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## SUBSTANTIATION OF THE RISK OF HOOKAH USE BY STUDENTS

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**Пац Н. В., Романова Е. В., Синегуб И. С. Обоснование риска употребления кальяна студентами** // *Здоровье человека, теория и методика физической культуры и спорта*. 2020. № 2 (18). С. 17–22 URL: <http://journal.asu.ru/zosh/issue/archive> <http://journal.asu.ru/zosh/issue/archiveDOI> [https://doi.org/10.14258/zosh\(2020\)2.2](https://doi.org/10.14258/zosh(2020)2.2)

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**Abstract.** The purpose of this work was to assess the conditions conducive to the development of bad habits (hookah Smoking) and the risk of health disorders amongst the youth, and furthermore, the study of the amount of harmful substances entering the organism of a hookah smoker for 1 minute when smoking.

The questionnaire method with the use of original, author's electronic test questionnaires for medical and social picture of hookah consumers among young people is applied. The study was held in October 2019. The study involved 254 people, hookah smokers, among them 59 boys and 195 girls.

20 people were assessed the load obtained by the number of puffs, the volume of inhaled hookah smoke, and the duration of one puff in order to substantiate the risk of entering harmful substances, such as nitrosamines, polycyclic aromatic hydrocarbons, volatile aldehydes, benzene, nitrogen oxide, heavy metals, carbon monoxide in hookah smoker's organism for 1 minute.

It is revealed that not only youth, but also teenagers join hookah smoking. The frequency of hookah Smoking by young people is different: 24, 3% of students smoke hookah every six months, 23, 4% — once a quarter, 30, 9% join the hookah Smoking only once a year, but there was a group of 20.6% out of the surveyed that consumes hookah once a month and more often.

The reasons why teenagers and young people smoke hookah are different: 22, 6% of the respondents search for the opportunity to relax when Smoking hookah, consciously for personal pleasure — 38, 7%, only to support the company — 29, 9%.

On average hookah Smoking consists of 171 puffs of 530 ml with the duration of one puff 3 seconds at a frequency of 2.8 puffs per minute.

The number of potentially dangerous components contained in hookah smoke, which has in its composition nitrosamines, polycyclic aromatic hydrocarbons, volatile aldehydes, benzene, nitric oxide, heavy metals, carbon monoxide, is quite high. This is a risk of health disorders in the young, unformed body of the hookah consumer, but it is also a risk of disturbance of the smoker's reproductive health, which has further long-term consequences for the future generation.

**Keywords:** hookah, volume of a puff, hookah smoke, risks, health, youth.

**Аннотация:** Цель данной работы состояла в том, чтобы оценить условия, способствующие развитию вредных привычек (курение кальяна), и риск нарушений здоровья среди молодежи, и, кроме того, изучение количества вредных веществ, поступающих в организм курящего кальяна за 1 минуту при курении.

Применен метод анкетирования с использованием оригинальных авторских электронных тестовых анкет для медицинской и социальной картины потребителей кальяна среди молодежи. Исследование было проведено в октябре 2019 г. В исследовании приняли участие 254 человека, курящих кальян, среди которых 59 мальчиков и 195 девочек.

20 человек оценили нагрузку, полученную по количеству затяжек, объему вдыхаемого дыма для кальяна и продолжительности одной затяжки, чтобы обосновать риск попадания вредных веществ, таких как нитрозамины, полициклические ароматические углеводороды,

летучие альдегиды, бензол, окись азота, тяжелые металлы, окись углерода в организме курильщика кальяна за 1 минуту.

Выявлено, что не только молодежь, но и подростки присоединяются к курению кальяна. Частота курения кальяна среди молодежи разная: 24,3% студентов курят кальян каждые шесть месяцев, 23,4% — раз в квартал, 30,9% присоединяются к курению кальяна только один раз в год, но была группа 20,6% из опрошенных, которые употребляют кальян раз в месяц и чаще.

Причины, по которым подростки и молодые люди курят кальян, различны: 22,6% респондентов ищут возможность расслабиться, когда курят кальян, сознательно для личного удовольствия — 38,7%, только для поддержки компании — 29,9%.

В среднем курение кальяна состоит из 171 затяжки по 530 мл с продолжительностью одной затяжки 3 секунды с частотой 2,8 затяжки в минуту.

Количество потенциально опасных компонентов, содержащихся в кальянном дыме, в состав которого входят нитрозамины, полициклические ароматические углеводороды, летучие альдегиды, бензол, оксид азота, тяжелые металлы, окись углерода, достаточно велико. Это риск возникновения расстройств здоровья в молодом, не сформированном теле потребителя кальяна, но это также риск нарушения репродуктивного здоровья курильщика, что имеет дальнейшие долгосрочные последствия для будущего поколения.

**Ключевые слова:** кальян, объем пуфа, кальянный дым, риски, здоровье, молодость.

## INTRODUCTION

Amongst the youth, it remains relevant to study the addiction of young people to bad habits. The main harmful habit in the age group from 17 to 20 years was tobacco Smoking [1, 6, 9]. But in the last 5 years, the amount of adherents of classical tobacco Smoking has shrunk, especially among students of higher educational institutions of medical specialties [2, 3]. However, it should be noted that with increasing pace the introduction of young people, including students, to Smoking hookah is growing [7, 8]. There are works of foreign scientists [8] indicating the Toxicological component of this bad habit [4,5]. It is noted that 1 gram of tobacco contains: resin-802 mg, nicotine-2.96 mg, carbon monoxide (CO) — 143 mg.

With a lot of work carried out in Belarus and Russia on the formation of adolescents and youth health-saving world view and behavior [10,11] data on the number of young people who use hookah in Belarus, in open sources is not noted. Risk groups have not been studied. There is no data on the impact of hookah on the health of different age groups (adolescents and youth), and therefore relevant assessment of the risk of hookah use for adolescents and youth.

## Purpose and objectives of the study.

Therefore, **the purpose** of this work was to assess the conditions conducive to the development of bad habits (hookah Smoking) and the risk of health disorders amongst the youth, and furthermore, the study of the amount of harmful substances entering the organism of a hookah smoker for 1 minute when Smoking.

The study involved 254 people, including boys –59, girls –195, who smoke hookah.

The respondents' gender is predominantly female (195 people) (fig.1).

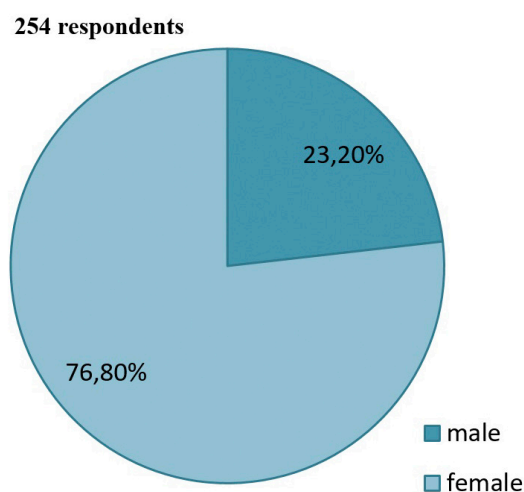


Fig. 1. Respondents' gender

The respondents' age is chiefly 18–20 years old (fig. 2). These are primarily students in the second-third years (fig. 3).

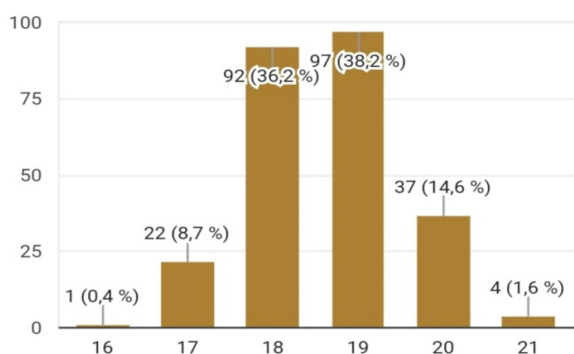


Fig. 2. Distribution of respondents according to the age

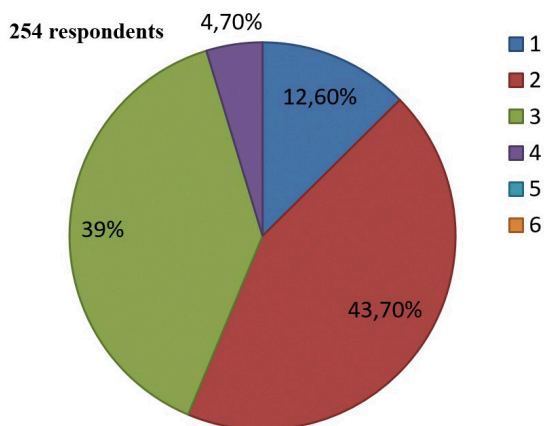


Fig. 3. Respondents year of study

However, a group of teenagers who are attached to Smoking Shisha was revealed. It was 9,1% of the surveyed.

### Materials and methods

The questionnaire method is applied with the use of original, author's electronic test questionnaires on the questions reflecting the influence of the social environment on the development of bad habits (hookah Smoking). The study was conducted in October 2019.

A group of 20 people, who smoke hookah, was selected. They were estimated the load obtained by the number of puffs, inhaled volume of hookah smoke, and the duration of one puff to substantiate the risk of entering harmful substances such as nitrosamines, polycyclic aromatic hydrocarbons (PAHs, e. g., anthracene and benzopyrene), volatile aldehydes (e. g., formaldehyde, acetaldehyde,

acrolein), benzene, nitrogen oxide, heavy metals (arsenic, chromium, lead), carbon monoxide (CO) in the hookah smoker's organism for 1 minute.

Statistical processing of the results was performed using software package Statistics 10.0

### Discussion and results.

Studies have shown that the frequency of hookah Smoking by respondents is different. Thus, 24,3% of students smoke hookah every six months, 23,4% — once a quarter, 30,9% join the hookah Smoking only once a year, but there was a group of 20.6% out of the surveyed that consumes hookah once a month and more often (fig. 4).

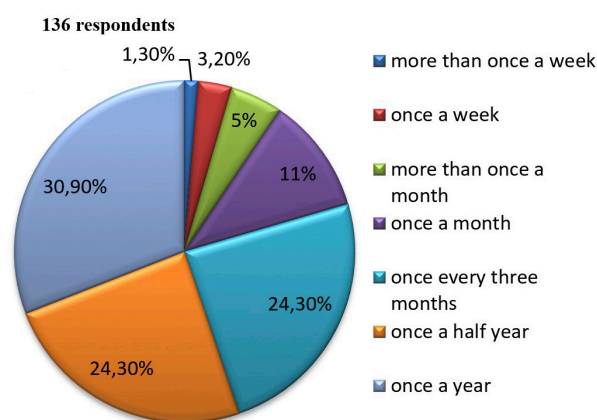


Fig. 4. Frequency of hookah Smoking by respondents

At the same time, it was found out whether our respondents smoke classical cigarettes, apart from the hookah. The survey showed with a high degree of certainty that no (fig. 5), and only 26,2% of the respondents smoke constantly, 7,4% of the respondents sometimes allow themselves to smoke 1–2 cigarettes.

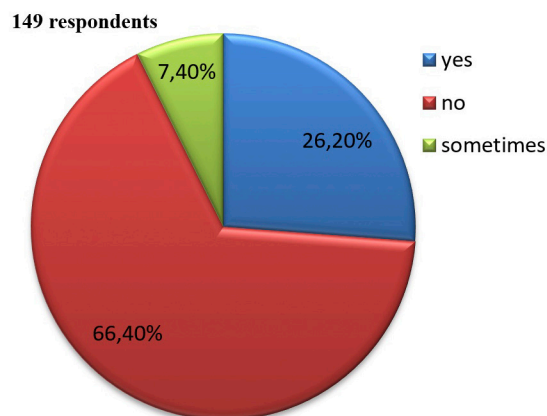


Fig. 5. Frequency of cigarette smoking in a group of students



Members of the examined group of students Smoking hookah ( $p < 0,05$ ) chose chiefly the strength of medium tobacco, 36% — light (fig. 6).

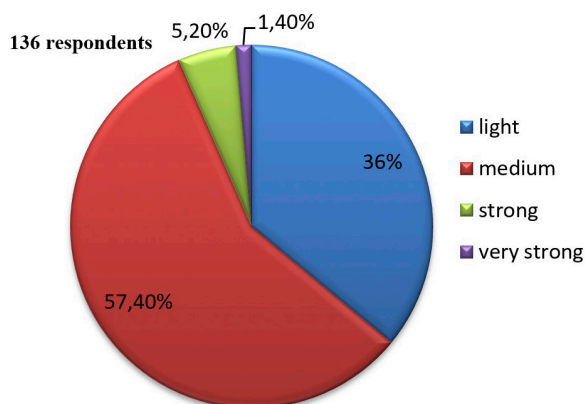


Fig. 6. Tobacco strength for hookah, chosen by respondents

When figuring out the reasons why respondents smoke hookah, it was noted that 22,6% of the respondents search for an opportunity to relax when Smoking hookah, consciously for personal pleasure — 38,7%, only to support the company — 29,9%. (fig. 7). It should be noted that hookah Smoking is promoted by various aromatic additives added to hookah tobacco, such as mango, apple, orange, pear and others.

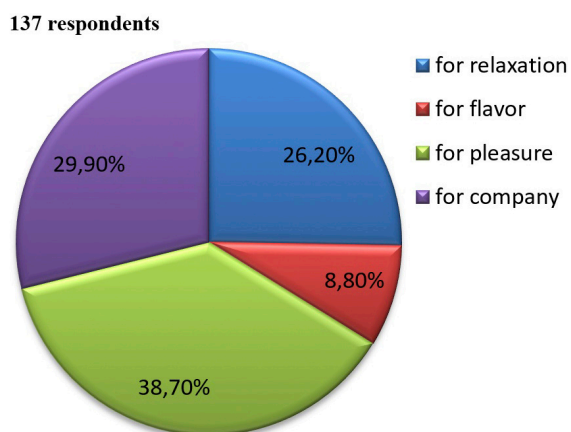


Fig. 7. Reasons for Smoking hookah by respondents

In the group of 20 examined people, when assessing the load which they received when using a hookah by the number of puffs, the volume of inhaled hookah smoke, and the duration of one puff, it was revealed that on average, Smoking a hookah consists of 171 puffs of 530 ml with a duration of one puff of 3 seconds at a frequency of

2.8 puffs per minute. This model is based on data from Smoking sessions lasting 30 minutes and more (on average 60 minutes).

According to some researchers, the nicotine content of hookah tobacco ranges from 2% to 4% compared to 1% to 3% for cigarettes [5]. Other studies show that after hookah Smoking there is an increase in the level of nicotine and alcoholoid (cotinine) [12]. According to these data, «after one 45-minute session of Smoking, the average concentration of nicotine in plasma increased from 1.11 to 60.31 ng/ml, and cotinine — from 0.79 to 51.95 ng/ml. The concentration of nicotine in saliva increased from 1.05 to 624.74 ng/ml, and cotinine — from 0.79 to 283.49 ng / ml. The average amount of nicotine and cotinine excreted in a 24-hour urine sample after Smoking was 73.59 mcg and 249 mcg, respectively» [12].

Thus, the results showed that the number of potentially dangerous components contained in hookah smoke, which has in its composition nitrosamines, polycyclic aromatic hydrocarbons (PAHs, for example, benzopyrene and anthracene), volatile aldehydes (for example, formaldehyde, acetaldehyde, acrolein), benzene, nitric oxide, heavy metals (arsenic, chromium, lead), carbon monoxide (CO) is quite high.

This is not only a risk of health disorders in the young, unformed body of the hookah consumer, but it is also a risk of disturbance of smoker's reproductive health, which has further long-term consequences for the future generation.

### CONCLUSION

1. Not only youth audience, but also teenagers are involved in hookah Smoking.

2. The reasons why teenagers and young people smoke hookah are different: 22,6% of the respondents search for an opportunity to relax when Smoking hookah, consciously for personal pleasure — 38,7%, only to support the company — 29,9%.

3. Hookah Smoking by youth is carried out with a frequency of every six months — 24,3% of students, once a quarter — 23,4%, 30,9% students join hookah Smoking only once a year, but out of the surveyed a group of 20.6% stood out, who consumes hookah once a month and more often.

4. On average, hookah Smoking among young people consists of 171 puffs of 530 ml with a

duration of one puff of 3 seconds at a frequency of 2.8 puffs per minute.

5. The number of potentially dangerous components contained in hookah smoke, which has in its composition nitrosamines, polycyclic aromatic hydrocarbons, volatile aldehydes, benzene, nitric oxide, heavy metals, carbon

monoxide, is high enough that with the volume of inhaling and their number per minute presents a toxicological risk of health disorders in a young, unformed body not only for the hookah consumer, but also is a risk of disturbance of smoker's reproductive health, which has further long-term consequences for the future generation.

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