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## To Assess and Compare Perception, Level of Dependence, Psychological Stress among Hookah and Non-Hookah Smokers: A Comparative Cross-Sectional Study.

**Dr A. Srividya**, Assistant Professor, Department of Oral Medicine and Radiology, Faculty of Dental Sciences, SGT University, Gurugram, India.

**Ms. Achint Kaur**, Undergraduate student, Faculty of Dental Sciences, SGT University, Gurugram, India.

**Dr Puneeta Vohra**, Professor and Head, Department of Oral Medicine and Radiology, Faculty of Dental Sciences, SGT University, Gurugram, India.

**Dr Astha Chaudhry**, Professor, Department of Oral Medicine and Radiology, Faculty of Dental Sciences, SGT University, Gurugram, India.

**Dr Komal Sharma**, Associate Professor, Department of Oral Medicine and Radiology, Faculty of Dental Sciences, SGT University, Gurugram, India.

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### KEYWORDS

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### ABSTRACT:

**Introduction:** Hookah smoking prevalence is increasing amongst youth owing to the misconceptions of its harmless nature and cultural beliefs tied to it. It is known that physical dependence and psychological stress is a major initiating factor for tobacco. The current study aims to assess and compare perception about smoking, nicotine dependence, and perceived stress among hookah and non-hookah smokers and its relation with age, and gender.

**Method:** The present cross-sectional study questionnaire-based study was conducted in the out-patient department of Oral Medicine and Radiology Department, of SGT Dental College, Gurugram, India for a period of two months from August to October 2023. Participants with a history of smoking for the past three years were included and divided into hookah and non-hookah smokers. Perception, nicotine dependence, and perceived stress were assessed among the participants. The perception about smoking was assessed using a self-administered questionnaire. The physical dependence was evaluated using a Fagerstrom scoring test for nicotine dependence, and the level of perceived stress was evaluated using a PSS10 (Perceived Stress Scale), which consists of 10 questions. Demographic data like participants age, gender were also noted. Statistical tests were performed using SPSS Version 26, for categorical and non-categorical data, with p value set<0.05.

**Results:** Total 120 participants were recruited and were divided into 60 were hookah smokers and 60 were non hookah smokers. Out of 60 hookah smokers, 23(38.3%) were female and 37 (61.6%) were male hookah smokers. In non-hookah smokers, 26 (41.6%) were females and 34 (58.4%) were males. There is no significant difference in perception of smoking, level of dependence, and perceived stress amongst both hookah and non-hookah smokers ( $p>0.05$ ). However, age and gender do affect smokers' perception, dependance and stress levels.

**Conclusion:** Hookah smoking is often initiated in families at a young age compared to other forms of tobacco. Stress and nicotine dependence does not show variation in both the groups. Participants in the study are well aware of government measures and harmful effects of smoking. The study reiterates the need for changing the regulatory measures to change the perception of smoking at large.



## 1. Introduction

According to WHO (World Health Organization), India has 267 million tobacco users, making it the second largest tobacco consumer and accounts for 1.35 million deaths per year. Cigarette is the most prevalent form of tobacco. Other forms of tobacco, such as beedi, gutka, and hookah, are equally consumed. Hookah (also known as water pipe smoking) originated around 400 years ago in ancient India and has been a part of local village traditions and customs, especially in Southeast Asian and Mediterranean countries. Hookah has re-emerged as a popular social activity amongst the youth.[1] The medium of tobacco transport in hookah is water stored in a long neck flask with a handle and a stout mouth piece.[2] People resort to smoking for various reasons. People lack the necessary knowledge about the harmful effects of tobacco smoking. [3] Furthermore, due to emerging trends of hookah smoking, youth perceive hookah less addictive and less hazardous to health than smoking cigarettes. The belief that it is affordable and common for parents to smoke with their children diminishes the perception of hookah smoking as a hazardous behaviour. [4] Various studies have demonstrated that numerous toxic agents, carcinogens and high levels of nicotine are delivered through smoking [2,4,5].

Nicotine dependence is a well-known contributor to the widespread use of tobacco. Despite the awareness of its detrimental effects, tobacco users continue consuming it. Research indicates that low socioeconomic status, along with early initiation of tobacco use, is associated with nicotine dependence. [6]

Contrasting trend is observed between low- and high-income countries, with the high- income countries showing low smoking prevalence. [7]

Psychological stress has also been identified to be one of the major causes of tobacco smoking, and smoking is considered to be a form of 'self-medication' for stress management. T o b a c c o consists of nicotine, which releases dopamine when inhaled, which brings a sense of calmness to the individual; however, the chronic use of tobacco damages health. [8]

Studies till now have assessed and compared the

understanding and behavior attributes of hookah and non-hookah smokers. However, not much has been explored regarding the level of dependence and psychological stress. The current study aims to assess and compare understanding, level of dependence, and psychological stress among hookah and non-hookah smokers.

## 2. Objectives

The primary objectives of the present study is to assess perception of smoking, level of nicotine dependence and perceived stress among smokers and non-hookah smokers. The secondary objective is to compare the above three parameters between both the groups. Also, to know whether age and gender have any role in the above three aspects of smokers.

The null hypothesis of the study is there will be difference in perception, stress and nicotine dependence among hookah and non-hookah smokers.

## 2. Methods

The present cross-sectional questionnaire-based study was conducted in the OPD department of Oral Medicine and Radiology from the period of August 2023 to October 2023. The study was conducted in the Faculty of Dental Sciences, SGT University, Gurugram, India, after approval from the Ethical Committee and Institutional Review Board (SGTDCHRI/ICMR-STIS/2023/20). The study was conducted following the rules of the Helsinki Declaration of 1975. The study is reported using STROBE criteria for cross-sectional studies.

Patients were recruited after obtaining complete medical, habit and dental history based on the following inclusion and exclusion criteria.

### Inclusion criteria

This includes:

-Patients from 20-65 years.

(a) For Hookah smokers: Patients with a history of continuous smoking hookah (water-based) for the past one year

(b) For non-hookah smokers: Patients with a history of continuous smoking (bidi and



cigarettes) for the past one year.

## Exclusion criteria

### Includes:

- Patients with any systemic diseases.
- Patients under any psychiatric medications.
- Patients with medically diagnosed psychological disorder.
- Patients with any other harmful habit history (ex. alcohol, drugs, etc).
- Patients under tobacco cessation program.
- Patients who have quit smoking habit.

**Written Informed consent** was procured from the participants after they had described the study in detail. After recruiting the participants perception, dependence level, and psychological stress was assessed. [Annexure 1] The participant's perception, nicotine dependence, and stress were assessed using questionnaires following the interview method by two researchers.

## A] Perception

Construction of the perception questionnaire. The perception of the hookah and non-hookah smokers was analyzed using a self-constructed, and validated questionnaire was designed for this study. The questionnaire consisted of five questions (one multiple choice questions and 4 binary type of questions). The questions were divided into cause for smoking, participants spend analysis, their perception about ill effects of smoking, and their knowledge regarding government measures taken against smoking. (Annexure 2)

## Validation of the Questionnaire

Content and face validity of the questionnaire was determined by two subject experts from the Department of Oral Medicine and Radiology and Public Health Dentistry (with an experience of 10 and 5 years respectively) reviewed the questionnaire. Reliability of the questionnaire was checked by test-retest method. The questionnaire was pilot-tested among 30 subjects and necessary changes were made based on the recommendations received. The final questionnaire thus formed was administered further to the participants. The

interview was conducted in vernacular language by the primary researcher in the presence of expert of the vernacular language (having more 15 years of experience).

## B] Dependence Scale

The second domain of the study was to determine the level of physical dependence of nicotine amongst both groups by referring to the Fagerström scale for nicotine dependence (FTND).[9] FTND is a widely used scale used to determine the nicotine dependence among cigarette smokers with the alpha coefficient ranging from 0.5 to 0.8.[10] While using it for hookah smokers, few modifications to the questions were made; for example, “cigarettes” were replaced with “hookah”. The participants were categorized based on their scores into low dependence, low to moderate dependence, moderate dependence, and high dependence. (Annexure 3)

## C] Perceived Stress Scale

The psychological stress among the participants was analyzed by referring to a Perceived Stress Scale. In this, scale, the participants were asked ten questions to evaluate their feelings and thoughts during the last month. On the basis of their answers, the participants were scored according the scoring criteria already given. (Annexure 4) Stress Scale -10 (PSS-10), [11], PSS is the most widely used psychological instrument for measuring the perceived stress among people with an alpha coefficient of 0.78 [12]

## Statistics

Statistical analysis was performed with Statistical Product and Service Solutions (SPSS) version 26, developed by IBM. the data was normally distributed and a parametric t test was used to compare the nicotine dependence and stress scale between hookah and non-hookah smokers based on the scores allotted as per the scales. A Chi square test was used to find the association between the age, and gender and all the three factors among hookah and non-hookah smokers P value <0.05\* was considered as statistically significant.

## 3.Results

Total 150 participants were screened during the time of research. Out of these, 30 subjects were excluded



(viz; did not meet the pre-established inclusion criteria, unwilling patients). The final participants included in the study were 120 participants. They were grouped into hookah smokers (60) and non-hookah smokers (60), out of which 23 (38.4 %) were females, 37 (61.6 %) were males hookah smokers, while 26 (41.6%) were females, and 34 (58.4 %) were males in non-hookah smokers.

The subjects in both the groups were further grouped based on their age range into three groups: 18-35 years; 36-50 years; 51-65 years. Perceived stress in both non-hookah (NHS) and hookah smokers (HS). Majorly, the participants experienced low stress in hookah smokers (HS) 41 (68.3%) and non-hookah smokers (NHS) 38 (63.3%) respectively. Only one subject in each group experienced severe stress. Refer Table/Fig 1

A t-test showed a statistically insignificant difference in perceived stress between both groups.  $p = 0.830$  Refer Table/Figure 2. Broad association of age and gender with perceived stress in both the groups noted with  $p$  value 0. Females showed lower stress than male level in both the groups. Participants belonging to 20-35 age group overall showed stress. Refer Table/Fig 3 and 4.

#### Level of dependence among hookah and non-hookah smokers

Majority of the participants in both study the groups showed low (2 (36.3%) in NHS; 24 (40.1%) in HS) dependence. (Ref. Table/Fig 5) While comparing both the groups there was found to be no significant difference in dependence among both the groups,  $P = 0.768$ . Ref Table/Fig6. Broad association of age and gender with nicotine dependence noted in both the groups noted with  $p$  value 0. Females exhibited low dependence, while males showed moderate dependence in both the groups. Primarily participants in all age strata showed low dependence in both the groups. Refer Table/Fig 7 and 8.

#### Perception in both hookah and non-hookah smokers

While peer pressure is responsible for starting smoking in both the groups; family and curiosity is the second inspiring factor for smoking among hookah

and cigarette smokers respectively [Why did you start smoking] Refer Table/Fig. 9. Both hookah and non-hookah smokers were found to be aware of the harmful effects of smoking tobacco [Do you think smoking is related to serious health complications] Refer Table/Fig 10. (How much do you spend on monthly basis for the habit?) Most subjects in both groups 35 (58.3%) in H S and 24 (40%) had a monthly in NHS expenditure of <500. Only 2 (3.33%) in NHS group spent more than 1000 in a month, no one in the HS spent more than 1000 in a month. Harmful effects of passive smoking was known to majority of the participants in both the groups [Is passive smoking harmful?]. Refer Table/Fig 11.

Maximum subjects were aware of the government's prohibition on smoking in public places [Are u aware of the ban in public smoking?] Refer Table/Fig 12

### 3. Discussion

The present study highlights the following significant points; a) Family tradition is prevalent in hookah smokers, while peer pressure helps in cigarette smoking. b) Majority of participants in both the groups suffered lower perceived stress however, there is no significant relationship. c) Physical nicotine dependence on nicotine is also low in both the groups, however there is no significant relationship between two. d) Maximum participants in the study are aware of the regulatory and prohibitory guidelines of government.

The present study reveals that there exists association between age and gender of a person with perceived stress levels and level of nicotine dependence among both hookah and non-hookah smokers. However, the perception of smoking, perceived stress, and level of nicotine dependence do not differ significantly amongst both hookah and non-hookah smokers. Awareness about smoking and its second-hand effects was linked directly to the age of a person among hookah smokers There is no significant relation between the perception of smoking in hookah and non-hookah smokers. The present study is similarly aligned to that of other studies by Noonan et al.<sup>10</sup> and Kardokar et al.[4], where the hookah smokers believed hookah to be less harmful. However, studies by Soumita Ghosh et al [2], Khalid et al.[13], and Bhushan K et al.[14] found there was a lack of knowledge about tobacco's harmful effects, tobacco use, and cessation among smokers.



In the present study, there was no significant difference in perceived stress, nicotine dependence, and smoking in both hookah and non-hookah smokers. However, there is broader association between age on stress and smoking. The study is like that of Andrea L Hobkirk et al.[15].

There was a correlation between increased stress and nicotine dependence in lower- income groups, while no such correlation was found in higher-income groups. The current study is dissimilar to the survey done by Gaur et al. [16] who found a positive correlation between stress and dependence.

The present study showed peer pressure and family tradition to be the main initiating factors among hookah smokers, while peer pressure alone motivated smokers. Another study found the various reasons for smoking include easy availability and lack of warnings on most of the products being sold (Vijayalakshmi et al.). [17] The knowledge about the harmful effects of tobacco did not deter participants from all groups, strata, and gender from smoking.

The present study is among the first studies to determine the relationship between physical nicotine dependence and hookah smoking. The study is novel in that the perceived stress levels and association with socioeconomic status in hookah smokers was not explored before. A comparison of the perception of smoking in various age groups and different socioeconomic strata in both hookah and non-hookah smokers was not determined before. Since the study was conducted in a limited time frame of two months and in dental setting, the conclusions cannot be generalized. Broad age difference and lack of standardizing other factors like education, monthly income, etc may act as confounding variable.

Peer pressure and culture remains the mainstay for smoking cigarettes and hookah among Indian population, as opposed to stress. The knowledge about the ill effects of smoking and government regulations related to smoking does not deter people from smoking. Measures appropriate to address the gap between awareness and practical application should be zeroed in. Future studies should explore the long-term effect of hookah smoking on subjects' stress and how is it associated clinically. Including more participants will also help strengthen the generalizability of the

study. Long-term epidemiological studies that correlate the clinical effects of hookah smoking with dependence level can be done.

## Conclusion

Tobacco consumption is one of the most significant health risks, causing many deaths globally. The study concluded that peer pressure and family tradition are the initiating factors for smoking in many young adults. Despite knowing the ill effects and second-hand effects of tobacco, people continue to consume it. There is a need to bridge the gap between awareness and actual application of the regulations.

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**Table/ Fig 1:** The table shows distribution of stress among hookah and non-hookah smokers

| Comparison         | Mean  | Standard deviation | t     | df  | P value |
|--------------------|-------|--------------------|-------|-----|---------|
| Non Hookah smokers | 11.28 | 6.386              | 0.215 | 118 | 0.830   |
| Hookah smokers     | 11.52 | 5.466              |       |     |         |

**Table/ Fig 2:** t test shows there is no statistically significant differences seen between the non-hookah and hookah smokers on psychological stress with  $p > 0.05$

|                             | PERCEIVED STRESS SCALE |            |                 | P value |
|-----------------------------|------------------------|------------|-----------------|---------|
|                             | High stress            | Low stress | Moderate stress |         |
| GENDER (non-hookah smokers) |                        |            |                 |         |
| FEMALE                      | 1(3.8)                 | 15(57.7)   | 10(38.5)        | 0.000*  |
| MALE                        | 0(0)                   | 23(67.6)   | 11(32.4)        |         |
| GENDER (hookah smokers)     |                        |            |                 |         |
| FEMALE                      | 1(4.3)                 | 14(60.9)   | 8(34.8)         | 0.000*  |
| MALE                        | 0(0)                   | 27(73)     | 10(27)          |         |

**Table/ Fig 3:** Chi-square test represents association between gender and perceived stress among both the groups with  $p = 0$ .

| Age in years         | PERCEIVED STRESS SCALE |                 |                      | P value |
|----------------------|------------------------|-----------------|----------------------|---------|
|                      | High stress n(%)       | Low stress n(%) | Moderate stress n(%) |         |
| (non-hookah smokers) |                        |                 |                      |         |
| 20-35                | 0(0)                   | 22(71)          | 9(29)                | 0.000*  |
| 36-50                | 1(5.6)                 | 8(44.4)         | 9(50)                |         |
| 51-65                | 0(0)                   | 8(72.7)         | 3(27.3)              |         |
|                      |                        |                 |                      | P value |

| Age in years (hookah smokers) | High stress n(%) | Low stress n(%) | Moderate stress n(%) | 0.000* |
|-------------------------------|------------------|-----------------|----------------------|--------|
| 20-35                         | 1(3.2)           | 22(71)          | 8(25.8)              |        |
| 36-50                         | 0(0)             | 12(66.7)        | 6(33.3)              |        |
| 51-65                         | 0(0)             | 7(63.6)         | 4(36.4)              |        |

**Table/ Fig 4:** Chi-square test represents association between age and perceived stress among both the groups with  $p = 0$ .

| FTNDS                      | Non Hookah smokers n(%) | Hookah smokers n(%) |
|----------------------------|-------------------------|---------------------|
| High dependence            | 5(8.3)                  | 3(5.0)              |
| Low dependence             | 22(36.3)                | 24(40.1)            |
| Low to moderate dependence | 16(26.6)                | 14(23.3)            |
| Moderate dependence        | 17(28.8)                | 19(31.6)            |

**Table 5:** The table shows distribution of nicotine dependence among hookah and non-hookah smokers

| Comparison         | Mean | Standard deviation | t      | df  | P value |
|--------------------|------|--------------------|--------|-----|---------|
| Non Hookah smokers | 3.82 | 2.071              | -0.296 | 118 | 0.768   |
| Hookah smokers     | 3.70 | 2.242              |        |     |         |

**Table/ Fig 6:** t test shows there is no statistically significant differences seen between the non-hookah and hookah smokers on nicotine dependence, with  $p > 0.05$

| GENDER               | FAGERSTORM NICOTINE DEPENDENCE |                |                            |                          | P value |
|----------------------|--------------------------------|----------------|----------------------------|--------------------------|---------|
|                      | High dependence n(%)           | Low dependence | Low to moderate dependence | Moderate dependence n(%) |         |
| (non-hookah smokers) |                                |                |                            |                          |         |
| FEMALE               | 1(3.8)                         | 16(61.5)       | 6(23.1)                    | 3(11.5)                  | 0.000*  |
| MALE                 | 4(11.8)                        | 6(17.6)        | 10(29.4)                   | 14(41.2)                 |         |

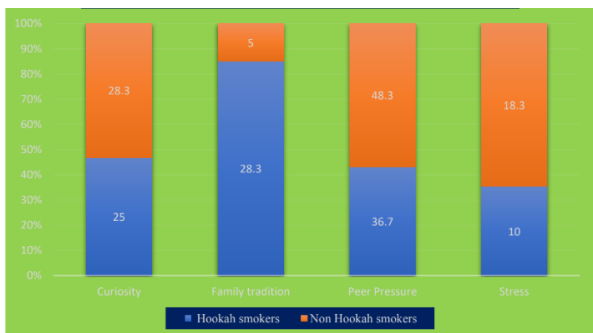


| GENDER (hookah smokers) | High dependence n(%) | Low dependence n(%) | Low to moderate | Moderate dependence n(%) | p value |
|-------------------------|----------------------|---------------------|-----------------|--------------------------|---------|
|                         |                      |                     | dependence n(%) | dependence n(%)          |         |
| FEMALE                  | 0(0)                 | 15(65.2)            | 7(30.4)         | 1(4.3)                   | 0.000*  |
| MALE                    | 3(8.1)               | 9(24.3)             | 7(18.9)         | 18(48.6)                 |         |

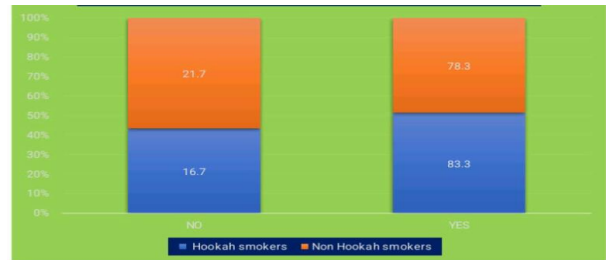
Table/ Fig 7: Chi square test shows association between gender and nicotine dependence among both the groups with p=0

Table/Fig 8: Chi square test shows association between age and nicotine dependence among both the groups with p=0

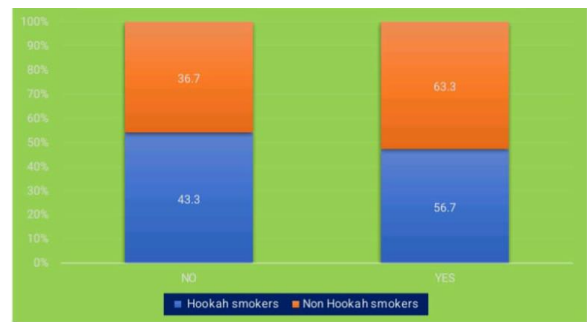
| FAGERSTROM NICOTINE DEPENDENCE    |                      |                |                            |                          |         |
|-----------------------------------|----------------------|----------------|----------------------------|--------------------------|---------|
| Age in years (non-hookah smokers) | High dependence n(%) | Low dependence | Low to moderate dependence | Moderate dependence n(%) | p value |
|                                   |                      | n(%)           | n(%)                       | n(%)                     |         |
| 20-35                             | 2(6.5)               | 15(48.4)       | 7(22.6)                    | 7(22.6)                  | 0.000*  |
| 36-50                             | 0(0)                 | 7(38.9)        | 6(33.3)                    | 5(27.8)                  |         |
| 51-65                             | 3(27.3)              | 0(0)           | 3(27.3)                    | 5(45.5)                  |         |
| Age in years (hookah smokers)     | High dependence n(%) | Low dependence | Low to moderate dependence | Moderate dependence n(%) | p value |
|                                   |                      | n(%)           | n(%)                       | n(%)                     |         |
| 20-35                             | 1(3.2)               | 11(35.5)       | 11(35.5)                   | 8(25.8)                  | 0.000*  |
| 36-50                             | 1(5.6)               | 8(44.4)        | 2(11.1)                    | 7(38.9)                  |         |
| 51-65                             | 1(9.1)               | 5(45.5)        | 1(9.1)                     | 4(36.4)                  |         |



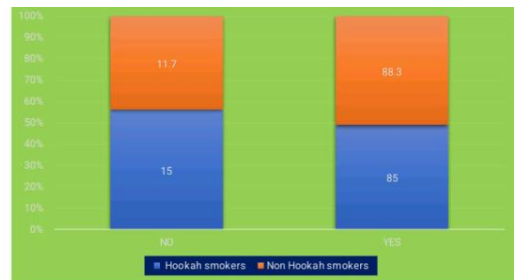
Table/Figure9: Bar graph showing the causes of smoking among hookah and non-hookah smokers.



Table/Figure 10: Bar graph representing the perception about the harmful effects of smoking among hookah and non-hookah smokers.



Table/Figure 11: Bar graph representing perception of hookah and non-hookah smokers about passive smoking and its harmful effects.



Table/Figure 12: Bar graph representing the perception of smokers (both groups) regarding public prohibition of smoking in India.

