

Effect Of Smoking On Body Mass Index, Blood Pressure And Pulse Pressure In Chronic Smokers

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Abstracts: Background and Aim: This study was conducted to depict the influence of cigarette smoking on changes in body weight as well as changes in blood pressure. The significance of this study lies in the fact that chronic smoking contributes to unhealthy weight. Further a comparison was done between Body mass index and Blood Pressure as per smoking load (average number of cigarettes multiplied by average duration of smoking) in chronic smokers. Methodology: In the present study, chronic smokers from outpatient clinic were selected randomly; subjects were then divided into two groups as per their smoking load. Out of them 33 with smoking load less than 50,000 and 32 with smoking load more than 50,000 were selected, their BMI was calculated, SBP and DBP were recorded and pulse pressure was derived. Based on these calculations, values were analyzed by Z test. p values of less than 0.1 was considered significant. Results: Results showed that BMI of chronic smokers with smoking load more than 50,000 was lower than those having smoking load less than 50,000 ($p < 0.05$). Observations of Blood pressure revealed that the ones having smoking load higher than 50,000 had lower systolic blood pressure and pulse pressure ($p < 0.1$ and $p < 0.05$ respectively) whereas values of diastolic blood pressure had no significant changes. Conclusion: There was a significant relationship between smoking load and Body mass index as well as between smoking load and systolic blood pressure. The study showed that smoking is independently associated with reduced BMI and reduced systolic BP. [Nagarsheth M NJIRM 2016; 7(2):41-43]

Key Words: smokers, smoking load, body mass index, pulse pressure.

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Introduction: Epidemiological studies have reported an inverse relationship between smoking and BMI as well as between smoking and blood pressure^{1,2}. The relationships between weight change, body weight and mortality have been points of concern in recent years. Weight loss has been associated with increased mortality by certain studies².

Some investigators have shown relationship between smoking and blood pressure but the mechanism was unknown while some other studies have come out with controversial results².

Hence to further explore a possible mechanism this study was done to compare the effects of smoking load (average number of cigarettes multiplied by average duration of smoking) on body mass index, blood pressure and pulse pressure in chronic smokers. Majority of the studies have focused on the effects in smokers and non smokers and only a meager amount of studies have revealed the dose response relationship between smoking, BMI and BP³.

Material and Methods: The present study group comprised of adult subjects attending the outpatient clinics on a volunteer basis. Informed consent was obtained from all the subjects. They were distributed in the age group of 27-42 years. Chronic healthy male

smokers were selected randomly. Then their smoking load was calculated based on this they were divided into two groups. 33 smokers having smoking load less than 50,000 and 32 having smoking load more than 50,000 were selected.

For choosing healthy subjects complete physical, systemic examination and laboratory investigations like hemoglobin, complete blood count and random blood sugar were carried out. Subjects taking any type local or systemic medication or those exposed to any type of toxic substances or having history of any cardiovascular /respiratory illness were excluded from the study.

Measurement of body mass index was done by dividing the weight of an individual in Kg by the square of his height measured in meters. After giving a rest for 15-20 minutes their blood pressure was measured by mercury sphygmomanometer with subjects in sitting position in right arm using the standardized procedure⁴. Average of the three readings was used for subsequent analysis.

After measuring blood pressure, pulse pressure (SBP-DBP) was calculated for subjects of both the group. Mean and standard deviation were obtained for BMI, BP and pulse pressure. Values obtained were analyzed

by Z test and p values less than 0.05 were considered significant.

Results: All the subjects were male with an average age of 35.24 ± 3.22 years among the group with smoking load less than 50,000 and 33.64 ± 3.71 in the group with smoking load more than 50,000.

Table 1 shows that there was no significant difference between heights of subjects of both the groups but there was a significant difference between their weights ($p < 0.05$). Table 2 depicted that no significant difference could be made out between the values of RBS and Hb of both the groups.

Table 1: Comparison of height and weight in chronic smokers with smoking load <50,000 and smoking load >50,000

Smoking load	Height (m) Mean \pm SD	Weight (Kg) Mean \pm SD
<50,000	1.54 ± 0.05	55.20 ± 2.62
>50,000	1.53 ± 0.06	50.13 ± 3.12

Table 2: Comparison of RBS (mgm%) and Hb (gm%) in chronic smokers

Smoking load	RBS (mgm%)	Hb (gm%)
<50,000	91.29 ± 6.71	12.14 ± 0.8
>50,000	90.82 ± 9.06	12.53 ± 0.6

Tables 3 and 4 revealed the observations of BMI, blood pressure and pulse pressure. It was found that BMI of chronic smokers having smoking load more than 50,000 was significantly lower than those having smoking load less than 50,000 ($p < 0.05$). Systolic blood pressure and pulse pressure were also found to be significantly lower in the group having more smoking load ($p < 0.01$ and $p < 0.05$ respectively).

Table 3: Comparison of BMI [wt(Kg)/h(m²)] in chronic smokers

Smoking load	BMI (Mean \pm SD)
<50,000	22.51 ± 1.35
>50,000	20.21 ± 1.40

Table 4: Comparison of Blood pressure and Pulse pressure in chronic smokers

Smoking load	BP (mm/Hg) SBP/DBP (Mean \pm SD)	Pulse Pressure (SBP-DBP) (Mean \pm SD)
<50,000	116.33 ± 10.6 80.4 ± 4.34	39.53 ± 5.42
>50,000	105.13 ± 8.36 77.31 ± 4.32	29.87 ± 5.31

Discussion: Numerous studies have confirmed that smokers do have a lower body mass index than non smokers ^{2,5}. Our study shows that increased smoking load also significantly lowers BMI, reasons for lower BMI in heavy smokers may be that nicotine acts as a major appetite suppressant ⁶. Researches done on effects of nicotine on the regions of hypothalamus which regulate appetite have also confirmed that it causes weight loss ^{6,7}.

The results of our study showed that either number of cigarettes smoked per day is more or duration of cigarette smoking is more both the factors lower BMI significantly. Chronic smokers having less smoking load had a higher BMI as compared to those having smoking load more than 50,000. Even though factors like gender, economic status, stress may affect BMI; smoking has an independent association with BMI.

In case of blood pressure, our findings confirm that smoking lowers blood pressure. The mechanism of relation of heavy smoking load with reduced blood pressure is unknown but certain studies have shown that cotinine (a metabolite of nicotine) relaxes vascular smooth muscle and dilates blood vessels in vitro and it decreases BP in anaesthetized dogs ^{8,9}.

Few studies have shown no correlation between smoking and BP whereas few have shown that there is a positive relation i.e. smoking releases sympathetic neurotransmitters which increases blood pressure ¹⁰.

Although nicotine is most abundant in tobacco, minor alkaloids such as nornicotine, anatabine, anabasine, etc are present in cigarette tobacco ^{11,12}. The physiological effects of these nicotine metabolites are not well understood hence their assessment would prove beneficial. The complex relation between smoking, blood pressure, body mass index and its complications should be considered in future studies.

Conclusion: In the present study it was found that greater the smoking load greater reduction in BMI also higher smoking load lead to reduced systolic blood pressure and hence reduced pulse pressure. Our findings on blood pressure contradict the findings of certain studies which show that hypertension results due to smoking.

Hence it was concluded that higher nicotine consumption caused significant reduction of BMI and SBP but the effects of minor alkaloids in cigarette smoking is still unknown.

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