency of clinic visits is a major factor predicting long-term cessation. The results indicate the need to pursue implementation and evaluation of multidisciplinary interventions in smoking cessation clinics with a longer follow-up, including the promotion of compliance to increase clinic visits and prevent relapse.

### **Keywords**

smoking cessation, outpatient clinic, evaluation

## **Introduction**

Prevalence estimates indicate that 39.0% of men and 5.1% of women in Taiwan in 2007 were current smokers (Bureau of Health Promotion, 2008) and that at least 18,803 deaths in Taiwan or one of every four deaths (27%) in middle-aged men (35–69 years old) could be attributed to smoking-related causes (Wen et al., 2005b). Recent evidence suggests that smoking resulted in 217,761 years of potential life lost (YPLL) for males, 15,462 YPLL for females, and corresponding annual productivity losses of US\$1371 million for males and US\$18.7 million for females (Yang, Fann, Wen, & Cheng, 2005).

Research has revealed that the mortality risk of adult exsmokers who had quit for 6 months is lower than that of current smokers for all causes, all cancer, lung cancer, and ischemic heart disease (Wen et al., 2005a). The health benefits of smoking cessation have been reported by the U.S. Surgeon General (US Department of Health and Human Services, 1990). The costs and clinical effectiveness of smoking cessation services have also been established (Cromwell, Bartosch, Fiore, Hasselblad, & Baker, 1997). Furthermore, smoking cessation services under insurance coverage have been shown to be cost-effective (Curry, Grothaus, McAfee, & Pabiniak, 1998).

These successful cessation services have included the use of the transdermal nicotine patch as an adjunct to smoking cessation counseling by physicians (Fiscella & Franks, 1996) and insurance coverage on the use of a behavioral program and nicotine-replacement therapy (NRT; Curry et al., 1998). In Taiwan, the government has begun to impose a tobacco health tax of NT\$5 (US\$0.14) on every pack of cigarettes since January 1, 2002. Ten percent of the revenues from this tax, estimated at

approximately NT\$10 billion (US\$286 million) annually, has been allocated for tobacco control programs (Bureau of Health Promotion, 2004). In 2009, the tobacco tax was increased to NT\$ 20 (Bureau of Health Promotion, 2009). On September 1, 2002, the Department of Health began funding a program called "Smoking Cessation at Outpatient Clinics" that provides financial support for NRT and brief counseling by physicians lasting up to 8 weeks in various levels of medical care institutions. The 7-day point-prevalence abstinence rates after 6 months were 29.6%, 26.9%, 22.9%, 19.2%, and 26.2%, for medical centers, regional hospitals, district hospitals, clinics, and public health centers, respectively, between September 2002 and July 2007 (Bureau of Health Promotion, 2008). Although the smoking cessation services at outpatient clinics in medical centers in Taiwan produce higher success rates at 6-month follow-up than do those in other institutions, few studies focus on long-term abstinence and the factors influencing the success of quitting at the end of follow-up.

NRT and physician advice for smoking cessation are found to increase the rate of quitting (Stead, Bergson, & Lancaster, 2008a, 2008b). Additionally, studies have shown at 1-year follow-up that smoking cessation programs in primary care clinics can help smokers to quit. The point-prevalence abstinence rates at 1 year ranged from 13.0% to 27.0% (Abdullah, Hedley, Chan, Ho, & Lam, 2004; Chatkin, Mariante de Abreu, Haggstram, Wagner, & Fritscher, 2004; Fiore et al., 2004). A study in Taiwan also reported an abstinence rate at 1 year of 17.2% (Chen, Yen, & Chao, 2008).

A meta-analysis reported that the annual incidence of relapse to smoking after 1 year of abstinence was 10% (Hughes, Peters, & Naud, 2008). Therefore, a study is needed using long-term follow-ups as proxies for lifetime smoking cessation. Few studies in Taiwan have explored the abstinence rates at  $\geq 2$  year follow-up. This study, at outpatient clinics of Family Medicine department in a medical center in Southern Taiwan, is aimed at evaluating the demographic characteristics and smoking background that influence the success of smoking cessation at 3-year follow-up.

## Methods

### *Smoking Cessation Services at Outpatient Clinics and Follow-ups*

Smoking cessation services, run jointly by Family Medicine Clinics and outpatient clinics in a medical center in Southern Taiwan, have been in operation since September 2002. Five family physicians have undertaken

training courses in smoking cessation treatments and have been certified by the Bureau of Health Promotion. These smoking cessation services include NRT, brief physician advice, and educational materials explaining smoking cessation techniques. Subsidies for service fees are covered by the National Health Insurance. Subsidiary NRT costs are NT\$250 per visit/wk. The treatment program can last for a maximum of eight weekly sessions in a period of 90 days.

The outpatient clinics of Family Medicine Department have developed a systematic approach for the management of smoking cessation services. Patients' smoking status is logged along with the electronic medical records of clinical procedures. Physicians are required to inquire about patient smoking status and document this in electronic records and then they can record other information and prescribe for patients. Family physicians are urged to assess smokers' interest in stopping. When smokers are clearly interested in quitting, family physicians give them behavioral counseling based on individual circumstances, such as setting a date for stopping completely, planning for likely problems, and enlisting the support of family and friends. NRT is provided, according to the prescription protocol, if the patient is eligible to relieve withdrawal symptoms. The smoking cessation services of outpatient clinics use a medicine formulation of only one nicotine patch over 24 hours. The protocol is as follows: (a) if the number of cigarettes per day (CPD) is  $\geq 20$ , Nicotinell TTS30<sup>®</sup> (nicotine content 52.5 mg) is prescribed for 4 weeks, then Nicotinell TTS20<sup>®</sup> (nicotine content 35 mg) for 2 weeks, and Nicotinell TTS10<sup>®</sup> (nicotine content 17.5 mg) for 2 weeks; (b) if the number of CPD is  $< 20$ , the prescription is Nicotinell TTS20 for 6 weeks, and Nicotinell TTS10 for 2 weeks.

After the first face-to-face counseling visit lasting for 20–30 min, subsequent seven face-to-face counseling visits lasting for 5–10 min once a week are arranged. Family physicians provided counseling to individual clients in accordance with their physical dependence, withdrawal symptoms, drug side effects, and their perceived barriers to quitting. The clients were followed-up by telephone at 3, 6, 12, and 36 months.

## Study Participants

A total of 805 clients received smoking cessation services at Family Medicine Clinics between September 1, 2002 and September 30, 2005. The criteria for inclusion were adult smokers ( $\geq 18$  years), with national health insurance and with CPD  $\geq 10$  or a Fagerstrom Tolerance Questionnaire (FTQ) score of  $\geq 5$  or a Fagerstrom Test for Nicotine Dependence (FTND)

score of  $\geq 4$ , whereas the criteria for exclusion were smokers with an acute cardiac condition over the recent 3 months or pregnancy. Four clients died before subsequent clinic visits or the third month follow-up call. Twenty-nine clients could not be contacted because of wrong telephone numbers. A total of 772 participants were included in this study.

### *Data Collection Process and Outcome Measures*

The study was approved by the Ethics Review Committee of a medical center. At the first clinic visit of the smoking cessation services, all participants completed a questionnaire that included questions relating to demographics, smoking status, nicotine dependence level, and reasons to quit. The questionnaire of reasons to quit developed by the American Lung Association of New Hampshire include eight items with binary answers, Yes and No. Its psychometric properties have not been well established. Therefore, a total score of this instrument cannot be used. For practical purposes, participants' psychological factors for quitting smoking were assessed. This scale includes quit smoking for myself, quitting smoking a #1 priority, tried to quit smoking before, health concern, commitment to trying to quit, social support, other personal reasons, and patience of quitting. The separate question was analyzed for Kaplan-Meier estimates to understand the abstinence rates for a variety of reasons to quit, which are essential conditions to start treatment.

At subsequent visits, withdrawal symptoms, drug side effects, and the perceived barriers to quitting were assessed. At the follow-up calls, assessment of the 7-day point abstinence was made using a standard abstinence question on whether the clients had smoked any cigarettes during the past 7 days. For practical purposes, based on the suggestions of Velicer and Prochaska (2004), the 7-day point-prevalence abstinence without chemical validation was used as an outcome measure. According to intention-to-treat analysis (West, Hajek, Stead, & Stapleton, 2005), those participants who could not be contacted at the 36-month follow-up were counted as smokers.

### *Statistics*

The Kaplan-Meier estimates were computed for 1-year and 3-year abstinence rates, and the overall abstinence rates among different categories were compared by log-rank tests. The hazard rate ratios (HRRs) were computed for analysis factors using Cox regression analyses. The analysis

factors included demographics, smoking status, numbers of clinics attended, and readiness to quit. JMP 6.0 software was used to conduct the statistical analysis.

## Results

Participants were 696 men and 76 women smokers, mean age 46.2 ( $\pm 16.5$ ) years. They smoked an average of 24.9 ( $\pm 12.3$ ) CPD. Based on the Kaplan-Meier survival analysis, the abstinence rates were 99.7%, 49.2%, 37.7%, 30.2%, and 22.7%, at 1, 3, 6, 12, and 36 months, respectively. Table 1 shows the 1-year and 3-year abstinence rates (Kaplan-Meier estimates) for basic characteristics. The majority of these clients were men (90.2%), who had made previous attempts at quitting (62.6%), attended one to four clinic visits (73.0%), and smoked the first cigarette of the day within 30 min (80.3%). The Kaplan-Meier estimates indicated overall 3-year abstinence rates of 24.5% and 8.3%, for men and women, respectively; 18.6% who had not made previous quit attempts and 25.2% who had; 26.2% and 21.8% for CPD <20 and  $\geq 20$ , respectively; 33.9% and 19.9% for the first cigarette of the day within 30 min and  $\geq 30$  min, respectively; 19.6% with one to four clinic visits; and 30.8% with five to eight visits. The log-rank tests indicated that survival curves were found statistically significant with respect to these factors ( $p < .05$ ).

Table 2 shows the univariate- and multivariable-adjusted HRRs for predicting failure in quitting smoking. The abstinence rate of patients was significantly associated with sex, previous quit attempts, and number of clinic visits ( $p < .05$ ). Failure was significantly less frequent in those patients treated with five to eight clinic visits (HRR = 0.78, 95% confidence interval [CI]: 0.63-0.95;  $p < .05$ ). In addition, it was found that the HRR were about the same before and after adjusting for sex, education level, previous quit attempts, and CPD.

Table 3 shows the 1-year and 3-year survival rates for a variety of reasons to quit. The Kaplan-Meier estimates indicated overall 3-year abstinence rates of 23.6% and 8.0% for responding Yes and No, respectively, to item 2: "quitting smoking is a number 1 priority for me"; 25.8% for Yes and 16.4% for No, for item 3: "I have tried to quit smoking before." The log-rank tests indicated survival curves were statistically significant with respect to these items ( $p < .05$ ).

Participants ( $n = 756$ ) stated six reasons to quit, including physician's advice to quit, concern for own health, concern for family's health, work requirement, saving money, and friends' encouragement. Most participants

**Table 1.** Demography and Clinical Characteristics of Patients ( $N = 772$ )

Analysis Factor	Category	Number of Patients	Percentage	Kaplan-Meier Estimates		$p$ Value of Log-Rank Test
				1 Year (%)	3 Years (%)	
Sex						.0034
	Male	696	90.2	31.3	24.5	
	Female	76	9.8	21.6	8.3	
Age group (years)						.4102
	18-39	319	41.3	28.9	20.8	
	40-64	310	40.2	31.2	13.5	
	$\geq 65$	143	18.5	31.7	25.6	
Educational level <sup>a</sup>						.3902
	Elementary or lower	133	18.3	39.1	25.2	
	High school	269	37.0	28.5	21.1	
	University	325	44.7	28.7	22.3	
Chronic illness <sup>a</sup>						.1463
	No	503	65.5	28.4	20.7	
	Yes	265	34.5	33.6	26.0	
Previous attempts <sup>a</sup>						.0068
	No	287	37.4	25.7	18.6	
	Yes	480	62.6	33.3	25.2	
Cigarettes per day <sup>a</sup>						.0693
	$<20$	163	21.1	35.8	26.2	
	$\geq 20$	609	78.9	28.9	21.8	
Wake-up first cigarette <sup>a</sup>						.0008
	$\leq 30$ min	615	80.3	28.4	19.9	
	$>30$ min	151	19.7	38.2	33.9	
Dependent level <sup>a</sup>						.0549
	Low-middle	102	13.3	34.6	30.3	
	High-very high	665	86.7	29.6	21.3	
Number of clinic visits						.0015
	1-4 times	563	73.0	28.3	19.6	
	5-8 times	208	27.0	36.1	30.8	
Side effects						.2953
	No	202	26.2	33.5	23.6	
	Yes	570	73.8	29.2	22.4	

<sup>a</sup> Factors with some missing data. Low-middle Dependent level: a Fagerstrom Tolerance Questionnaire (FTQ) score of  $<5$  or a Fagerstrom Test for Nicotine Dependence (FTND) score of  $<4$ ; High-very high: FTQ  $\geq 5$  or FTND  $\geq 4$ .



**Table 2.** Crude and Mutually Adjusted Hazard Rate of Analysis Variables

Analysis Factor	Category	Hazard Rate Ratio	Univariate 95% Confidence Interval	Multivariable Adjusted	
				Hazard Rate Ratio	95% Confidence Interval
Sex					
	Female	1.00		1.00	
	Male	0.75	0.59–0.98	0.77	0.59–1.02
Educational level					
	Elementary or lower	1.00		1.00	
	High school	1.03	0.87–1.03	1.16	0.90–1.49
	University	1.04	0.88–1.23	1.22	0.96–1.56
Previous attempt					
	No	1.00		1.00	
	Yes	0.84	0.71–0.99	0.87	0.73–1.04
Cigarettes per day					
	<20	1.00		1.00	
	≥ 20	1.16	0.95–1.43	1.13	0.92–1.42
Number of clinic visits					
	1–4 times	1.00		1.00	
	5–8 times	0.79	0.65–0.95	0.78	0.63–0.95

attended the smoking cessation clinics because of concern for their own health (86.5%) and for their family’s health (58.7%). The percentages of other reasons were 16.5% for physician’s advice to quit, 12.2% for work requirement, 17.9% for saving money, and 18.9% for friends’ encouragement, respectively.

## Discussion

In the current study, 30.2% of smokers receiving smoking cessation services at Family Medicine Clinics of a medical center in Taiwan reached a 7-day point-prevalence abstinence rate at 1 year that was superior to the previous abstinence rates (13.0–27.0%) described for smoking cessation clinics or primary care clinics (Abdullah et al., 2004; Chatkin et al., 2004; Fiore et al., 2004). Our data confirmed previous findings in showing that a nicotine patch with brief counseling (abstinence rate 25.4%) was more effective than counseling alone (14.5%), patch only (8.0%), or self-help (5.0%); (Chatkin et al., 2004; Stead et al., 2008a). Thus, the integration

**Table 3.** Abstinence Rates for a Variety of Reasons to Quit ( $N = 772$ )

Analysis Factor	Category	Number of Patients	Percentage	Kaplan-Meier Estimates		$p$ Value Log-Rank Test
				1 Year (%)	3 Years (%)	
1. Do I want to quit smoking for myself? <sup>a</sup>	Yes	717	98.3	30.5	22.7	.3892
	No	12	1.7	25.0	12.5	
2. Is quitting smoking a #1 priority for me? <sup>a</sup>	Yes	654	90.1	31.4	23.6	.0099
	No	72	9.9	18.7	8.0	
3. Have I tried to quit smoking before? <sup>a</sup>	Yes	458	62.7	33.5	25.8	.0058
	No	272	37.3	25.2	16.4	
4. Do I believe that smoking is dangerous to my health? <sup>a</sup>	Yes	713	97.7	30.6	22.7	.5896
	No	17	2.3	23.5	17.65	
5. Am I committed to trying to quit even though it may be tough at first? <sup>a</sup>	Yes	667	91.5	31.3	23.0	.0929
	No	62	8.5	20.6	18.0	
6. Are my family, friends and co-workers willing to help me quit smoking? <sup>a</sup>	Yes	643	88.7	30.6	23.3	.6387
	No	82	11.3	28.7	18.0	
7. Besides health reasons, do I have other personal reasons for quitting smoking? <sup>a</sup>	Yes	532	73.2	30.5	23.3	.6537
	No	195	26.8	29.9	21.0	
8. Will I be patient with myself if I backslide? <sup>a</sup>	Yes	633	86.9	30.4	22.3	.9993
	No	95	13.1	30.0	24.0	

<sup>a</sup> Factors with some missing data.

of smoking cessation treatments into routine primary care was also effective for adult smokers in Taiwan.

The 3-year effect of long-term cessation in this study does not appear to be as good, according to the survival curve, in comparison with 1-year and 5-year

success rates for a smoking cessation in Turkey (Oztuna, Can, & Ozlu, 2007). The likely reasons for the lower success rates at 3 years might include no close and frequent follow-up for relapse prevention or multidisciplinary counseling. Intensive support, behavioral therapies, and multidisciplinary professional advice have been reported to have a positive effect on the success of smoking cessation programs (Oztuna et al., 2007; Ranney, Melvin, Lux, McClain, & Lohr, 2006; Vogt, Hall, Hankins, & Marteau, 2009).

In Taiwan, subsidies for smoking cessation service fees are partially covered by National Health Insurance. The subsidies only include NRT costs and physician fees. The provision of financial assistance for smokers trying to quit, or reimbursement of the fees of health care providers, leads to an increased rate of successful quit attempts (Reda, Kaper, Fikrelter, Severens, & van Schayck, 2009). Therefore, subsidies for relapse prevention interventions implemented by health professionals should be provided by the National Health Insurance to sustain the long-term abstinence outcomes of smoking cessation services.

Gender has also been previously evaluated as an important factor, showing that women have lower abstinence rates compared to men (Scanlon et al., 2000; Wetter et al., 1999). This has resulted from women's greater concerns about weight gain as a significant factor for relapse (Meyers et al., 1997) and higher rates of depression following smoking cessation (Covey, Glassman, & Stentner, 1997). In the current study, gender differences were observed in the 1-year and 3-year smoking cessation rates. Weight gain and depression for women, as impediments to quitting, need to be further managed in smoking cessation interventions to prevent relapse.

In our group of smokers, there were no significant differences in smoking cessation among groups for age, education level, and concurrent illness, which are similar to the results in previous literature (Oztuna et al., 2007). There were significant differences for smoking cessation among groups for previous attempts and dependence level, in contrast to the previously reported research (Chatkin et al., 2004). A complete therapy session for smoking cessation is suggested to last for a maximum of 8 weeks by the Department of Health in Taiwan. In this study, participants with five to eight clinic visits had 0.78 times (95% CI: 0.63-0.95) failure in quitting smoking than those with one to four visits. Greater frequency of clinic visits provides benefits to smokers with respect to long-term abstinence. Additionally, frequency of clinic visits was noted as a determinant of success in quitting at the end of 3 years in the Cox regression model. The promotion of compliance with clinical therapy for adult smokers is an important strategy in smoking cessation interventions.

In this study, health concern was the primary motive for quit attempts, which is consistent with the results of previous literature (McCaul et al., 2006). Previous literature reported that smokers were not adequately informed about the health risks of smoking and misinformed about medicinal nicotine (Cummings et al., 2004). However, only 18% of the participants in this study received smoking cessation services because of physicians' advice. General practitioners need to advise and assist smokers in a manner appropriate to their motivation to quit. Based on the survival rates for a variety of reasons to quit, knowing "whether stopping smoking is a priority for smoker" and "whether trying to quit smoking before" can help health professionals tailor advice to motivation.

There are some limitations in this study. First, a control group needs to be designed to support the ability of generalizations. Second, biochemical verification of abstinence could provide a further assurance at the key follow-up points, such as at the sixth and ninth month. Third, continuous abstinence rates could be measured at the 1-, 6-, or 12-month points to compare them with the results of 7-day point prevalence abstinence. A prolonged abstinence rate can be more appropriate than point prevalence abstinence for assessing the long-term health benefits of smoking cessation. Furthermore, a prolonged abstinence rate would be more stable for relapse curves than a shorter point prevalence rate. Although the percentage of 1-year abstainers who relapsed in the third year is lower than that reported in the previous literature (Hughes et al., 2008), more than 3-year follow-ups need to be used in the future study because the annual incidence of relapse after 1 year is estimated to be 10%.

## **Conclusion**

This study examined the smoking cessation services in Family Medicine Clinics in Taiwan that provide a combination of pharmacological interventions and physician advice in an outpatient clinical setting. In addition, the study searched for the predictors of failure or success in the evaluation of smoking cessation interventions and provided a sufficiently long follow-up period to test the program's effectiveness in producing long-term cessation. This study suggests that it would be helpful for health professionals to set up multidisciplinary interventions that provide intensive support for increased frequency of clinic visits and close and frequent follow-up for relapse prevention.

## **Declaration of Conflicting Interest**

The authors declared no conflicts of interest with respect to the authorship and/or publication of this article.

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