Factors Influencing Intermittent Smoking in Male and Female Students in Korea

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Abstract

Background/Objectives: To evaluate influential factors associated with intermittent smoking in male and female students in Korea. **Methods/Statistical Analysis**: This study is the second analytic research on the 2014 10th adolescents' health behavior online raw data. The participants in this study were 35,904 high school students. Collected data were statistically analyzed using a Rao- Scott Chi-Square test and a logistic regression analysis. **Findings:** For male students, influential factors were domicile, the perceived economic status of a household, and the undertaking of physical activities; while for female students, influential factors were having family members who smoke, perceived levels of happiness, and having suicidal ideas. In particular, a detailed analysis of the influential factors showed that having friends who smoke and alcohol use was most strong influential factors. Moreover, a common influential factor for both male and female students was feelings of despair, which can lead to depression and possibly to having suicidal ideas. **Applications/Improvement:** Consideration of gender is important in smoking cessation programs for intermittent smoker. It is also necessary to provide programs to prevent depression in intermittent smoking adolescents.

Keywords: Adolescents, Intermittent Smoking, Students

1. Introduction

Smoking contributes to a wide range of diseases such as chronic obstructive lung disease, cerebrovascular accident, coronary heart disease, diabetes mellitus and multiple organ cancers. Quality of life of the patient with such disease, as well as malignancy, is severely affected[1]. Moreover, more than 30% of the cancer mortality rate is caused by smoking according to the National Center for Chronic Disease Prevention and Health Promotion Office on Smoking and Health[2]. In Korea, there were 46,207 smoking related mortality cases in 2003, and in 2012, this figure increased to 58,155. It was estimated that more than 80,000 people will die due to smoking related health problems in[3].

The adult smoking rate in Korea is as high as 24.1%, with the percentage of male smokers especially high (37.6%). This is the highest rate among OECD member nations[4]. Furthermore, 80% of adolescent smokers continue smoking till adulthood. Accordingly, an emphasis on preventing adolescents from smoking, and influencing smoking cessation is required[5]. More specifically, even though the smoking rate of Korean adolescents is 9.2%, which is relatively lower than that of Canadian adolescents[6], the age people start smoking in Korea is becoming younger, increasing the severity of adolescent smoking[7]. Moreover, the side effects of smoking are associated with not only smoking status but also the frequency of smoking. Generally, intermittent smokers smoke lightly and on a non-daily basis. Most daily smokers suffer from nicotine dependency. In most daily smokers, smoking behavior is triggered by nicotine concentration. In contrast, intermittent smoking is less associated with nicotine dependency[8]. It is more likely triggered by social-environmental factors such as certain environments, drinking, and smoking companies[9].

Nicotine dependency is a serious obstacle to lowering the high smoking rate. The successful smoking cessation rate of daily smokers who want to quit is very low. Most of them fail due to nicotine dependency. This is an

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important fact. Intermittent smoking is not triggered by nicotine dependency. Thus, cessation of smoking is easier for intermittent smokers than it is for daily smokers. Consequently, smoking cessation programs should focus on the intermittent smoker. This would be more cost effective.

Although intermittent smokers smoke fewer cigarettes than daily smokers, they are at high risk of smoking related health problems. According to[10], compared to with non-smokers, intermittent smokers are also reported to have health problems including cardiovascular diseases, malignant neoplasm, and respiratory diseases, placing importance on smoking cessation programs for intermittent smokers. In addition, as the intermittent smoking in adolescents eventually becomes daily smoking, to prevent this, influential factors of intermittent smoking should be investigated. Most of the studies on influential factors concerning the smoking frequency of adolescents have been conducted overseas and, few studies have been undertaken on influential factors associated with intermittent smokers in Korea. Also, an analysis of influential factors based on gender is necessary as smoking rate factors and factors influencing smoking differ significantly according to gender[11,12]. The purpose of this study, then, is to investigate influential factors of intermittent smoking in high school students according to gender.

2. Materials and Methods

2.1 Definition of Terms

2.1.1 Intermittent smoke

An operational definition: He/she is a smoking adolescent who does not smoke every day[13].

2.2 Research Tool

The questionnaire of the 10th Adolescents' Health Behavior Online Research consists of 125 questions covering 15 areas. For this study, adolescents' demographic factors such as domicile and parents' levels of education; family factors such as having family members who smoke and perceived economic status of a household; school factors such as school type, grade, academic performance, and having friends who smoke; and individual health and health related behavior factors such as perceived health status, perceived body figure, perceived level of happiness,

physical activity, body weight control, stress, feelings of despair, having suicidal ideas, alcohol use, and sexual experience were selected as research tools.

2.3 Participants and Method

This study is the second analytic research on the 2014 10th adolescents' health behavior online raw data, conducted by the Ministry of Education, the Ministry of Health and Welfare, and the KCDCP. The data were cleared for use after approval from the KCDCP. The participants in this study were 35,904 high school students from freshmen to seniors. A stratified cluster sampling was used for online sampling and considering stratification variables, cluster variables, and weighted values, a complex sample analysis module was used for analysis. Collected data were statistically analyzed using SPSS 22.0; differences in demographic features, individual health, and features of health related behavior were analyzed using a Rao-Scott Chi-Square test; influencing factors were analyzed using a logistic regression analysis.

3. Results

The participants in this study were 35,904 high school students. 17,907 were male and 17,997 were female. There were 1,990 (5.6%) intermittent smoking students, among them, 1,488 (8.3%) were male and 502 (2.7%) were female (Table 1).

Differences in the socio-demographic characteristics and health related behavior between male students who had never smoked and male intermittent smokers were analyzed. There were significant differences regarding domicile, paternal levels of education, maternal levels of education, having family members who smoke, the perceived economic status of a household, school type, academic performance, having friends, who smoke, physical activity, body weight control, feelings of despair, suicidal ideas, alcohol use, and sexual experience. More specifically, small to middle-sized city domicile, lower

Table 1.　Smoking frequency of study participants

Categories	Male (N=17,907)	Female (N=17,997)	Total (N=35,904)
None	14254 (79.2%)	16956 (94.4%)	31210 (86.50%)
Intermittent	1488 (8.3%)	502(2.7%)	1990 (5.60%)
Daily	2165 (12.4%)	539(2.9%)	2704 (7.90%)

paternal education levels, lower maternal education levels, the presence of a smoking family member, a lower perceived household economic status, vocational school attendance, lower academic performance, the presence of smoking friends, higher physical activity, attempting to control body weight, higher stress levels, the presence of feelings of despair, the presence of suicidal ideas, alcohol use, and sexual experience were associated more with intermittent smokers than with those who had never smoked (Table 2).

For female students, differences in socio-demographic characteristics and health related behavior between those who had never smoked and intermittent smokers are shown in Table 3. There were significant differences in paternal levels of education, maternal levels of education, having family members who smoke, the perceived economic status of a household, school type, academic performance, having friends who smoke, perceived. health status, perceived body figure, perceived levels of happiness, physical activity, body weight control, stress, feelings of despair, suicidal ideas, alcohol use, and sexual experience. More specifically, lower paternal levels of education, lower maternal levels of education, the presence of smoking family members, attendance at a vocational school, lower academic performance, the presence of smoking friends, a lower perceived health status, having a slender figure perception, having feelings of unhappiness, higher level of physical activity, attempting to control body weight, having higher stress levels, the presence of feelings of despair, the presence of suicidal ideas, alcohol use, and sexual experience were associated with intermittent smoking (Table 3).

Factors such as paternal levels of education, maternal levels of education, having family members who smoke, the perceived economic status of a household, school type, academic performance, having friends who smoke, physical activity, body weight control, feelings of despair, suicidal ideas, alcohol use, and sexual experience were common factors for both genders. Factors such as domicile, perceived health status, perceived body figure, perceived level of happiness, and stress showed gender specific associations with intermittent smoking. In order to indentify influential factors among the previously mentioned variables, a logistic regression analysis was performed for both male and female students.

For male students, there were significant differences in domicile, the perceived economic status of a household, school type, academic performance, having friends

who smoke, perceived body figure, physical activity, body weight control, feelings of despair, alcohol use, and sexual experience. For female students, there were significant differences in having family members who smoke, school type, academic performance, having friends who smoke, perceived body figure, perceived levels of happiness, body weight control, feelings of despair, suicidal ideas, alcohol use, and sexual experience. Factors commonly influencing both male and female students were school type, academic performance, having friends who smoke, perceived body figure, body weight control, feelings of despair, alcohol use, and sexual experience (Table 4).

4. Discussion

Smoking rates are significantly different around the world according to gender. According to data on smoking rates of people aged between 15 and 24, as of 2012, the smoking rate of Korean males was 23.8%, Korean females was 4.7%; Canadian males was 14.5%, Canadian females was 10.8%; French males was 31.4%, French females was 24.3%; and American males was 14.6%, American females was 10.7%. These figures point out that the smoking rate of Korean males was 5.06 times higher than Korean females. From a social-cultural view point, male adolescents have more likely been raised to perceive a delinquency, including smoking, as manliness, while female adolescents have more likely been raised to perceive preventing delinquency as womanishness. Generally, most studies have focused on only male adolescents. With the increase in the rate of females smoking rate, however, it is necessary to conduct studies based on gender[14]. Also, factors influencing smoking differ depending on gender. For male students, factors influencing smoking are stress and depression, while female students are self-esteem and social environments, which are believed to provide support for individuals in need. As confirmed in this study, influencing factors for male students and female students were different: domicile, physical activity, and the perceived economic status of a household were influences for male students, while suicidal ideas, having family members who smoke, and perceived level of happiness were influencing factors for female students. In detail, for male students, small or middle-sized city residents are more likely to be intermittent smokers than metropolis residents. Regarding perceived economic status, middle-economic status students are more likely to smoke intermittently than high-economic status students. The undertaking of low to moderate

Table 2. Differences in the socio-demographic characteristics and health related behavior by smoking frequency in male students (N = 17,907)

Variables		Categories	Never smoking (N=14,254)	Intermittent smoking (N=1,488)	x²(p)
Demogra-phic factors	Residence area □	Metropolis	6595(44.7)	606(40.6)	22.097
		S/M sized city	6489(49.7)	713(51.1)	<.001
		Rural area □	1170(5.6) □	169(8.3) □	□
	Paternal level of education □	Middle school	551(3.8)	70(4.4)	50.001
		High school	4573(31.6)	537(36.5)	<.001
		College	7060(50.2)	601(40.7)	
		Unknown □	2070(14.5) □	280(18.4) □	□
	Maternal level of education □	Middle school	442(3.0)	61(3.8)	45.567
		High school	5907(41.3)	622(42.0)	<.001
		College	5728(40.4)	498(33.4)	
		Unknown	2177(15.3) □	307(20.8) □	□
Family factors	Smoking family member	None	7276(51.1)	667(44.8)	21.338
		Yes	6978(48.9)	821(55.2)	<.001
	Perceived economic status of household □	High	4403(31.1)	423(28.5)	35.134
		Middle	9180(64.2)	943(63.4)	<.001
		Low □	671(4.6) □	122(8.1) □	□
School factors	School type □	General	12219(84.0)	1085(70.1)	52103.186
		Special □	2035(16.0) □	403(29.9) □	<.001 □
	Grade	1	5050(34.7)	509(33.4)	.937
		2	4779(33.3)	503(33.9)	.705
		3	4425(32.0)	476(32.6)	
	Academic performance □	High	5350(37.4)	386(25.9)	148.034
		Middle	7458(52.6)	827(55.3)	<.001
		Low	1446(10.0)	275(18.8)	□
	Smoking friends	None	4013(27.7)	49(3.6)	417.843
		Yes	10241(72.3) □	1439(96.4) □	<.001 □
Individual factors	Perceived health status □	High	10410(72.9)	1078(72.3)	.896
		Moderate	2969(20.9)	309(20.8)	.654
		Low □	875(6.2) □	101(6.9)	□
	Perceived body figure	Thin	4789(33.5)	543(36.7)	8.503
		Average	4428(31.0)	462(31.2)	.037
		Obese □	5037(35.5) □	483(32.1) □	□
	Perceived happiness □	Happy	8967(62.6)	858(58.1)	11.861
		Moderate	3976(28.0)	469(31.6)	.009
		Unhappy □	1311(9.3) □	161(10.3) □	□
	Physical activity	None	3637(26.2)	290(19.3)	48.807
		Low	5108(35.7)	522(35.0)	<.001
		Moderate	4191(29.1)	524(36.1)	
		High □	1318(9.0) □	152(9.6) □	□
	Body weight control	No-try	8173(57.4)	745(49.1)	38.465
		Try	6081(42.6)	743(50.9)	<.001
	Stress □	High	4527(31.9)	536(36.7)	18.660
		Moderate	6593(46.1)	680(45.1)	<.001
		Low	3134(22.0)	272(18.2)	□
	Despair feeling □	None	11079(77.8)	987(66.0)	105.208
		Yes	3175(22.2)	501(34.0)	<.001
	Suicidal idea □	None	12796(89.7)	1265(85.1)	30.209
		Yes	1458(10.3)	223(14.9)	<.001
	Alcohol use □	None	6542(46.0)	156(10.0)	717.820
		Yes	7712(54.0)	1332(90.0)	<.001
	Sexual experience	None	13540(94.8)	1222(81.8)	380.670
		Yes	714(5.2)	266(18.2)	<.001

Table 3. Differences in the socio-demographic characteristics and health related behavior by smoking frequency in female students (N = 17,997)

Variables		Categories	Never smoking (N=16,956)	Intermittent smoking (N=502)	x²(p)
Demogra-phic factors	Residence area □	Metropolis	7649(44.3)	212(40.8)	2.397
		S/M sized city	8084(49.4)	247(52.0)	.458
		Rural area	1223(6.4)	43(7.2)	□
	Paternal level of education □	Middle school	565(3.2)	26(5.3)	81.419
		High school	6033(35.5)	207(40.7)	<.001
		College	8208(48.8)	154(31.0)	
		Unknown	2150(12.4)	115(23.0)	□
	Maternal level of education □	Middle school	548(3.1)	18(3.5)	73.921
		High school	8001(47.4)	252(49.2)	<.001
		College	6543(38.7)	129(25.4)	
		Unknown	1864(10.8)	103(21.8)	□
Family factors	Smoking family member □	None	7800(46.2)	170(31.8)	39.256
		Yes	9156(53.8)	332(68.2)	<.001
	Perceived economic status of household □	High	4265(25.1)	106(21.2)	33.684
		Middle	11955(70.4)	347(68.6)	<.001
		Low	736(4.5)	49(10.0)	□
School factors	School type □	General	14373(85.4)	303(62.6)	70449.415
		Special	2583(14.6)	199(37.4)	<.001
	Grade □	1	5473(32.9)	147(32.1)	1.441
		2	5773(33.9)	177(32.1)	.561
		3	5710(33.3)	178(35.8)	□
	Academic performance	High	5751(33.6)	110(20.9)	91.550
		Middle	9620(57.0)	284(57.7)	<.001
		Low	1585(9.4)	108(21.3)	□
	Smoking friends	None	10911(64.5)	24(4.8)	714.862
		Yes	6045(35.5)	478(95.2)	<.001
Individual factors	Perceived health status □	High	10564(62.4)	253(51.1)	26.323
		Moderate	4857(28.6)	186(36.2)	<.001
		Low	1535(9.6)	63(12.8)	□
	Perceived body figure	Thin	2906(16.9)	109(22.1)	9.257
		Average	5881(34.7)	165(34.0)	.013
		Obese	8169(48.4)	228(43.9)	□
	Perceived happiness □	Happy	9836(58.2)	198(38.7)	86.099
		Moderate	5498(32.3)	204(42.8)	<.001
		Unhappy □	1622(9.5)	100(18.6)	□
	Physical activity	None	7980(47.0)	224(44.5)	19.417
		Low	6018(35.8)	153(32.1)	.001
		Moderate	2359(14.0)	95(16.9)	
		High	599(3.3)	30(6.4)	□
	Body weight control	No-try	7603(45.0)	168(33.3)	26.027
		Try	9353(55.0)	334(66.7)	<.001 □
	Stress □	High	7971(46.6)	313(61.7)	43.527
		Moderate	7139(42.4)	155(31.2)	<.001
		Low	1846(11.0)	34(7.0)	□
	Despair feeling □	None	11563(68.3)	217(43.0)	137.563
		Yes	5393(31.7)	285(57.0)	<.001
	Suicidal idea	None	14710(86.9)	339(67.6)	147.804
		Yes	2246(13.1)	163(32.4)	<.001
	Alcohol use	None	9077(53.9)	26(5.2)	446.226
		Yes	7897(46.1)	476(94.8)	<.001 □
	Sexual experience	None	16516(97.4)	397(78.0)	578.208
		Yes	440(2.6)	105(22.0)	<.001

Table 4. An analysis of factors influencing intermittent smoking in male and female students in Korea(N = 35,904)

Variables		Categories	Male (N=17,907) Odds Ratio	p	Female (N=17,997) Odds Ratio	p
Demogra-phics factors	Residence area	Metropolis(Ref.)				
		S/M sized city	1.111	0.118		
		Rural area	1.564	<.001		
Family factors	Smoking family member	None(Ref.)				
		Yes			1.248	.048
	Perceived economic status of household	High(Ref.)				
		Middle	0.830	.003		
		Low	1.112	.394		
School factors	School type	General(Ref.)				
		Special	2.029	<.001	2.322	<.001
	Academic performance	High(Ref.)				
		Middle	1.494	<.001	1.680	<.001
		Low	2.560	<.001	2.461	<.001
	Smoking friends	None(Ref.)				
		Yes	7.116	<.001	15.302	<.001
Individual factors	Perceived body figure	Obese(Ref.)				
		Average	1.187	.029	1.388	.003
		Thin	1.300	<.001	2.004	<.001
	Perceived happiness	Happy(Ref.)				
		Moderate			1.450	.001
		Unhappy			1.468	.027
	Physical activity	None(Ref.)				
		Low	1.309	<.001		
		Moderate	1.509	<.001		
		High	1.131	.210		
	Body weight control	No-try(Ref.)				
		Try	1.159	.015	1.384	.001
	Despair feeling	None(Ref.)				
		Yes	1.336	<.001	1.392	.003
	Suicidal idea	None(Ref.)				
		Yes			1.502	.001
	Alcohol use	None(Ref.)				
		Yes	5.327	<.001	8.337	<.001
	Sexual experience	None(Ref.)				
		Yes	2.873	<.001	3.657	<.001

physical activity also influences intermittent smoking more than the undertaking of no physical activity. For female students, having smoking family members increased the likelihood of intermittent smoking. Intermittent smoking was also influenced by the perceived levels of happiness in female students. Students with low perceived levels of happiness status are more likely to smoke intermittently than students with high perceived levels of happiness. Female students with suicidal ideas also have a significantly increased likelihood of intermittent smoking.

Most of these findings are similar to previous studies. School type was associated with intermittent smoking in both genders. In a previous study vocational high school students were more likely to smoke than general high school students[15]. Low academic performance and having smoking friends are factors influencing intermittent smoking in this study. These results are similar to previous study[16]. Feelings of despair are also an influential factor for both genders. Feelings of despair are associated with depression, and possibly with suicidal

ideas. Thus, smoking cessation programs must be made considering mental health. In this study, behavioral problems of adolescents such as alcohol consumption and sexual experience are factors contributing to intermittent smoking. This is similar to the results of previous study. Among those influential factors, the presence of smoking friends is the most influential factor. It showed strong association with intermittent smoking in both genders. As shown in this study, intermittent smoking is caused more by socio-environmental factors than by nicotine dependency.

Though these findings are similar to some previous studies, a more detailed analysis is required in the future. Intermittent smoking adolescents are more likely to develop into everyday smokers; however, as their dependency on nicotine is still low, they can be effective objects of smoking cessation intervention. In addition, it was found that some smoking students took advantage of smoking as a means of weight control, and sexual experience was a factor influencing intermittent smoking. Consequently, it is necessary to provide appropriate weight control methods and knowledge of sexual matters through hygiene and health education programs. Furthermore, it is necessary to improve emotional support and mental health promotion programs for students who have smoking friends, have feelings of despair, suffer from depression, and have suicidal ideas.

5. Conclusion

Therefore, we conclude that gender should be considered in the development and application of smoking cessation programs for adolescents. Also, the programs should reflect the factors that increase the likelihood of intermittent smoking. Intermittent smoking is relatively easy to quit than daily smoking. Intermittent smokers must quit. If they do not, they will likely become daily smokers. This study evaluated factors influencing intermittent smoking between non-smoking groups and intermittent-smoking groups. Further studies that evaluate factors for intermittent smoking, among daily-smoking and intermittent-smoking groups are necessary.

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