

Original Article

THE EFFECTS OF CIGARETTE SMOKING ON HEMOGLOBIN LEVELS COMPARED BETWEEN SMOKERS AND NON SMOKERS

Shah BK¹, Nepal AK¹, Agrawal M², Sinha AK²

¹Department of Biochemistry and Medical Laboratory Technology, Sunsari Technical College, Dharan, Nepal. ²Department of Pathology, BP Koirala Institute of Health Sciences, Dharan, Nepal.

ABSTRACT

Background: Smoking is one of the global problems causing different disease. Smoking cause variation in different parameters of blood among which hemoglobin is believed to be increased due to smoking. **Objective:** To compare the effect of cigarette smoking on hemoglobin levels between smokers and non smokers. **Materials and methods:** A cross-sectional comparative study was conducted in Department of Pathology, Hematology Laboratory, B.P. Koirala Institute of Health Sciences, Dharan, Nepal. Total of 100 sample size which compromised of 50 smokers and 50 non smokers were included the study. Hemoglobin was estimated by Cyanmethemoglobin method. Student 't' test was applied for parametric data and Chi-Square test was applied for categorical data. A p-value less than 0.05 was considered statistically significant. **Results:** Mean±SD of hemoglobin for smokers was 14.14±1.3 g/dl and for non smokers was 12.37±2.36 g/dl. The awareness about smoking effect in both smokers and non smokers group was not significantly different (p=0.15). Similarly the mean±SD age was 32.78±9.27 years for smokers and 35.68±11.11 years for non smokers, and was not significantly different (p=0.18). **Conclusion:** The present study showed that the hemoglobin level of smoker group was higher than the non-smoker group. Further substantial studies in large population should be conducted to generalize this findings.

Introduction

Smoking is a practice in which substance like tobacco is burned and tasted or inhaled. Globally, smoking kills more than four million people every year and likely to cause more premature death by 2020.^{1,2} The most common method of smoking is industrially manufactured cigarettes but also hand rolled from loose tobacco and rolling paper. Other smoking implements include pipes, cigar, bidis, hookahs, vaporizers and bongs. Toxic ingredients in cigarette smoke circulates throughout the body causing damage in several different ways. The burning tobacco and paper produce more than four

thousand chemical compounds in the form of gases, vapours and particulates like carbonmonoxide, hydrogen cyanide, phenols, ammonia, formaldehyde, benzene, pyrene, nitrosamines, nicotine and tar.³

Smoking is known cause of increase in hemoglobin (Hb) concentration, that is believed to be mediated by exposure of carbonmonoxide.

Corresponding author:

Bijay Kumar Shah, B.Sc. MLT
Department of Biochemistry and Medical Laboratory
Technology, Sunsari Technical College, Dharan,
Sunsari Technical College, Dharan, Nepal
E-mail: cool_bijay51@yahoo.com

Carbonmonoxide binds to Hb to form carboxyhemoglobin, an inactive form of hemoglobin having no oxygen carrying capacity. Carboxyhemoglobin also shift the Hb dissociation curve in the left side, resulting in a reduction in ability of Hb to deliver oxygen to the tissue. To compensate the decreased oxygen delivering capacity, smokers maintain a higher hemoglobin level than non-smokers.⁴ Tobacco smoking is the most important risk factor associated with chronic bronchitis and emphysema. Parental smoking is said to exacerbate respiratory disease in children. Maternal smoking has been shown to be leading cause of pediatric deaths from low birth weight, short gestation, respiratory distress syndrome and sudden infant death syndrome. Many health problems, hematological and physiological changes are seen in human body due to smoking.^{5, 6} The present study was conducted to compare the effect of cigarette smoking on hemoglobin levels between smokers and age-matched non smoker controls.

MATERIALS AND METHODS

This study was a comparative cross sectional study in which purposive sampling technique was done. The duration of the study was two months from June 2011 to July 2011. A total 50 subjects who were smokers and 50 age matched non smoker controls were included in this study. Laboratory tests were performed in Department of Pathology, Hematology laboratory, B.P. Koirala Institute of Health Sciences (BPKIHS). Venous blood was

collected by venipuncture. Hemoglobin was measured by cyanmethemoglobin method under standard protocol.⁷ The participants were informed about research and those who were willing to participate were included in the study, written consent was taken from the subjects. Ethical approval was obtained as per the guidelines of Institute Ethical Review Board (IERB), BPKIHS.

STATISTICAL ANALYSIS

Data were entered in MS Excel 2007 and consequently analysed by using statistical software SPSS (SPSS Inc., Chicago USA). Student 't' test was performed for parametric numerical data and Chi-Square test was performed for non-parametric categorical data. P value less than 0.05 was considered statistically significant at 95% Confidence Intervals.

RESULTS

The study sample comprised of 100 subjects out of which 50 were smokers and 50 were non smokers. The (Mean±SD) Hb of smokers was 14.14 ±1.3 g/dl and for non smokers was 12.37±2.36 g/dl (p<0.001) respectively (Table 1). There was no significant difference (p=0.15) between the awareness about smoking effect in both smokers and non-smokers (Table 2). The average age at which the patients had started smoking was found to be 24 year of age. Similarly, the (Mean±SD) age was 32.78±9.27 years for smokers and 35.68±11.11 years for non smokers.

Table 1: Haemoglobin levels in smokers and non-smokers

Hb (g/dl)	Smokers	Non smokers	Total	p-value
Mean±SD	14.44±1.33	12.37±2.36	13.25±2.10	<0.001

Student 't' test was applied at 0.05 level of significance

Table 2: Awareness of smoking among the smokers and non-smokers

Awareness	Smokers	Non smokers	p-value
Aware	32	38	0.15
Non aware	18	12	

Chi-Square test was applied at 0.05 level of significance.

Table 2: Age of smokers and non-smokers

Age (years)	Smokers	Non smokers	Total	p-value
Mean±SD	32.78±9.27	35.68±11.11	34.23±10.28	0.18

Student 't' test was applied at 0.05 level of significance

DISCUSSION

Similar result was obtained by Nordenberg D et al, 1990 who confirmed that hemoglobin levels were significantly higher for smokers than non smokers.¹ Similarly Tirlapur VG et al, 1983 concluded that hemoglobin concentration increased with advancing age in heavy smokers of both sexes.³ Aitchison R et al, 1988 showed in his findings that, increased carboxyhemoglobin levels were seen in the samples of study because of smoking.³ Muhammad A M et al, 2010 remarked, smoking is associated with increase hemoglobin levels in total blood.⁸ Milman N et al, 1984 found during his study that, tobacco smoking has an increasing effect on hemoglobin concentration in both genders.⁹ Our study showed similar results as previous study.

In our study, there was no significant difference in the awareness about the effect of smoking on their health between smokers and non smokers ($p > 0.05$). It was reported that maximum number of smokers used to smoke 1-5 cigarettes per day with alcoholic beverages. Many young smokers were encountered in this study. The number of subjects who had started smoking within last 5 years were maximum i.e. 21 patients among 50. In this study, we also found that the mean±SD age at which all the smokers patients had started their smoking was 24.12±5.13 years. The present study had few limitations: a) The sample size was relatively small, b) The duration and extent of smoking and other factors like alcohol, tobacco were not considered.

CONCLUSION

The results of the present study confirm that hemoglobin level is significantly higher in smokers than non-smoker. Further large scale studies including different age groups should be required to confirm these findings. Moreover mass campaign should be conducted by government, media and other resources to create awareness regarding harmful effects of cigarette smoking.

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