Original Article

Effects of Cigarette Smoking on Blood Pressure and Hearing Level of Male Adults of Hyderabad, Sindh, Pakistan

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ABSTRACT

OBJECTIVE: To assess correlation of cigarette smoking on blood pressure and hearing level and Compare with non-smokers.

METHODOLOGY: This Cross-Sectional Comparative Study conducted at the department of ENT Combined Military (CMH) Hospital Hyderabad from July to December 2019; Simple random technique was used for data collection. Simple random sampling is the basic sampling technique where we select a group of subjects (a sample) for study from a larger group (a population). Each individual is chosen entirely by chance and each member of the population has an equal chance of being included in the sample.

RESULTS: Out of 359 participants, 163 were smoker while 195 were non-smoker. The mean age of smoker was 28.99±3.374 years and non- smoker was 28.00±4.451 years. No significant difference found in both groups regarding their educational standard (systematic collection and analysis of data related to the field of education). Severity of the hearing loss was significantly associated with cigarette smoking. Increased Systolic and diastolic blood pressure was associated with cigarette smoking.

CONCLUSION: The evidence was suggestive of positive correlation of cigarette smoking with increases blood pressure and hearing impairment.

KEY WORDS: Cigarette Smoking, Blood Pressure, Hearing Level.

This article may be cited as: Shaikh SA, Memon SF, Laghari ZA, Bhatti MA, Shah H, Nizamani GS. Effects of Cigarette Smoking on Blood Pressure and Hearing Level of Male Adults of Hyderabad, Sindh, Pakistan. J Liaquat Uni Med Health Sci. 2020;19(01):33-6.
doi: 10.22442/jlumhs.201910658

INTRODUCTION

Cigarette smoking is burning of tobacco and inhalation of smoke. Cigarette smoking believed to have started in the period 5000-3000 BC. About 1.3 billion of world's population consume cigarette smoke[1], In Pakistan, statistics reports that it is 36% for men and 9% for women[2] and for university students of Jamshoro it is 11.9%[3]. Cigarette smoke contains about 8500 different components; of them, there are 150 smoke intoxicants[4]. These components are divided into gaseous phase containing CO (4.2%), CO_2 (9.5%), oxygen (10%) and nitrogen (73%), also includes ammonia, nitrogen oxides (nitric oxide, NO), nitrosamines, hydrogen cyanide, hydrogen dioxide, volatile sulphur-comprising compound, hydrocyanic acid, hydrazine, Acetaldehyde, vinyl chloride and acroleid. The particulate phase consists of tar, water and nicotine[5].

Cigarette smoking affects almost all organs of human body either directly or indirectly. Smokers are more susceptible to the development of chronic diseases including chronic obstructive pulmonary disease, vascular diseases, stroke, multiple carcinomas, periodontal diseases, cardiovascular diseases, osteoporosis and impotence. Recent research has shown that cigarette smoking also causes hearing loss and affects the endocrine system[6].

Hearing impairment is one of the most important health concerns after chronic hypertension and arthritis throughout the world[7].The WHO, reported that about 360 million of world population suffer from a degree of hearing impairment out of which 328 million are adults while 32 millions are children[7, 8]. Number of factors that cause hearing impairment including; "genetic or hereditary tendency, ageing, exposure to loud noises or occupational noise exposure, repeatedly childhood ear infections, complications during childbirth or use of ototoxic medicines"[9]. Hearing impairment is one of the causes that limited significant communication and social interactions within society and finally leads to reduce quality of life including physical and cognitive problems. In Public health, it is known that hearing impairment is related to depression, diabetes, and dementia[10-12].

This study was conducted to investigate the effect of cigarette smoking on blood pressure and hearing impairment as compared with non-smokers.

METHODOLOGY

This Cross-sectional study was conducted in the Combined Military Hospital Hyderabad from July to December 2019. In this study, we recruited the subjects having history of smoking > 5 years. Simple random technique used for data collection. Simple random sampling is the basic sampling technique where we select a group of subjects (a sample) for study from a larger group (a population). Each individual is chosen entirely by chance and each member of the population has an equal chance of being included in the sample.

Young adult men from 20 years to 35 years were selected for the study. The data collected through an interview using a structured questionnaire with Socio demographic description, including educational standard, medical screening, age, and occupation, and marital status, history of cigarette smoking, chronic diseases, and family diseases. A number (n=400) 400 young male adult including smokers and non-smokers were randomly recruited from the city of Hyderabad. After interview and completing the questionnaire, participants with the history of taking medication of blood pressure, ototoxic drugs, suffering from repeated ear infections and discharge, congenital heart diseases, ear deformity and all cases of conductive deafness, history of hypertension, diabetes mellitus, and nerve deafness in family were excluded from study. Written and verbal approval was taken of all participants related to study and satisfied their queries.

Blood pressure was measured by mercury sphygmomanometer. The audiometry performed on Audiometer MAICO-MA39 (Berlin Germany). The audiometry was performed in soundproof room. Trained otolaryngologist technician performed test and collected data at different frequencies for each ear at six different frequencies 0.5, 1.0, 2.0, 3.0, 4.0, and 6.0 kHz. The collected data were analyzed on SPSS 16.0.

RESULTS

Hypertension is non-communicable disease and considered as a major risk factor of life throughout world. Approximately 1.13 billion of adult population affected from increased blood pressure. In order to find out the association a cross sectional study conducted. Total 400 smokers and non-smokers selected. Out of 400 participants, only 359 participants finally participated in this study giving the response rate of 89.75%. Table I shows the mean age of smokers was 28.99±3.374 years while in non-smokers was 28.00±4.45. Socioeconomic status indicates that in upper class there is not any participants form both groups and in middle class smokers were 35 (21.47%) non- smokers were 49 (25.12%), in lower class smokers were 128 (78.52%) non-smokers were 146 (74.87%). Educational level of smokers and non-smokers categorized as Masters, Graduates ≤12 Standard Education and Illiterate. In Masters, smoker were 18 while non-smokers were 5, in graduates smokers were 42 while non-smokers were 29, in ≤ 12 standard education smokers were 77 while non-smokers were 105, in illiterate smokers were 26 while non-smokers were 56. BMI in smokers were 22.05±2.05 and in non-smokers were 22.7±1.95.

Table II reveals that in Smokers pulse per minute was 69.42±4.03 while in non- smokers were 66.29±3.33, P<0.05. Systolic blood pressure (mmHg) in smokers were 119.28±7.927 while in non-smokers were 115.6±4.86, *P*<0.05. Diastolic blood pressure (mmHg) in smokers were 80.21±5.43, while in non-smokers were 79.6±3.75, P=0.4229 that indicates statistically non- significance. In smokers hearing level was 22.71±11.365 and in non-smokers were 15.91±7.374, *P*<0.05.

Table III shows that smokers pulse rate indicates significant correlation with r=0.168**, while in non-smokers it is not significantly correlated with r= -0.164. Systolic blood pressure, in smokers significantly correlated with r=0.293**, in non-smokers it is not significantly correlated with r=0.056. Diastolic blood pressure, in smokers significantly correlated with r=0.243**, in non-smokers it is not significantly correlated with r= 0.085.

TABLE I: BASIC CHARACTERISTICS OF PARTICIPANTS (n=358)

Variable	Smokers (n=163)	Non- smokers (n=195)
Mean Age (years)	28.99±3.374	28.00±4.45
Socio Economic Status		
Upper Class	0 (0.00%)	0 (0.00%)
Middle Class	35 (21.47%)	49 (25.12%)
Lower Class	128 (78.52%)	146 (74.87%)
Education Standard		
Masters	18 (11.04%)	5 (2.56%)
Graduate	42 (25.76%)	29 (14.87%)
Higher Secondary	77 (47.23%)	105 (53.84%)
Illiterate	26 (15.95%)	56 (28.71%)
BMI	22.05±2.05	22.7±1.95

TABLE II: COMPARISON OF BLOOD PRESSURE AND PULSE RATE

Variable	Smokers (n=163)	Non-smokers (n=195)	*P*-value
Pulse (Beats/minute)	69.42±4.03	66.29±3.33	< 0.05
Systolic BP (mmHg)	119.28±7.927	115.6±4.86	< 0.05
Diastolic BP (mmHg)	80.21±5.43	79.6±3.75	=0.4229
Hearing Level (dB)	22.71±11.365	15.91±7.374	< 0.05

TABLE III: CORRELATION OF BLOOD PRESSURE AND PULSE RATE PARAMETERS

Variables	Pearson Correlation	*P* Value
Pulse in Smokers Pulse in Non-smokers	0.168* -0.164	<0.05
Systolic BP (mmHg) in Smokers Systolic BP (mmHg) in Non- Smokers	0.293** 0.056	<0.05
Diastolic BP (mmHg) in Smokers Diastolic BP (mmHg) in Non-Smokers	0.243** 0.085	>0.05

** Correlation is significant at the 0.05 level (2-tailed)*
***correlation is significant at the 0.01 level (2-tailed)*

DISCUSSION

Hypertension is a primary cause of health; approximately 18% of adult's less than 45 years aged and 33% of adults aged more than 45 years of age affected in Pakistan. High blood pressure considered as a silent killer due to increased morbidity and mortality. In Pakistan, few studies have been carried out to determine the association of increased blood pressure and degree of hearing loss with cigarette smoking in young male adults[13].

In this study out of 400 participants, 358 participants recruited, 163 were smokers, and 195 were non-smokers. The mean age of smokers was 28.99±3.731 year and non- smokers was 28.00±4.451 year. In smokers, 27(16.43%) participants belong to age group of 20-25 years, 73 (45.20%) belongs to age group of 26-30 years and 63 (38.35%) belongs to 31-35 years age group. In non-smokers, 57 (29.33%) participants belong to 20-25 years age group, 73 (37.33%) belongs to 26-30 years age group and 65 (33.33%) belongs to age group of 31-35 years. Similarly[14], 25 year mean age in overall 504 workers, and statistically significant variance was found in hearing impairment in both group's smokers and non-smokers.

As reported earlier[13] that smokers were having increased hearing loss than non-smokers. Hearing level in smokers was 22.71±11.365 dB while in non-smokers have 15.91±7.374 dB, it indicates that smokers were prevalent of hearing loss than non-smokers. Similarly, this finding was found in other study[15].

It is already documented that cigarette smoking increases blood pressure due to its acute vasoconstriction action[16]. The finding in this study suggests that cigarette smokers have increased systolic blood pressure than in non-smokers with statistically significant difference but diastolic blood pressure is not statistically significant in both groups. Similar finding were reported from previous studies[16-18], Linneberg A et al[19] differ with our study. We documented pulse rate is significantly higher in smoker than non-smokers, similar finding had been reported from study[20].

CONCLUSION

This study, suggests that prolonged cigarette smoking increases blood pressure and causes hearing impairment in young adults.

Ethical permission: University of Sindh IRB No. Physiol:/ERI/03 dated 01-01-2019

Conflict of Interest: There is no any conflict of interest

Funding: There was no any funding agency.

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