Original Research Article

Effect of Tobacco Smoking on Hemoglobin Level among Kirkuk Technical Institute Students

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Abstract

Smoking is regarded as one of the most common unhealthy habits that affect human health because of its impacts on other body organs .

The aim was to determine the impact of cigarettes smoking regarding the Hemoglobin level. among Kirkuk- technical institute students . Across- sectional study was done and a randomly selected sample (30 smokers and 30 non – smokers students from the same age between 19-20 years) from different scientific depts. in Kirkuk Technical Institute after receiving their agreements to participate in the study which was started from 1/11/2015 till 1/2/2016 .

A special questionnaire sheet prepared for this purpose and Hemoglobin estimation was done in primary health center which belongs to Kirkuk technical institute by using Sahli's haemoglobinometer which is the documented method used in primary health center . The study results show that 85.0 % living inside Kirkuk city and most of students from administrative dept .(70.0%) , 21 smoker students (70%) and 23 non- smoker students (76.7%) from were aware from the dangerous effect of smoking on human health .

The study concluded that early establishment of smoking in young age group lead to more complications .

The study recommended that advanced educational programs about the effect of smoking and its relation to diseases occurrence in other body organs and further future complications lead to death .

تأثير التدخين على هيموغلوبين الدم بين طلبة المعهد التقني / كركوك

الخلاصة

إن التدخين من أهم الغير صحية التي تؤثر بشكل مباشر على صحة الإنسان لما تسببه السيكارة من إخطار على الصحة وسائر أعضاء الجسم . هدف البحث لدراسة تأثير التدخين على نسبة هيموغلوبين الدم بين طلبة المعهد التقني / كركوك حيث أجريت دراسة مقطعية واختيرت عينة عشوائية (كان 30 منهم مدخنا و 30 طالبا غير مدخنا) ومن نفس الأعمار ومن مختلف الأقسام العلمية في المعهد التقني كركوك بعد اخذ موافقتهم الشخصية على إجراء البحث للفترة من 2015/11/1 ولغاية 2016/2/1 حيث صممت استمارة استبيان أعدت للبحث وتم قياس هيموغلوبين الدم لكافة الطلاب وتحديد درجته في مختبر المركز الصحي التابع للمعهد التقني بطريقة سالي.

أظهرت النتائج بان غالبية الطلبة يسكنون داخل مدينة كركوك (85%) ومن الأقسام الإدارية (70.0%) وان (21– 70%) من المدخنين و (23– 76.7%) من غير المدخنين على علم بإضرار التدخين الخطيرة وأثاره على صحة الإنسان .

استنتجت الدراسة بان ممارسة التدخين في عمر مبكر له اثر كبير في حدوث الضرر ومضاعفاته وان هيوغلوبين الدم يزداد عند الطلبة المدخنين

أوصت الدراسة باعتماد برامج تعليمية موسعة لتوضيح إضرار التدخين وما يسببه من إمراض مستقبلية لأعضاء الجسم المختلفة تترتب عليها عدة مضاعفات قد تؤدي بحياة الإنسان إلى الموت.

الكلمات المفتاحية : التدخين, هيموغلوبين الدم, تأثير , الطلاب.

Introduction

Hemoglobin concentration in the blood is the most important frequently used laboratory indicators in clinical practice. Many studies reveled that hemoglobin level is affected by tobacco smoking [1] .

The smoking hazards are widely recognized [2,3] although significant numbers of people still continue to smoke in the developing countries. [4, 5]

The prevalence of cigarette smoking in the adult people reached up to 12% in Sudan [5] . On the other hand, in some developed countries, where the prevalence of cigarette smoking is twice that of Sudan, it started to decrease over the last year [6].

Cigarette smoking is a well known risk factor for respiratory diseases [7, 8], cardiovascular [9, 10] neoplastic [11, 12] and other health problems occurrence in the body [13, 14] .

Smoking is one of the causes that leading to increase hemoglobin (Hb) concentration in the blood , that is believed to be mediated by exposure of carbonmonoxide .

Carbonmonoxide (CO) binds to hemoglobin to form carboxyhemoglobin, which is an inactive form of hemoglobin having no oxygen carrying capacity, shifting the Hb dissociation curve to the left side, and resulting in decrease in hemoglobin ability to deliver oxygen to the body tissue. Therefore to compensate this defect in oxygen delivering capacity, smokers people having a higher hemoglobin concentration level in their than non-smokers [15] .

Smoking nowadays is mainly through industrially manufactured cigarettes and rolled paper form. The toxic substances in cigarettes causing damage for different organs in the body. WHO / reported the adjustments measures for HB concentration for smoker according to the numbers of cigarettes smoking / day (packets) as following: [16]

No. of Cigarettes smoking / day	HB concentration changes in the blood
Never -smoker	
Current smoker	0.3 g/dl
Between ½ -1 packet/day	0.3 g/dl
Between 1-2 packets/day	0.5 g/dl
More than 2 packets/day	0.7 g/dl

Therefore , many death and health problems are seen due to smoking because of its effect on human body systems like respiratory and cardio- vascular.

The aim of the present study was to determine the impact of cigarettes smoking regarding the hemoglobin level among Kirkuk technical students.

Materials and Methods

1- A administrative agreement

Official permission was taken from Kirkuk Technical Institute and primary health center before establishing the study .

2- Study setting :

The study was carried out in primary health center which belongs to Kirkuk technical institute.

3- Study sample and sampling techniques

It is a descriptive study which was done among (60 students) from different departments. A special questionnaire was distributed to them after receiving the written consent from them and the data was collected by interviewing with the study students after complete explanation of the study aim.

4- Study period:
The study was done during the period from 1st November /2015 till the 1st of February /2016.

5- Data collection tool :
A special questionnaire has been prepared by the investigator utilizing available related literature to the questionnaire item included three main parts :
Part-1- Demographic characteristics including (Scientific dept., residence)
Part-2- Students perceptions regarding cigarette smoking effect on human body
Part-3- Information about the numbers of cigarettes smoking / day and in which age they established smoking for smoker students only.
Classification criteria as suggested by WHO [17] were used as below:
a- Smoker (someone who, at the time of the study , smokes any tobacco product either daily or occasionally).
b-Non – smoker (someone who, at the time of the study, does not smoke at all)
c-Ex- smoker (some one who was formerly a daily or occasional smoker but currently does not smoke at all).

6- Exclusion Criteria
A-Any students with history of acute illness like Diabetes Mellitus or Hypertension or renal disease were excluded from the study .

B- Any history of denoted blood within the previous 6 months.

7- Reliability of the questionnaire form :
The questionnaire was presented to (4) experts in the clinical medicine , they were (2) Community physicians and (2) statistical experts .
The reliability of the questionnaire was 75 %.

8- Statistical analysis of data :-
All the questions with yes and no answer , number and percent will be calculated
The statistical test used for this study was Chi- square in order to detect the relation among the studied variables and the dependent level of significance was
($p < 0.05$). [18]

The estimation of Hemoglobin level among study students was done by Sahli's haemoglobinometer method. Blood samples were taken by laboratory technologist using Sahli's pipette and then put to the hemoglobin tube where hemoglobin (Hb) changed to acid haematin by the addition of 0.1 N hydrochloric acid.
The final resulting brown color solution was diluted by adding distilled water which was lastly compared with the standardized brown glass index blocks of Sahli's haemoglobino-meter [19].

Result
Table 1 : Socio demographic characteristics of the study students

Socio- demographic parameter		Study students N=60	
		No,	**%**
Residence	Inside kirkuk city	51	85%
	Outside kirkuk city	9	15%
Department	Administrative	42	70.0%
	Technical	10	16.6%
	Health	8	13.4%

Table 1 shows that 85.0 % of study students were living inside Kirkuk city and most of them from administrative dept .(70.0%).

Table 2 : Distribution of study students according to their perception regarding cigarette smoking effect on human body

Perception regarding cigarette smoking effect on human body	Students perception				Total	*P value
	Smokers students N=30		Non- smoker students N =30			
	No.	%	No.	%		
yes	21	70%	23	76.7%	44 (73.7%)	
No	9	30%	7	23.3%	16 (26.7%)	0.559

* χ² – test was used

Table 2 shows that 70.0% of smoker students and 76.7 % of non smoker students were aware of smoking hazards and its effect on human health like continuous headache with generalized weakness and dyspnea (shortness of breath) with a P- value = 0.559

Table 3: Frequency distribution of study smoker students according to daily cigarettes smoking

Daily cigarettes smoking	Study smoker students N=30		Hb changes	*P value
	Number	Percent		
Less than 5 cigarettes / day	4	13.4	Within normal range (13- 17)g/dl	
5-10 cigarettes / day	8	25.7	Mild changes (17- 18)g/dl	0.000
10-20 cigarettes / day	13	43.3	Moderate changes (18- 19)g/dl	
> 20 cigarettes / day	5	16.6	Sever changes > 19 g/ dl	
Total	30	100.0		

* χ² – test was used

Table 3 shows that 43.3% of study smoker students smoking between 10-20 cigarettes / day with a p value = 0.000.

Table 4: Frequency distribution of study students according to hemoglobin level measurement

Hemoglobin level measurement	Students awareness				Total	*P value
	Smokers N=30		Non- smokers N =30			
	No.	%	No.	%		
Less than normal 11-13 g/ dl	2	6.6%	5	16.6%	7	0.228
Normal 13-16 g/dl	3	10.0%	22	73.4%	25	0.000
Above than normal 17-19 g/dl	25	83.4%	3	10.0%	28	0.000
Total	30	100.0%	30	100.0%	60	

* χ^2 – test was used

Table 4 shows that most of smoker students having a hemoglobin level above than normal limit (25- 83.4%) in comparison with non smoker students the HB level is normal (22- 73.4%) with a p- value = 0.000 .

Discussion

Concerning the perception of smoking impact on human body , the two groups of the study students were aware of its dangerous effect on human body organs.
Similar study was done by Shah *et al* [20] in Hematology laboratory /Department of Pathology, B.P. Koirala Institute of Health Sciences (BPKIHS)in order to compare cigarette smoking effect on hemoglobin levels between two groups (smokers and nonsmokers). They found that there was no significant difference (p=0.15) between them.
 Regarding the number of cigarettes smoking / day , the current study showed that about half of them smoked between10-20 cigarettes.
Skjelbakken *et al* [21] reported in their study among a cohort of 4, 159 Nerwegain men 20-49 year period, 20% of the men had stopped smoking. They mentioned that gradually smoking cessation decreased their hemoglobin by 0.10mmol/ l (1.6g/l) in comparison to those who never smoked. Further more , among people who still continue smoking , there was a positive increase in Hemoglobin

concentration results in relation to dose response of cigarettes smoking per day
Concerning the hemoglobin level , the current study showed that there was a high level of Hb in smoker students in comparison to non smoker students .
Similar study was done by Mutwakil *et al* [22] in Omdurman military hospital – Khartoum - Sudan to determine liver function test and hemoglobin concentrations in smokers in spite of their present complain. They found that hemoglobin levels were higher (Mean ±SD = 13.5±2.0 g/dl) in smokers in comparison to the other group who are not smoker (Mean ±SD = 5.1±0.7 mg/dl and 12.8±1.9 g/dl, *P*= 0.048 and 0.001 respectively).
In the last century, the data of the second national health and nutrition examination survey (NHNES) reported that generalized increased in the hemoglobin distribution curve in smokers people [23].
More update studies   were able to describe significantly higher hemoglobin levels in the current people who are smoking more than 10 cigarettes per day in comparison to those who are never smokers [24].
Ashish *et al* [25] conducted a study in Himalayan institute of Medical Sciences/ department of physiology / Swami Ram nagar, Dehradun, India to evaluate the relationship of tobacco-smoking   with   hemoglobin

concentration and a total of 150 clinically healthy volunteers between the age group of 21- 55 years agreed to participate in the study. They found that the hemoglobin mean value was 14.5 ± 0.79in smokers people , while for non smokers was 13.27 ± 1.32   and the differences was highly statistically significant (p= 0.001) which indicated that cigarette smoking has a significant effect on hemoglobin concentration level.

Smoking is one of the important factors which should be take care of in the estimation of hemoglobin concentration . Cigarettes smoke contains nicotine, nitrogen oxides , carbon monoxide, hydrogen cyanide and free radicals which are toxic substances and carcinogenic compounds harmful to human health [26].

Carbon monoxide ,which is   found in cigarettes, has affinity for hemoglobin 245 times more than oxygen. Carboxy-haemoglobin is Hb+ CO=. The normal value for Carboxyhaemoglobin in non – smokers is < 1.5%, therefore , smokers can have Carboxyhaemoglobin levels ranging between 3-15% [27].

Conclusion
1-Awarness of smoking hazards seen in both smoker and nonsmoker students.

2- Dangerous of increasing hemoglobin level in blood is associated with increased dose of cigarettes smoking per / day.

3- Smoking is directly related with increased hemoglobin level in blood.

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