

## Tobacco and alcohol usage as risk factors of non-communicable diseases among students of Zenica University (Bosnia and Herzegovina)

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### ABSTRACT

**Aim** To establish the presence of two risk factors, smoking and alcohol use, for non-communicable diseases among students at the University of Zenica.

**Methods** The research was conducted at eight schools of the University of Zenica in the academic year 2016/2017 during the period from 1 December 2016 to 15 February 2017. The study involved 600 students 19-29 years of age (all years of study). The research was carried out with a standardized and validated questionnaire, the STEPS non-communicable Disease Risk Factors survey, developed by the World Health Organization.

**Results** Tobacco was used by 145 (24.2%) students, 68 (46.9%) of them being males and 77 (53.1%) females ( $p < 0.05$ ). Males smoked 15.62 and females 13 cigarettes per day ( $p < 0.05$ ). On average, male participants were 16.56 years old, and female participants 16.71 when they started consuming cigarettes ( $p < 0.05$ ). A total of 289 (48.1%) students consumed alcohol, of whom 135 (70.2%) were males and 154 (37.7%) females ( $p < 0.05$ ).

**Conclusion** There is evidence of high prevalence of smoking and alcohol usage as the risk factors for non-communicable diseases. Two levels of the prevention measures should be applied in order to reduce the prevalence of such risk factors: strategic level with a definition of the population, actors, activities, target population and anticipated results, and tactic level which will show contingency activities at the University.

**Key words:** smoking, alcohol drinking, prevalence

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## INTRODUCTION

Non-communicable diseases (NCDs), also known as chronic diseases, tend to be of long duration and are the result of a combination of genetic, physiological, environmental and behavioural factors. The main types of NCDs are cardiovascular diseases, cancer, chronic respiratory diseases and diabetes (1). The global burden of non-communicable diseases (NCDs) is increasing rapidly as a result of a number of factors, such as economic development and related erosion of traditional food practices (increase in the intake of processed food high in fat, salt and sugar) and change in cultural norms (increase in the use of tobacco and alcohol), decline in physical activity and increase in sedentary lifestyle (2). The risk factors for NCDs such as smoking, alcohol, sedentary lifestyle, obesity, dietary habits, etc. are inculcated during adolescence and continue to exist in adult life increasing the risk of hypertension, diabetes, and cardiovascular diseases (3). About 90% of adult smokers in the US start smoking cigarettes at the age of 18. According to the Center for Disease Control and Prevention (CDC) results of the National Youth Tobacco Survey (NYTS) in 2012 showed that prevalence of tobacco usage among middle school and high school students was 7.1% and 23.3%, respectively (4). Consistent epidemiological evidence has pointed out that moderate alcohol consumption is inversely associated with risk factors for cardiovascular diseases (5). In addition to numerous health risks, alcohol consumption at university student campuses leads to an appearance of various problems such as violent behaviour, vandalism and hangover-related behaviour issues (6).

According to a research conducted in Bosnia and Herzegovina (B&H) in 2013 smoking prevalence of 37.6-49.2% was found in male and 29.7% in female adults, while the prevalence of passive smokers was 37.8% (7). In a research conducted in B&H in 2015 it was found that living in an urban environment was a risk factor for substance use and misuse (SUM) in girls (8). In the 2015 research a progression in the trend of smoking was found among students in Tuzla (B&H) (9). The frequency of tobacco and alcohol use among the Zenica University students has not been investigated so far. Data received from the similar

studies in B&H prompted us to investigate alcohol and tobacco usage among students of Zenica University (B&H).

The aim of this research was to determine the extent of two risk-factors for non-communicable diseases – alcohol and tobacco – among Zenica University students. This will serve as a basis for the creation of prevention measures.

## EXAMINEES AND METHODS

### Examinees and study design

The research was conducted at eight schools of the University of Zenica (School of Medicine, School of Metallurgy and Materials, School of Mechanical Engineering, School of Economics, Law School, Islamic Pedagogical School, School of Philosophy and School of Polytechnics) in the academic year 2016/2017 during the period between 1 December 2016 and 15 February 2017. The University of Zenica is attended by approximately 3700 students. A total of 600 randomly selected students (voluntarily responded and agreed to an invitation for inclusion in the research) of all academic years (19 to 29 years of age) were involved in the study. The survey was anonymous. All participants signed informed consents to participate in the research. The research was approved by the Vice Rector for Education and Student Affairs at the University of Zenica.

### Methods

This cross-sectional study was carried out with a standardized and validated questionnaire, the STEPS Non-Communicable Disease Risk Factors survey, developed by the World Health Organization (WHO) (10). The survey was tailored to the student population and the polling environment. The STEPS survey consists of three steps. The first step contains questions related to demographic data and lifestyle related to tobacco use, alcohol use, eating habits, physical activity issues, sedentary lifestyle. The second step refers to anthropometric measures, and the third step provides space for entering blood pressure values of the subjects and values of biochemical parameters. The results of a modified form of the survey's first step are the only ones presented in this paper. The modified survey contains questions related to the use of tobacco and alcohol

consisting of 11 questions each (current smoking status, age smoking onset, a number of cigarettes per day, consumption of alcohol drinks, alcohol consumption during the past 30 days, amount of alcohol drinks per day).

**Statistical analysis**

The statistical analysis was performed using T-test, and  $\chi^2$  test was used to calculate smoking and alcohol consumption according to age, gender and school. The results are presented in tables and expressed by relative and mean values. The selected levels of  $p < 0.05$  were used.

**RESULTS**

The University of Zenica is attended by 3700 students. The study involved 600 Zenica University students, of whom 192 (32%) were males and 408 (68%) females ( $p < 0.05$ ). The majority of participants were enrolled at the School of Medicine, 110 (18.4%) and School of Polytechnics, 91 (15.2%), followed by School of Metallurgy and Materials with 86 (14.3%), School of Economics with 85 (14.2%) participants. Participants enrolled in the School of Islamic Pedagogy were the least numerous, 45 (7.5%) ( $p < 0.05$ ) (Table 1).

A total of 145 (24.2%) participants claimed that they used tobacco, of whom 68 (46.9%) were males and 77 (53.1%) females ( $p < 0.05$ ) (Table 2). The highest specific prevalence of smokers was found among the students of the Law School, 19 (out of 57; 33.3%), School of Medicine, 34 (out of 110; 30.9%) and School of Mechanical Engineering, 14 (out of 49; 28.6%). The Islamic Pedagogical School and School of Economics had smallest prevalence of smokers, eight (out of 45; 17.8%) and 14 (out of 85; 16.5%), respectively ( $p = 0.05$ ) (Table 3).

**Table 1. Distribution of students involved in the study by school and gender**

School (No. of students)	No (%) of students		
	Males	Females	Total
School of Medicine (298)	32 (29.1)	78 (70.9)	110 (18.4)
Polytechnics (332)	40 (44.0)	51 (56.0)	91 (15.1)
Metallurgy and Materials (220)	25 (29.1)	61 (70.9)	86 (14.3)
Economics (609)	24 (28.4)	61 (71.6)	85 (14.2)
Philosophy (637)	24 (31.2)	53 (68.8)	77 (12.8)
Faculty of Law (572)	28 (49.2)	29 (50.8)	57 (9.5)
Mechanical Engineering (350)	18 (36.8)	31 (63.2)	49 (8.1)
Islamic Pedagogical (663)	1 (2.2)	44 (97.8)	45 (7.5)
<b>Total (3681)</b>	<b>192 (32.0)</b>	<b>408 (68.0)</b>	<b>600 (100.0)</b>

**Table 2. Frequency of tobacco and alcohol consumption among students by gender**

Variable	No (%) of students		
	Males	Females	Total
<b>Tobacco consumption</b>			
yes	68 (46.9)	77 (53.1)	145 (24.2)
no	124 (27.3)	331 (72.7)	455 (75.8)
<b>Total</b>	<b>192 (32.0)</b>	<b>408 (68.0)</b>	<b>600 (100.0)</b>
<b>Alcohol consumption</b>			
yes	135 (70.2)	154 (37.7)	289 (48.1)
no	57 (29.8)	254 (62.3)	311 (51.9)
<b>Total</b>	<b>192 (32.0)</b>	<b>408 (68.0)</b>	<b>600 (100.0)</b>

Prevalence of smoking among male students was 35.4% and 18.9% among female students ( $p < 0.05$ ).

Male participants smoke 15.62 cigarettes per day, whereas female participants 13 cigarettes a day ( $p < 0.05$ ). On average, male participants were 16.56 years old, and female participants 16.71 when they started smoking cigarettes ( $p < 0.05$ ).

A total of 289 (48.1%) participants claimed alcohol consumption, while specific gender prevalence for alcohol consumption was higher among males 135 (out of 192; 70.2%) comparing to females ( $p < 0.05$ ) (Table 2). Specific prevalence for alcohol consumers was highest among students enrolled in the School of Philosophy and School of Medicine, 50 (out of 77; 65.0%) and 65 (out of 110; 59.1%), respectively ( $p < 0.05$ ) (Table 3).

**Table 3. Distribution of tobacco and alcohol consumption of students by schools**

School	No (%) of students					
	Tobacco consumption			Alcohol consumption		
	Yes	No	Total	Yes	No	Total
Law School	13 (33.3)	38 (66.7)	57 (9.5)	32 (56.2)	25 (43.8)	57 (9.5)
School of Medicine	34 (30.9)	71 (71.4)	110 (18.4)	65 (59.1)	45 (40.9)	110 (18.4)
Mechanical Engineering	14 (28.6)	57 (74.0)	49 (8.2)	24 (49.0)	25 (51.0)	49 (8.2)
Philosophy	20 (26.0)	71 (78.0)	77 (12.9)	50 (65.0)	27 (35.0)	77 (12.9)
Polytechnics	20 (22.0)	70 (81.4)	91 (15.1)	44 (48.4)	47 (51.6)	91 (15.1)
Metallurgy and Materials	16 (18.6)	37 (82.2)	86 (14.4)	35 (40.7)	51 (59.3)	86 (14.4)
Islamic Pedagogical	8 (17.8)	71 (83.5)	45 (7.5)	9 (20.0)	36 (80.0)	45 (7.5)
Economics	14 (16.5)	35 (71.4)	85 (14.0)	33 (39.0)	52 (61.0)	85 (14.0)
<b>Total</b>	<b>145 (24.2)</b>	<b>455 (75.8)</b>	<b>600 (100.0)</b>	<b>289 (48.1)</b>	<b>311 (51.9)</b>	<b>600 (100.0)</b>

**DISCUSSION**

The results of this study showed that almost one quarter (24.2%) of students consumed tobacco, 46.9% males and 53.1% females. The study conducted in Tuzla (B&H) during the 2012-2013 period on a sample of 254 students showed 22.8% pre-

valence of smokers among students (9), which is close to the prevalence of tobacco usage obtained in this study. Similarly, 28.5% of active smokers were noticed among 1217 third-year medical students in Turkey (11), 24.8% among 2820 students in Bhutan using STEPS questionnaire (12). A cross-sectional study performed among 12 medical schools in four European countries (Germany, Italy, Poland and Spain) showed smoking prevalence of 29.3% among 2249 students (28% of German and 31.3% Italian students) (13). Higher smoker prevalence, 42.3%, was reported among 154 students in Riyadh (Saudi Arabia) (14). According to a WHO report on the global tobacco epidemic in 2017 for B&H, prevalence of tobacco users in adult population (aged 15-49) was 33.6% (15), which is higher comparing to the results obtained in this study for student population. Smoking prevalence of 31.0% was found on the sample 1002 adolescents at Pristina (Kosovo) (16).

Smoking prevalence among young adults (15-34 year old) in European countries is very low for Sweden, 6.7% and 8.1%, for males and females. Smoking prevalence in other European countries is as follows: Bulgaria, 57.6% and 48.7%, Portugal, 42.0% and 24.6%, Croatia, 46.4% and 42.6%, Spain, 44.7% and 36.7%, Czech Republic, 51.3% and 42.7%, Italy, 38.5% and 33.8%, Germany, 37.1% and 31.7% for young adults (15-34 year old) males and females, respectively (17). Smoking prevalence for Bosnia and Herzegovina (B&H) of 35% and 16% for young (17-18 years old) males and females, respectively, was found in a study by Sekulic et al. (2012) (18), which is almost the same prevalence comparing to the results of our study (35.4% and 18.9% for males and females).

According to a research involving 187 countries worldwide during the period between 1980 and 2012, age-standardized prevalence of daily tobacco smoking for males declined from 41.2% to 31.1% (an average annual rate of 0.9%), and for females from 10.6% to 6.2% per year (19). The mean prevalence of tobacco smoking among adults in the African Region was reported to be 21% for males and 3% for females, although in some countries prevalence of up to 48% for males and 20% for females was found (20).

A study in Serbia reported smoking prevalence of 17.7-57.3% in males and 42.6% in females (21).

The results of MONICA research conducted on a sample of 800 students in Novi Sad (Serbia) showed a statistically significant increase of female smokers (from 30.8% to 41.7%) in the period 1994-2008, and a significant decrease of male smokers, making the number almost identical to the one obtained in 2004, six years before, when it was 37.9% (22). In our research prevalence of female smokers (53.1%) is higher than prevalence of male smokers (46.9%). According to this research males started smoking tobacco products at the age of 16.56, and females at the age of 16.71. This corresponds with the literature (22,23). Results from this study have shown that males smoke 15.62 cigarettes per day, whereas females 13 cigarettes per day. A research study conducted at the King Saud University in Riyadh, Saudi Arabia showed that majority of students (69%) smoked 10 cigarettes a day, and only 18% smoked 10 to 20 cigarettes per day (24).

The second risk factor that was in focus of this study was alcohol consumption, and it was found that nearly half (48.1%) of students were alcohol consumers; alcohol consumption was more frequent in males (70.2%). According to ESPAD 2015 data collection from 35 countries, on average, 48% of students drink alcohol, which corresponds to the data obtained in this study (25). Bosnia and Herzegovina is one of the European countries with very high prevalence of alcohol consumption with approximately 47% of adolescents who self-reported harmful alcohol drinking (18). Some studies have shown that college students drink more alcohol than young people the same age not attending college (26). A research performed at the University of Tuzla (B&H) in 2010 including 526 students of the third and fourth year (41% of were males) showed alcohol consumption prevalence of 62.3% (27), which is far higher comparing to the results obtained in the presented study (48.1%). The study conducted among 307 students at the University of Osijek (Croatia) showed alcohol consumption prevalence of 93.2% (28). Such a deviation in the results obtained in B&H and Croatia occurred probably due to religious background of the participants (majority of the population in B&H are of the Islamic religion, which prohibits the use of alcohol). The study on the frequency of alcohol consumption among students at three large universities in Serbia conducted on a sample of 2285 stu-

dents showed 4.6% alcohol consumption prevalence on a daily basis, and 77% occasionally (29). The results of a study conducted at the State University of Novi Pazar (Serbia) showed that 61.9% of first-year students and 64.4% of fourth-year students have consumed alcohol at least once in their lifetime; furthermore, 45.2% of first-year students and 55.56% of fourth-year students drink alcohol (30). These data correspond to the data obtained in presented research. The cross-sectional study on alcohol consumption conducted at the universities in the north-west Spain claimed that 78% of students drink alcohol (31) but far less at the University of Cordoba, Argentina (37%) (32). The results of the presented study showed 20% lower prevalence alcohol consumption comparing to the results of a previous similar study in B&H (27).

Non-communicable diseases are global epidemic caused by numerous risk factors. According to the World Health Organization (WHO) data chronic non-communicable diseases are the leading cause for the increase in morbidity and mortality of the world population (10). They have a direct impact on the working ability and life quality of the diseased. The consumption of harmful substances, tobacco and alcohol, is not only addictive, but it also poses a risk for the occurrence of non-communicative diseases (33).

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Main limitations of this study are unequal gender representation in the student sample (especially among students from Islamic Pedagogical School) and the number of participants by the schools. The obtained data could serve as the basis for further investigation including large population as well as eating habits, physical activity issues, sedentary lifestyle in order to define effective measures of prevention, e. g. at the strategic level (which defines participants, activities, their direction and anticipated results) and the tactic level (which shows contingency activities at the University).

In conclusion, tobacco and alcohol usage is evident among the students of University of Zenica. So far, active measures to reduce smoking and alcohol consumption among the student population have not been conducted in the area of Zenica-Doboj Canton, although measures of counselling have been carried out by the Family Medicine Departments at Healthcare Centres.

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## TRANSPARENCY DECLARATION

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