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Smoking as an Extra Risk Factor of Firefighters in Greece: A Descriptive Study

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Abstract

Background: Fire fighters face a high risk for many diseases especially because of high levels of carbon monoxide (CO) and other toxic risks. Fire fighters who smoke are at greater risk. Smoking increases the risk of getting respiratory and cardiovascular diseases, cancer, and poorer treatment outcomes for certain diseases.

Objective: The objective of this study was to examine the smoking profile of healthy fire fighters in Greece and the degree of their addiction to smoking. This can quantify the need for smoking cessation interventions in the workplace.

Methodology: Three hundred fire fighters filled in an anonymous questionnaire about the level of addiction to nicotine, estimated by the Fangestrom questionnaire.

Results: Eighty seven percent of the fire fighters were found to be systematic smokers, defined as smoking 10 cigarettes or more per day. Seventy five fire-fighters (25%) were slightly addicted to smoking (score <3), 174 (58%) were moderately addicted (score 4-6), and 51 (17%) were highly addicted (score 7-10). 194 (64.6%) found the first cigarette of the day to be the hardest to avoid with 46 (15.3%) lighting up within the first five minutes of waking up. Those who lived in the city and had a high addiction to smoking were significantly more likely to have difficulties in areas where smoking is not allowed. Thirty six (12%) fire fighters continue to smoke even when they are ill.

Conclusions: The high prevalence rate of systematic fire-fighters smokers indicates that the provision of cessation support services is essential. The results of our research also reflect the need for relevant studies that focus on similar working populations.

Key words: smoking, firefighters, addiction

Introduction

Smoking constitutes one of the biggest plagues of our century. The figures are particularly disappointing for the younger population, where smoking has taken an endemic form in most Western societies while at the same time it constitutes the primary reversible cause of death through prevention, worldwide. To clarify, a smoking addiction means that a person has formed an uncontrollable dependence on cigarettes to the point where quitting would cause severe emotional, mental, or physical reactions (White et al., 2006). The global level of smoking addiction is so strong that the World Health Organization considers it a chronic disease in which the smoker should be treated as a patient who needs medical intervention (Mackay & Eriksen, 2002).

Statistics show that somewhere in the world a smoker dies every 8 seconds. In addition, every hour, 140 European citizens also die because of smoking. At this rate, it is estimated that until 2020, deaths from smoking will have increased by about 10 million per year. It is calculated that one third of the world's, 1.1 billion adult population are smokers and that smoking causes 3.5 million deaths each year on a global level. Half of these deaths are premature due to some type of smoking related cause. Furthermore, individuals who started smoking during adolescence and continue to do so for the next 20 years are expected to die 20–25 years earlier than those who have never smoked (Mackay & Eriksen, 2002). Smoking has also been found to be the leading cause of at least 25 life-threatening diseases which include chronic obstructive pneumonopathy, lung cancer, coronary heart disease, asthma and stroke. It is estimated that it is responsible for 12.2% of all diseases in developed countries (WHO, 2006).

The incidence of smoking is also gender sensitive depending on age, social status, income and education. However, during the last years, smoking seems to have increased more among women in developing countries compared to women in developed countries. The existing data show that in developing countries, the percentage of men who smoke

is 50% and for women 9% whereas in the developed countries the percentages are 35% and 25% respectively (Tountas, 2003).

Of course, we must also mention that passive smoking causes adverse health effects similar to smoking. In the US alone there are approximately 3.000 yearly lung cancer deaths of non-smokers. Non-smokers who are exposed to passive smoking, at home or at work, increase their risk of developing lung cancer by 20–30%. As with active smoking, there is a dose–response relationship between second-hand smoke exposure and lung cancer—the longer the duration and the higher the level of exposure, the greater the risk of developing lung cancer. Therefore, there is no risk–free level of exposure to second-hand smoke (US Dept of Health & Human Services, 2006, Wipfli et al., 2008).

In Greece, the evidence is rather disappointing. Forty four point nine percent of the country's population is smokers. This data is shocking if one considers that for the entire population of the 15 EU member states, smoking incidence is 31% (Mackay & Eriksen, 2002) and in some countries even lower, i.e. United Kingdom (Percival, 2007). Thus, the need for tobacco interventions is critically important in improving and protecting individual as well as public health, and especially vulnerable populations such as women and children (Wipfli et al., 2008, Percival 2007).

Not many tobacco-related studies have been carried out in regards to the profession of fire fighters. Those that have been published have mostly researched topics such as coronary events, which account for 39% of “on duty” deaths in fire fighters in the United States, where smoking is a main risk factor (Geibe et al., 2008). Furthermore, another study from Switzerland indicates that fire fighters experience respiratory symptoms, atopy and bronchial hyperactivity (Miedinger et al., 2007). Smoking, in such a profession, is an additional risk factor which should be prohibited. Alternatively, fire fighters who smoke should be encouraged to quit.

The lack of references in regards to smoking and fire fighters led us to organize a study to

examine the smoking addiction in specific professionals in our country.

Research Questions and Hypothesis

In the present study our main hypothesis was whether the degree of addiction to smoking was high in such susceptible professionals.

The research questions investigated concerned:

- The percentage of fire fighters systematic smokers
- The degree of their addiction to smoking
- The correlation of demographic data with degree of addiction
- The need for organizing smoking cessation programs in their workplace

Methodology

This analysis is the first part of a two part study which investigates the smoking profile and habits among men and women of different professions, in the prefecture of Attica, in order to assess the need of implementing smoking cessation programs in the workplace.

The first part of the research focuses on the firefighter's level of addiction, controlled for demographic information. The second part of the research focuses on personal beliefs and the degree to which individuals believe they can quit smoking. For the purpose of this study we will only discuss the first part.

Design and sample

A cross-sectional study was taken place in the Headquarters of the Brigade (which gave us the permission to conduct this study), the Health Administration Department, the Fire Brigade Academy and 6 local Firefighting Stations in Attica. These services were selected using the simple and random method.

For the firefighters sample selection, the stratified sampling technique was used, according to which the total working population of firemen were subdivided in homogenous groups according to their position in hierarchy. Thus, four groups were formed: high ranking officers, low ranking officers, field firefighters and firefighters

working in administrative posts. A random sample was then selected from each group.

Therefore, from 320 smokers worked in the selected services, 300 of them agreed to participate to the study signing a written form of consent. The study was conducted in a two month period (21/2 – 21/4/ 2008).

Measures

The instrument used for the data collection was the Fangestrome questionnaire (Frangestrome, 2005), which was used after taking the permission of the author.

The Fangestrome questionnaire includes six main questions that assess the participant's level of addiction, separating the smokers into slightly (score < 3), moderately (score 4-6) and highly addicted (score 7-10), according to a ten-degree scale based on the Likert system (Frangestrome, 2005).

Questions about demographic characteristics such as sex, age, permanent residence, rank in the Fire department and level of education, were added. The questionnaire was anonymous and self-administered.

Smokers, in defined day and time, and after being fully informed of the purpose of the study by the researcher, filled in the questionnaires and they placed the completed questionnaires in a special box, in the presence of the researcher, for the protection of anonymity.

The statistical analysis of the data was carried out using SPSS 12.0. The control of cross-correlations was done using the χ^2 method.

Results

Sociodemographic data

The sample consisted of 258 men (86%) and 42 women (14%), with a mean age of 34.3 ± 6.8 years. The majority was within the age group 25-35 years. Among the participants, 132 individuals (44%) were high ranking officers, 16% (n=48) were low ranking officers, 26% (n=78) were firefighters, 8.67% (n=26) were administrative officers and 5.33% (n=16) included others. Two hundred and nine participants (69.65%) lived in Athens, 17 (12.33%) in other cities and 54

(18%) reported a provincial village as their permanent residence. 182 participants (60.7%) had only completed high school, 109 (36.3%) had a University degree, and 9 (3%) had a Master degree.

Degree of addiction to smoking

Two hundred and sixty one individuals (87%) were found to be systematic smokers which are defined as more than ten cigarettes a day. According to the Fangerstrom scale, 174 firefighters (58%) were moderately addicted to smoking (score 4-6), 51 (17%) were highly addicted (score 7-10) and the remaining 75 (25%) represented the slightly addicted group of participants (score <3). In regards to gender, the majority of men (n=92) (35.67%) and few women (n=3) (7%) were considered to have a moderate

addiction to tobacco use. The percentage of men who were highly addicted to smoking was 29.67% (n=77) while the age group 25-35 years showed the highest levels of addiction for both sexes.

A relatively high percentage of smokers revealed that throughout the years they have smoked between 11-20 cigarettes per day. 106 men (41.3%) men and 4 women (10%) smoked an average of 19.32 cigarettes daily, which is almost equivalent to a pack of cigarettes. There was also a significant difference between the two genders and the years that they had been smoking (p<0.001). 113 men (43.9%) have been smoking for 10-20 years whereas two women (4.79 %) have been smoking for the same period (table 1).

Table 1: Number of cigarettes smoked and years of smoking by the participants according to gender

Items	Male N (%)	Female N (%)	P
A package of cigarettes smoked / day	106 (41.3)	4 (10%)	P<0.001
10-20 years of smoking	113 (43.9%)	2 (4.79)	P<0.001

The average number of cigarettes per day that the participants have been smoking in the past 6 months is 24.7. Seventy one men (27.6%) and one woman (2.3%) smoked 21-30 cigarettes per day.

One hundred and six participants (35.2%) of whom 42 (14%) were high ranking officers find it difficult not to smoke in places where

smoking is forbidden, e.g. in a church or in a library. The first cigarette in the morning is the most difficult to give up for 64.6% (n=194) of both sexes (p=0.001). Moreover, 118 participants (39.2%) of whom 46 (15.3%) were high ranking officers and 12% (n=36) firefighters continue to smoke even when they are sick (table 2).

Table 2: Difficulties faced by the participants not to smoke

<i>Difficult not to smoke</i>	Yes (N)	Yes (%)	No (N)	No (%)	P
In forbidden areas	108	36.0	192	64.0	P<0.001
The first cigarette in the morning	194	64.6	106	35.4	P<0.001
Even they are sick	118	39.2	182	60.8	P<0.001

Discussion

Firefighters are considered a special group of workers due to their working conditions and the fact that their respiratory system is exposed to and affected by several irritant substances (Miedinger et al, 2007). These factors alone could aggravate the respiratory system's function, making smoking an additional risk factor. Furthermore, the nature of their occupational environment creates high levels of stress and symptoms of burnout syndrome. In addition, the extensive duration in their work place for over 24 hours and the strong relationships developed between colleagues enhance the inner tendency for smoking (Cunradi et al., 2007).

Therefore, it is no surprise that 87% of our sample were found to be systematic smokers. The average number of cigarettes per day among fire fighters is almost one pack (19.32 cigarettes). Other researchers have indicated that in periods of stress and anxiety, the smoker tends to smoke more than usual (Cunradi et al., 2007; Albertsen et al., 2006; Fukuoka et al., 2008; Patakas, 1994). In regards to gender and the daily number of cigarettes that the participants have been smoking in the last 6 months, men show an increase in number with 21-30 cigarettes while women show a decline with 11-20 cigarettes. It seems that a period of six months provides enough time to alter the smoking behaviour of an individual even slightly. Further examination of this

relationship may provide constructive information for health initiatives.

A comparative study was completed by the Smoking Cessation Department of Papanikolaou General Hospital of Thessaloniki, the second biggest city in Greece. The research investigated the differences in the smoking behavior between 728 men and 486 women who worked in the hospital as well as the mean number of cigarettes per day in relation to gender. The data showed that men smoked 36 ± 2 and women 25 ± 8 that is about 10 cigarettes on average more than our sample (Argyropoulou & Patakas, 2005). In our study, the highest rate was observed in the age group 51-60 years and the lowest in the age group 41-50 years. In addition, the study showed that the majority of the workers were heavy smokers, one in four of whom were moderately addicted and approximately one in three were slightly addicted.

Differences were also noted between smoking and age groups. The age group 25-35 years had the highest percentage of smokers while the age group 55-65 years had the fewest smokers. Results were different at the Thriasio Hospital in Athens. The largest proportion of smokers was held by the age group 51-60 years and the lowest by the age group 41-50 years (Traganas et al., 2004). The literature mentions that the younger a smoker is the less he or she values the risks that smoking may bring to their health in the

future. At the same time, addictions are much more seductive to those ages, i.e. social activities, peer pressure, sense of belonging (Fry et al., 2008; Pust et al., 2008; Etcheverry & Agnew 2008; McLeod et al., 2008).

The first cigarette of the day is the most difficult to avoid. After sleep, smokers are eager to smoke in order to prevent the symptoms of deprivation, which depend on the degree of addiction. Almost one in six of highly addicted smokers light up within five minutes of waking up and one in ten of slightly addicted smokers smoke within an hour of waking up. These results may be attributed to the fact that the association of the morning coffee and cigarette are quite strong for the smoker (Mitruska, 2005). It is also impressive that almost one in four participants smoke even when they are ill. This behavior may be able to explain their level of addiction.

The research also shows statistically significant results between residence and the difficulty to avoid smoking in no-smoking areas ($p=0.43$). Almost one in six participants who live in Athens has difficulties in avoiding to smoke in prohibited areas, unlike individuals in provinces who are able to withstand the lack of nicotine longer and this is most likely attributed to the fact that from a young age they don't light up in public areas due to respect or fear of elders. The results are also statistically significant between the level of addiction and smoking in non-smoking areas i.e. church, library ($p=0.001$). The higher the level of addiction to nicotine the less time one can go without smoking. Thus, public areas such as libraries, churches or public places are often avoided by the smoker. Visits to these areas may also be cut short or endured through many breaks. This finding is confirmed by the results of another study regarding smoking habits of hospital staff in general hospitals. Health professionals continue to smoke while on duty, even after smoking prohibition is enforced in the hospitals (Vagropoulos et al., 2006).

Even though the profession of firemen is already considered high risk, few studies exist in regards to the long-term damage that

is caused to the lungs from the combination of smoking and the inhalation of toxic substances. Some of those studies are related more on smoking and the repercussions to the pulmonary functions rather than the smoking behaviour (Miedinger et al., 2007). Another example is a four year study which was carried out in the United States and examined 96 participants from the Fire Department of West Sussex. It included 31 non-smokers, 40 smokers and 25 ex-smokers although after four years 12 participants had left the study. Pulmonary function was tested for the first two years and then each year for the remaining two. The results were expressed by the change of indicators in pulmonary operation in comparison to each year. These indicators were better in non-smoking firefighters (Tashkin et al., 1997; Douglas et al., 1985).

According to a study conducted in Germany smoking behaviours can also be attributed to the type of profession. This study describes the smoking patterns of 3528 construction workers as reported at occupational health examinations (Rothenbacher et al., 1996). Subjects were between the ages of 20 and 59 years working as plumbers, carpenters, painters, plasterers, bricklayers, unskilled workers or white collar employees. The overall smoking prevalence was 53.5% with a significant difference between the white collar group and the rest of the professions. Plasterers marked a very high rate with 55.8% of current smokers having an average of 20.5 daily cigarettes in comparison to white collar employees, who exhibited the lowest rate of smokers (32.5%) with an average of 19.2 daily cigarettes.

With regards to strengths and limitations we find that one strength of this study is that the firefighters seemed to welcome the researchers. None of the participants denied filling out the questionnaire. Another positive point, in our opinion, is that the majority of the smokers asked the researcher about smoking cessation programs and their implementation in the workplace. This indicates that health promotion programs in the workplace are not only welcome but can also contribute to a healthier lifestyle. Furthermore, the high-ranking officers of the

Fire Department were very co-operative and helpful in distributing this study to the firefighters. Their assistance reassured our concerns for bureaucratic difficulties. Finally, this is the first study on smoking addiction to firefighters.

A number of limitations were also present. Although efforts were made for the selection of the sample to be extended to the whole country, according to statistical principles of sampling, this was not possible. Due to particular working conditions and structure of the agency, extending the study to achieve full national coverage, failed. Therefore, sampling was confined to the city of Athens, the capital of Greece. However, the sample did include firefighters working in various regions of the country that were at that time in Athens for educational purposes. Also, the use of a self-administered questionnaire may have allowed subjective interpretations and beliefs on behalf of the firefighters although thorough information had been provided to them beforehand.

From this research experience we found that smokers in some professions have a higher risk of ill health due to the nature of their work. Thus, these working groups should be offered priority in preventative interventions. The workplace seems to be an ideal setting for smoking cessation programs, a hypothesis which has been supported by other researchers (Cunradi et al 2007, Albertsen et al 2006, Cahill et al 2008, Armitage 2007, O'Connell et al 2006, Tanaka et al 2006).

Also, it is important to conduct further studies concerning specific professions with high risk factors and increased physical and emotional stress, such as fire fighters. As proven by other studies certain occupations, particularly the blue collar employees, face a higher risk to smoking addiction (Cunradi et al 2007, Albertsen et al 2006, Rothenbacher et al 1996, Argyropoulou & Patakas 2005). For firemen there is not just the need to study the connection between the toxic inhalation of smoke and cigarette smoking but also the smoking behavior of these individuals. In this way, health representatives can gain a better idea of the population's characteristics and as a result design more enhanced and

detailed programs. The implementation of smoking cessation programs in these population groups would improve their living standards and stimulate individuals to adopt a healthier behavioral norm, free from the harmful impacts of nicotine.

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