A Pilot Study Evaluating Preferences for Caffeinated Drinks Consumption Among Mures Medical Students

Iustinian SIMION\textsuperscript{1,3}, Victoria RUS\textsuperscript{1,2,*}, Maria SALCUDEAN\textsuperscript{1,3}, Catalin Moise DOGAR\textsuperscript{4}, Monica TARCEA\textsuperscript{1}, Florina RUTA\textsuperscript{1,3}

\textsuperscript{1}Department of Community Nutrition and Food Hygiene, University of Medicine and Pharmacy of Tirgu Mures
\textsuperscript{2}Department of Informatics, University of Medicine and Pharmacy of Tirgu Mures
\textsuperscript{3}Romanian Nutrition and Dietetics Association
\textsuperscript{4}Department of Information and Public Relations, University of Medicine and Pharmacy of Tirgu Mures

*corresponding author: Victoria RUS, e-mail: victoria.rus@umftgm.ro

Abstract
The scale of caffeinated drinks offered for young adults is large and also is the risk for abuse followed by heart or brain injuries due to high levels of caffeine, taurine, sugars etc. For this purpose, we chose to evaluate the risk behaviors in a group of Mures medical students and assess their practices and knowledge of excess caffeine drinks intake. For this study, we used a food frequency questionnaire containing 26 questions related to personal data, food behaviors, types of food and drink consumed and the frequency of consumption. The questionnaire was applied to 427 Mures medical students in 2016. On average, 2/3 of the Mures medical students associate an excess of coffee, energy drinks and other types of caffeinated beverages, especially during the exams period. From the list of preferred drinks that our students chose, in descending order, are: coffee, carbonated beverages, alcoholic beverages and energy drinks. Students often turn to alcoholic drinks, sometimes in combination with energy drinks, raising the risk for their health. 25% have only coffee in the morning, on empty stomach, skipping breakfast. More than half of them have at least 3 coffees per day, with possible health impact on long term. Our data emphasizes once more the importance of health education in schools and universities, especially for medical students and future doctors, and the need for efficient community interventions in order to prevent lifestyle behaviors at risk.

Keywords: caffeine intake, diet, energy drinks, health education

Introduction
A recent public health problem is represented by some risk eating behaviors of young people, either through insufficient food intake either as a result of an unbalanced diet by excessive intake of foods rich in salt and calories, or caffeine and additives (WHO, 2007; Hendricks et al., 2006).

The foods containing substances suspected of having adverse health effects are: excess coffee, energy drinks, soft drinks, sweets, sugar products, confectionery-pastry products, semi-prepared meats, sausages and fast food. To which can be added chaotic meals consumption and lifestyle, physical inactivity, late night eating, resting after eating a copious meal.

In the last period of time, it has been given special importance to the excessive caffeine consumption, especially by children and young people, from concentrated tea, coffee, cola drinks, energy drinks, caffeinated alcoholic drinks, chocolate or even aspirin and other pain relief drugs (WHO, and Bize et al., 2007; Aull et al., 2008). Caffeine excess in the body can be a possible risk for brain addiction, psychological imbalance, lack of sleeping, gastritis or constipation, high blood
pressure, bones calcium loss, dehydration, excess of sugar and chronic diseases related to this.

Coffee consumption has been associated with both benefits and risks on health: (1) positive effects of coffee consumption can be seen in lower risk of developing type 2 diabetes, liver or Parkinson's disease, beneficial effects of caffeine on long-term memory, and (2) potential adverse health effects, are related with an increased risk of developing cancer, high blood pressure, anxiety, cardiovascular disease and gastrointestinal disorders (Aull et al., 2008; Currie et al., 2008; Górnicka et al., 2014). Genetic variations could contribute to individual differences in the body's response to caffeine intake.

Food habits acquired during childhood have important health consequences both in the short and long term in adulthood (Górnicka et al., 2014; Reissig et al., 2009; Gunja et al., 2012) that’s why surveys and community interventions in schools are mandatory.

The purpose of this study was to identify the preferences, attitudes and knowledge of the students from the University of Medicine and Pharmacy of Tîrgu Mureș, regarding the consumption of caffeinated beverages and the associated risk.

**Material and methods**

We used a descriptive study conducted on a group of 427 students enrolled at the University of Medicine and Pharmacy of Tîrgu Mureș, aged between 18 and 30 years old, carried out by applying an online lifestyle assessment questionnaire, consisting of 26 questions related to food behavior and consumption frequency of beverages containing caffeine. It’s a pilot study for screening the behaviors, preferences and also possible biases before applying a randomized study in our university focused on caffeinated drinks consumption and related risks. The beverage’s caffeine content was evaluated to an average of 50 mg / 100 ml (starting from a very large scale of possibilities from the market, like energy drinks with contents starting from 30 to 200 mg, brewed black filter coffee with 40 mg, 10 mg of caffeine in cola drinks, or even from 60 mg in one Aspirin tablet to 200 mg in weight loss drugs).

Dissemination of the fill-in questionnaire was conducted in 2016, through the following channels: by e-mail and Facebook social network, by posting the questionnaire (created through the Google Forms program) to the student groups of the Faculty of Medicine and Pharmacy in Tîrgu Mureș. The information was collected during March - April 2016.

The data collection tool was the questionnaire, the research objective being the interpretation of the data and generalizing the results for the community.

**Statistical analysis**: The information obtained from the questionnaires was centralized into an Excel database, and the statistical analysis was performed using the IBM/SPSS V20 program. The interpretation of the statistical tests was compared with the statistical significance threshold $p=0.05$.

**Results and discussion**

The monitored group consisted of 55.6% students aged between 21-30 years and 43.2% with less than 20 years. 79.80% were women and 69.25% from urban residence.

Regarding student's weight classification, the Body Mass Index (BMI) was calculated and the respondents were classified as follows: 12.2% had a BMI corresponding to "underweight" category,
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70.4% classified as “normal weight”, 14.10% had a corresponding “overweight” BMI, and 3.3% were obese (Figure 1).

We observed a statistically significant relationship between BMI = 30-34.9 kg/m\(^2\) and the number of sugar teaspoons added in tea/coffee/day greater than 3, \(p=0.004\).

The most frequent diseases reported (not necessarily related to caffeine consumption) by respondents were: thyroid gland disorders (4.9%, \(n=21\)), depression (5.63%, \(n=24\)), gastric ulcer (1.8%, \(n=8\)), and high blood pressure (HBP) (1.4%, \(n=6\)) (Figure 2). From inferential statistics, we had a statistically significant association between high blood pressure and age over 30 \((p=0.004)\), and also depression occurs more frequently in women \((p=0.007)\) over 30 \((p=0.004)\), similar to other studies (Whalen et al., 2008; Specterman et al., 2015; Smit et al., 2004).

A share of 16.9% of students do not eat breakfast, instead they consume coffee on an empty stomach. The preferred locations for dining and having coffee were: 88.99%, home, 10.56% at the canteen, 6.10% at the restaurant, and 2.35%, for fast-food restaurants. We observed a statistically significant association between the preferred location for having coffee of women (home) and men (fast-food), \(p=0.003\).

38.73% reported one coffee consumption per day, and 27.23% stated an intake of 2-3 coffee/day; coffee consumption was significantly influenced by age over 30 years old (consuming over 5 cups of coffee/day) compared to those younger than 20 (consuming on average 1 coffee/day), \(p = 0.002\) (Figure 3).

Consumption of alcohol was moderate among students, and the most frequently alcoholic beverages consumed were: wine (men, \(p<0.05\)) (24.4%) and beer (16.9%) with a daily frequency in a 250 ml quantity. Interesting was the association (for 9% of the students) of energy drinks with alcoholic drinks at events.

Concerning the energy drinks consumption, a share of 73.2% declared an occasional frequency consumption, 35.40% consumption with increased frequency and daily consumption was reported by 1.2% of students.

The reasons for not to consume energy drinks included: „I think it can hurt my health” (68%, \(n=261\)); „I’m not feeling well” (16%, \(n=16\))
and 1.2% “Because of the price” (Figure 4). A percentage of 23.5% said that they felt bad after consuming energy drinks (Figure 5), and most of them (90.89%) believed that the population should be informed about the effects of these caffeinated beverages.

In the studied group there was an important rate of students who tend to combine energy drinks with alcohol (17.4%), or with coffee and chocolate (17%) (Figure 6). Over half of them (59.66%) reporting abuse of these substances in exam session, respectively 16.22%, when they go to feasts (p <0.05) and parties.

Romanian students, have an unhealthy diet, according to current studies in our country and studies from the European Union as well (Aull et al., 2008; Gunja et al., 2012; Grosz et al., 2008) thereby 43.75% of students skip breakfast (for coffee) (Whalen et al., 2008; Specterman et al., 2015; Smit et al., 2004).

From the data analyzed we observe that most students used to drink coffee (69.48%) and energy drinks (73.2%), 59.6% of them drink excessively with friends and colleagues, especially in the exam session, and in the organized student parties and other feasts (p <0.05), only a small proportion combining coffee and energy with alcohol (17.4%) as well with sweets containing caffeine (17%), similar results had a similar study conducted in Turkey in 2012 on a group no=2090 students, 53.5% declaring energy drinks consumption and
only 28.1% combining energy with alcohol at parties (Tesfaye et al., 2009).

The caffeine effects on psychological and performance improvements, especially during the exam session, were observed after consuming high doses that are unattainable in normal daily circumstances as well as after taking a realistic dose (Fredholm, 2011; Godos et al., 2014; Institute for Scientific Information on Coffee, 2017; Baspinar et al., 2017).

In another similar study conducted also in Turkey (Dong-Chul You et al., 2011), 48.3% of students said they had consumed energy drinks at least once, and the reasons given by those who did not consume were: lack of interest for these products (38.5%) and the fear of harm to health (29.2%) (Papakonstantinou et al., 2015; Liqing et al., 2015; Scholey et al., 2004; Miller et al., 2008) compared to our research data, which shows that 27.7% of the respondents did not consumed energy drinks, and the most frequent reasons for the lack of consumption of these drinks were the fear that it may harm their health (68%), but also 16% of the medical students said they did not believe in the effects of these drinks (Ferreirian et al., 2004; European Food Safety Authority, 2017; European Commission, 2003; Pieszko et al., 2010; Federal Institute for Risk Assessement, 2008; Bekir et al., 2014).

**Conclusions**

After analyzing the data from the questionnaires we have drawn the following conclusions:

Most students make diet and drinking abuses when participating at parties, as well as during the examination when the volume of attention and concentration need to be raised;

The main reason why some of the students said they were not accustomed to drink caffeine-rich beverages and energy drinks was the negative impact on health, thus confirming our hypothesis;

Our considerations regarding the gender has no connection with coffee/tea consumption, even though an increased tendency of energy drinks consumption was found among men, also the coffee consumption being significantly influenced by age, namely people older than 30 years;

This study has shown that more than half of Mures students are consuming energy drinks at some point. The caffeine beverage consumer’s profile is: a man attending student parties, and who consume energy drinks and alcohol.

It would be helpful to take these factors into account in developing policies to protect young people from the health impact of caffeinated beverages, excess coffee, energy drinks and alcohol.

**References**


