Comparative Analysis of Smoking Impact on Health of Smokers and Non-Smokers of Quetta City Dwellers

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Abstract  Cigarette smoking is an addictive and destructive behavior and it can cause serious health problems and most important preventable cause of death in the world. In the present study using questionnaire data of smokers (n = 323) and non-smokers (n=218) from the patients in the Out Patients Department (OPD) of civil hospital Quetta was collected. Based on smoking history, the study population was categorized into smokers (<25 cigarettes/day), and non-smokers while smokers were further subdivided into three sub-categories based on their ages: up to 35, up to 50, and above 50. The results depicts that the mean hemoglobin (Hb) levels of smokers and non -smokers were 15.9±0.4g/L and 12.6±0.5g/L respectively, which increased progressively with the number of cigarettes consumed per day. It was observed that 0%, 53.11% and 68.92 were suffering from Chest diseases in group 1, 2 and 3 respectively. In case of high blood pressure population belonging to group 1 and 2 showed greater percentage while group 3 showed lower percentage. Increase in the percentage of heart diseases with age and smoking habit was also observed in all three groups which were prominent in group 3. The present study confirms that the smoking had severe effects on health of the smokers causing lungs and heart diseases. Furthermore, the implications could be made that 60% of the total population is smokers which are the indicator in increase attitude of community towards smoking despite many initiative of declaring smoking as taboo by government and tradition of the area.

Keywords  Out Patients Department (OPD),Hemoglobin, Blood Pressure, Smoking

1. Introduction

Cigarette smoking; becoming a major lifestyle factor is influencing the human’s health1 and its is an addictive and destructive behavior2. Now a days it is considered one of the serious health problems and most important preventable causes of death in world3. There are more than 4000 chemicals found in cigarette smoke4 including CO. The main source of inhaled carbon monoxide is cigarette smoking 5. It has approximately 200 fold greater affinity for haemoglobin (Hb) as compared to oxygen6,7, resulting in the formation of carboxyhaemoglobin (COHb). The level of COHb may be above 10% in chain smokers, 4–6% range for smokers and 1–2% for non-smokers8-12. With increasing cigarette tar content and age, the absorption of relative fraction of carbon monoxide increases 13 and hence the concentration of oxygen is reduced and if this happens in the body, it will eventually cause narrowing and hardening of blood vessels (atherosclerosis). The half-life (t1/2) for COHb is 4–5 h in humans breathing air 14.

Hemoglobin levels predict mortality and morbidity 15. On average, hemoglobin decreases with age that is from 147.5 to 145.1 g/L 15,16. It is shown from some of the previous studies that increase in hemoglobin enhances mortality from heart disease 17 while on the other hand it is found by some scientists that decrease in hemoglobin is a risk factor for cardiovascular disease 18, and chronic diseases 19,20. It is linked with many other diseases, such as respiratory diseases 21. Tobacco smoke has toxic 22, genotoxic 23, mutagenic 24, and carcinogenic properties 25.

As far as BP is concerned, cigarette smokers had lower BPs than nonsmokers which is due to their lower weight 26,27. However, nicotine present in cigarette smoke causes the blood pressure and heart rate to increase. The rise in blood pressure is due to both; an increase in cardiac output and in total peripheral vascular resistance 28.

This study explores the effect of smoking on the hemoglobin level and blood pressure. Representative population from smokers and non-smokers were randomly sampled to analyze the consequences of cigarette smoke on
human health.

2. Subjects and Methods

Data collected using questionnaires already designed and developed considering different variables including Hb, chest diseases and heart diseases. The target audiences were the patients in the OPD of civil hospital Quetta. The data was collected from the patients who visited laboratory for blood test during November 2013 to January 2014 for 90 working days and considered as 3 months. The sample size was 7.5% of the total population. Data analysis revealed that the representative population were smokers (n = 323) and non-smokers (n=218) respectively. The study population ages of smokers were between 25 to 80 years and for nonsmokers 18 to 90 year for whom smoking status, Hb level, and health status were recorded. Based on smoking history, the study population was divided into two categories: smokers (<25 cigarettes/day), and non-smokers. Study populations were subdivided into three categories based on their ages: upto 35, upto 50, and above 50. Hemoglobin values were tested and provided by the hospital lab.

Data was analyzed using Statistical Package for Social Sciences (SPSS) version 13. The basic statistics were applied and results were expressed in mean + standard error (S.E). The correlation between smokers and non-smoker Hb values were also given and linear regression results were found to be highly significant.

3. Results

The mean hemoglobin levels of smokers and non smokers were 15.8870 ± 0.40277 g/L and 12.5833 ± 0.52345g/L respectively (Table1). The difference in the values of mean hemoglobin levels was not prominent within the three groups of smokers.

| Table 1. Descriptive statistics for smokers and non smokers Hb |
|------------------|-------------|---------------|----------|----------|
|                   | Mean + S.E  | Min-Max       | Variance | S.D      |
| Smoker Hb         | 15.8870 + 0.40277 | 12.20-20.10  | 3.731    | 1.93163  |
| Non Smoker Hb     | 12.5833 + 0.52345 | 8.70-15.60    | 4.932    | 2.22082  |

One-Sample t-Test

| Test Value = 0 |
|------------------|-------------|---------------|----------|
| T                | Sig. (2-tailed) | Mean Difference | 95% Confidence Interval of the Difference |
|                  |              |                | Lower    | Upper    |
| smokerHb         | 39.444       | .000           | 15.88696 | 15.0517  | 16.7223  |
| NsmokerHb        | 24.039       | .000           | 12.58333 | 11.4789  | 13.6877  |
It was observed that 0% population of group 1 was suffering from TB and COPD while in group 2, 46.89% population was safe from the chest diseases & 53.11 % population was suffering from TB for three years (fig. 1). In group 3, 31.08% population was found safe from chest diseases while 39.38% and 29.54% were suffering from TB and COPD respectively (fig. 2).

Population belonging to group 1 and 2 showed greater percentage of high blood pressure than normal i.e 66.67% and 62.5%
respectively (fig. 3 & 4). On the other hand, results of group 3 showed lower percentage of high blood pressure that is 33.33% (fig. 5)

Figure 3. Percentage of population showing high and normal blood pressure in group 1

Figure 4. Percentage of population showing high and normal blood pressure in group 2

Figure 5. Percentage of population showing high and normal blood pressure in group 3
Population belonging to group 1, 2 and 3 showed increase in the percentage of heart diseases with age respectively (fig. 6). About 68.88% population of group 3 were affected with increase in the number of cigarettes per day and age. Linear regression showed that the increase in heart diseases with age and period of smoking are highly significant at \( p<0.05 \) for group 3 only while for group 1 and 2 it is non-significant (Table 2).

**4. Discussion**

The trend of smoking is increasing day by day in all age groups. The increase in the number of cigarette per day is the cause and severity of different diseases. Our results indicated an increase in the hemoglobin with the number of cigarettes consumed per day. These results are in broad agreement with other studies who also reported that the increase in the number of cigarettes increases blood levels of carboxyhemoglobin and carbon monoxide which causes the blood to be thickened and hence may increase blood pressure and the risk of coronary heart disease \(^5,15,29,30\).

Cigarette smoking is the major risk factor of COPD and also of all chronic diseases and cancer \(^33,34\). The respiratory system is mostly harmed by tobacco smoke \(^31,32\). Our data showed that respiratory diseases are prominent in the second and third group. These results are highly supported by the findings of Rabe indicating that in any smoker aged >40 yrs COPD should be considered with other symptoms \(^35\).

Our data also indicated the reduction in the percentage of high BP patients in group 3. These findings are supported by Omvik who proposed that due to the presence of nicotine in cigarette tobacco blood pressure and heart beat is likely to increase during smoking \(^28\). However, in several studies, smokers tend to have a slightly lower blood pressure than non-smokers \(^36\).

Several mechanisms may intensify the risk of coronary heart disease in persons exposed to tobacco smoke. Our results also indicated that the risk of heart diseases for smoker’s increases with age and habit of smoking that is number of cigarettes consumed per day and these result are highly correlated with the findings of other researcher too \(^17,28,37\). There is always a possibility of some cultural factors such as nature of housing, time spent in office and outside home and also the diet habits which are not measured and may be considered in future research.

**Table 2.** Linear regression results for three groups of smokers.

|       | R value | Mean square | F     |
|-------|---------|-------------|-------|
| Group 1 | 0.642   | 3.308       | 2.799 |
| Group 2 | 0.1     | 0.184       | 0.06  |
| Group 3 | 0.688*  | 22.22       | 6.288 |

* value significant at \( p<0.05 \)
5. Conclusion and Recommendations

The present study confirms that the smoking had severe effects on health of the smokers causing lungs and heart diseases. Furthermore, the implications could be made that 60% of the total population is smokers which are the indicator in increase attitude of community towards smoking despite many initiative of declaring smoking as taboo by government and tradition of the area.

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