J Korean Med Sci 2006; 21: 843-8
ISSN 1011-8934

The Stages of Change in Smoking Cessation in a Representative Sample of Korean Adult Smokers

This study reports the stages of change in smoking cessation in a representative sample of Korean adult smokers. The study subjects, all adult smokers (n=2,422), were recruited from the second Korea National Health and Nutrition Examination Survey conducted in 2001. The stages of change were categorized using demographic (age and sex), socioeconomic (education, residence, and household income), and smoking characteristics (age at smoking onset, duration of smoking, and number of cigarettes smoked per day). Age-stratified analyses of the association of socioeconomic and smoking characteristics with the stages of change in male and female smokers were also conducted. According to the stages of change, the study population consisted of 37.6% (95% CI, 35.7-39.5) pre-contemplation, 56.0% (54.0-58.0) contemplation, and 6.4% (5.4-7.4) preparation. The associations between the characteristics of the smokers and the stages of change were all statistically significant. The age-stratified analyses showed that all the socioeconomic and smoking characteristics were significantly associated with the stages in males, while education and residence had significant associations in females. This study revealed that a relatively small number of Korean smokers were prepared to quit and the stage distribution might be influenced by demographic, socioeconomic, and smoking characteristics.

Key Words : *Smoking, Behavioral Modification; Behavior Therapy*

Hyung-Joon Jhun, Hong-Gwan Seo*

Department of Occupational and Environmental Medicine, Hangang Sacred Heart Hospital, Hallym University, Seoul; Center for Cancer Prevention and Detection*, National Cancer Center, Goyang, Korea

Received : 9 November 2005
Accepted : 7 March 2006

Address for correspondence
Hong-Gwan Seo, M.D.
Center for Cancer Prevention and Detection, National Cancer Center, 809 Madu1-dong, Ilsandong-gu, Goyang 410-769, Korea
Tel : +82.31-920-1707, Fax : +82.31-920-1520
E-mail : hongwan@ncc.re.kr

INTRODUCTION

Smoking is one of the most serious public health issues in the world. Despite a recent downward trend, smoking remains the most serious public health problem in Korea. Respiratory morbidities are significantly higher in children who had a smoking parent than in those who had not (1). In 1999, premature death due to smoking was estimated at 57.7% in males and 11.4% in females in Korea (2).

A variety of individual and population-based interventions aimed at smoking cessation have been developed. The transtheoretical model is a conceptual theory that has commonly been used for behavioral modification in areas such as smoking cessation, dieting, regular exercise, and seatbelt use (3-5). One of the major contributions of the model is the recognition that individuals progress through a series of stages: recognizing the need to change, contemplating a change, making a change, and finally sustaining the new behavior. The "stages of change" is a central concept in the transtheoretical model. Smokers can be classified into one of three stages. *Precontemplation* describes smokers who are not thinking of quitting. *Contemplation* describes smokers who consider quitting in the next 6 months. *Preparation* describes smokers who intend to quit in the next 30 days and have made a 24-hr quit attempt in the past year. According to the definition, smokers who intend to quit in the next 30 days but have no quit attempt in the past year are not classified into preparation but contemplation stage (6, 7).

Stage-matched interventions can be individualized in response to the needs and characteristics of the individual. Examples of such interventions include stage-matched manuals, short counselor calls, and expert system interventions (8, 9). In addition, the stage of change for smoking cessation has important implications in public health (10). To design interventions that are appropriate for an entire population, information on the stage distribution of smokers in a general population is necessary. Velicer et al. reported the stage distributions for three samples of smokers in the United States (smokers from the states of Rhode Island and California and a total of 114 workplaces in four different geographic locations) and found that approximately 40% were in the pre-contemplation stage, 40% were in the contemplation stage, and 20% were in the preparation stage (11). A study that examined a population of smokers in an Australian general medical practice found that 37, 42, and 21% were in the respective stages (12). However, the stages of change in smoking cessation among Korean smokers have never been reported. Therefore, this study describes the stages of change in a representative

sample of Korean adult smokers.

MATERIALS AND METHODS

The subjects in this study were recruited from participants in the second Korea National Health and Nutrition Examination Survey (K-NHANES) conducted in 2001. The K-NHANES randomly sampled the general Korean population to assess health and nutritional statuses through interviews and health examinations (13).

Of the 37,769 Koreans who provided health and nutrition information for the second K-NHANES, 7,922 adults (aged ≥20) reported their smoking status. Among these, 2,223 males and 226 females were identified as current smokers. We excluded 27 smokers because they did not report a readiness to quit smoking. As a result, 2,422 smokers remained for analysis.

We used two questions from the questionnaire of the second K-NHANES to classify the stages of smokers. The questions were as follows:

Q1. In the last year, have you tried to quit smoking?
1) Yes 2) No
Q2. Are you planning to quit smoking within the next one to 6 months?
1) Thinking of quitting smoking within the next month
2) Thinking of quitting smoking within the next 6 months
3) Thinking of quitting smoking at some point, but not within the next 6 months
4) Absolutely not thinking of quitting

In this study, the stages of change was defined as follows:
Pre-contemplation: The smokers who responded 4) to Q2
Contemplation: The smokers who responded 2) or 3) to Q2, and those who responded 1) to Q2 and 2) to Q1
Preparation: The smokers who responded 1) to Q2 and 1) to Q1

The stages of change in smoking cessation were categorized using demographic (age and sex), socioeconomic (education, residence, and household income), and smoking characteristics (age at smoking onset, duration of smoking, and number of cigarettes smoked per day), as previous studies have found that these characteristics are important (14-18). The percentages of the survey participants in each stage and the 95% confidence intervals were evaluated using demographic, socioeconomic, and smoking characteristics. The Mantel-Haenszel chi-square analysis was used to test trends for individual associations between characteristics and the stages of change.

Age and sex are the most important determinants of health behaviors, including smoking (19). In addition, the reported smoking prevalence in Korean women was much lower than that in Korean men (20). Therefore, sex-specific age-stratified analyses for the association of socioeconomic and smoking characteristics with the stages of change were conducted. The Cochran-Mantel-Haenszel statistics were used to evaluate the statistical significance of these analyses. All the statistical analyses in this study were conducted using the PROC FREQ procedure of the SAS statistical package (21).

RESULTS

The overall smoking prevalence in the adult participants who reported their smoking status (n=7,922) was 30.9% (95% CI, 29.9-31.9). The smoking prevalence was 61.6% (60.0-63.2) in adult Korean males and 5.2% (4.6-5.9) in adult Korean females.

Table 1 shows the distribution of the stages of smoking cessation with their 95% confidence intervals by demographic, socioeconomic, and smoking-related variables. According to the stages of change, the study population consisted of 37.6% (35.7-39.5) pre-contemplation, 56.0% (54.0-58.0) contemplation, and 6.4% (5.4-7.4) preparation. As age increased, the proportion of smokers in the contemplation and preparation stages declined, while the percentage in the pre-contemplation stage increased. A greater percentage of males were in the preparation stage, while a greater percentage of females were in the pre-contemplation stage.

As education increased, the percentage of smokers in the pre-contemplation stage declined, while the percentages in the contemplation and preparation stages increased. A smaller percentage of smokers residing in rural areas were in the preparation stage compared to those residing in cities. The percentage of smokers in the pre-contemplation stage declined as household income increased, while the percentages in the contemplation and preparation stages increased.

Smokers who started smoking at or after 30 yr of age tended to include a greater percentage in the pre-contemplation stage and smaller percentages in the contemplation and preparation stages than those who started smoking when they were younger than 30. Smokers who began smoking when they were 20-29 yr old showed the greatest percentage in the preparation stage among all the age groups. The proportion of smokers in the pre-contemplation stage increased as the duration of smoking increased, while the proportions in the contemplation and preparation stages declined. As the number of cigarettes smoked per day decreased, the proportion of smokers in the preparation stage increased. The observed trends between the characteristics of the smokers and the stages of change were all statistically significant.

The age-stratified analyses showed that all the socioeconomic and smoking characteristics had significant associations with the stages of change in male smokers. After adjusting for age, the proportion of male smokers in the preparation stage in-

Table 1. Distribution of the stages of change in smoking cessation with 95% confidence intervals by demographic, socioeconomic, and smoking characteristics

	No.	Percentage of smokers by stage of change			Trend test (p-value)
		Pre-contemplation % (95% CI)	Contemplation % (95% CI)	Preparation % (95% CI)	
Total	2,422	37.6 (35.7, 39.5)	56.0 (54.0, 58.0)	6.4 (5.4, 7.4)	
Age (yr)					<0.0001
20-29	472	28.4 (24.3, 32.5)	64.0 (59.7, 68.3)	7.6 (5.2, 10.0)	
30-39	679	30.8 (27.3, 34.3)	62.3 (58.7, 65.9)	6.9 (5.0, 8.8)	
40-49	631	34.7 (31.0, 38.4)	59.3 (55.4, 63.1)	6.0 (4.2, 7.9)	
50+	640	54.5 (50.7, 58.4)	40.2 (36.4, 44.0)	5.3 (3.6, 7.1)	
Sex					<0.0001
Male	2,200	36.0 (34.0, 38.0)	57.6 (55.5, 59.7)	6.5 (5.4, 7.5)	
Female	222	54.1 (47.5, 60.6)	40.1 (33.6, 46.5)	5.9 (2.8, 8.9)	
Education					<0.0001
Below high school level	664	55.6 (51.8, 59.4)	41.0 (37.2, 44.7)	3.5 (2.1, 4.9)	
High school	937	34.4 (31.3, 37.4)	58.9 (55.8, 62.1)	6.7 (5.1, 8.3)	
College/University	821	26.8 (23.8, 29.8)	64.8 (61.5, 68.1)	8.4 (6.5, 10.3)	
Residence					<0.0001
Large city	1,087	33.5 (30.7, 36.3)	60.0 (57.1, 62.9)	6.5 (5.1, 8.0)	
Medium-sized city	802	36.5 (33.2, 39.9)	55.7 (52.3, 59.2)	7.7 (5.9, 9.6)	
Rural area	533	47.7 (43.4, 51.9)	48.2 (44.0, 52.5)	4.1 (2.4, 5.8)	
Household income (US $/month)					<0.0001
<500	297	49.2 (43.5, 54.8)	45.8 (40.1, 51.5)	5.1 (2.6, 7.5)	
500-999	273	43.6 (37.7, 49.5)	52.0 (46.1, 57.9)	4.4 (2.0, 6.8)	
1000-1999	867	36.2 (33.0, 39.4)	57.4 (54.2, 60.7)	6.3 (4.7, 8.0)	
2000-2999	580	34.3 (30.5, 38.2)	57.8 (53.7, 61.8)	7.9 (5.7, 10.1)	
3000+	405	32.8 (28.3, 37.4)	60.5 (55.7, 65.3)	6.7 (4.2, 9.1)	
Age at smoking onset (yr)					0.0183
10-19	832	36.5 (33.3, 39.8)	57.9 (54.6, 61.3)	5.5 (4.0, 7.1)	
20-29	1,372	35.3 (32.8, 37.9)	57.6 (55.0, 60.2)	7.1 (5.7, 8.4)	
30+	203	56.2 (49.3, 63.0)	38.4 (31.7, 45.1)	5.4 (2.3, 8.5)	
Duration of smoking (yr)					<0.0001
<10	499	27.9 (23.9, 31.8)	62.3 (58.1, 66.6)	9.8 (7.2, 12.4)	
10-19	752	32.4 (29.1, 35.8)	62.4 (58.9, 65.8)	5.2 (3.6, 6.8)	
20-29	646	37.3 (33.6, 41.0)	56.7 (52.8, 60.5)	6.0 (4.2, 7.9)	
30+	506	54.7 (50.4, 59.1)	39.9 (35.7, 44.2)	5.3 (3.4, 7.3)	
No. of cigarettes smoked per day					<0.0001
<10	380	36.6 (31.7, 41.4)	50.3 (45.2, 55.3)	13.2 (9.8, 16.6)	
10-19	906	31.6 (28.5, 34.6)	61.7 (58.5, 64.9)	6.7 (5.1, 8.4)	
20+	1,114	42.5 (39.7, 45.5)	53.7 (50.8, 56.6)	3.8 (2.7, 4.9)	

creased with education, in urban residents, with household income, for a late age of smoking onset, in those with a short duration of smoking, and in those who smoked a few cigarettes per day (Table 2).

The age-stratified analyses showed that education and residence had significant associations with the stages of change in female smokers (p<0.05). After adjusting for age, the proportion of female smokers in the preparation stage increased with education and in urban residents (Table 3).

DISCUSSION

This study revealed that a relatively small number of Korean adult smokers were prepared to quit smoking compared to the stage distributions found in three samples from the United States and in an Australian general medical practice (11, 12). However, caution must be exercised when making a comparison of the stage distributions based on different studies. The definitions of the stages and the questionnaires used to classify smokers have been modified since the concept of the stages of change was first introduced (22). The definition of the stages and questionnaire used in this study were not exactly same as those used in previous studies (6, 7, 11, 12). Our subjects were a random sample of the general Korean population, while those of the previous American and Australian studies did not represent the general populations of the respective nations. Our results were similar to the population-based national estimates of the stage of change among daily smokers in the United States who responded to the Current Population Survey during the 1990s; in 1992-1993, 59.1, 33.2, and 7.7% of the respondents were pre-contemplators, contemplators, and in

Table 2. Age-stratified analyses of the association of socioeconomic and smoking characteristics with the stages of change in smoking cessation in male smokers (n=2,200)

	No.	20-29 (yr)			30-39 (yr)			40-49 (yr)			50+ (yr)			CMH (*p*-value)
		PC %	C %	P %	PC %	C %	P %	PC %	C %	P %	PC %	C %	P %	
Education														<0.0001
Below high school level	529	38.9	50.0	11.1	45.6	54.4	0	36.6	57.7	5.6	59.3	37.5	3.2	
High school	876	32.2	63.4	4.4	35.1	58.4	6.5	34.6	59.8	5.6	39.0	50.0	11.0	
College/University	795	26.4	64.7	8.9	23.9	68.3	7.8	31.1	62.1	6.8	31.2	58.4	10.4	
Residence														0.0043
Large city	1,001	26.3	67.3	6.5	29.2	64.1	6.8	31.2	64.3	4.5	46.8	46.4	6.8	
Medium-sized city	730	32.6	59.0	8.3	28.4	63.3	8.3	35.7	56.6	7.7	45.6	45.6	8.8	
Rural area	469	32.0	61.3	6.7	40.2	57.3	2.6	37.0	56.5	6.5	57.4	39.1	3.6	
Household income (US $/month)														0.0421
<500	224	42.1	52.6	5.3	30.6	63.3	6.1	37.0	61.1	1.9	54.2	36.1	9.6	
500-999	236	32.6	60.5	7.0	31.8	63.6	4.5	34.2	57.9	7.9	52.3	44.1	3.6	
1000-1999	813	25.4	68.6	5.9	30.9	62.2	6.9	35.6	58.9	5.4	52.2	42.2	5.6	
2000-2999	551	30.3	61.6	8.1	32.5	59.2	8.4	31.0	62.6	6.4	48.9	42.2	8.9	
3000+	376	29.6	60.6	9.9	27.9	68.5	3.6	33.8	58.6	7.5	34.4	60.7	4.9	
Age at smoking onset (yr)														0.0096
10-19	807	30.4	63.9	5.7	32.2	62.3	5.4	37.4	57.9	4.7	56.2	38.5	5.4	
20-29	1,301	28.4	63.2	8.3	29.3	63.7	7.0	32.3	61.0	6.8	48.5	45.0	6.4	
30+	81				42.9	28.6	28.6	33.3	62.5	4.2	40.0	52.0	8.0	
Duration of smoking (yr)														<0.0001
<10	418	27.8	64.2	8.0	25.0	57.1	17.9	14.3	71.4	14.3	33.3	66.7	0	
10-19	695	37.0	60.5	2.5	29.9	64.4	5.7	28.3	66.3	5.4	36.4	54.5	9.1	
20-29	622				41.7	54.2	4.2	34.9	59.1	6.0	37.2	54.7	8.1	
30+	449							35.5	58.1	6.5	52.6	41.4	6.0	
No. of cigarettes smoked per day														<0.0001
<10	291	26.8	59.8	13.4	24.6	55.7	19.7	32.9	52.9	14.3	44.9	43.6	11.5	
10-19	822	24.5	68.1	7.4	24.4	68.6	7.0	27.4	67.4	5.3	44.9	46.2	8.9	
20+	1,068	39.3	58.5	2.2	37.2	59.1	3.8	36.9	58.2	4.9	53.3	43.2	3.5	

PC, pre-contemplation; C, contemplation; P, preparation; CMH, Cochran-Mantel-Haenszel statistic.

the preparation stage respectively. This distribution was similar in subsequent surveys (1995-1996; 1998-1999) (23). Therefore, the characteristics of the subjects must be considered when interpreting stage distributions from different studies.

Our study suggests that the stage distribution of smokers could be influenced by demographic, socioeconomic, and smoking characteristics. Therefore, interventions for transition between the stages of change in smokers should be modified according to the characteristics of the smokers. Both clinical (individual) and public health (population) approaches to treat smokers, especially those who are unwilling to attempt quitting, are needed. On an individual level, a clinician or health care professional can motivate smokers who are in the pre-contemplation and contemplation stages to quit smoking by presenting the benefits of quitting in regard to current and future health, emphasizing the negative consequences of tobacco use and potential benefits of quitting, identifying barriers to quitting, and discussing coping strategies (24, 25). In addition, public health approaches such as tobacco tax increases, the extension to non-smoking areas, the prohibition of tobacco advertisements, and the printing of warning phrases or pictures on tobacco products have been suggested and implemented to induce smokers to quit (26).

The age-stratified analyses showed that all the socioeconomic and smoking characteristics had significant associations with the stages in males, while education and residence had significant associations with the stages in females. This suggests that socioeconomic and smoking characteristics influence the stages of change in male and female smokers in different ways. However, this study could not confirm this point due to the small number of female smokers. Further studies on the differences in smoking behaviors and the stages of change between male and female smokers are needed.

Corresponding to the need to stop smoking to protect public health, the Korean government has implemented various anti-smoking approaches since 2000. In addition to public health approaches, a smoking cessation program at the clinic level was introduced to all public health centers in Korea in 2005. The low proportion of Korean adult smokers in the preparation stage in this study might be due to the recent implementation of these anti-smoking approaches, which may not have had enough time to produce significant effects. The third K-NHANES was still in progress when we conducted this study, and its data were unavailable. Therefore,

Table 3. Age-stratified analyses of the association of socioeconomic and smoking characteristics with the stages of change in smoking cessation in female smokers (n=222)

	No.	20-29 (yr)			30-39 (yr)			40-49 (yr)			50+ (yr)			CMH (*p*-value)
		PC %	C %	P %	PC %	C %	P %	PC %	C %	P %	PC %	C %	P %	
Education														0.0367
Below high school level	135	33.3	66.7	0	50.0	50.0	0	56.3	31.3	12.5	77.7	21.4	0.9	
High school	61	19.2	69.2	11.5	26.3	57.9	15.8	42.9	57.1	0	0	100.0	0	
College/University	26	0	71.4	28.6	26.7	60.0	13.3	33.3	66.7	0	0	100.0	0	
Residence														0.0409
Large city	86	8.7	73.9	17.4	35.3	47.1	17.6	42.9	42.9	14.3	62.5	34.4	3.1	
Medium-sized city	72	30.0	60.0	10.0	29.4	64.7	5.9	50.0	50.0	0	82.8	17.2	0	
Rural area	64	33.3	66.7	0	0	75.0	25.0	66.7	33.3	0	79.6	20.4	0	
Household income (US $/month)														0.8777
<500	73	100.0	0	0	0	100.0	0	30.0	70.0	0	76.3	22.0	1.7	
500-999	37	0	100.0	0	20.0	80.0	0	75.0	25.0	0	65.0	35.0	0	
1000-1999	54	23.1	61.5	15.4	23.1	61.5	15.4	22.2	55.6	22.2	89.5	10.5	0	
2000-2999	29	7.1	78.6	14.3	75.0	0	25.0	100.0	0	0	50.0	50.0	0	
3000+	29	0	66.7	33.3	28.6	57.1	14.3	80.0	20.0	0	100.0	0	0	
Age at smoking onset (yr)														0.9465
10-19	25	16.7	66.7	16.7	0	100.0	0				100.0	0	0	
20-29	71	16.7	72.2	11.1	26.9	57.7	15.4	50.0	50.0	0	71.4	28.6	0	
30+	122				40.0	50.0	10.0	52.0	40.0	8.0	75.9	23.0	1.1	
Duration of smoking (yr)														0.0840
<10	81	17.6	67.6	14.7	30.4	56.5	13.0	41.7	41.7	16.7	58.3	41.7	0	
10-19	57	0	100.0	0	28.6	57.1	14.3	56.3	43.8	0	72.0	28.0	0	
20-29	24				0	100.0	0	66.7	33.3	0	75.0	20.0	5.0	
30+	57										80.7	19.3	0	
No. of cigarettes smoked per day														0.0643
<10	89	16.7	61.1	22.2	30.8	46.2	23.1	50.0	37.5	12.5	66.0	34.0	0	
10-19	84	8.3	83.3	8.3	33.3	61.1	5.6	55.6	44.4	0	83.3	13.9	2.8	
20+	46	33.3	66.7	0	16.7	83.3	0	40.0	40.0	20.0	82.8	17.2	0	

Abbreviations are same as Table 2.

we used the data obtained from second K-NHANES in this study. Further studies are needed to follow the changes in the stage distribution and to evaluate the effectiveness of anti-smoking programs.

REFERENCES

1. Jang AS, Choi IS, Lee S, Nam HS, Kweon SS, Son MH, Lee JH, Park SW, Kim DJ, Uh ST, Kim YH, Park CS. *The effect of passive smoking on asthma symptoms, atopy, and airway hyperresponsiveness in schoolchildren. J Korean Med Sci 2004; 19: 214-7.*
2. Ha BM, Yoon SJ, Lee HY, Ahn HS, Kim CY, Shin YS. *Measuring the burden of premature death due to smoking in Korea from 1990 to 1999. Public Health 2003; 117: 358-65.*
3. Prochaska JO, Diclemente CC, Norcross JC. *In search of how people change. Applications to addictive behaviors. Am Psychol 1992; 47: 1102-14.*
4. Laforge RG, Velicer WF, Richmond RL, Owen N. *Stage distributions for five health behaviors in the United States and Australia. Prev Med 1999; 28: 61-74.*
5. Nigg CR, Burbank PM, Padula C, Dufresne R, Rossi JS, Velicer WF, Laforge RG, Prochaska JO. *Stages of change across ten health risk behaviors for older adults. Gerontologist 1999; 39: 473-82.*
6. Diclemente CC, Prochaska JO, Fairhurst S, Velicer WF, Rossi JS, Velasquez M. *The process of smoking cessation: an analysis of precontemplation, contemplation, and preparation stages of change. J Consult Clin Psychol 1991; 59: 295-304.*
7. Etter JF, Sutton S. *Assessing 'stage of change' in current and former smokers. Addiction 2002; 97: 1171-82.*
8. Prochaska JO, Diclemente CC, Velicer WF, Rossi JS. *Standardized, individualized, interactive, and personalized self-help programs for smoking cessation. Health Psychol 1993; 12: 399-405.*
9. Prochaska JO, Velicer WF, Redding C, Rossi JS, Goldstein M, Depue J, Greene GW, Rossi SR, Sun X, Fava JL, Laforge R, Rakowski W, Plummer BA. *Stage-based expert systems to guide a population of primary care patients to quit smoking, eat healthier, prevent skin cancer, and receive regular mammograms. Prev Med 2005; 41: 406-16.*
10. Prochaska JO. *A stage paradigm for integrating clinical and public health approaches to smoking cessation. Addict Behav 1996; 21: 721-32.*
11. Velicer WF, Fava JL, Prochaska JO, Abrams DB, Emmons KM, Pierce JP. *Distribution of smokers by stage in three representative samples. Prev Med 1995; 24: 401-11.*

12. Zwar NA, Richmond RL, Harris MF. *What proportion of general practice patients are ready to stop smoking? Poster presentation. First National Tobacco Control Conference. Adelaide. 12-14 June 2001.*
13. Korea Institute for Health and Social Affairs. *Korea National Health and Nutrition Examination Survey 2001. Seoul: Ministry of Health and Welfare of Korea, 2001.*
14. Fukuda Y, Nakamura K, Takano T. *Socioeconomic pattern of smoking in Japan: income inequality and gender and age differences. Ann Epidemiol 2005; 15: 365-72.*
15. Cavelaars AE, Kunst AE, Geurts JJ, Crialesi R, Grotvedt L, Helmert U, Lahelma E, Lundberg O, Matheson J, Mielck A, Rasmussen NK, Regidor E, Do Rosario-Giraldes M, Spuhler T, Mackenbach JP. *Educational differences in smoking: international comparison. BMJ 2000; 320: 1102-7.*
16. Patterson JM, Eberly LE, Ding Y, Hargreaves M. *Associations of smoking prevalence with individual and area level social cohesion. J Epidemiol Community Health 2004; 58: 692-7.*
17. Khuder SA, Dayal HH, Mutgi AB. *Age at smoking onset and its effect on smoking cessation. Addict Behav 1999; 24: 673-7.*
18. Breslau N. *Daily cigarette consumption in early adulthood: age of smoking initiation and duration of smoking. Drug Alcohol Depend 1993; 33: 287-91.*
19. Van Loon AJ, Tijhuis M, Surtees PG, Ormel J. *Determinants of smoking status: cross-sectional data on smoking initiation and cessation. Eur J Public Health 2005; 15: 256-61.*
20. Jee SH, Samet JM, Ohrr H, Kim JH, Kim IS. *Smoking and cancer risk in Korean men and women. Cancer Causes Control 2004; 15: 341-8.*
21. Stokes ME, Davis CS, Koch GG. *Categorical data analysis using the SAS system. 1995, Cary, NC: SAS Institute Inc.*
22. Etter JF, Perneger TV. *A comparison of two measures of stage of change for smoking cessation. Addiction 1999; 94: 1881-9.*
23. Wewers ME, Stillman FA, Hartman AM, Shopland DR. *Distribution of daily smokers by stage of change: Current Population Survey results. Prev Med 2003; 36: 710-20.*
24. Anderson JE, Jorenby DE, Scott WJ, Fiore MC. *Treating tobacco use and dependence: an evidence-based clinical practice guideline for tobacco cessation. Chest 2002; 121: 932-41.*
25. Zwar N, Richmond R, Borland R, Stillman S, Cunningham M, Litt J. *Smoking cessation guidelines for Australian general practice. Aust Fam Physician 2005; 34: 461-6.*
26. Levy DT, Chaloupka F, Gitchell J. *The effects of tobacco control policies on smoking rates: a tobacco control scorecard. J Public Health Manag Pract 2004; 10: 338-53.*