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**ORIGINAL ARTICLE /** *ARTIGO ORIGINAL*

# Frequency of the use of hookah among adults and its distribution according to sociodemographic characteristics, urban or rural area and federative units: National Health Survey, 2013

## *Frequência do uso de narguilé em adultos e sua distribuição conforme características sociodemográficas, moradia urbana ou rural e unidades federativas: Pesquisa Nacional de Saúde (PNS), 2013*

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**ABSTRACT:** ***Objective:*** To assess the frequency of the use of hookah in the Brazilian adult population aged 18 to 59 years. ***Methods:*** This is a cross-sectional, population-based study using the National Health Survey (PNS), 2013. Sampling was based on three stages: census tract, household, and individual. The frequency and the 95% confidence interval (CI) of the outcome "frequency of use of hookah," among those who reported tobacco use, were described according to demographic and socioeconomic variables, urban or rural area of the country, and macroregions; the frequency of hookah use according to the age and education was also investigated; all analyzes were weighted. ***Results:*** Of the 60,225 adults surveyed, 15% reported the use of some tobacco product; the frequency of use of hookah among them was 1.2% (95%CI 0.8 – 1.6) and higher in male subjects, in white individuals, in the youngest age group, with average to high education and residents of urban areas and the south and midwest. Among those who have used the hookah, 50% used it occasionally, 12.8% monthly, 27.3% weekly, and 6.8% daily. ***Conclusions:*** The relevance of the findings is because this is the first nationally representative study that evaluated the frequency of use of hookah in adults in the country. The results point to the need to implement surveillance regarding its use, as has occurred in relation to tobacco.

***Keywords:*** Prevalence. Health Surveys. Smoking. Cross-sectional studies. Adults.

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**RESUMO:** ***Objetivo:*** Avaliar a frequência do uso de narguilé na população adulta brasileira de 18 a 59 anos. ***Métodos:*** Estudo transversal de base populacional utilizando a Pesquisa Nacional de Saúde (PNS), de 2013. Amostragem compreendeu três estágios: setor censitário, domicílio e indivíduo. A frequência e intervalo de confiança de 95% (IC95%) do desfecho "frequência do uso de narguilé", dentre aqueles que relataram uso de tabaco, foi descrita conforme variáveis demográficas, socioeconômicas, zona urbana ou rural do país e macrorregiões; ainda foi investigada a frequência do uso do narguilé conforme idade e escolaridade; todas as análises foram ponderadas. ***Resultados:*** Dos 60.225 adultos entrevistados, 15% relataram uso de qualquer produto do tabaco, sendo a frequência do uso de narguilé dentre esses de 1,2% (IC95% 0,8 – 1,6), maior no sexo masculino, nos de cor branca, faixa etária mais jovem, com escolaridade média à alta e moradores da área urbana e da região sul e centro-oeste; entre aqueles que experimentaram narguilé, 50% o utilizaram esporadicamente, 12,8% mensalmente, 27,3% semanalmente e 6,8% diariamente. ***Conclusões:*** A relevância dos achados deve-se ao fato de que este é o primeiro estudo de representatividade nacional que avaliou a frequência do uso do narguilé em adultos no país; os resultados apontam para a necessidade de implementar sua fiscalização, assim como vem ocorrendo em relação ao tabaco.

***Palavras-chave:*** Prevalência. Inquéritos Epidemiológicos. Hábito de Fumar. Estudos Transversais. Adultos.

## INTRODUCTION

The hookah is a form of tobacco consumption, which has been used for centuries in Africa, the Middle East, and certain Asian countries[1-3]. It is estimated that about 100 million people around the world use this form of tobacco[4].

Recent evidence shows that its use is growing worldwide, although representative studies of countries remain scarce. While it was formerly a practice used by adults, it is currently far more common among young people[5], who think of hookah smoking sessions as a leisure activity to be shared with friends, in bars, in their homes, and in their own families[6].

The Global Youth Tobacco Survey (GYTS) 1999–2008, involving over 500,000 students aged 13–15 years around the world, showed that, contrary to the prevalence of smoking, which remains stable or is even decreasing in some countries, other forms of tobacco are increasing, and the hookah is among the most frequent[7].

The same survey conducted in adults, the Global Adult Tobacco Survey (GATS), in 2008–2010, with individuals aged ≥ 15 years, published data on the hookah from 13 countries (Bangladesh, Brazil, China, Egypt, India, Mexico, Philippines, Russia, Thailand, Turkey, Ukraine, Uruguay, and Vietnam)[8]. Prevalence among men was the highest in Vietnam (13.0%) and among women in Russia (3.2%). 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, respectively, being more frequent in the age range from 15 to 24 years and in the urban area; both the males and the female subjects took the 9th place in prevalence among the 13 centers studied[7].

A systematic review published in 2011 about the use of hookah showed that, of the 38 studies found, only 4 were representatives of their country; the majority of the studies on this type of tobacco product have been performed only in population subgroups[9].

In Brazil, for example, in addition to the data from GATS, the prevalence of hookah use in students of the 3rd and 6th years of the School of Medicine of University of São Paulo (USP), in 2008 and 2013[10], is also known. Approximately, 40% and 53% in female and male students, respectively, had tried the hookah up to the 3rd year of university, with similar results among the students of the 6th year.

Recent data from the National Survey of School Health (PeNSE) in Brazil, with a sample of 61,037 students in the state capitals, aged 13 to 15 years, indicated that 22.7% (95%CI 21.7 – 23.5) tried cigarettes, 6.1% (95%CI 5.6 – 6.6) are regular smokers, and 7.1% (95%CI 6.5 – 7.7) tried other tobacco products, including the hookah, half of them being regular smokers[11].

The National Health Survey (PNS), held in 2013, nationally representative, investigated, aside from tobacco itself, the use of other tobacco products such as hookah. This article shows the frequency of use of hookah and its distribution according to sociodemographic characteristics, urban/rural area, and federative units in the country.

## METHODS

This cross-sectional study with data from the PNS in 2013 was carried out with individuals in the 18 to 59 years age group who reported the use of any tobacco product, regardless of the frequency of use (the PNS was applied for population aged ≥ 18 years, but this study only analyzed individuals aged 18 to 59 years owing to the lack of hookah use in individuals aged ≥ 60 years).

The PNS 2013 is a population-based survey with sampling in three stages: census tracts, households, and residents. Only one resident of each household, aged older than or equal to 18 years, was drawn to participate. The sampling process aimed to ensure the representation for the country, for Brazilian macroregions, states, and some metropolitan areas. Full details of the sampling procedures can be obtained from the survey's technical report[12].

The use of hookah was evaluated only among those who reported the use of some tobacco product. These people were asked "On average, how many of the following items do you currently smoke per day or week? Hookah (number of sessions)?," with the following answer options: "once per day or more" (daily), "once per week or more" (weekly), "less than once a week" (monthly), "less than once a month" (sporadic), and "does not use the product." For the operationalization of the outcome, any frequency of use was considered in the dichotomous variable "use of hookah" (yes/no).

The independent variables considered were sex, age (18 – 29, 30 – 39, and 40 – 59 years), education (no schooling or incomplete primary education, complete primary education or incomplete secondary education, complete secondary education or incomplete higher education, and complete higher education or more), skin color (white, brown, and black), place of residence (urban or rural area), and Brazilian region (north, northeast, southeast, south, and midwest).

Statistical analyzes were performed using Stata 13.1 (Statcorp, College Station, Texas, TX, USA), considering the weighting necessary because of the complexity of the sample design (set of commands svy). Descriptive analyzes presenting absolute and relative frequencies of the outcome according to the independent variables were conducted.

The PNS 2013 complied with the ethical precepts in research, and its approval in the National Research Ethics Committee was filed under protocol number 328.159 on June 26, 2013.

## RESULTS

The PNS sample was composed of 60,225 individuals aged older than 18 years. Of these, 8,735 of them reported using any tobacco product (14.7%; 95%CI 14.2 – 15.2). The sample size of this study was of 7,328 individuals aged 18–59 years, who reported consumption of tobacco products daily or less than daily. Considering the sample weights to expand for the Brazilian population, these 7,328 individuals represented 18,190,723 inhabitants in the country. Among the tobacco users, about two-thirds were men and more than half the number aged 40 – 59 years. Just less than half the number of them revealed no schooling or complete primary education (46.6%), reported brown skin (46.9%), and lived in the Southeast macroregion (45.1%); more than 80% lived in urban areas (Table 1).

The frequency of hookah use among individuals who reported using any tobacco products was 1.2% (95%CI 0.8 – 1.6), and it was higher in younger individuals, those with at least complete primary education living in the urban area, and in the southern and midwestern macroregions (Table 1). Among those who reported hookah use, about half the number made sporadic use of it (53%) and about one-third used it weekly (27.3%) (Figure 1).

Among those individuals using hookah daily, 63% were aged 18 to 29 years, (Figure 2), and all of them had at least completed secondary education (Figure 3). Among weekly hookah users, three quarters were aged 18 – 29 years (Figure 2) and just over half the number of them (56%) showed complete primary education or incomplete secondary education (Figure 3).

Evaluating the use of hookah by state (Figure 4), it can be seen that the use among men was higher in Mato Grosso do Sul (9.9%) and lower in Bahia (0.1%). Among women, the highest frequency was found in Mato Grosso (5.9%) and the lowest in Acre and Espírito Santo (0.3%), except for states where the frequency was zero (Figure 2). In the states of Rondônia, Roraima, Pará, Amapá, Maranhão, Piauí, Rio Grande do Norte, Paraiba, Pernambuco, and Alagoas, there was someone referring the use of the hookah.

## DISCUSSION

Contrary to the popular belief that the hookah is less harmful and less addictive than cigarettes, recent research shows that both the forms involve significant health risks, and the hookah can be a precursor to cigarette smoking and can even induce nicotine addiction[13-18].

Table 1. Sample distribution and frequency of hookah use among adults aged 18 – 59 years reporting the use of any tobacco products. National Health Survey, 2013.

| Variable | Estimated total population using tobacco products | Frequency of hookah use among tobacco users % (95%CI) | Valor p |
|---|---|---|---|
| Sex | | | 0.154 |
| Male | 11,063,598 (60.8) | 1.4 (1.0–2.1) | |
| Female | 7,127,125 (39.2) | 0.8 (0.4–1.6) | |
| Age (full years) | | | < 0.001 |
| 18 – 29 | 4,296,649 (23.6) | 3.6 (2.4–5.3) | |
| 30 – 39 | 4,256,629 (23.4) | 1.2 (0.6–2.5) | |
| 40 – 59 | 9,635,626 (53.0) | 0.1 (0.0–0.1) | |
| Education level | | | < 0.001 |
| Uneducated and incomplete primary | 7,999,855 (46.6) | 0.2 (0.1–0.4) | |
| Complete primary and incomplete secondary | 3,263,076 (19.0) | 2.6 (1.4–4.7) | |
| Complete secondary and incomplete superior | 4,602,962 (26.8) | 1.9 (1.2–3.1) | |
| Complete superior education | 1,290,133 (7.5) | 1.4 (0.5–4.0) | |
| Skin color | | | 0.316 |
| White | 7,536,403 (42.0) | 1.6 (1.0–2.4) | |
| Brown | 8,417,445 (46.9) | 0.9 (0.5–1.6) | |
| Black | 1,989,969 (11.1) | 0.7 (0.1–3.5) | |
| Area of residence | | | < 0.001 |
| Urban area | 15,451,200 (84.9) | 1.3 (1.1–1.9) | |
| Rural area | 2,739,523 (15.1) | 0.1 (0.0–0.5) | |
| Macroregion | | | < 0.001 |
| North | 1,266,074 (7.0) | 0.1 (0.0–0.5) | |
| Northeast | 4,558,595 (25.1) | 0.1 (0.0–0.3) | |
| Southeast | 8,209,473 (45.1) | 0.8 (0.4–1.7) | |
| South | 2,899,601 (15.9) | 3.4 (2.0–5.5) | |
| Midwest | 1,256,979 (6.9) | 3.4 (2.2–5.1) | |
| Brazil | 18,190,723 (100.0) | 1.2 (0.8–1.6) | |

Higher prevalences of the use of hookah compared with cigarettes are observed in various countries[19,20]. In Lebanon, for example, GYTS 2005, applied to adolescents aged 13 – 15 years, showed that around 60% smoked another form of tobacco, with hookah being the

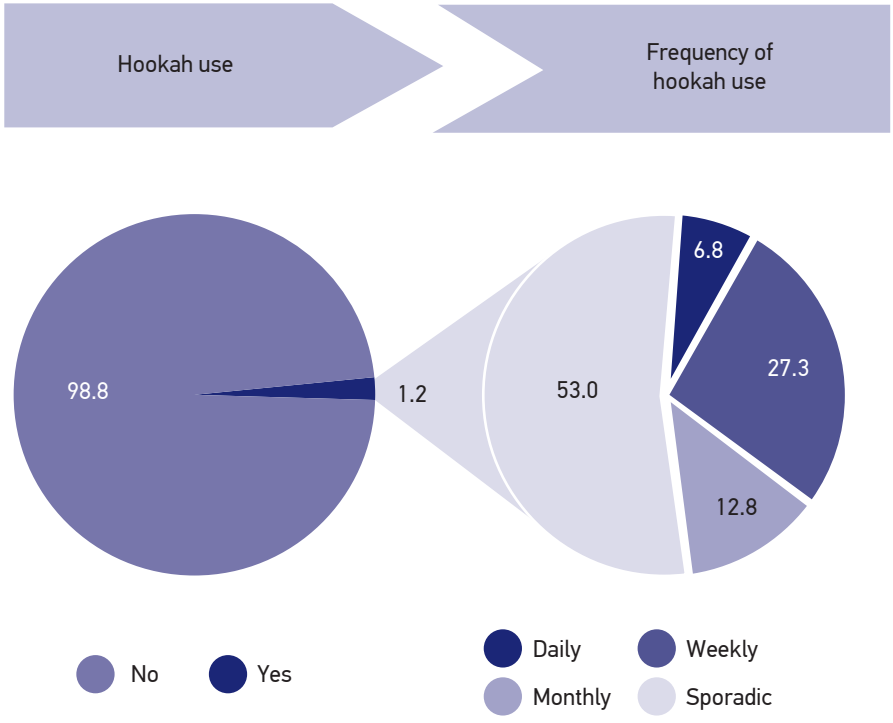


Figure 1. Frequency of hookah use among tobacco consumers. National Health Survey, 2013.

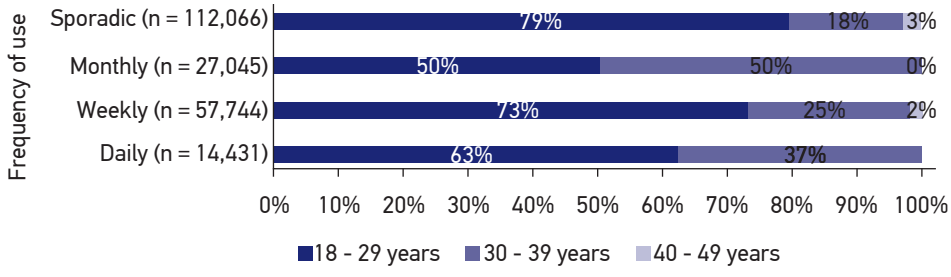


Figure 2. Age range distribution according to the frequency of hookah use among tobacco consumers. National Health Survey, 2013.

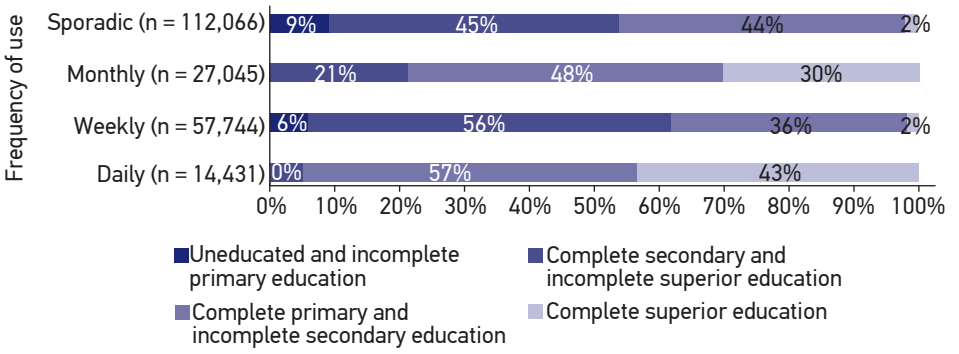


Figure 3. Education distribution according to frequency of hookah use, among tobacco consumers. National Health Survey, 2013.

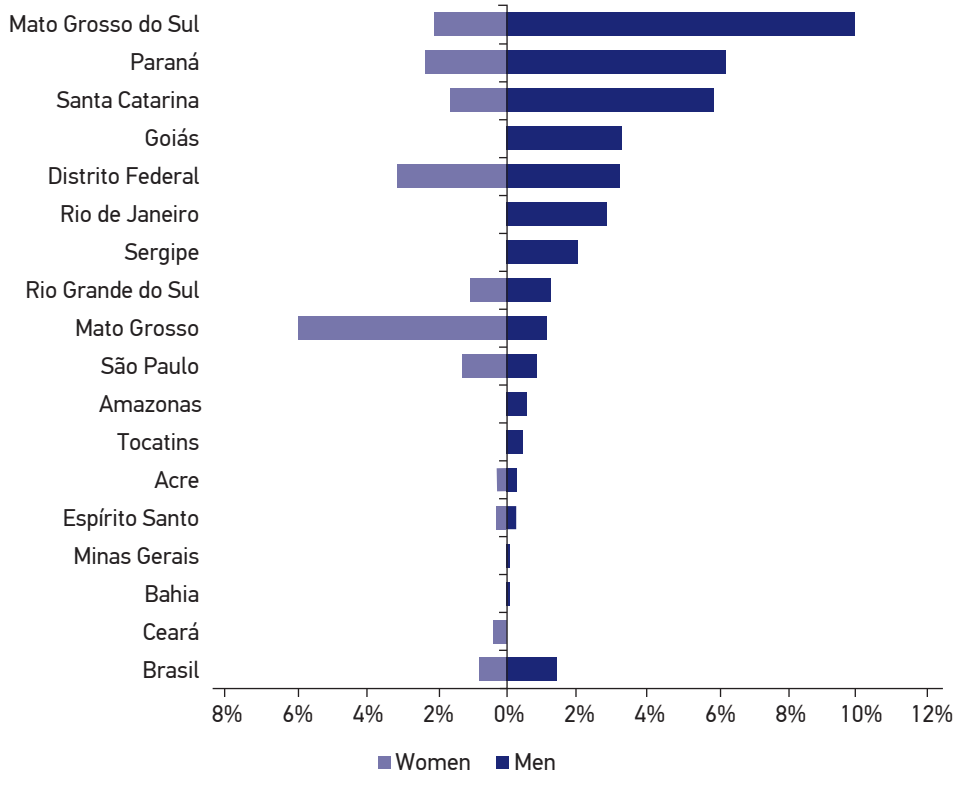


Figure 4. Frequency of hookah use in each Brazilian state, stratified by sex, among tobacco users. National Health Survey, 2013.

main form smoked at least once in the previous month, compared with 10% of cigarette users. In comparison with 2001, the prevalence of smoking in the country decreased, while the use of other tobacco products increased[19]. The results of the GYTS indicate that this is happening in all the countries of Arab origin[7].

This new panorama has proven itself as a challenge in terms of public health, as not only in the west but also in other countries, the use of hookah is increasing[21]. A study in eight universities in North Carolina has shown that the hookah was the second most used form of tobacco after cigarettes, with experimental use reported by 40% of students and current use with a prevalence of 17%[22]. A study with students from Birmingham, England, showed that about 40% had tried the hookah and 8.0% were regular smokers, compared with 9.4% smokers of regular cigarettes[23].

There is still not much evidence that the use of hookah is restricted to young people as a "lifestyle," characteristic of this age, or whether we will have a cohort effect, with increased prevalence of the use of hookah in adulthood, as longitudinal studies start to be increasingly available in literature.

Data from the PNS show that 1.2% of those who reported using any tobacco product already used hookah, which is equivalent to over 210,000 people (considering the extrapolation to the population because of sample weighting); its use was higher in male subjects (although not statistically significant), younger individuals with complete primary education, and living in urban areas and in the south and midwest.

The comparison between the frequencies of use of the hookah found in the PNS with the few existing data in the country is difficult because of the different ages in the studies. However, it should be noted that the literature is virtually unanimous about the increased use of this form of tobacco among young people[24-26], as was detected in the PNS. The frequency of use of hookah in the country, among individuals aged 18 – 29 years, compared with the 40 – 59 years age group, was 36 times higher in the younger group. Another finding that is consistent with the literature is that this form of tobacco consumption is most used among young people with high education. In Brazil, it was observed that the highest prevalence was among those who had completed primary education, followed by those who had completed secondary education and incomplete superior education. That is, hookah users in Brazil are young people in high school and university.

There was diversity in the frequency of hookah use according to the country's macroregions, with the highest frequencies in the midwest and south. The study by Szklo et al.[27] with students aged 13 – 15 years in the cities of Campo Grande (MS), São Paulo (SP), and Vitória (ES) showed frequencies for other tobacco products of 18.3%, 21.3%, and 4.3%, respectively. The highest consumption of other tobacco products in these three centers corresponded to the use of hookah.

This form of use of other tobacco products is characteristic of the urban area in Brazil, while in some countries, living in the rural area was a risk factor for the use of hookah[28].

It is possible that this is dependent on the recent emergence of this practice in Brazil, that is, probably starting in urban areas and, in the future, moving to the rural area, as it is related to education.

The frequency of use of hookah reveals a worrying scenario, because almost one-third of the users use it weekly (about 30%) or daily (about 7%). Even more relevant is the fact that, among the daily and weekly users, the highest proportion is in the youngest age group (18 – 29 years). Groups with higher education showed both greater frequency of use of hookah and greater frequency of use, especially among those with complete secondary education and incomplete superior education. It is possible that college students account for this higher prevalence.

In 1997, Macaron et al.[29] showed the presence of cotinine in urine in hookah smokers, which has been replicated ever since[29]. The available research shows that lung cancer, respiratory diseases, increased heart rate, increased systolic and diastolic pressures, and low birth weight are some of the diseases already well established as consequences to the use of hookah[13,30-32]. The hookah smoke contains many of the toxins also found in cigarette smoke, including nicotine, which causes addiction, carbon monoxide, which causes cardiovascular disease, and polycyclic hydrocarbons, which causes cancer[33]. The presence of charcoal and certain toxins that are produced by the hookah in higher levels compared with the cigarette are also a factor, and it is worth highlighting that, in a single hookah session, the amount of smoke inhaled can reach 150 times that of a single cigarette[34].

Some limitations of the study should be highlighted: the information was based on the report of the respondents, which may have caused some information bias. In addition, we do not have nationally representative data to estimate the time trends of the use of hookah among adults in the country.

The world scenario shows that trends of hookah use are alarming, having ceased to be a social phenomenon among young people in some regions to become the beginning of a global epidemic[35]. In 2007, the American Lung Association called the hookah "an emerging deadly trend," calling for more research specifically on the use of hookah to be inserted in national research on tobacco[36].

A significant reduction in smoking among adults, from 34.8% in 1989 to 12.1% in 2012[37,38], was observed in Brazil. This was because of public policies adopted by the country and of the intervention of nongovernmental institutions and various other sectors of society.

In 2011, Brazilian Law No. 12546/2011 on smoke-free environments, Presidential Decree No. 8,262/2014, and the ministerial decree of December 4, 2014, banned the use of tobacco in public premises and established standards of protection for workers. Among the products listed in the decrees, the hookah was included[39,40]. The expansion and implementation of the effective monitoring of public environments and establishments in Brazil is necessary, seeing as how quickly the use of hookah is spreading worldwide.

## CONCLUSION

The results of the PNS indicate that the use of hookah, although still representing a lower portion of the tobacco products, was more frequently used among young high school and university students residing in urban areas. Measures should be implemented for monitoring the use of hookah, before it becomes an epidemic such as the one resulting of tobacco use in the form of cigarettes.

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