

**ASSOCIATION BETWEEN TOBACCO CONSUMPTION AND HEARING IMPAIRMENT IN ADULT POPULATION- A HOSPITAL BASED CASE CONTROL STUDY****Kirankumar Gunadal***

Senior Resident. *Corresponding Author

Sangappa Doddamani

Professor.

ABSTRACT **Aim:** This study aimed to estimate the risk of hearing impairment among adults using various tobacco products, including bidi, cigarettes, chewable tobacco, and gutkha. **Methodology:** Conducted at the SNMC ENT Department, this prospective study involved patients presenting with hearing impairments at the OPD. Participants were classified into tobacco consumers and non-consumers. The test group consisted of adults over 18 who used tobacco, while the control group included both tobacco consumers and non-consumers matched by age. Participants were randomly selected following inclusion and exclusion criteria, and written informed consent was obtained. Hearing assessments included otoscopic evaluation, a tuning fork test, and pure-tone air-conduction and bone-conduction audiometry. **Results:** Analysis of pure tone audiometric data revealed that severe hearing impairment (>60 dB) was most common among smokers (30%), followed by mild (26–40 dB) impairment at 28.3% and moderate (41–60 dB) impairment at 18.3%. Tobacco consumption was significantly associated with hearing impairment ($p < 0.05$), with 76.7% of smokers showing impairment compared to 28.3% of non-smokers. The prevalence of hearing impairment also increased with age. Sensorineural hearing loss was the most common type (64.04%), followed by mixed (26.08%) and conductive loss (10.8%). The duration of tobacco consumption did not show a statistically significant impact on hearing impairment ($p > 0.05$). **Conclusion:** In countries like India, where tobacco consumption is widespread, this study found a significant correlation between tobacco use and hearing impairment. While the study highlighted a positive relationship between tobacco consumption and hearing loss, the impact of exposure duration and age, though clinically relevant, was not statistically significant.

KEYWORDS : pure tone audiometry (PTA), tobacco, hearing impairment.**INTRODUCTION**

In developing countries like India, smoking and tobacco consumption is common health problem. Globally about 130 crore peoples are addicted to various tobacco products. Nicotine, tar products etc. are various tobacco products which are injurious to health.¹ The tobacco leaves are rich in alkaloids, but nicotine is the most abundant. Therefore, the alkaloid content includes: nicotine N'-oxide, myosmine, β -nicotyrine, cotinine, 2,3'bipyridyl, anabasine, normicotine, N-methylanabasine.³ Evidences have accumulated in recent years on the adverse effects of smoking and tobacco use on ear diseases and hearing among different population groups. Among adults the risks of internal ear diseases especially hearing loss also increases with smoking. The risk of becoming hearing-impaired often increases with the number of cigarettes smoked, as well as with the intensity and the duration of exposure to smoke and tobacco.⁴

MATERIALS AND METHODS

The prospective study was conducted in the ENT Department, patients presented to the OPD with hearing impairments. The participants were classified as either tobacco consumer and non-consumer. The test group consisted of tobacco consumer of age above 18years, and the age matched control group. Subjects of both the tobacco consumer and the non-consumer were interviewed by using a preformed questionnaire. After assessing inclusion and exclusion criteria patients were chosen randomly. Written informed consent was obtained from the participants. The hearing examination was done, which included an otoscopic evaluation, a screening tuning fork test, and pure tone air-conduction and bone conduction audiometry.

Inclusion Criteria

1. Normal healthy adult individuals of age above 18years addicted to various tobacco products like cigarette, bidi, oral tobacco, gutka addiction. for at least 5 years were included in the study.

Exclusion Criteria

1. People having CSOM,
2. Inner ear diseases,
3. Diabetes mellitus, Hypertension,
4. Previous ear surgery,
5. Head trauma,
6. Working In factory or noisy environment.

Parameters Assessed

- Degree of hearing loss.
- Type of hearing loss.

RESULTS**Table 1- Age Wise Comparison.**

Age comparison group						
age(yrs)	smoking status				total	
	smoker		non-smoker			
	No	%	No	%	No	%
18-30	10	16.7	34	56.7	44	36
31-40	15	25	16	26.7	31	25.8
41-50	11	18.3	7	11.7	18	15
51-60	17	28.3	1	1.7	18	15
>60	7	11.7	2	3.3	9	7.5
total	60	100	60	100	120	100

Table 2- Degree Of Hearing Loss In Study Group.

degree of hearing loss in study group											
smoking status	affected individual		degree of hearing						normal hearing		total
			26-40		41-60		>60				
	No	%	No	%	No	%	No	%	No	%	
smoker	46	76.7	17	28.3	11	18.3	18	30	14	23.3	60
non-smoker	17	28.3	12	20	5	8.3	0	0	43	71.7	60
total	63	52.5	29	24.2	16	13.3	18	15	57	47.5	120

Table 3- Degree Of Hearing Loss With Respect To Age.

degree of hearing loss with respect to age											
smoking status	age (yr)	affected subject		hearing loss			normal hearing		total		
		No	%	26-40	41-60	>60	No	%			
smoker	18-30	6	60	5			4	40	10		
	31-40	8	53.3	5	5	0	7	46.6	15		
	41-50	9	81.8	4	5	1	2	18.2	11		
	51-60	17	100	2	4	3	0	0	17		
	>60	6	85.7	1	2	11	1	14.3	7		
	total	46	76.6	17	11	3	14	23.3	60		
	18-30	5	14.7	4	1	0	29	85.3	34		
non-smoker	31-40	6	37.5	5	1	0	10	62.5	16		
	41-50	4	57.1	3	1	0	3	42.9	7		
	51-60	1	100	0	1	0	0	0	1		
	>60	1	50	0	1	0	1	50	2		
	total	17	28.3	12	5	0	43	71.7	60		
	18-30	5	14.7	4	1	0	29	85.3	34		
	31-40	6	37.5	5	1	0	10	62.5	16		

Table 4- Type Of Hearing Loss With Respect To Smoking Status.

type of hearing loss and smoking status									
smoking status		type of hearing loss						total	
		conductive		sensorineural		mixed			
		no	%	no	%	no	%		
smoker		5	10.8	29	63.04	12	26.08	46	100
non-smoker		5	29.4	10	58.8	2	11.8	17	100
total		10	15.9	39	61.9	14	22.2	63	100

Table 5- Hearing Loss In Relation To Different Tobacco Products.

hearing loss in relation to different tobacco products										
tobacco product	hearing impairment (dB)						normal hearing		total	
	26-40		41-60		>60					
	No	%	no	%	no	%	no	%	no	%
bidi	1	8.3	2	16.7	7	58.3	2	16.7	12	100
cigarette	10	52.6	2	10.5	2	10.5	5	26.3	19	100
gutka	4	28.6	3	21.4	4	28.6	3	21.4	14	100
chewable tobacco	2	13.3	4	26.7	5	33.3	4	26.7	15	100
total	17	28.3	11	18.3	18	30	14	23.3	60	100

Table 6- Hearing Loss In Relation To Duration Of Tobacco Consumption.

hearing loss in relation to duration of tobacco consumption												
duration of consumption (yrs) No		degree of hearing loss						normal hearing			total	
		26-40		41-60		>60						
		%	no	%	no	%	no	%	no	%	no	%
<5	2	33.3	1	16.7	0	0	3	50	6	100		
5 to 10	7	50	1	7.1	0	0	6	42.9	14	100		
11 to 20	4	26.7	2	13.3	6	40	3	20	15	100		
21-30	2	15.4	5	38.5	5	38.5	1	7.7	13	100		
>30	2	16.7	2	16.7	7	58.3	1	8.3	12	100		
total	17	28.3	11	18.3	18	30	14	23.3	60	100		

After analyzing pure tone audiometric (PTA) data for the degree and severity of hearing impairment, it was found out that severe form (>60dB) was most common (30%) followed by mild (26-40dB) form (28.3%) and moderate (41-60dB) form was least (18.3%) in smokers. Tobacco consumption was found to be statistically associated with the hearing impairment ($p < 0.05$), with 76.7%, while 28.3% among non-smokers having impairment. Also, the percentage of affected individual increases with increases in age. Sensorineural type of hearing loss found to be most common type (63.04%), followed by mixed (26.08%) and conductive will be least type (10.8%). We observed duration of tobacco consumption has varied impact on hearing impairment which was statistically not significant ($p > 0.05$).

DISCUSSION

Nicotine increases the carbon monoxide levels in blood, which in turn converts hemoglobin to carboxy-hemoglobin. Carboxy-hemoglobin reduces the oxygen availability to cochlea and causes destruction of hair cells of cochlea. Toxic products in cigarette cause oxidative damage to hair cells. That is Nicotine has direct vasospastic action and causes atherosclerosis of vessels supplying cochlea. Various studies also suggest that with increase in age and increase in years of tobacco addiction directly correlate with the degree of hearing loss. In this study we assessed the degree of hearing loss in a tobacco user of aged above 18 years with comparing age matched healthy non-tobacco user. We found out that the tobacco has an impact on degree of hearing impairment, which is statistically significant. This study's findings underscore the importance of considering hearing health in tobacco cessation programs. Public health initiatives should highlight the risk of hearing loss as another detrimental effect of tobacco use, potentially motivating individuals to quit.

In a study conducted by SHAIKH SN et al. found that tobacco consumption has adverse effect on hearing, and positive correlation of degree of hearing loss with duration of exposure.

The prospective study conducted by ADESH K et al. found that SNHL

was most common type and mild to moderate was most common degree of hearing loss. Which was almost similar to our current study. In a study conducted by Istrate M. et al., Paschoal CP. et al., Gaur K. et al., Cruickshanks KJ. et al. found tobacco consumption has adverse impact on the hearing impairment.

CONCLUSIONS

In developing countries like India, smoking and tobacco consumption is common health problem. Many studies were conducted to know adverse effect of tobacco consumption on hearing. In our study we concluded that, positive correlation of the consumption of different tobacco products and its impact on the hearing outcome, which is statistically significant. And also, clinically found that impact on hearing increases with increases in age and duration of exposure, but which was statistically not significant.

REFERENCES:

- Chaudhary K, Verma JK. Section: ENT Study of Relation between Tobacco Addiction and Sensorineural Hearing Loss in Bundelkhand Region. 2022;9(2):3-5.
- Paschoal CP, De Azevedo MF. Cigarette smoking as a risk factor for auditory. Braz J Otorhinolaryngol. 2009;75(6):893-902.
- Istrate M, Hasbei-Popa M, Iliescu DA, Ghita AM. Effects of cigarette smoking on sensorineural hearing impairment and age-related macular degeneration. Tob Prev Cessat. 2021;7(August):1-8.
- Gaur K, Kasliwal N, Gupta R. Association of smoking or tobacco use with ear diseases among men: A retrospective study. Tob Induc Dis. 2012;10(1):2-5.
- Cruickshanks KJ, Klein R, Klein BEK, Wiley TL, Nondahl DM, Tweed TS. Cigarette smoking and hearing loss: The epidemiology of hearing loss study. Jama. 1998;279(21):1715-9.
- Shaikh SN, Shaikh K, Saeed H, Aijaz R, Talib S, Haque Z. Is tobacco smoking correlated with Hearing loss? A Comparative Observational Study in healthy adult males. Isra Med J. 2020;12(3):131-6.
- Kumar A, Gulati R, Singhal S, Hasan A, Khan A. The Effect of Smoking on the Hearing Status-A Hospital Based Study. Journal of Clinical and Diagnostic Research: JCDR [Internet].