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Determination of Factors Impacting Smoking Habits of University Students: An Empirical Analysis from Turkey

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ABSTRACT The aim of this study is to determine the main factors impacting cigarette smoking habits of university students. In order to achieve this aim, the primary data obtained from face to face questionnaire conducted with 260 university students was used for the *Zero the Altered Poisson Regression Model*. The results of the study showed that the students' age ranged from 18 to 35 years and 55.4 percent of these were women. Besides, twenty-three percent of the total students smoked, and 83.3 percent of them were men. Average monthly cigarette consumption amount was five packs per student. The results highlighted that of the 19 factors that effected on smoking, 16 were statistically significant. If the prohibitions applied by the government on smoking are implemented, and cigarette taxes are increased, it could be decreased smoking rates in young people. By being conducting effective campaigns related to public health on social and real media, the smoking rate could be decreased considerably.

INTRODUCTION

The smoking rate was reported as forty-eight percent and fifteen percent for men and women worldwide in 2010s, respectively (Giovino et al. 2012). According to Global Adult Tobacco Survey (GATS), approximately 16 million people used the tobacco products, and smoking rate was 31.2 percent in Turkey in 2008. Also, these proportions for men and women were 47.9 and 15.2 percent, respectively (GATS 2010). In Turkey in 2012, on the other hand, about 14.8 million people (27.1%) used tobacco products, and smoking proportions for men and women were calculated as 41.5 percent and 13.1 percent, respectively (GATS 2014). Comparing the smoking rates in 2008 and 2012, smoking tendency decreased considerably. The most important factors on this decrease were the cigarette smoking prohibition in all indoor spaces in Turkey since May 19, 2008 (Anonymous 2015a), mandatory pictorial warnings added on cigarette packs, and cigarette prices raised by the Turkish government (GATS 2014).

While the smoking rate has decreased generally in developed countries, it has also increased steadily for women and children in developing countries in recent years. Therefore, cigarette marketers have developed the effective marketing tactics and strategies for women and young people in developing countries (Gil-Lacruz et al. 2015). The first international tobacco control treaty, the Framework Contract on Tobacco Control, was underwritten in Geneva on May 21, 2003. This legally binding treaty provided powerful new tools to the nations to protect the health of their nationals from the tobacco industry's deceptions and slick marketing (Oguzturk and Gulcu 2012; Anonymous 2015b). As a result of this treaty, the Ministry of Health in Turkey arranged the "Action Plan of National Tobacco Control Program", and put it into effect quickly. The main intention of this program was to increase the rates of non-smokers over and under 15 years to eighty percent and one hundred percent until 2010 in Turkey, respectively (Oguzturk and Gulcu 2012).

However, smoking rates have started to rise again after 2012 in Turkey due to the deficiencies in the application of the laws preventing smoking, and the inefficiency of local public controls with regard to smoking. Especially, smoking habits among young people, therefore, has started to increase critically. They were stimulated to smoke by the most important motivation sources under the effects of references groups such as their families, collage friends/mates, and role models.

Their smoking rates have increased considerably and so have their exposed expenditure rates within total disposable income. The total cost of their smoking includes not only the cig-

arette materials but also the medical expenditures undertaken with smoking. When considered only their cigarette material expenditure per households in 2013, their total cigarette material cost was calculated as USD 197.8 (USD 53.5*3.7 persons) with average USD 53.5 expenditure per capita. This value calculated for only cigarette material was approximately half of the minimum wage (USD 404.7) in Turkey (TURKSTAT 2015). When adding the medical expenditures to this cost calculated, the total cost of smoking has reached to higher figures for young people in recent years. In order to eliminate the cost pressures on the national economy, and to provide a more healthy population, the governments have always cautioned the young smokers by means of effective anti-smoking campaigns by administering controlled laws that prevent smoking.

In recent studies conducted by some researchers, it was argued that the young smokers must be often warned by anti-smoking campaigns, and it should be also cut the links with their reference groups stimulated by motivating their smoking. Actually, the results of the studies conducted by Gil-Lacruz et al. (2015) and Mansour et al. (2015) reported that the increasing rate smoking of young and women were worrisome, and thus they should be informed about the adverse health effects of cigarettes under several campaigns carried out by the governments. On the other hand, it was highlighted that the religious beliefs, the most respected persons, parents and friends' smoking attitudes and behaviors were strongly associated with the students' smoking habits (Liu et al. 2015; Mansour et al. 2015; Mudhovozi and Niyanga 2015; Akl et al. 2013; Rhodes and Ewoldsen 2009.

In light of these results, determining the core motivation sources of young smokers is of paramount importance to conduct the effective anti-smoking campaigns to prevent the same. This study was, thus, designed to determine the factors influencing smoking habits of the university students, and then to make some recommendations to university students, and to help them reduce their smoking by considering these factors.

MATERIAL AND METHODS

The main material of the research was obtained from face-to-face interviews conducted with 260 students in May 2014 at Bayburt University. On the other hand, the data obtained from various institution and organizations as well as the scientific research project reports and papers also included in the secondary data of the study.

Sampling Method

According to the information obtained from the student affairs, the sample size was determined. In order to calculate the sample size, the following equation was used (Newbold 2011).

$$n = \frac{Np(1-p)}{(N-1)\sigma_{px}^2 + p(1-p)} = 260 \quad (1)$$

$$\sigma_p^2 = \left(\frac{r}{z_{\frac{\alpha}{2}}}\right)^2 = \left(\frac{0.05}{1.64}\right)^2 = 0.00093 \quad (2)$$

Where,

n = sample size (260)

N= student population (the number of students educated at the university) (5842)

p = smoking probability (0.5)

$Z_{\alpha/2}$: = z value (1.64 for 90% confidence level),

σ^2_p : variance

r: deviation from the average (±0.05)

Participants

This study was carried out with 260 participants, and they were randomly selected from four faculties including engineering, education, economics and administrative sciences and technology. By taking into consideration the number of the women and men students in each faculty, their numbers were determined proportionally. The number of women participants was higher than men (144 women and 116 men).

Instrumentation

The questionnaire comprised of 32 items revised and obtained from previous studies, and then these surveys were presented in four sections to the participants. The first and second sections covered the socioeconomic and demographic characteristics, and daily life activities and study conditions of the students. The third and final sections included in the cigarette quantity used and total cigarette expenditure of the

students, and their attitude and behavior towards smoking. Participants of the study were asked to answer to each statement stating the significance level of smoking attributes for them. A Likert-type scale was used (where 1 refers to the least important and 5 refer to the most important attribute).

Pilot Study

In order to prepare the final survey forms, a pilot study was administered by the researchers. In order to test whether or not the students understood the questionnaires, and whether these were wrong and deficient, a pre-survey study was designed, and then the final survey forms were prepared following the necessary corrections.

Data Collection

After the aim of the study was explained clearly to the students, the answers of the students were marked on the final survey forms by the researcher within 15-20 minutes. This survey study was completed in May 2014. Following the data collected, the data was controlled and then entered into the computers by the researchers.

Statistical Analyses

The Limdep 4.0 statistical package program was used for the *Zero Altered Poisson Regression Model Analysis*. The analysis was applied to measure the effects on smoking of the socioeconomic and demographic characteristics along with the behavioral attributes of the young consumers. The parameter coefficients in the analysis were estimated by the *Zero Altered Poisson Regression Model*. Individual and group significances of these coefficients were tested using *z* and *Tau and log-likelihood statistics*, respectively. In order to evaluate any econometrical problem among the variables, they were tested by considering *the variance-inflating factor (VIF)* and *Durbin-Watson d statistics*, respectively. Multicollinearity among variables was detected by calculating the VIF (Topcu et al. 2015).

Ethical Consideration and Human Rights

After getting the assents of the respondents, giving detailed information and explanations about the questionnaires, and explaining to be not recorded with writing of confidential individual information (name, phone number, and address), the survey study was started. On the other hand, it was also stated that if the respondents were bored and tired, they could be separated from the questionnaire without answering so that they did not remain under a psychological effect.

RESULTS

The demographic and socioeconomic characteristics of the students smoking and non-smoking are shown in Table 1. The data was obtained from 260 participants (144 women, 116 men) ranging from 18 and 35 years in age. While 55.4 percent of the respondents were the female and seven percent of them smoked, the smoking rate of the male was 43.1 percent. Although the average ages of the female and male were 21.9 and 22.9 years, those of smoking female and male were 23.0 and 23.3 years. The results represented that the majority of the students started smoking in the first years of university education.

Average monthly expenditures and smoking expenditures of the female and male were USD 258.3 and USD 308.0, USD 3.7 and USD 32.8, respectively. On the other hand, those of smoking female and male were USD 335.7 and USD 53.3, and USD 365.7 and USD 76.0. The average monthly expenditures of non-smoking female

Table 1: Some socio-economic and demographic characteristics of the participants *(N=260)*

Participants	*Gender*		*Age (years)*		*Expenditure ($/month)*		*Smoking expenditure ($/month)**	
	Female	*Male*	*Female*	*Male*	*Female*	*Male*	*Female*	*Male*
Smoking	10	50	23.0	23.3	715.1	779.0	113.6	161.9
Non-smoking	134	66	21.8	22.6	537.9	562.2	-	-
Total/Average	144	116	21.9	22.9	550.2	656.0	7.9	69.8

* ITRY=#1.91 in 2013, $ 1.11 in 2014.

and male were USD 252.5 and USD 263.9 (Table 1). Consequently, smoking males spent more than the women.

Residence places of the students, smoking and non-smoking, are listed Table 2. Even though 48.8 percent of the students lived in rental apartments, 46.9 and 4.3 percent of those stayed in the public and private dormitories, and in other places. While the majority of smoking respondents resided in the rental apartments, non-smoking students inhabited the dormitories.

The attitudes related to the media usage of the students smoking and non-smoking is showed in Table 3. Smoking and non-smoking students spent daily much more time on the Internet (for email, scientific researches, news) than the others. However, they also used the social media (Facebook, Twitter, chat) following Internet communication. On the other hand, while they watched the television for 2.14 hours per day, they slept daily for 7.8 hours. Smoking and non-smoking students, therefore, exhibited similar attitudes towards the real world and social media.

Some health-related attitudes of the students smoking and non-smoking are reported in Table 4. Average *body mass index* for the respondents were calculated as 22.7. However, that of smoking students was bigger (23.5) than that of the others. On the other hand, the rates of chronic diseases, regularly having breakfast and making regular exercise for smoking students were lower than those of non-smoking students.

Weighted grade point average *(WGPA)* of the students smoking and non-smoking are given in Table 5. The rate of the participants with the score higher than 2.4 WPGA was 61.5 percent. However, that of smoking students with 2.4 *WPGA* was 43.3 percent lower than that of non-smoking (52.5%). As a result, non-smoking students are more successful than smoking students.

The attitudes of smoking students towards smoking are shown in Table 6. Smoking students stated that they smoked more when the cigarette price came down by appreciating the most important to its brand. On the other hand, smoking students believed that the moderate attributes impacting their smoking were their friends' environment, the idea of stress reduction, smoking addiction and smoking prohibition indoors.

Table 2: Residence places of the participants *(N=260)*

Participants	*Residence places*			
	Public dormitories	*Private dormitories*	*Rental apartment*	*Others*
Smoking	9	14	37	0
Non-smoking	50	49	90	11
Total	59	63	127	11

Table 3: The attitudes related to the media usage of the participants *(N=260)*

Participants	*Attitudes*			
	Watching TV(h/day)	*Internet usage (h/day)*	*Social media usage (h/day)*	*Sleep duration (h/day)*
Smoking	2.2	3.5	3.1	7.8
Non-smoking	2.1	3.8	3.6	7.8
Average	2.1	3.7	3.5	7.8

Table 4: Some health-related attitudes of the participants *(N=260)*

Participants	*Some health-related attitudes*			
	Body mass index	*Chronic diseases*	*Having breakfast regularly*	*Exercising regularly*
Smoking	23.5	1	34	35
Non-smoking	22.5	15	125	99
Total/Average	22.7	16	159	134

Table 5. Weighted grade point average *(WGPA)* of the participants *(N=260)*

Participants	*WGPA*				
	< 2.00	*2.00-2.49*	*2.50-2.99*	*3.00-3.49*	*≥3.50*
Smoking	10	24	22	4	0
Non-smoking	20	75	66	36	3
Total	30	99	88	40	3

The attitudes of non-smoking students towards non-smoking are depicted in Table 7. It was represented that the most important motivation attributes preventing smoking for the respondents were yellowing of the teeth, high smoking cost and fear to reaction from family and friends, following the harmful effects on human health, and the smell and smoke after smoking. Smoking bans indoors and non-smoking friend selections, however, this had the lowest impact on the attributes preventing smoking.

The empirical results of the *Zero Altered Poisson Regression Model* are represented in Table 8. The result of the analysis highlighted that there were positive relationships among each attributes such as fourth graders, tea and water consumptions, total expenditure, public dormitories, Internet usage, performing sports, having breakfast, chronic diseases and monthly cigarette smoking amounts of the participants. On the other hand, there was a converse connection between the cigarette prices, education in engineering faculty, gender, age, *BMI*, watching television, waking up early, less sleeping, *GPA* and monthly cigarette smoking amounts of the participants. All these attributes were of great importance in terms of the behavioral science theory and statistical tests *($p<0.01$, 0.05 and 0.10)*.

DISCUSSION

As known, although smoking causes various diseases on living organisms, the smoking rate has increased dramatically in the young generations of developing countries in recent years. The results of the present study were supported by this scenario with about twenty-five percent smoking rate of the respondents, and with 23.2 years as the average age of smoking students. In order to determine the smoking trends of the young people, and which factors

Table 6: The attitudes of smoking students towards smoking *(N=60)*

Attitudes	*Smoking sensitivity (average)*
I give a great importance to cigarette brand	3.5
I smoke more when the prices fall	3.3
Environmental affect and friend environment	3.3
Smoking reduces stress	3.2
I don't want to smoke, but I am addicted to smoking	3.0
I avoid to smoke indoors	2.8
My family is of a great impact on my smoking	2.4
Smoking gives confidence to me	2.1

Table 7: The attitudes of non-smoking students towards non-smoking *(N=200)*

Attitudes	*Non-smoking sensitivity (average)*
Smoking is harmful for health	4.7
I don't put up with the smell and smoke of smoking	4.4
Smoking make my teeth look yellow	3.3
Smoking cost is very high	3.3
If I smoke, my parents will react against to me	2.9
If I smoke, my friends will react against to me	2.5
Everyone must comply with smoking ban indoor.	2.2
I choose my friends who don't smoke	2.1

Table 8: Empirical results of the Zero Altered Poisson Regression Model

Variables	*Regression model*		*Marginal effects*		*Means*
	Coefficient	*S.D.*	*Coefficient*	*S.D.*	
Constant	4.970***	0.270	19.346	1.079	-
Price	-0.038***	0.010	-0.149	0.050	6.800
Engineering faculty (the others=0)	-0.202***	0.040	-0.788	0.162	0.392
Fourth graders	0.168***	0.049	0.655	0.199	0.438
Gender (female=1)	-0.184***	0.059	-0.717	0.244	0.554
Age	-0.050***	0.008	-0.194	0.049	22.346
Education	0.006	0.008	0.024	0.052	14.777
Tea consumption	0.005*	0.003	0.019	0.041	5.258
Water consumption	0.012*	0.007	0.046	0.046	11.712
Expenditure	0.001***	0.001	0.001	0.039	589.923
BMI (Body Mass Ind.)	-0.025***	0.005	-0.097	0.045	22.728
Rental apartments	0.207***	0.055	0.804	0.227	0.488
Watching TV	-0.002	0.011	-0.009	0.059	2.142
Internet usage	0.030***	0.009	0.117	0.055	3.695
Exercising regularly	0.198***	0.043	0.769	0.177	0.515
Having breakfast regularly	0.068*	0.036	0.264	0.151	0.612
Awake up early	-0.029	0.053	-0.111	0.212	0.492
Less sleeping	-0.156***	0.051	-0.609	0.208	0.169
Grade point average (WGPA)	-0.144***	0.053	-0.562	0.214	2.441
Chronic diseases	0.737	0.948	2.867	3.798	0.062
Tau statistics	0.393***	0.049			
Poisson log-likelihood	-698.747				
Z.I. Poisson log-likelihood	-455.050				

***p<0.01 **p<0.05 *p<0.10

affect them and how by considering the core issues, therefore, is of a great importance and priority to provide actual information to policy-makers and decision-makers.

In order to reach the aims, the present study was planned to determine the factors impacting smoking by the university students. The results of the study highlighted that the students increased the smoking trends and cigarette smoking amounts as they moved closer to the graduation years *(p<0.01)*. Actually, they believed that increasing smoking causes them to feel confident under an expanding social environment, and help them reduce the stresses resulting from the density course pressures, and much lower *WGPA* score levels *(p<0.01)* and the professional anxieties in the future (Table 6). These results were supported by the results of some previous studies related to the increasing smoking rates influenced directly by economic and social environments of the participants conducted by Erdal et al. (2015), Mansour et al. (2015), Mudhovozi and Nyanga (2015), GATS (2014), Marques and Ikediobi (2010). Eldalo et al. (2015), Kulsoom and Afsar (2015), Topcu and Uzundumlu (2012), reported, moreover, that lower *GPA* scores along with higher stress, anxiety and depression also increased smoking proportions of the respondents.

The result of the study also indicated that there was a linear relationship between the cigarette smoking amount and tea as well as water consumption amounts to be the complementary products *(p<0.10)*. Smoking and alcohol consumption addiction make necessary not only a social environment but also the complementary products such as tea and water. Tea and water consumption, therefore, along with increasing smoking rate also rose linearly. Reich et al. (2011) reported that tea, coffee and water were widely used as the additional drinking substances among alcoholics and cigarette addicts by being similar to the results of the present study. If smoking bans applied between 2008 and 2010 years in Turkey are implemented similarly and controlled effectively by the public authorizers indoors and at the public places today, the smoking rates could be decreased considerably.

The empirical results stated that their total expenditures within disposable income of the students due to increasing smoking rates and their complementary products were of a rising

proportion *(p<0.01)*. The results of the study analyzing the relations between smoking and its expenditures managed by Kilic and Ozturk (2014) reported that the young people with higher financial power consumed more and better quality cigarette than the others.

As considered, the residence places impact the increase in smoking ration of the students, it was analyzed there was a positive correlation between staying at the rental apartments and smoking frequencies and amounts *(p<0.01)*. This accommodation type is for allow the students to move more freely, and thus they could always smoke increasingly. In fact, the parameter had the biggest marginal impact on increasing smoking rate than the other. Fortified these findings, El Ensari et al. (2012) found that the students reduced gradually the concerns and tendencies to the accommodations applied the legal procedures preventing smoking.

The results of the study also showed that there were the linear relationships between Internet usage *(p<0.01)*, exercising regularly *(p<0.01)*, and having breakfast regularly *(p<0.10)* along with increasing smoking ration. Especially, young people have spent more time on the Internet with their mobile phone in recent years, and thus they have smoked consciously or unconsciously more than the other times. On the other hand, exercising and having breakfast regularly by the respondents increased smoking rates. When they exercised regularly, they needed to have breakfast more than other students, and then to smoke increasingly by peaking up their physiological needs. These results complied with the results of the previous studies organized by Audrain-McGovern et al. (2013) with regard to exercising regularly, Kim et al. (2010) about Internet usage, and Liu et al. (2015) related to having breakfast and its impact on increasing smoking proportions in young people.

The empirical results of the study also exposed that there was an inverse correlation between the packed cigarette prices and smoking *(p<0.01)* due to demand theory. The students smoked cigarette more when its price reduced slightly (Table 6). The theoretical result was strengthened by Gil-Lacruz et al. (2015) declaring to be affecting negatively the smoking rates by means of higher prices and cautionary pictures on its package labels.

On the other hand, the results of the study identified that the mature women *(p<0.01)* with lower *BMI (p<0.01)* slept less *(p<0.01)* by educating at the engineering faculty *(p<0.01)* smoked noticeably less than the others. The results of the present study were affirmed by the results of the studies carried out by Campaña et al. (2015) reporting to be used less alcohol and cigarette at the engineering faculties rather than the economics and business ones, Gil-Lacruz et al. (2015) explaining to be smoked women much less rather than men in many developing countries, however, to be accepted as potential buyers of young people and women for the cigarettes selling by the tobacco companies. Additionally, Mansour et al. (2015) and Erdal et al. (2015) stated that the students ranging from 18 and 25 years smoked fairly more than the other age groups. On the other hand, Baum (2009) and Underner et al. (2006) also highlighted that there was a negative relation between not only *BMI* and smoking rate, but also less sleeping and that, respectively.

CONCLUSION

In recent years, smoking rates in young people and women in the developing countries have increased dramatically. Various legal arrangements on smoking prohibition indoors and at the public places were made by the government until 2008, and smoking rates reduced considerably from 2008 to 2010 years. These rates have, however, started to increase again nowadays due to the lacks of implementation and control with regard to legal arrangements preventing smoking. Therefore, in order to determine the attributes impacting increasing smoking trends of the university students were designed for this study. The results of the study depicted that twenty-three percent of the students with at 23.1 years of age smoked, and their cigarette material expenditures consisted of twenty-five percent of their total expenditures. In addition, it was stated that smoking students appreciated cigarette brands with lower prices, stress reduction belief, and their friend environments.

The results of the study also highlighted that increasing smoking frequencies of the students were associated with nearing the graduate years, the consumption of the complementary goods, disposable income increase, and accommodation at the rental apartments, exercising and hav-

ing breakfast regularly by using the Internet. On the other hand, the mature male with lower *BMI* educating at the engineering faculties under high *WGPA* scores smoked less than the other students at the other faculties by taking into consideration higher cigarette prices.

RECOMMENDATIONS

Firstly, the legal arrangements preventing smoking indoors and at the public places should be redesigned to respond to today's needs for young people, and then they should be implemented widely, and should be often controlled by public and local authorities. Individuals and the business owners/managers infringing the smoking prohibit must be always punished rigorously. In addition, the governments should make the addiction substances control whether or not be normal levels, and the tobacco companies must apply a tolerance limit according to *WHO* criteria under government controls by considering the legal disclaimers by means of the visual instruction and superscriptions impacting negatively human healthy on the cigarette packages. In order to add these preventers, the governments must conduct effective anti-smoking campaigns on real world and social media, and it should be prevented in the young people to reach to the cigarette bulks by being sold from higher prices under high taxes at a few selling points for mature people.

Secondly, the families should control the relationships or links with the reference groups and social environments stimulating their young individuals by following whether or not smoke, and they should provide them with motive toward non-smoking groups. Their families should provide the students accommodation at the public or private dormitories rather than the rental apartments.

Finally, with the rearrangements in the syllabuses by reducing the theoretical courses in favor of the applied courses at the social and health science faculties as at the engineering faculties, the students should be focused on scientific and computer laboratory studies, and thus the university administrators should provide them not only to have less free time but also with facilities such as libraries, lesson and rest halls, gyms at each faculty so as to do the various activities preventing their smoking. On the other hand, they should also provide the non-smoking students to derive benefit from the attractive social possibilities or facilities (fitness center, café, cinema, various student clubs) with a flexible time schedule.

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