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Research Article

Changes in Respiratory Variables in Hookah Users Compared to Non-Users

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Abstract

Introduction: The use of hookah has been growing worldwide, especially among young people, who evaluate narguile sessions as a leisure activity.

Objective: To verify respiratory variables through tests in hookah users when compared to non-user individuals.

Methods: The study was conducted with 29 voluntaries divided into two groups: 14 group non-users and 15 group hookah users. All were submitted to the following tests: 6MWT, Mon oximeter, manovacuometry and peak 6.

Results: The mean age was the same in both groups, in the non-user group the PEF found was average of 437.8 ± 150.2 l/min, average VEF1 of 2.64 + 0.90 liters, Average PE max of 84.28 ± 24.71 cm H2O, Average PI max of -65.71 ± 24.71 cm H2O, 6MWT average of 579.35 ± 50.97 meters and no significant alteration in the Mon oximeter was found. The group users present average PEF average of 501.6 ± 146.0 l/min, VEF1 average of 2.76 ± 0.80 liters, Average PE max of 105 ± 19.11 cm H2O, Average PI max of -87, ± 23.01 cm H2O, mean 6MWT of 548.07 ± 73.74 meters and 5 participants presented concentrations detected in the test. Among the values found in the present study, the only statistically significant was the PI max, whose significance level was 0.01.

Conclusion: The use of hookah may result in damage to pulmonary conditions, evidenced by the decrease in walking distance and the amount of carbon monoxide brand based on the lungs of users.

Keywords: *Nicotine; Tobacco Products; Hookahs; Respiratory Tests*

Introduction

For the Mun dialHealth Organization, hookah can be considered a type of pipe with water of Eastern origin commonly used to smoke flavored tobacco among other forms of drugs. Although there are several types of hookah around the world, this study mentions the most common as: hookah, shisha or hookah; which became popular worldwide from the 1990s, consisting of a tobacco oven or vase, a body, a water vessel, a hose and a nozzle [1].

Usually when coal is burned, a heat source is generated in hookahs, and as a consequence a smoke that emits toxic products caused by both coal and tobacco. The formation of smoke composition depends on the material that makes up coal and tobacco, and how toxic

it can become including flavourings [1]. Another factor that can influence the toxicity of hookah smoke is the number, volume, duration and interval of the swallows, data from the National Cancer Institute indicate that during atypical use of hookah, the user brings large doses of toxic substances [1], which may be related to chemical dependence, cardiopulmonary diseases and cancer, generating similar consequences in hookah users [1].

Currently the smoking habit is responsible for about 5 million deaths/year, becoming the leading cause of preventable morbidity and mortality; it is estimated that by 2030 this number will increase from 10 million, if prevention and control measures are not established [2].

Aim of the Study

Thus, our study aimed to communicate and educate the population by suggesting information policies to consumers warning about the risks of the use of dand hookah. To verify changes in respiratory variables through tests in hookah users when compared to non-users.

Method

This is an observational, comparative, descriptive study between hookah users and non-users. The participants were recruited and performed clinical tests and evaluation questionnaires at the pulmonary rehabilitation outpatient clinic of the ABC Health University Center. The study was approved by the Research Ethics Committee, case number 14976019.7.0000.0082 and all participants signed a free and informed consent form.

Participants aged 18 to 30 years were eligible; hookah users for at least 6 months; non-hookah users; both genders; sedentary. Exclusion criteria: hookah users and other types of cigarettes associated with them; participants with some cardiorespiratory pathology already diagnosed.

Patients were evaluated by the following clinical trials: Fagerstrom test for the degree of dependence of each individual nicotine [3-5]; where added to the points of each alt and the final total value, consider or-is how total value: from 0 to 2 = very low dependency; from 3 to 4 = low dependence; 6 to 7 = high dependence and 8 to 10 = very high [6] applied only to the user group. 6-minute walk test (6MWT): analyzing these vital signs and symptoms during the test [7] oxygen saturation (with nonin onyx pulse oximeter), Borg scale for lower limbs fatigue and dyspnea and distance in meters, as recommended by the gold standard according to the America Thoracic Society (ATS); Manovacuometer: the used manovacuometer (M120 from Commercial Medical) and considered maximum inspiratory pressure (PImax) and maximum expiratory pressure (PEmax) for imuscle forces [8]; using-se the proposed formula for the Brazilian population [9]. Monoximeter: to measure the measurement of carbon monoxide (CO) [8] Was Used device of the Brand Micro Medical Limited Smoke Check - PO Box 6, where each individual performed a forced expiration. Peak-Flow (PFE): performed in accordance with pulmonary function guidelines/expiratory measures [10,11]; Useful the Ferraris Piko 1 device®.

Descriptive analysis of the data was generated, the qualitative aspects were presented by absolute and relative frequency and the variables were presented by mean, standard deviation, minimum and maximum values, using data normality test (Shapiro-Wilk test).

To compare respiratory variables and the 6-minute walk test, the student t test was used; and to relate the classification of carbon monoxide, the Chi-square test was used. The significance level of $p < 0.05$ was adopted and the statistical program used was Stata version 11.0.

Result

Table 1 describes the characteristics of the hookah user group compared to non-users.

Characteristics	Non-Users	Users
Male	4	9
Female	10	6
Age (years)	23 ± 2,57	23 ± 2,57
Weight (Kg)	64,92 ± 13,37	75,6 ± 9,98
Height (cm)	166,46 ± 10,25	168,14 ± 8,31
Usage/week		2,15 ± 2,82
Age 1st time		16,15 ± 2,82
Time of use		6,92 ± 2,32

***Table 1**: Characteristics of participants users and non-users of hookah.*

Age in years; Weight in kilograms; Height in meters and centimeters; Usage/week: Frequency of sessions per week; Age 1st time: Age that individual used hookah for the first time; Time of use: Time in years that each individual reported. Data expressed in mean and standard deviation.

Nongroup of non-users observed that the mean age = 23 ± 2.57 years, PEF of 437.8 ± 150.2 l/min, VEF1= 2.64 ± 0.90 liters, PE max = 84.28 ± 24.71 cm H_2O, PI max = -65.71 ± 24.71 cm H_2O, TC6 = 579.35 ± 50.97 meters and no monoximeter alteration was found table 2.

Variables	Non Users	Users	P
PEF (L/min)	437.8 ± 150.2	501.6 ± 146	0.62
VEF1 (L)	2.64 ± 0,90	2.76 ± 0,80	0.64
PE max (cmH_2O)	84.28 ± 24.71	105 ± 19.11	0.99
PI max (cmH_2O)	65.71 ± 24.71	87.14 ± 23.01	0.01
TC6' (m)	579.35 ± 50.97	548.07 ± 73.74	0.10
Monoximeter (CO)	0	5	0.048

***Table** 2: Comparison between respiratory variables in users and non-users.*

PEF (Expiratory Flow Peak) liters per minute; VEF1: (Forced Expiratory Volume in the first second) in liters; PE max: (Maximum Expiratory Pressure) in centimeters of water; PI max: (Maximum Inspiratory Pressure) in centimeters of water; 6MWT: (6-minute walk test) in D meters demonstrated in mean and standard deviation.

The group of users have a mean age of 23 ± 2.57 years, PEF of 501.6 ± 146.0, VEF1 = 2.76 ± 0.80 l/minute, PE max = 105 ± 19.11cm H_2O, PI max = 87.14 ± 23.01 cm H_2O, TC6 = 548.07 ± 73.74 meters and Mon oximeter was found the average value of 5 users with alteration.

Among the values found in the present study, only the variable PI max was statistically significant, with significance level of 0.01.

Discussion

The habit of hookah has been growing, especially among young people who classify these sessions as a leisure practice divided with friends and family both in different environments such as bars or in the residence; although representative studies of countries are still scarce.

Study such as the Global Youth Tobacco Survey (GYTS) 2008 [12], which participated approximately more than 500,000 students aged 13 to 15 years in the world, described that other varieties of tobacco are growing, being the hookah considered more frequent; the

opposite of the tobacco habit that is stable or decreasing in some countries. The Global Adult Tobacco Survey (GATS) [13] was conducted in adults in 2010, reported data on hookah in 13 countries, in Brazil, the prevalence was 0.18% (95% CI 0.11 - 1.36) and 0.1% (95% CI 0.05 - 0.20), in men and women, being more dominant in the beech age from 15 to 24 years and in urban areas. In this study, we observed the prevalence of hookah users of 8 men and 7 women, aged 19 - 25 years on average; the same was verified about prevalence in the previous studies.

In hookah smoke, most of the toxins found in cigarette smoke are found, among them: nicotine that produces carbon monoxide (CO) responsible for cardiovascular diseases and polycyclic hydrocarbons responsible for cancer. Some are produced at a higher level by hookah compared to cigarettes, perhaps because the amount dand instilled smoke can reach 100 times that produced by a single cigarette in just a single hookah session [14].

It is known that at high temperatures, high concentrations of toxic products are released, which are instilled by both users and people close to the environment during hookah use. The burning of coal and the incomplete combustion of tobacco when the hookah is lit, a temperature close to 500°C occurs, below the fuel temperature of the common cigarette [15]. In this study, the test was retested with the Mon oximeter that mediates the amount of carbon monoxide present in the body of the participants, the CO is seen as a chemical asphyxia and can interfere in the transport of oxygen to the tissues, causing tissue hypoxemia, altering the benefit of oxygen in the cells. It was observed that 5 of the 14 users had a higher amount of CO in the blood than normally predicted.

After 45 minutes of hookah use, an increased heart rate, expired carbon monoxide, in addition to increased exposure to heavy, toxic and di cyclic elimination metals, such as cadmium is started [16].

The presence of the water inserted in the pipe makes some think that it collaborates in removing the toxic substances from the d, but, infect, it causes the user to ingest even more smoke.

However, Mulder., *et al*. [17] demonstrated that the individuals presented functional capacity close to the predicted, and the fact that these individuals presented 6MWT values considered normal can be explained by the mild smoking load found in the sample, it was stated that the smoking time was not sufficient to promote an active influence on functional capacity [17].

In this study, it was observed that hookah users compared to non-users traveled a shorter distance in meters when performing the 6-minute Walk Test, which relates the data of the study mentioned above.

The results of this study suggest that hookah users performed greater lung strength capacity when related to non-users, this may occur due to the daily practice of smoking, where the procedures for use are similar to those of the device used for such measurement. What infers us to develop a critical eye, pronouncing us to say that the indiscriminate use of hookah does not cause satisfactory divergences in a brief period of use.

It is known that long-term smoking causes irreversible pathologies to the respiratory system, and therefore we question whether these changes would be seen in the consumer group in the long term [18].

A study by Silva., *et al*. recruited 30 participants, divided into two groups: cigarette smoker (CFG) and hookah smoker (PFM), peak expiratory flow, maximum respiratory pressures, level of physic activity and nicotine dependence; referent to respiratory muscle strength, the CFG presented a better result than the GFN. As for the measurement of the peak expiratory flow in the CFG 61.5% does not present limitation, 15.4% present mild limitation, 15.4% have moderate limitation and 7.7% have severe obstruction. In the GFN 82.4% do not present limitation and 17.6% have moderate limitation. This shows us that smoking, regardless of the tobacco product used, impairs the pulmonary structure, contrary to what hookah users argue [19].

Emphasizing more on the subject Lunelli., *et al.* it has been reported that the respiratory muscle strength of smokers is modified by the change in the mechanism of pulmonary defense by decreasing mucociliary clearance, and excessive mucus production, causing an obstructive pattern, and increasing airway resistance; explaining the fact that manovacuometry values are below what is predicted in relation to the two groups studied [20].

Conclusion

The hookah so can cause damage to pulmonary conditions, evidenced by the decrease in walking distance in meters and by the amount of carbon monoxide present in the lungs of users, even though they are not significant. It is possible to affirm that there were changes in the distance traveled by users and non-users, which suggests that the use of hookah has a relationship in this result obtained.

Thus, there is a need for other studies with a longer time interval and frequency of smoke, and a considerable sample for analyzing the deleterious effects in which hookah exerts. And thus, how important it is not to make use, and with this make it remarkable the approach and prevention of this practice that is not well disseminated yet. Thus, it will become a public health problem to which it will prevent diseases in many individuals.

Bibliography

1. Instituto Nacional de Câncer José Alencar Gomes da Silva/ Ministério da Saúde. Uso de narguilé: efeitos sobre a saúde, necessidades de pesquisa e ações recomendadas para legisladores (2017).
2. Nunes, Emilia. Consumo de tabaco. Efeitos na saúde (2006).
3. INCA. Teste de Fargeström (2020).
4. Carmo JT and Pueyo AA. "A adaptação ao português do Fagerström test for nicotine dependence (FTND) para avaliar a dependência e tolerância à nicotina em fumantes brasileiros". *Revista Brasileira de Medicina* 59.1-/2 (2002): 73-80.
5. Heatherton TF., *et al*. "The Fagerström test for nicotine dependence: a revision of the Fagerstrom Tolerance Questionnaire". *British Journal of Addiction* 86.9 (1991): 1119-1127.
6. Spiandorello WP., *et al*. "Avaliação da participação de pequeno número de estudantes universitários em um programa de tratamento do tabagismo". *Jornal Brasileiro de Pneumologia* 33.1 (2007): 69-75.
7. ATS Committee on Proficiency Standards for Clinical Pulmonary Function Laboratories. ATS statement: guidelines for the six-minute walk test". *American Journal of Respiratory and Critical Care Medicine* 166.1 (2002): 111-117.
8. Parreira VF., *et al*. "Pressões respiratórias máximas: valores encontrados e preditos em indivíduos saudáveis". *Revista Brasileira de Fisioterapia* 11 (2007): 361-368.
9. Leiner George C., *et al*. "Expiratory Peak Flow Rate Standard Values for Normal Subjects". Use as a Clinical Test of Ventilatory Function (1963).
10. Boaventura CM., *et al*. "Valores de referência de medida de pico de fluxo expiratório máximo em escolares". *Arquivos Médicos do ABC* 32.2 (2007): S30-34.
11. Pereira CAC., *et al*. "Espirometria. In: Diretrizes para testes de função pulmonar". *Jornal Brasileiro de Pneumologia* 28.3 (2002): S1-S82.

12. Erguder T., *et al*. "Evaluation of the use of Global Youth Tobacco Survey (GYTS) data for developing evidence-based tobacco control policies in Turkey". *BMC Public Health* 8.S1 (2008): S4.

13. Palipudi, KM., *et al*. "Determinantes sociais do uso da saúde e do tabaco em treze países de baixa e média renda: evidências do Global Adult Tobacco Survey". *PloS one* 7.3 (2012): e33466.

14. Maziak W., *et al*. "CO exposure, puff topography, and subjective effects in waterpipe tobacco smokers". *Nicotine and Tobacco Research* 11.7 (2009): 806-811.

15. Torrey CM., *et al*. "Waterpipe cafes in Baltimore, Maryland: Carbon monoxide, particulate matter, and nicotine exposure". *Journal of Exposure Science and Environmental Epidemiology* 25.4 (2015): 405-410.

16. La Fauci G., *et al*. "Intoxicação por monóxido de carbono em fumantes de narguilé (cachimbo d'água)". *Canadian Journal of Emergency Medicine* 14.1 (2012): 57-59.

17. Mulder I., *et al*. "Smoking cessation and quality of life: the effect of amount of smoking and time since quitting". *Preventive Medicine* 33.6 (2001): 653-660.

18. Urrutia I., *et al*. "Smoking habit, respiratory symptoms and lung function in young adults". *European Journal of Public Health* 15.2 (2005): 160-165.

19. Silva JÁ., *et al*. "O pico fluxo expiratório em mulheres fumantes e não fumantes e suas medidas de confiabilidade". *ASSOBRAFIR Ciênc* 6.1 (2015): 41-48.

20. Lunelli ML., *et al*. "Análise das condições pulmonares de discentes tabagistas de cigarro e tabagistas de narguilé do Centro de Ciências da Saúde da Universidade Regional de Blumenau". *ASSOBRAFIR Ciênc* 7.1 (2016): 43-45.

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