

Cigarette smoking and burnout syndrome among medical students at University of Kragujevac, Serbia [†]

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Abstract: The aim of our study was to estimate the association of cigarette smoking with burnout syndrome in medical students at the University of Kragujevac, Serbia. Burnout syndrome is defined as a triad of symptoms: emotional exhaustion, cynicism, and academic inefficiency. Cigarette smoking was significantly associated with cynicism, with smokers often showing higher cynicism compared to non-smokers (40.7% vs. 32.3%; $P = 0.023$). Also, cigarette smoking was significantly associated with higher academic inefficiency, with smokers often showing academic inefficiency compared with non-smokers (43.6% vs. 35.0%; $P = 0.022$). Cigarette smoking was not significantly associated (44.9% vs. 38.5%; $P = 0.096$) with emotional exhaustion.

Keywords: burnout syndrome; medical students; cigarette smoking

1. Introduction

Burnout syndrome is defined as a triad of symptoms: emotional exhaustion, cynicism, and academic inefficiency [1]. Burnout occurs due to extended exposure to stress at work and is characteristic especially for professions that involve working with persons who find themselves in situations that are emotionally demanding [2]. It most often occurs in helping professions, due to the specificity of working with people with hardships. The burnout syndrome in students is associated with academic obligations, and it relates to feeling exhausted because of the demands of the studies, a cynical attitude regarding the studies and a perception of self-incompetence as a student. The following three dimensions make up burnout syndrome among students: 1) Emotional Exhaustion - EE (due to educational demands), 2) Cynicism - CY (indifference / apathetic attitude regarding academic activities) and 3) low academic efficiency – EF (perception of incompetence as a student) [2].

The research so far found that medical students are among the students of very stressful studies and that therefore they can be at an increased risk for burnout syndrome [3-5]. However, estimated prevalence significantly varied across the studies, and a recent meta-analysis suggested that one in two students suffer from burnout, even prior to residency [6].

The relationship between burnout and smoking has not been studied widely [7]. The results of some previous research have identified smoking cigarettes as a determinant of burnout in medical students, [7-9], but findings were inconsistent [10]. Cecil et al. [11] found that smoking was associated only with high scores for emotional exhaustion in

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medical students in the United Kingdom. The aim of our study was to assess the association between cigarette smoking and high level of burnout syndrome in medical students.

2. Methods

2.1. Study setting and population

This study involved students of medicine at the Faculty of Medical Sciences, University of Kragujevac, Serbia.

2.2. Study design

The study was designed as a cross-sectional study.

2.3. Study sample

The study included all students enrolled at all 6 years of academic integrated medical studies at the Faculty of Medicine, University of Kragujevac, who provided a voluntary consent to participate in the study by signing an informed consent form. In total, 760 of the 836 medical students were included in the analysis (response rate was 90.9%).

2.4. Data collection

Data were collected using a structured printed questionnaire. Along with the questions regarding the smoking habit, this research also used the Maslach Burnout Inventory - Student Survey, MBI-SS, as a specific instrument to assess the level of risk for burnout in students of medicine. [3].

Students were regarded as smokers if they have regularly smoked at least 1 cigarette a day during 1 year; students were classified as current smokers if they have smoked at least one cigarette every day during the last 12 months, and as ex-smokers if at least a year has passed since they stopped smoking. Also, medical students who were smokers gave information about the age when they started smoking, average number of cigarettes they smoke per day, and about smoking cessation.

2.5. Instruments

The Maslach Burnout Inventory - Student Survey (MBI-SS) [3] was used in this study. The MBI-SS [15] has 15 items with 7 categories ranging from 0 to 6 (1: never; 2: a few times a year or less; 3: once a month or less; 4: a few times a month; 5: once a week; 6: a few times a week; 7: everyday). The 15 items refer to feelings regarding university, i.e., feelings regarding one own's academic work. The results among each burnout domains were used as continuous variables and categorized as low, moderate and high score/risk, according to the determined cutoffs [2].

Serbian version of the MBI-SS questionnaire was validated during this research, in a population of students of medicine in Serbia, which confirmed that this questionnaire is a valid and reliable instrument [12]. The study showed the presence of 3 main components (explaining 64.9% of variance), test-retest validity showed good stability of the scale. Reliability expressed through the Cronbach's alpha coefficient was high for all three subscales (i.e., 0.869 for MBI EE, for MBI CY 0.856 and for MBI EF 0.852).

2.6. Statistical analysis

Chi-square and t-test were used in the statistical analysis.

3. Results

Almost a third (243; 32.0%) of medical students smoked cigarettes during their life (Table 1). At the time of survey, there were 18.8% current and 13.2% former smokers. The average age at which medical students started smoking was 18.4 ± 2.5 years (range 11-27).

The average number of cigarettes that medical students smoked per day was 12.8 ± 8.3 cigarettes (range 2-40).

Table 1. Distribution of medical students according to smoking habit.

Variables		Number (N=760)	%
Cigarette smoking	Never	517	68.0
	Ever	243	32.0
Smoking status	Non-smokers	517	68.0
	Former smokers	100	13.2
	Current smokers	143	18.8
Average age at smoking initiation (Mean \pm SD; Range)		18.4 \pm 2.5; 11-27	
Average number of cigarettes smoked per day (Mean \pm SD; Range)		12.8 \pm 8.3; 2-40	

Mean \pm SD (standard deviation).

According to the distribution of burnout syndrome risk categories, high risk of emotional exhaustion was present in 308 medical students, i.e., 40.5% of all participants (Table 2). Subscale MBI-CY showed high risk of burnout in 266 (35.0%) students of medicine. Subscale MBI-rEF showed that 37.8% of all participants had a high risk of burnout.

Table 2. High level of risk for burnout syndrome in medical students, by subscales.

MBI-SS subscales	Number (N=760)	(%)
MBI EE	308	40.5
MBI CY	266	35.0
MBI rEF	287	37.8

MBI-SS (Maslach Burnout Inventory - Student Survey); MBI EE (Emotional Exhaustion); MBI CY (Cynicism); MBI rEF (reverse Academic Efficacy).

Table 3. Distribution of medical students with high risk of burnout syndrome, by domains and by smoking habit.

Variables		High risk					
		MBI EE		MBI CY		MBI rEF	
		%	P*, **	%	P*, **	%	P*, **
Smoking cigarettes	Never	38.5		32.3		35.0	
	Ever	44.9	0.096	40.7	0.023*	43.6	0.022*
Smoking status	Non-smokers	38.5		32.3		35.0	
	Former smokers	41.0		39.0		42.0	
	Current smokers	47.6	0.148	42.0	0.067	44.8	0.067
Average age at smoking initiation (Mean \pm SD)		18.3 \pm 2.5	0.721	18.2 \pm 2.7	0.603	18.4 \pm 2.7	0.701

Average number of cigarettes smoked/day (Mean ± SD)	13.3 ± 8.4	0.447	13.8 ± 8.6	0.164	14.1 ± 8.9	0.069
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MBI EE (Emotional Exhaustion); MBI CY (Cynicism); MBI rEF (reverse Academic Efficacy); Mean ± SD (standard deviation); P (probability, * χ^2 -test, ** t-test).

Cigarette smoking was significantly associated with cynicism, with smokers more often showing high cynicism compared to non-smokers (40.7% vs. 32.3%; $P = 0.023$) (Table 3). Also, cigarette smoking was significantly associated with higher academic inefficiency, with smokers more often showing high academic inefficiency compared with non-smokers (43.6% vs. 35.0%; $P = 0.022$). Cigarette smoking was not significantly associated with emotional exhaustion (44.9% vs. 38.5%; $P = 0.096$).

4. Discussion

Up to now, there was not much research into the association between cigarette smoking and burnout syndrome in students of medicine worldwide [13]. In this study, cigarette smoking was significantly associated with cynicism and higher academic in-efficiency, without a significant association with emotional exhaustion. Similar to our findings, a cross-sectional study in Brazil showed that in second to eighth semester undergraduate medical course students smoking was positively associated with the cynicism domain and negatively linked to the academic effectiveness domain [14]. Also, smoking habits were associated with all burnout syndrome dimensions in students of medicine in Kazakhstan [15]. On the other hand, Cecil [11] surveyed 356 medical students in Great Britain, but did not record an association of smoking and burnout syndrome, while smoking was significantly associated only with high scores for emotional exhaustion.

Opposite to that, several studies have determined that there was no statistically significant association between the level of burnout syndrome and smoking [16, 17]. In medical students in Hong Kong, smoking was not associated with burnout, which authors attributed to fewer smokers in this study sample [18]. A study in Iraq, that included 424 medical students, did not find that smoking was associated with significantly high rates of burnout [19].

These findings point to a potential association of smoking and burnout syndrome. Still, since the number of current and former smokers was low compared to non-smokers in most of the studies, especially in countries where smoking control strategies have already been successfully implemented at the national level, additional research is needed to completely elucidate the results. The differences in results between studies might be due to the differences in study design, sample size, questionnaires used to assess the burnout syndrome, differences in studies curriculums, demographic characteristics of medical students (gender, socio-economic status, etc.), study financing, life-style, other habits than cigarette smoking, etc. In conclusion, the effects of cigarette smoking on the burnout syndrome need to be further elucidated in longitudinal research.

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