

RESEARCH ARTICLE

The National "Smoking Cessation Clinics" Program in the Republic of Korea: Socioeconomic Status and Age Matter

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Abstract

Background: Between 1998-2009 South Korea experienced significant progress in reducing the male smoking rate from 66.3% to 46.9%. As part of a significant government effort in the area of smoking cessation intervention, the Korean government implemented the national "Smoking Cessation Clinics (SCC)" program in 2004. **Materials and Methods:** Data covered 804,334 adult male smokers participating in SCC program at 253 public health centers between 2006-2009. We examined participant cessation rates with the SCC program, their characteristics and program intervention components using health insurance status as a socioeconomic status (SES) indicator. Multivariate logistic regression analyses were performed correcting for intra-class correlations within public health centers. **Results:** The overall 6-month quit rate was high (46.8%). Higher odds of smoking cessation were positively associated with higher levels of behavioral counseling sessions, but not nicotine replacement therapy (NRT). Cessation rates were lower for Medicaid participants than for regular health insurance participants. Disadvantaged younger smokers were less likely to participate in the program. Older smokers were more likely to quit regardless of SES. Stress was cited as major reason for failure. **Conclusions:** SES inequalities across different age groups exist in smoking cessation among Korean adult male smokers. There is a need for intervention programs specifically targeting sub-populations of SES by different age groups.

Keywords: Smoking cessation clinics - socioeconomic status - age - behavioral counseling - nicotine replacement therapy

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Introduction

South Korea has historically had a high cigarette smoking rate among adult males, but between 1998-2009 it experienced significant progress in reducing that rate from 66.3-46.9% (KCDC, 2010). Although the rate of smoking in men is still high, a large proportion (about two-thirds) of smokers intend to quit smoking, and about 57% of current Korean smokers have ever tried to quit (KCDC, 2010). Various motivations for Koreans to quit smoking exist, both economic and social. Following ratification of the WHO Framework Convention on Tobacco Control (2003), the Korean government raised cigarette taxes, although the price of cigarettes remains low (about US\$2/pack). The government also banned smoking in public places, placed restrictions on tobacco advertising, promotion and sponsorship, and instituted mandatory health warnings on cigarette packages. From a social perspective, smoking used to be prevalent across all classes of socioeconomic status (SES), but it is now viewed in Korea as a behavior associated with low SES, as it is in some other countries (Townsend et al., 1994; Kim et al., 2006; Bauld et al., 2007; Khang et al., 2009; Federico et al., 2009). Further, more people in Korea are now aware of the harmful

effects on health from smoking and are more likely to note smoking indiscretions. This shift in social attitudes toward smoking is partly the outcome of government education efforts.

One important thrust of efforts by the Korean government toward reducing cigarette smoking is the implementation of nationwide smoking cessation programs funded by cigarette taxes. Such a program is the toll-free telephone Quitline, which has been operated by the government since 2006. Another significant government effort in the area of smoking cessation intervention is the national "Smoking Cessation Clinics (SCC)" program, which has operated out of 253 public health centers run by the Ministry of Health and Welfare since 2004. The SCC program, which is the focus of the current work, provides both comprehensive behavioral counseling and nicotine replacement therapy (NRT) free of charge. The SCC is unique in its use of convenient community public health centers that are easily accessible by a large fraction of the Korean population, including those in rural areas and low income communities. From its inception, 1.3 million smokers had utilized the SCC program by 2009 (Ministry of Health and Welfare, 2009).

Although the Korean government has been overall

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successful in substantially reducing the cigarette smoking rate, smoker socioeconomic inequalities have actually increased (Kim et al., 2006; Khang et al., 2009). The resulting health burden is a significant challenge for public health, and there is great potential for improving the average population health by reducing the health burden of the low SES group. In the current study we examine the 6-month cessation among SCC participants from 2006-2009 and assess the relationships of the cessation rate with intervention components, with a focus on SES inequalities represented by health insurance status.

Materials and Methods

Setting

Following a 2004-2005 pilot program, the SCC program was launched nationwide in 2006 in all public health centers. Every health center maintains a medical doctor and 1-3 program counselors who have completed standardized training. Any Korean citizens can enroll free in the 6-month program. Following the initial counseling session, 2 more personal cessation counseling sessions, one at 4-6 weeks and one again at 6 months, are required. Other forms of behavioral counseling are available. These include face-to-face personal meetings, telephone calls, e-mail, or SMS. An NRT package is offered to anyone who smoked 10 or more cigarettes per day, and is available to any smoker who requests it. In addition to skin patches, nicotine gums and candies are available. At the end of the 6 months, participants are asked to self-report their smoking status. Those who drop out of the program or who fail to maintain abstinence can re-enroll.

Data and measures

To facilitate counseling and program evaluation for each participant, the 2004-2009 "National Cessation Clinic User Registry" compiled data on registered participants from all public health centers. Besides use of the SCC program, personal information, appointment schedules, counseling contents, test results such as nicotine dependence measures, and progress reports were entered into the registry.

A total of 804,334 of participant records were available for analysis based on the following inclusion criteria as described in Figure 1: (a) data from full program years between 2006-2009; (b) men; (c) adults (i.e., age ≥ 20); and (d) participants with complete information regarding mandatory national health insurance enrollment.

Our dichotomous outcome measure was defined as successful cessation if participants reported "no smoking at all" in the 6-month personal face-to-face follow-up interview, a failure otherwise. For program intervention components, all participants were categorized based on the level of behavioral counseling received, and on whether they received an NRT package (1=yes; 0=no). The level of behavioral counseling was categorized as low, medium, or high by counting the number of contacts (0-10, 11-15, ≥ 16), with sessions delivered in a mixture of face-to-face meetings, phone meeting, email or SMS communication. Nicotine dependence was assessed using the Korean version of the Fagerström Test for Nicotine Dependence

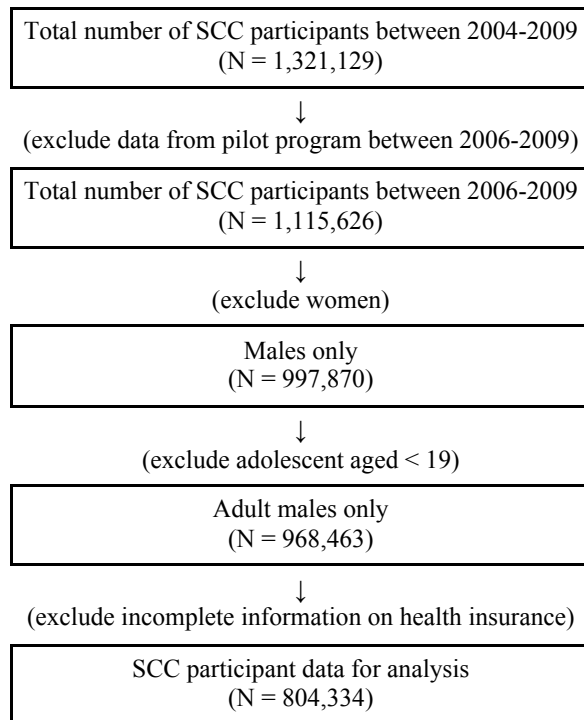


Figure 1. Flowchart for Selection of SCC Participant Data for Analysis

(Ahn et al., 2002). Participants reported the number of cigarettes smoked per day. Demographic characteristics and other health-related factors data (e.g., BMI (WHO/IASO/IOTF, 2000)) were also collected. Data related to income were not collected, so we used health insurance status as a proxy measure for participants' income status. All Korean citizens must enroll in one of two national health insurance plans, either "Medicaid" for those 5% of the population whose income falls below the subsistence level, or "Regular Health Insurance."

Statistical analysis

For all participants, we examined their descriptive characteristics, their 6-month cessation rate, and their health insurance status. We conducted multivariate logistic regression analysis to estimate the odds ratios (ORs) of successfully quitting smoking for 6 months for each predictor. Two intervention components, the number of behavioral counseling sessions and an NRT indicator, along with demographic factors and the number of daily cigarettes, were included in the logistic regression analyses. Because program participants are nested within 253 health centers, factors related to the participants within the same health centers may be correlated. To account for such intraclass correlations and to obtain correct standard errors for estimates, we estimated robust standard errors in logistic regression models using the statistical package Stata v.11.0 (StataCorp, 2009).

Results

Table 1 reports descriptive characteristics of the SCC program participants and their 6-month cessation rate, overall as well as by health insurance status. The overall 6-month self-reported cessation rate was 46.8%, and the

Table 1. Descriptive Statistics for SCC Program Participants and Their Reported 6-month Quit Rate

Variable	Total participants				Medicaid participant				Regular health insurance participants			
	Participated		Quit		Participated		Quit		Participated		Quit	
	n=804,334		n=376,285		n=41,123		n=17,358		n=763,211		n=358,927	
	No	%	No	%	No	%	No	%	No	%	No	%
Health insurance status												
Medicaid	41,123	5.1	17,358	42.2	–	–	–	–	–	–	–	–
Regular health insurance	763,211	94.9	358,927	47.0	–	–	–	–	–	–	–	–
Total number of behavioral counseling sessions												
1-10	504,051	62.7	126,428	25.1	26,421	64.2	5,461	20.7	477,630	62.6	120,967	25.3
11-15	213,821	26.6	174,091	81.4	10,046	24.4	7,896	78.6	203,775	26.7	166,195	81.6
≥ 16	86,462	10.7	75,766	87.6	4,656	11.3	4,001	85.9	81,806	10.7	71,765	87.7
NRT offered												
No	150,745	18.7	78,310	51.9	10,891	26.5	4,529	41.6	139,854	18.3	73,781	52.8
Yes	653,589	81.3	297,975	45.6	30,232	73.5	12,829	42.4	623,357	81.7	285,146	45.7
Number of average cigarettes per day												
<10	54,594	6.8	31,621	57.9	5,044	12.3	2,597	51.5	49,550	6.5	29,024	58.6
10-19	204,586	25.4	101,459	49.6	10,824	26.3	4,795	44.3	193,762	25.4	96,664	49.9
20-29	360,016	44.8	165,622	46.0	16,869	41.0	6,979	41.4	343,147	45.0	158,643	46.2
≥30	185,138	23.0	77,583	41.9	8,386	20.4	2,987	35.6	176,752	23.2	74,596	42.2
Nicotine dependence												
Mild (0-3)	252,154	31.3	133,716	53.0	11,293	27.5	5,543	49.1	240,861	31.6	128,173	53.2
Moderate (4-6)	325,174	40.4	147,805	45.5	17,215	41.9	7,119	41.4	307,959	40.4	140,686	45.7
Severe (7+)	227,006	28.2	94,764	41.7	12,615	30.7	4,696	37.2	214,391	28.1	90,068	42.0
Age group												
20-29	82,442	10.2	30,597	37.1	987	2.4	340	34.4	81,455	10.7	30,257	37.1
30-39	187,044	23.3	77,081	41.2	2,429	5.9	787	32.4	164,615	24.2	76,294	41.3
40-49	199,560	24.8	87,361	43.8	7,275	17.7	2,302	31.6	192,285	25.2	85,059	44.2
50-59	165,973	20.6	84,302	50.8	10,907	26.5	4,168	38.2	155,066	20.3	80,134	51.7
≥ 60	169,315	21.1	96,944	57.3	19,525	47.5	9,761	50.0	149,790	19.6	87,183	58.2
BMI (kg/m ²)*												
<23	321,359	40.0	147,550	45.9	20,709	50.4	8,731	42.2	300,650	39.4	138,819	46.2
23-25	225,487	28.0	108,069	47.9	10,594	25.8	4,513	42.6	214,893	28.2	103,556	48.2
≥25	257,467	32.0	120,662	46.9	9,816	23.9	4,114	41.9	247,651	32.4	116,548	47.1
Alcohol use in past week**												
No	473,522	68.5	222,177	46.9	29,027	80.9	12,202	42.0	444,495	67.8	209,975	47.2
Yes	217,533	31.5	102,232	47.0	6,839	19.1	2,891	42.3	210,694	32.2	99,341	47.1
Residential area												
Metropolitan	336,792	41.9	158,591	47.1	17,592	42.8	6,849	38.9	319,200	41.8	151,742	47.5
Non-metropolitan	467,542	58.1	217,694	46.6	23,531	57.2	10,509	44.7	444,011	58.2	207,185	46.7
Year												
2006	156,429	19.4	65,169	41.7	7,553	18.4	2,924	38.7	148,876	19.5	62,245	41.8
2007	201,343	25.0	98,881	49.1	12,323	30.0	5,235	42.5	189,020	24.8	93,646	49.5
2008	245,610	30.5	114,541	46.6	12,785	31.1	5,371	42.0	232,825	30.5	109,170	46.9
2009	200,952	25.0	97,694	48.6	8,462	20.6	3,828	45.2	192,490	25.2	93,866	48.8

*BMI categories are based on Asian definition: <23 kg/m² (normal); 23-25 kg/m² (overweight); and >25 kg/m² (obese). See the publication by WHO/IASO/IOTF (2000);

**The majority of missing data on alcohol use occurred in 2006

rate was higher for regular health insurance participants (47.0%) than for Medicaid participants (42.2%). Comparing regular health insurance participants and Medicaid participants by different characteristics, such as age. In every instance the pattern of cessation rates was similar, showing lower rates for those receiving Medicaid. While the intervention components showed mixed results for 6-month cessation (i.e., positive relationship with behavior counseling, negative relationship with NRT), the cessation rates for Medicaid participants were consistently lower than for regular health insurance participants across the behavioral counseling level or NRT. A similar pattern of lower cessation rates by Medicaid participants was reported across other characteristics such as cigarette smoking level and demographic characteristics including different age groups. Notably, enrollment rates for older smokers were higher in the Medicaid participants. In the regular health insurance participants, the enrollment rates were higher for younger smokers. Almost half of Medicaid enrollees were over 60 years old and 50% of them reported abstinence for 6 months.

Table 2 presents estimated ORs and the 95% confidence intervals from multivariate logistic regressions adjusted for the factors related to the 6-month cessation among participants in the SCC program. Overall,

Medicaid participants were less likely to be successful than regular insurance participants in the 6-month cessation (OR=0.63). ORs were estimated separately, too, for Medicaid and regular health insurance participants, and the patterns across different covariates were similar.

Participants receiving more behavioral counseling sessions had substantially higher odds of 6-month cessation whereas those receiving an NRT package were less likely to report cessation. As expected, odds of cessation increased for participants who reported having smoked fewer cigarettes per day (OR=1.21, 1.48, 1.96). As the age of the group increased, the odds increased in general. For regular health insurance participants, the odds increased steadily with age (OR=1.12-1.83). For Medicaid participants, the oldest group had notably higher odds of 6-month cessation than younger groups (OR=1.48 for age ≥60).

We attempted to contact by phone participants who failed to achieve the 6-month cessation to learn the reason for their failure. Table 3 tabulates the reasons for failure stated by the 73.4% of those participants whom we successfully contacted. More than two-thirds of them cited a lack of willingness to quit smoking (75.3% of Medicaid and 68.3% of regular health insurance participants). About one-quarter of them mentioned being unable to cope

Table 2. Adjusted Odds Ratios (OR) and 95% CIs of Successfully Quitting for 6 Months*

Variable		Total participants (n=804,334) AOR (95%CI)	Medicaid participants (n=41,123) AOR (95%CI)	Regular health insurance participants (n=763,211) AOR (95% CI)
Health insurance status	Regular Health Insurance	1	-	-
	Medicaid	0.63 (0.59, 0.68)	-	-
Total no. of behavioral counseling sessions	1-10 (Ref)	1	1	1
	11-15	13.58 (12.4, 14.9)	15.13 (12.9, 17.8)	13.50 (12.3, 14.8)
	≥16	22.10 (19.2, 25.4)	25.80 (21.4, 31.2)	21.87 (19.0, 25.2)
NRT offered	No (Ref)	1	1	1
	Yes	0.65 (0.60, 0.69)	0.81 (0.71, 0.92)	0.63 (0.59, 0.68)
Average number of cigarettes per day	<10	1.96 (1.86, 2.07)	1.77 (1.52, 2.06)	1.98 (1.88, 2.09)
	10-19	1.48 (1.44, 1.52)	1.28 (1.16, 1.41)	1.49 (1.45, 1.53)
	20-29	1.21 (1.19, 1.23)	1.20 (1.11, 1.29)	1.21 (1.19, 1.23)
	≥30 (Ref)	1	1	1
	Age group	20-29 (Ref)	1	1
	30-39	1.11 (1.02, 1.21)	0.87 (0.69, 1.09)	1.12 (1.02, 1.22)
	40-49	1.25 (1.15, 1.36)	0.82 (0.63, 1.06)	1.27 (1.16, 1.38)
	50-59	1.59 (1.46, 1.73)	1.03 (0.79, 1.33)	1.62 (1.48, 1.76)
	≥60	1.83 (1.68, 2.01)	1.48 (1.13, 1.93)	1.83 (1.67, 2.00)
	BMI (kg/m ²)	<23	0.93 (0.92, 0.95)	0.98 (0.91, 1.05)
23-25		1.00 (0.98, 1.02)	1.03 (0.95, 1.12)	1.00 (0.98, 1.02)
≥25 (Ref)		1	1	1
Residential area	Metropolitan	0.87 (0.78, 0.97)	0.69 (0.58, 0.83)	0.88 (0.79, 0.98)
	Non-metropolitan (Ref)	1	1	1
Year	2006 (Ref)	1	1	1
	2007	0.84 (0.75, 0.94)	0.69 (0.55, 0.86)	0.85 (0.76, 0.95)
	2008	0.71 (0.64, 0.80)	0.65 (0.52, 0.81)	0.72 (0.64, 0.80)
	2009	0.95 (0.85, 1.06)	0.98 (0.79, 1.22)	0.95 (0.84, 1.06)

*The results reported in the table did not include alcohol use as a covariate in the models. The results here were almost identical with the results including alcohol use. The ORs for alcohol use were not statistically significant in all three models

Table 3. Reasons Cited by Participants for Failure to Maintain 6-month Smoking Cessation

Variable	Total participants* n=314,302 (%)	Medicaid participants n=16,909 (%)	Regular health insurance participants n=297,393 (%)
Lack of willingness	215,771 (78.7)	12,734 (75.3)	203,037 (68.3)
Stress (mainly work-related)	76,181 (24.2)	2,747 (16.3)	73,434 (24.7)
Withdrawal symptom	3,268 (1.0)	226 (1.3)	3,042 (1.0)
Peer pressure to smoke	10,512 (3.3)	550 (3.3)	9,962 (3.4)
Other (includes weight gain)	8,570 (2.7)	652 (3.9)	7,918 (2.7)

*Among those participants who failed to maintain 6-month cessation, the SCC program was able to contact 73.4% of them who provided the reasons for failure

with stress (16% of Medicaid and 25% of regular health insurance participants). Some 3 percent mentioned peer pressure as the reason.

Discussion

Our results show that SCC participants self-reported a 6-month smoking cessation rate of 46.8%. Participants who received a higher level of behavior counseling reported a higher likelihood of cessation, but participants receiving an NRT package reported a lower likelihood of cessation. Medicaid participants, who had income below the subsistence level, were less likely to report successful 6-month smoking cessation, compared to the regular insurance participants, indicating SES-related inequalities in smoking cessation. Age was shown to be a factor related to SES inequalities for both program participation and for smoking cessation.

Similar cessation programs have been implemented in other countries, but because the cessation services provided and the target populations in those countries differed from Korea, it is difficult to judge how comparable these

cessation rates are. While the SCC program targets all adult smokers in South Korea, the Stop Smoking Services in the UK focuses more on young persons, pregnant women, and economically disadvantaged smokers (Bauld et al., 2005). The 4-week cessation rate of the Stop Smoking Services program was 49% between 2010-2011 (The Health and Social Care Information Center, 2011). In Hong Kong, 2 programs—the Mobile Smoking Cessation Programme targeting elderly smokers aged 60 or older (Abdullah et al., 2008) and the Smoking Cessation Health Centre targeting the general population—yielded quit rates ranging from 24-28% for 6 months (Abdullah et al., 2008) and 18-27% for 12 months (Abdullah et al., 2004). In New Zealand a primary care setting based program providing participants with NRT and supportive consultation in 2000 had 6-month cessation rates that ranged from 23-36% (Richards et al., 2003).

Our data show SES-related inequalities in smoking cessation (42.2% for Medicaid vs. 47.0% for regular health insurance participants). Past studies suggest that SES inequalities may be increasing: smoking cessation patterns over time show a trend toward increasing cessation in

higher SES groups, along with increasing inequalities in smoking in Western countries (Gilpin et al., 2002; Jefferis et al., 2004; Chilcoat, 2009). Other European studies have found that, in general, SES inequalities in smoking and cessation are increasing among younger age cohorts and decreasing among older age cohorts (Federico et al., 2007; Schaap et al., 2008). Our Korean data show that SES inequalities in cessation increase throughout young and middle ages, and start to decrease only at age 60 or older.

The majority of SCC participants who failed to quit smoking during the 6-month program period reported that they were not willing to quit smoking yet. Medicaid participants reported they were less willing to quit than regular health insurance participants. This is consistent with other studies reporting that low SES smokers are less likely to intend to quit, to make a quit attempt, or to be abstinent from smoking (Reid et al., 2010; Sansone et al., 2012; Kishore et al., 2013; Sarkar et al., 2013).

This study is the first comprehensive report using data from more than 800,000 participants enrolled in the national SCC program in Korea between 2006 and 2009. Compared to the rates in programs of other countries, cessation rates for the SCC program are quite high (Gilpin et al., 2002; Schaap et al., 2008). There are several possible explanations for this. First, unlike other western countries where smoking rates have been steadily declining over four decades, Korea experienced a steep decade-long decline from when the base smoking rate was still high (66% in 1998). Therefore, the success rate attributable to the SCC program seems to be accelerating. Second, repeated re-enrollment of some participants may have fueled the higher cessation rate. As part of the national plan to reduce smoking, the SCC program does not deter smokers from re-enrolling in the next period. Eighteen percent of participants re-enrolled between 2005 and 2009. Further, Korean participants are self-selected among smokers, as enrollment is voluntary.

Age is found to be associated with SES disparities in our data. Whereas enrollments in the program are approximately evenly divided across age groups for regular health insurance smokers (exception: 20-29 years of age), the age distribution is much more skewed for Medicaid smokers. For Medicaid smokers, participation rates increase dramatically with age (2.4% for 20-29; 47.5% for ≥ 60). In other words, intention to quit smoking seems lowest for disadvantaged young smokers and highest for oldest. Once enrolled, the rate of cessation is consistently lower for Medicaid participants than for the regular health insurance participants in all age groups. The pattern of such age-related SES inequalities in cessation is found to increase as smokers age, but at age 60 or older the inequalities seem to be slightly attenuated. Given the variation of enrolled participants by age and by SES, specific intervention components targeting certain age in SES subpopulations might lead to a more effective program. Specifically, a focus on disadvantaged younger smokers would result in greater public health benefits by avoiding the more serious future health consequences of smoking.

In our analyses, more behavioral counseling sessions were associated with a higher likelihood of 6-month

smoking cessation among the general public in Korea. The available data (i.e., a total number of behavioral counseling sessions), however, did not differentiate the type of sessions, thus, we were not able to assess the intensity of the intervention being offered. NRT did not appear to be helpful, regardless of the level of behavior counseling sessions participants receive. While the majority of SCC participants received an NRT package, detailed data on NRT adherence were not collected. Our 2009 data show that the mean duration of NRT use was 2 weeks, so it would have been probable that participants who received NRT may not have followed instructions properly (Oh et al., 2012). Absent detailed data on the actual NRT use, we were unable to determine the effectiveness of NRT in our setting. It is also possible that participants who are less willing to quit insist on receiving NRT to a greater degree than participants who are more determined to quit.

Among those who reported failure, more Medicaid participants were not willing to quit yet than regular health insurance participants. As is well documented in the literature, people in low SES groups may have lesser knowledge or may be exposed to an environment promoting smoking, both of which may contribute to an underestimation of the harmful effects on healthy living in the long term, and thus to lower intentions to quit (Sorensen et al., 2002).

As many participants cited stress, mainly work-related, as a reason for failure, program components focusing on how to cope with work-related stress without smoking might help those participants to be successful. Further analysis of who is likely to experience work-related stress would inform the content of such intervention components. Since one-quarter of those who failed the program were not available, firm conclusions about the reasons of failure for those who were missing on the information are not possible.

Strengths of the present study include its use of a large data set from a national program aiming at both disadvantaged and regular smokers; and its focus on SES inequalities across different age groups in smoking cessation. Despite mixed results of the intervention components, our findings would also provide useful information in designing and implementing large scale population targeted interventions, particularly in countries where the cigarette market is growing and where little social support exists for smoking cessation.

Limitations to our study include: First, because the program allows individuals to re-enroll in the program if they fail, individuals might be included in our 4-year data more than once. As such, data for those multiple enrollments would be correlated, potentially underestimating the standard errors of the coefficients in multivariate models. Eighteen percent of participants re-enrolled between 2005 and 2009. Second, as noted earlier, there might be a discrepancy between actual use of NRT and receipt of it among NRT receivers. Although we instructed receivers to follow protocol using NRTs correctly, it was not feasible to verify whether NRT was used as instructed. Therefore, in order to accurately ascertain whether NRT itself was an effective tool for

smoking cessation, more data need to be collected. Third, as 6-month abstinence is based on self-reports, participants may possibly have over-reported their actual success in quitting smoking. A recent study using another Korean population data estimated a 5.3% discrepancy for men when comparing the self-reported rates with the cotinine-verified smoking rates (Jung-Choi et al., 2012). One contributing factor to potential over-reporting is avoiding “loss of face.” In Korea it could be considered as such if one did not succeed in quitting smoking after enrolling in the program. However, one study using a subset of SCC data in which the urine test was conducted from 294 participants for their 4-week cessation reported an excellent agreement score between the self-report and the urine cotinine [κ coefficient=0.79 (95%CI 0.70-0.88)] (Park et al., 2007).

In conclusion, the overall 6-month quit rate was high (46.8%). SES inequalities exist in smoking cessation among Korean adult male smokers in that cessation rates were lower for Medicaid participants than for regular health insurance participants. We find that, along with SES, an age or cohort effect may exist where disadvantaged smokers across all age groups lag in smoking cessation, especially young adult smokers. This point is relevant to those countries where changes in standards of living and healthy life styles occur swiftly, with gaps developing in the adoption of health behaviors, particularly in younger and poorer people. Further investigation is warranted focusing on whether and how a combination of different intervention components might work better with different sub-populations such as a younger, low income population in real world settings.

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