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Study of Relationship between E-Cigarette Selection Factors and Smoking Cessation Attempts

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ABSTRACT

Introduction: Most of previous studies on E-cigarette were focused on adolescents and adults or factors related to the use of E-cigarette. The relationship between E-cigarette selection factors and smoking cessation attempts among college students has not been reported yet.

Objective: The objective of this study was to analyze the relationship between perception of E-cigarette and smoking cessation attempts in college students known to have strong mental and physical maturity, social justice, and ideals compared to adolescents and have strong desire. This study used data from the Korea National Health and Nutrition Examination Survey in 2016. Subjects were 36 college students enrolled in school who had E-cigarette experience. Linear regression analysis was performed to identify factors influencing smoking cessation using SPSS version 25.0.

Result: Regarding factors influencing smoking cessation, both model 1 and model 2 revealed that those who perceived E-cigarette to 'help quit smoking and be less harmful than cigarette' were more likely to have cessation attempt. In Model 2, frequency of binge drinking was more likely to affect smoking cessation in 'less than 4 times a month' compared to 'more than 4 times a month'.

Conclusion: A health policy should be established so that continuous smoking cessation support services can be provided to college students along with a healthcare approach to disseminate proper awareness of E-cigarette.

Key Words: E-cigarette, Cigarette, Smoking cessation, Perception, Healthcare

INTRODUCTION

Smoking is a major cause of death due to respiratory and cerebrovascular diseases including various cancers. It affects most of the body and causes not only various diseases but also contributes to low weight and diseases of newborn baby in the case of female smokers.[1]

According to the World Health Organization report, about 4 million people die from smoking each year, and by 2020, the death toll is expected to reach 10 million.[2] In Korea, the rate of daily smoking among adults was 20.0% in 2014, which is higher than the average daily smoking rate of 19.7% among OECD adults and the third highest among OECD member countries. The smoking rate of adults aged above 19 years decreased gradually from 66.3% in males and 6.5% in females in 1998, to 43.2% in males and 5.7% in females in 2014. The average smoking rate of males (43.2%) was higher than the total smoking rate (24.2%).[3]

In particular, college students constitute a high percentage of population and college student smokers are more likely to become smokers during their lifetime. This addiction causes not only individual health burden and cost but also social costs, as well as increasing medical use in the elderly population.[4-8]

E-cigarette is a battery-powered device that can vaporize e-liquid containing various chemical substances such as nicotine, flavors, propylene glycol, glycerol, etc. Smokers inhale the vapor from e-cigarette. Various types of products are being developed and sold, ranging from first-generation products such as disposable 'Cigalike' to third-generation high-end mechanical devices.[9,10] In Korea, 80% of smokers know about E-cigarette, 16% of them have tried E-cigarette, and

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15% of them have used E-cigarette daily.[11] E-cigarettes have been increasingly used among smokers since their introduction in the US, Europe, and Korea.[12]

With the increasing use of E-cigarettes, and issues related to the safety and smoking cessation effects of E-cigarette, under the World Health Organization's Framework Convention Alliance for Tobacco Control (2014) 179 countries unanimously agreed to regulate all types of products promoting the use of tobacco, with or without nicotine.[13] Until the evidence suggests that E-cigarette is safe, governments should prohibit the indoor use of E-cigarette and stop their promotion or advertisements as a means of smoking cessation. In addition, the results of clinical studies on the effects of smoking cessation have not been reported, and the safety controversy remains in the presence of harmful substances in the cartridge, apart from the presence or absence of nicotine.[14] Recent studies have shown that E-cigarette is potentially dangerous and increases the risk of vascular injury,[15] and adversely affects respiratory, gastrointestinal, cardiovascular, and nervous systems, with negative effects on the immune system[16] and cardiovascular disease.[17]

In a previous study, e-cigarette is less harmful to health than general tobacco, and helps to reduce general consumption of tobacco as a smoking cessation aid and alleviates withdrawal symptoms and facilitates smoking cessation.[18] In Korea, 83.9% of respondents were aware of E-cigarette in the cognitive survey conducted by Ministry of Health & Welfare, in which 40.1% of respondents answered that E-cigarette was a substitute for tobacco to quit smoking, and 37.2% responded that E-cigarette was less harmful to health than general tobacco.[19] In addition, E-cigarette was considered more economical, or had the effect of smoking without smoke.[11] Also, most of the studies were conducted on youth and adults,[20,21] and were related to factors associated with E-cigarette use and experience.[22,23,24] There are no studies on the relationship between E-cigarette selection factors and smoking cessation attempts among college students.

Therefore, this study aims to analyze the relationship between perception of E-cigarette and smoking cessation attempts among college students known to have strong mental and physical maturity, social justice, and ideals compared with adolescents, and have a strong desire.[26] In the future, we will attempt to improve smoking experience and abuse of smoking habits by college students, and provide basic data necessary for healthcare approaches such as e-cigarette regulation and policy development.

METHODS

Subjects

This study used data derived from the 2016 Korea National Health and Nutrition Examination Survey conducted by Ministry of Health and Welfare. The subjects of the analysis included 36 college students who were enrolled in school or had a leave of absence, and who had E-cigarette experience, except subjects who had no response or response errors.

Methods

The Korea National Health and Nutrition Examination Survey data using the questionnaire related to E-cigarette were developed for the first time in 2016. The dependent variable used the question, "Have you ever tried to quit smoking?", and was configured to respond with "no = 0" and "yes = 1". E-cigarette perception was based on the question, "What is the main reason for choosing E-cigarette?", and was configured to respond with "It seems to be less harmful than cigarette = 0", "It seems to help to quit smoking = 1", "You can smoke indoors = 2", "easily obtainable = 3", "better flavor = 4", " I like fragrance = 5 "," I cannot smell the cigarette = 6 "," I am curious = 7 ", or " Other = 8". In this study, only responses excluding non-response and missing values were used.

Data analysis

Data analysis was done by using frequency analysis and chi-square test to analyze the general characteristics and E-cigarette perception of the subjects, and the relationship with the smoking cessation attempt using SPSS version 25.0. A linear regression analysis was performed to analyze the factors influencing smoking cessation attempts of subjects. We assessed the significance of all tests at p =0.05, with a 95% confidence interval.

RESULTS

Subject characteristics

The general characteristics of the subjects were as follows: 91.7% males, 58.3% engaged in economic activity, and 63.9% started smoking below age 19 years. In terms of average number of cigarettes smoked per day, 'under 10 cigarettes' was the most common (41.7%) and with regard to frequency of binge drinking, 'less than 4 times per month' was the most common (55.6%) **(Table 1)**.

Table 1: Subject Characteristics

Variables		N	%
Gender	Male	33	91.7
	Female	3	8.3
Economic activities	Yes	21	58.3
	No	15	41.7
Age at smoking onset	<19 years	23	63.9
	≥19 years	13	36.1
Average no. of cigarettes smoked per day	≤10 cigarettes	15	41.7
	11-≤20 cigarettes	12	33.3
	≥21 cigarettes	9	25.0

Table 1: *(Continued)*

Variables		N	%
Frequency of binge drinking	<less than 4 times	20	55.6
	≥more than 4 times	16	44.4
Total		36	100.0

Relation between General Characteristics and Smoking Cessation Attempts

Based on the analysis of the relationship between general characteristics and e-cigarette selection, in the case of frequency of binge drinking, 95.0% of respondents who answered 'less than 4 times a month' and 66.8% of respondents 'more than 4 times a month' chose 'I have tried smoking cessation'. In terms of reasons for E-cigarette selection, 100.0% of the respondents who answered 'It seems to be less harmful than cigarette' and 'It seems to help to quit smoking' chose 'I have tried to quit smoking'. Half of the respondents who answered 'I can smoke indoor' and 71.4% of respondents who answered 'better flavor' chose the option, 'I have tried to quit smoking'. Frequency of binge drinking and reasons for the selection of E-cigarette were statistically significant **(Table 2)**.

Table 2: Relationship between General Characteristics and Smoking Cessation

Variables		Smoking Cessation Attempts						
		No		Yes		Total		χ^2(p)
		N	%	N	%	N	%	
Gender	Male	5	15.2	28	84.8	33	100.0	0.655
	Female	1	33.3	2	66.7	3	100.0	
Economic activities	Yes	3	14.3	18	85.7	21	100.0	0.206
	No	3	20.0	12	80.0	15	100.0	
Age at smoking onset	<19 years	4	17.4	19	82.6	23	100.0	0.024
	≥19 years	2	15.4	11	84.6	133	100.0	
Average no. of cigarettes smoked per day	≤10 cigarettes	3	20.0	12	80.0	15	100.0	0.320
	11-≤20 cigarettes	2	16.7	10	83.3	12	100.0	
	≥21 cigarettes	1	11.1	8	88.9	9	100.0	
Frequency of binge drinking	<less than 4 times	1	5.0	19	95.0	20	100.0	4.410*
	≥more than 4 times	5	31.3	11	68.8	16	100.0	
Reason for selecting E-cigarette	It seems to be less harmful than cigarette	0	0.0	6	100.0	6	100.0	8.229*
	It seems to help with quitting smoking	0	0.0	12	100.0	12	100.0	
	Can smoke indoor	2	50.0	2	50.0	4	100.0	
	Better flavor	4	28.6	10	71.4	14	100.0	

Factors Affecting Smoking Cessation Attempts

Analysis of factors affecting smoking cessation attempts suggested that in the case of E-cigarette selection, Model 1 was found to affect smoking cessation more when the reason for E-cigarette selection was stated as 'helpful to quit smoking and less harmful than tobacco' compared with 'better flavor'. The reasons for E-cigarette selection were statistically significant ($p<0.05$). Model 2 was found to affect smoking cessation more when the reason for E-cigarette selection was stated as 'helpful to quit smoking and less harmful than tobacco' compared with 'better flavor'. In the case of frequency of binge drinking, 'less than 4 times a month' affects smoking cessation more than 'more than 4 times a month'. The reasons for E-cigarette selection and frequency of binge drinking were statistically significant ($p<0.05$) **(Table 3)**.

Table 3: Factors Affecting Smoking Cessation Attempts

Variables	Model 1	Model 2
	B	β
(Constant)	2.0390***	2.709***
Reason for selecting E-cigarette	-0.059*	-0.070*
Gender		-0.282
Economic activities		-0.060
Age at smoking onset		0.098
Average no. of cigarettes smoked per day		0.009
Frequency of binge drinking		-0.326*

*p<0.05, *** p<0.001; Reason for selecting E-cigarette (0= It seems to be less harmful than cigarette, 1= It seems to help with quitting smoking, 2=Can smoke indoor, 3=Better flavor), Gender (0=Male, 1=Female), Economic activities (0=Yes, 1=No), age at smoking onset (0=<19 years, 1=≥19 years), Average no. of cigarettes smoked per day (0=less than 10 cigarettes, 1=11-≤20 cigarettes, 2=≥21 cigarettes), frequency of binge drinking (0=<4 times a month, 1=≥4 times a month)

DISCUSSION

E-cigarette is growing rapidly as a substitute for general tobacco, and by 2050, the proportion of E-cigarette among all tobacco products is expected to reach 4%.[9,13,27] The purpose of this study was to analyze E-cigarette perception and smoking cessation attempt among college students.

As a result of analysis of the relationship between general characteristics and smoking cessation attempts, the frequency of binge drinking and the reasons for E-cigarette selection were statistically significant ($p < 0.05$ for each) in relation to smoking cessation. According to Cha (2015) reasons for choosing E-cigarette were 56.1% to "quit smoking" and 55.1% to "control smoking". These results suggest that the reason for choosing E-cigarette was to reduce the amount of smoking and ultimately to quit smoking.[28,29]

As a result of analysis of the factors influencing smoking cessation attempt, in the case of E-cigarette selection reason, Model 1 showed a greater likelihood to quit smoking when the reason stated was 'help quit smoking and be less harmful than cigarette' compared with 'better flavor'. In model 2, as factors underlying E-cigarette selection, individuals were more likely to quit smoking when the reason was 'help quit smoking and be less harmful than cigarette' compared to 'better flavor'. In the case of frequency of binge drinking, 'less than 4 times a month' affected smoking cessation attempts more compared with 'more than 4 times a month'. These findings are in line with previous studies that suggest that E-cigarette helps smoking cessation,[30,31] that smoking E-cigarette was less harmful than tobacco,[32,33] and that it facilitated smoking reduction.[34,35] The actual E-cigarette experience rate was 9.2% p higher when there was smoking cessation plan (15.6%) compared with no plan (24.8%), and the cigarette experience rate varied according to the smoking cessation plan.[36,37] E-cigarette sales companies are promoting E-cigarette as a smoking cessation aid[38] to help quit smoking via the Internet. Actually, younger people are using E-cigarette more and more.[36,39]

CONCLUSION

Based on the results of this study, policy recommendations are as follows. First, institutional improvement is needed to insert a statement that the hazard pictogram for health and E-cigarette is not objective as a smoking aid or as harmless to human body. Second, smoking education is needed through various activities and educational channels for college students. Particularly, regular health education and steady promotion should be done to spread the right awareness about E-cigarette. Third, health policy and healthcare approaches should be made to promote and provide smoking cessation support services and proven smoking cessation aids for adults as well as college students.

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