



Sindh Univ. Res. Jour.

SURJ

EFFECT OF SMOKING ON BLOOD PRESSURE OF INHABITANTS OF HYDERABAD VICINITY

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(Received 18th February 2009 and Revised 09th May 2009)

Abstract

Present piece of study was conducted to evaluate whether hypertension is associated with cigarette smoking in Pakistan. Study started with random screening of the inhabitants of the area for smoking, hypertension and associated risk factors. A self administered questionnaire was prepared for this purpose. Overweight and obesity were assessed by body mass index and hypertension by recording of blood pressure. Amongst the total 3382 selected volunteers, smokers were 933, they had significantly higher systolic blood pressure Mean \pm SD 130.1 \pm 16.33 mm Hg, CV 12.1 against 127.6 \pm 15.19, CV 11.9, diastolic pressure 87.2 \pm 11.28 mm Hg, CV 12.9, against 84.8 \pm 9.80, CV 11.5. Slightly changes in mean arterial pressure noted in smokers 101.5 \pm 6.63, CV 18.4, compared to non smokers, it was 99.1 \pm 7.77, C.V 18.2. Smokers also had significantly higher pulse rate 78.6 \pm 7.24 compared to 68.8 \pm 5.76 beats/minute in non smokers. Smoking had significant correlation with SBP, DBP, MAP and BMI, -.311, -.312, -.313 and .255 respectively. Similarly, prevalence of hypertension in smokers was higher (23.5%) than in non smokers (16.4%).

Keywords: Smoking, hypertension, non smokers, body mass index.

1. Introduction

Smoking is an addiction as well as a habit. The relationship between smoking and hypertension has been examined by word wide studies. However basic information on such type of study is negligible in Pakistan. The present study is an attempt to provide preliminary report in this direction on the population of Hyderabad and adjoining areas. Because of smoking around 114,000 people die every year in UK. For every smoking-related death about 20 others smokers are suffering from a smoking-related disease (Poulsen *et al.*, 1998). Estimated number of cigarette smokers is 1.3 billion, 82 percent in developing countries. If smoking is not effectively controlled death number due to smoking and smoking related diseases may reach to one billion during the 21st century (Najem, *et al.*, 2006).

Higher incidence rates of hypertension were reported among male workers in Japan and Korea who stopped smoking or who never smoked than among male workers who continued to smoke (Lee *et al.*, 2001). Another

study revealed that there were no differences in the proportions of hypertension between smokers and non-smokers (Fogari *et al.*, 1996). Tobacco use is the most common cause of avoidable cardiovascular mortality worldwide (Teo *et al.*, 2006). In one study of normotensive smokers Grapple *et al.*, (1992) there was an average elevation in systolic blood pressure of 20 mmHg after the first cigarette.

Tobacco smoke contains nicotine, the powerfully addictive drug, Tar a carcinogenic agent, Carban monoxide that decreases oxygen supply to the body, increases heart rate and blood pressure (Zhang *et al.*, 2000). Smoking causes a very long list of diseases including: heart disease, stroke, impotence lung diseases low birth weight, premature birth and bleeding, miscarriage, sudden infant death syndrome. Second-hand smoking can also produce health problems (Jatoi *et al.*, 2007). Nicotine is eliminated from the body within 48 hours after the last cigarette. Trying to cut down gradually is likely to just prolong the withdrawal process. Post-cessation increase in blood pressure and

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lung secretion, constipation, mouth ulcers, and the thorny issue of altered drug metabolism (Gratziou 2009).

An increase in erythrocyte aggregation was found to be associated with cardiovascular risk factors such as hypertension(Razavian *et al.*, 1992) and smoking (Levenson *et al.*, 1987).

Trying nicotine replacement therapy combined with counseling is the best way to get rid of smoking successfully and to reduce withdrawal symptoms.

2. Materials and Methods

Present study was conducted from December 2006 to September 2008; it included random screening of the inhabitants of the area for smoking, hypertension and determination of the associated risk factors. The targeted population belonged to different localities of Hyderabad city representing different ethnic, socio-economic and educational groups. 3382 subjects (2118 males and 1264 females) age range 20-76 years met study criteria and participated. A self administered questionnaire was filled by participants for collection of data. Overweight and obesity were assessed by body mass index. Body mass index was calculated by weight kg/Height m². Hypertension was assessed by recording of blood pressure (systolic<140mmHg and diastolic <90mmHg. Blood pressure was recorded after five minutes rest (Freeman 1996). Two measurements were taken, the interval between the first and second

was at least 20 minutes as described by Ministerio *et al.*, (1990). Pulse pressure (PP), was calculated as SBP-DBP=PP, Mean arterial pressure (MAP) was calculated as DBP+1/3 of PP. Pulse rate (PR) was recorded by putting the fingers on the radial artery (in resting position) for a minute (Al-kandari 2006). Subjects were classified into three categories calculated an indicator of obesity acceptable weight (BMI < 25 kg/ m²), overweight (BMI 25–29 k/g m²), and obese (BMI ≥ 30 kg/m²) (Ackard *et al.*, 2002).

3. Results and Discussion

Total 3382 volunteers were selected for the analysis of blood pressure and related parameters as shown in (Table-1, 2 and 3). The statistical data were compared smokers against non smokers. 933 smokers had significantly lower frequency of variable percentage (FV) (27.6). Prevalence of hypertensin was higher (23.5%) in smokers against non smokers (16.4%). Systolic blood pressure (SBP) Mean ± S.D. 130.1 ±16.33 mm Hg and CV 12.1, diastolic blood pressure (DBP), 87.2 ±11.28 mm Hg and CV 12.9 compared to 2449 non smokers data comprising frequency variable (FV) 72.4, (SBP) 127.6 ± 15.19 CV 11.9 and (DBP) 84.8 ± 9.80 and CV 11.5.

Table-1. Relationship of smoking with hypertension, obesity (N=3382)

Variable	n Frequency of Variable %		n Frequency of hypertension %	
Total volunteers	3382	100.0	624	18.5
Females	1264	37.3	273	21.6
Males	2118	62.7	351	16.6
Smokers	933	27.5	220	23.5
Non smokers	2449	72.5	404	16.4

Table-2. Statistical data of smokers against non smokers in relation to blood pressure (N=3382)

Variable	Frequency		SBP mmHg		DBP mmHg		P R beats/m	
	n	Variable FV %	Mean \pm S.D	CV%	Mean \pm S.D	CV%	Mean \pm S.D	CV%
Total volunteers	3382	100.0	128.3 \pm 15.55	12.1	85.5 \pm 10.28	12.0	72.5 \pm 6.87	6.4
Normotensives	2758	81.5	121.8 \pm 8.58	07.0	81.4 \pm 6.34	07.8	69.8 \pm 5.34	5.7
Hypertensive	624	18.5	153.8 \pm 9.0	05.8	102.6 \pm 5.28	05.1	76.5 \pm 4.75	3.6
Females	1264	37.3	127.7 \pm 17.20	13.5	84.9 \pm 11.01	13.0	64.2 \pm 5.81	5.4
Males	2118	62.7	128.6 \pm 14.47	11.2	85.8 \pm 9.81	11.4	73.3 \pm 4.23	6.4
Smokers	933	27.5	130.1 \pm 16.33	12.5	87.2 \pm 11.28	12.9	78.6 \pm 7.24	7.3
Non smokers	2449	72.5	127.6 \pm 15.19	11.9	84.8 \pm 9.80	11.5	68.8 \pm 5.76	5.4

Table-3. Statistical data of smokers against non smokers in relation to blood pressure (N=3382)

Variable	Frequency		PP mmHg		MAP mmHg		BMI kg/ m ²	
	n	Variable %	Mean \pm SD	CV%	Mean \pm SD	CV%	Mean \pm SD	CV%
Total volunteers	3382	100.0	42.8 \pm 7.47	17.4	99.7 \pm 11.78	11.8	22.7 \pm 3.05	13.4
Normotensive	2758	81.5	40.4 \pm 6.88	7.3	94.8 \pm 4.22	10.4	21.9 \pm 2.66	12.1
Hypertensive	624	18.5	42.4 \pm 7.01	13.7	116.7 \pm 5.88	4.9	25.7 \pm 2.72	10.6
Females	1264	37.3	42.8 \pm 7.82	18.3	99.2 \pm 12.88	13.0	22.6 \pm 3.53	15.6
Males	2118	62.7	42.8 \pm 7.26	17.0	100.1 \pm 11.05	11.0	22.7 \pm 2.73	12.0
Smokers	933	27.5	42.9 \pm 12.80	12.6	101.5 \pm 6.63	18.4	22.6 \pm 3.07	13.6
Non smokers	2449	72.5	42.8 \pm 11.29	11.4	99.1 \pm 7.77	18.2	22.7 \pm 3.05	13.4

Table-4. Correlation coefficient of systolic, diastolic mean arterial pressure and BMI with smoking and sex.

Variable	SBP	DBP	MAP	BMI
Smoking	-.311 **	-.312 **	-.313 **	.255**
Sex	.599**	.608 **	.521 **	.274 **

**= Co relation is significant at p= 0.01,

N =total number of samples, M = Mean, SBP = Systolic blood pressure, DBP = diastolic blood pressure,

PP = pulse pressure.

MAP = mean arterial pressure, PR= Pulse rate, BMI= body mass index, mmHg = millimeters of mercury,

SD = standard deviation, CV coefficient of variation.

Slightly changes in pulse pressure (PP) and mean arterial pressure (MAP) noted in smokers, pulse pressure 42.9 ± 12.80 , CV 12.6 compared to non smokers: 42.8 ± 11.29 , CV 11.4 and MAP 101.5 ± 6.63 , CV 18.4, was compared against 99.1 ± 7.77 , CV 18.2 respectively (Table 3). The effects on the body mass index were calculated in terms, Mean \pm S.D. 22.6 ± 3.07 kg/m² CV 13.6 compared against non smokers 22.7 ± 3.05 kg/m² CV 13.4. A notable variation has been observed in blood pressure levels of smokers and non smokers.

The body mass index also observed with slight changes in between two groups. Smoking showed significant correlation with SBP, DBP and MAP at $p < 0.01$ (Table-4). Using non-clinical samples Omvik (1996) reported higher blood pressure levels among never or former smokers than among current smokers. Hypertension is one of the most common medical problems. The relationship of smoking with hypertension is still unclear (Narnkiewicz *et al.*, 2005). It is reported by William (1996), Rey (1998) and Schroder *et al.*, (2002) that though hypertension is treatable but incurable and poorly controlled. Iribarren (1996) and Vasani *et al.*, (2001) showed that even subjects with 'normal' (120–129/80–84 mmHg) to 'high-normal' blood pressure are highly prone to heart diseases. According to Kannel (2000), only 17–19% of hypertension occurs in isolation. Mulrow *et al.*, (2001) states that in mild hypertension life style modifications alone are often recommended by the doctors for a period of 6-12 months.

4. Conclusions

Summarizing the text of the present results it can be concluded statistically that the smoking is a risk factor causing elevation in blood pressure. Doctors should strongly advise smokers to stop smoking and recommend the use of symptom less nicotine replacement therapy. Ban on sale of cigarettes and smoking at public & work places should be announced and strictly implemented by the Government of Pakistan to prevent large number of premature deaths due to smoking and smoking related diseases (like hypertension). Further in this area more detailed study and education awareness on hypertension and likely risk factors is needed.

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