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Original Research Article

Self-assessment of hearing on hookah smokers

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ABSTRACT

Background and Aim: Previous studies have reported adverse effect of smoking on our health. Current study aimed to investigate ill effect of hookah smoking on hearing sensitivity, annoyance evaluation, hookah related attitude and knowledge about hearing loss among hookah smokers of village.**Materials and Methods:** A questionnaire of 10 questions related to aim and objectives of the study were administered on 146 men smokers participated in the current study.**Results:** The hazardous effect of hookah smoking on hearing and psychological health are well reflected in the present investigation.**Conclusion:** Lack of awareness regarding adverse effect of hookah smoking was observed in the present study.This is an Open Access (OA) journal, and articles are distributed under the terms of the [Creative Commons Attribution-NonCommercial-ShareAlike 4.0 License](#), which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.For reprints contact: reprint@ipinnovative.com

1. Introduction

Sensorineural hearing loss is one of the most common sensory issue and occurs from pathologies in inner ear and auditory nerves.¹ Sensorineural hearing loss hampers the ability to understand speech in noisy situations and leads to difficulty in communication and social connectivity.² There are various risk factors of sensorineural hearing loss which includes genetic causes, complications during birth, infectious disease, ear infections, ototoxic drugs, noise induced hearing loss, aging and so on³⁻⁵ Earlier literature has reported hearing loss among smokers.^{1,6} Previous investigations have also reported effect of smoking on outer hair cells of the cochlea and enhancement in oxidative stress due to production of reactive oxygen species and elevated systemic inflammatory markers.^{7,8}

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Earlier investigations have well revealed adverse effect of hookah on health.^{9,10} Hookahs have metals, and cancer-causing chemicals, the carbon dioxide used to heat tobacco may increase health risks.⁹ Finding of earlier investigations has also reported carbon monoxide intoxication among hookah smokers.¹⁰ Carbon monoxide (CO) poisoning leads to immediate neurological symptoms and neuropsychological effects.¹¹ After inhalation, binding of CO to the cytochrome cause improper functioning of the respiratory chain in the mitochondria. Production of the reactive oxygen species leads to neuronal and myocardial necrosis and apoptosis.¹⁰ To the best of our knowledge, there is no literature till date to comment on effect of hookah smoking on hearing sensitivity. The objective of the present study was self-assessment of hearing quality, annoyance evaluation, hookah related attitude and knowledge about hearing loss caused by hookah smoking among villagers in

Haryana.

2. Materials and Methods

The study was done on hookah smokers, who smoke hookah on daily basis. The study was done on 146 men aged above 30 to 60 years who smoke a minimum of 5 to maximum of 10 times a day. All participants were randomly chosen on the basis of their willingness to take part in the study. Informed consent was taken from all participants of the study. They were clarified in details about the purpose of study. All participants were belonging from low to high socioeconomic status and their mother tongue was Hindi. A questionnaire of 10 questions related to self-assessment of hearing quality, annoyance evaluation, knowledge and attitudes associated with hookah smoking. The questions administered were in accordance with ISO/TS 15666 (2003), an international standard of acoustics-assessment of noise annoyance using social and socio-acoustic surveys.¹² Questionnaires were translated into Hindi and reverse translation was carried out to ensure that the context of the questionnaire was accurate. Five native Hindi speakers proofread these translated questions in Hindi and also had knowledge of English. Later, under close observation of audiologists, the same questionnaire was used for the participants.

There were 6 questions related to assess hearing quality, 3 questions related to annoyance and 1 question related to knowledge about ill effect of hookah smoking. Questions were either 2-points, 3-points and 4-points closed-set tasks rating scale, depending on the nature of the questions. The questionnaire was used by the undergraduate students of audiology for the data collection under close supervision of audiologists. All the participants were asked to answer these questions while choosing the single answer that was most appropriate. Oral informed consent was taken from all participants. The data were analyzed using SPSS (version 17, IBM Corporation, Bengaluru, India), along with descriptive statistics, percentages and proportions of the study subjects, in context to a particular response.

3. Results

The percentages and proportions of different categories of questionnaires listed under different headings are based on the ratings scale by graphical representation. The percentage and proportion were determined for the answers of each question. For the question “*Quality of hearing*” 46% of smokers had responded excellent, 34% above average, 14% average and 6% below average. On the question “*hearing over phone*” 48% of smokers miss some conversation and 6% smokers miss full conversation. For the question related to *quality of hearing in crowd places*, 34% of smokers miss some conversation, whereas, 9% of smokers miss full conversation.

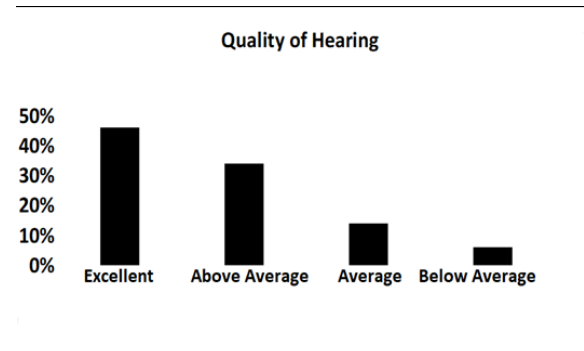


Fig. 1: Quality of hearing

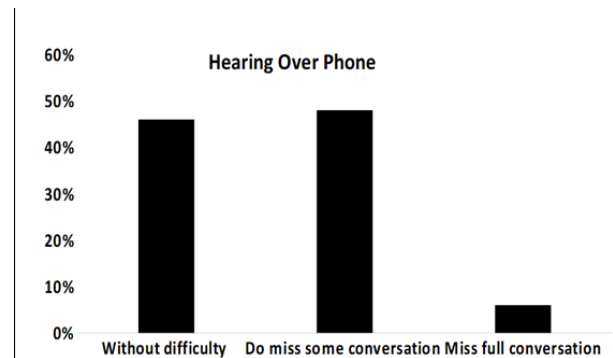


Fig. 2: Hearing over phone

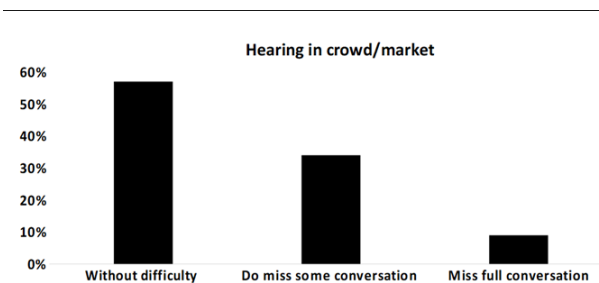


Fig. 3: Hearing in crowd

29% people had reported keeping volume of TV/radio louder. 63% of smokers talk loudly as reported by their friends and family members.

For tinnitus in the ear, 46% of the smokers reported frequently whereas 8% reported always and 3% reported more than once a day. For headache, 46% of smokers feel headache sometimes and 8% of smokers feel headache very often. 37% of the smokers were not aware about the ill effect of smoking hookah. Only 17% of the smokers reported poor quality of sleep whereas 51% of the smokers reported irritation.

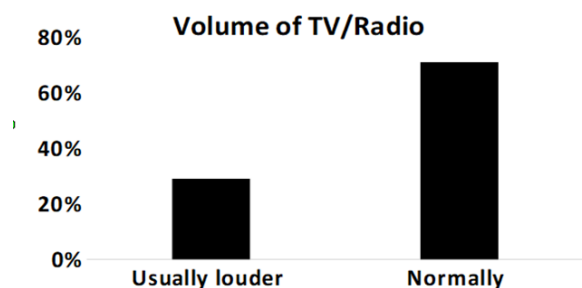


Fig. 4: Volume of TV/Radio

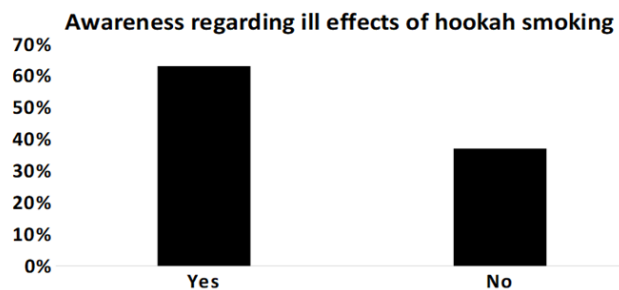


Fig. 8: Awareness regarding ill effects of hookah smoking



Fig. 5: Talkingloudly



Fig. 9: Quality of sleep

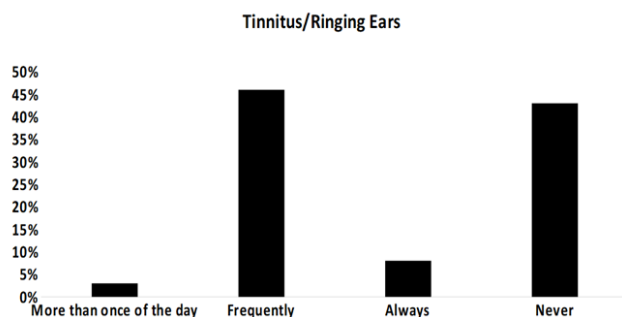


Fig. 6: Tinnitus or ringing sensation in ear

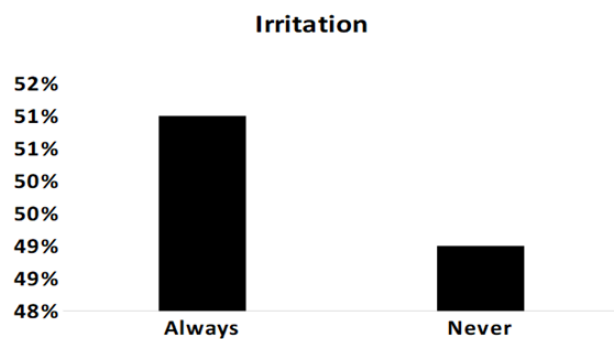


Fig. 10: Irritation

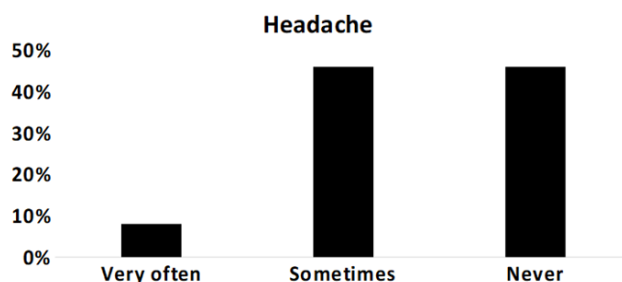


Fig. 7: Headache

4. Discussion

The finding of the present study showed that almost half of the population rated excellent hearing whereas other half reported hearing difficulties in crowd/talking over phone which suggest adverse effect of hookah smoking in these individuals. Almost 1/3 of smokers keeps the volume of TV/radio louder and approximately 60% of the smokers talks loudly with their family and friends which shows ill effect of hookah smoking on hearing among majority of subjects participated in the present

study. Previous literature has also reported reduced hearing sensitivity among smokers.^{1,6,13} A study done by Wang et al., 2021 showed strong association between cigarette smoking and speech-frequency and high-frequency hearing loss.¹³ They also reported that smoking was positively associated with an increased risk of hearing loss in middle-aged and older males. Moreover, Hu et al., 2019 investigated hearing sensitivity on 50195 employees of age range 20–64 years and reported adverse effect of smoking on hearing. The outcome of their study presented an increased risk of hearing loss at 1kHz and 4kHz among smokers.⁶

The outcome of the present investigation also revealed tinnitus and headache among almost half of the total hookah smokers participated in the study which is similar with the findings of previous literature where researchers had reported tinnitus among cigarette smokers.^{14,15}

Veile et al. reported sufficient evidence to support tinnitus associated with smoking.¹⁴ Another study done by Biswas et al., 2021 also reported significantly higher risk of tinnitus among current and ever smokers.¹⁵ Earlier investigators have suggested biologically plausible that nicotine causes anemia of the cochlea via vasoconstriction could be the reason of poor cochlear health among smokers.¹⁶ Smoking would aggravate the circulatory system of the cochlea could be the possible reason of poor hearing health among hookah smokers. Previous literature has reported local hypoxia may exacerbated by higher levels of carboxyhemoglobin in smokers compared with non-smokers.¹⁷ Moreover, ototoxic agents such as hydrogen cyanide, lead, styrene and toluene can be traced as constituents of cigarette/hookah smoke.¹⁸ Nicotine has effect on the transmission of auditory information by interfering with the release of neurotransmitter in different centers of the central auditory nervous system.¹⁹ Nicotine alter synaptic plasticity could be the reason of tinnitus among smokers.²⁰

Approximately 20% of the hookah smokers reported poor quality of sleep and almost half of the total number of smokers reported irritation showed psychological issues in hookah smokers. Liao et al., also reported sleep disturbance among smokers compared to nonsmokers. They also reported variation in sleep problems on the basis of the characteristics of their smoking. Investigations in this area has also reported higher degrees of nicotine dependence and intensity of smoking were associated with shorter sleep duration.²¹ The result of current research also showed lack of awareness among hookah smokers related to ill effect of smoking on health.

5. Conclusion

The negative consequences of hookah smoking are well reflected in this questionnaire-based study as it shows that these individuals have issues with hearing sensitivity and presence of tinnitus is seen in half of the smoker's population participated in the study. Lack of awareness

regarding adverse effect of hookah smoking was also observed in the current investigation. Hence, it is necessary to educate these people about hazardous effects of hookah on their hearing health. Further hookah smokers should be referred for comprehensive audiological evaluation in order to investigate the involvement of the peripheral and central auditory system. The findings of present study also showed ill effect of hookah smoking on quality of sleep and psychological wellbeing.

6. Source of Funding

None.

7. Conflict of Interest

None.

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