

Impact of Hyperviscosity of Blood on Elevation of Blood Pressure among the Adulthood at Baghdad City

أثر لزوجة الدم العالية على ارتفاع ضغط الدم بين الشباب في مدينة بغداد

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الخلاصة

هدف الدراسة: تهدف الدراسة الحالية إلى تقييم ارتفاع ضغط الدم عند المرضى الذين يعانون من زيادة لزوجة الدم ، وإيجاد العلاقة بين ارتفاع ضغط الدم وزيادة لزوجة الدم.

المنهجية: دراسة وصفية أجريت للمدة مابين الأول من تموز ولغاية الأول من أيلول للعام 2014 وأجريت الدراسة على 54 شخصا الذين حضروا إلى مصرف الدم للتبرع بالدم .

وتألفت اداة الدراسة من أربعة أجزاء تضمن الجزء الأول الخصائص الاجتماعية و الديموغرافية والجزء الثاني تناول التاريخ الطبي السابق والحالي للمتبرع . وشمل الجزء الثالث السلوك الشخصي والجزء الرابع تكون من قياس مستوى صبغة الدم ، و ضغط الدم قبل وبعد التبرع بالدم ولتحديد ثبات المقاييس تم استخدام مقياس كرونباخ وكان = 0.73 .

وقد تم جمع البيانات باستخدام المقابلة الشخصية من قبل المتبرعين لملئ الخصائص الديموغرافية الاجتماعية الشخصية ، والمشاكل الطبية ، وقام الباحث بقياس مستوى صبغة الدم عينة الدراسة قبل التبرع بالدم ، وقياس ضغط الدم قبل وبعد التبرع و تم تحليل البيانات بواسطة تطبيق الوسائل الإحصائية الوصفية والاستنتاجية .

النتائج: وبينت نتائج الدراسة أن الخصائص الديموغرافية لعينة الدراسة كانت 96.3 % من الذكور ، 22.2 % منهم في سن 23-27 سنة ، 68.5 % متزوجين ، 35.2 % تخرج من المدرسة الثانوية، كان 37 % منهم موظفين حكوميين ، و 44.4 % منهم ذو دخل كاف ، وكان تاريخ التدخين لعينة الدراسة أن 100 % منهم كان المدخنين ، وان نسبة 64.8 % مستمرين في التدخين ، وكان 94.3 % متقطعي للتدخين ، وكان 87 % منهم من مستعملي الاركيلة، 18.5 % منهم مستمرين في استخدامها وكان 90.8 % متقطعي الاستعمال للاركيلة.

الاستنتاج: كشفت الدراسة بان قراءة ضغط الدم تغيرت قبل وبعد سحب الدم ، وتم إيجاد علاقة ذات دلالة إحصائية بين المستوى العالي للهيموجلوبين و ارتفاع ضغط الدم بمستوى معنوية اقل او يساوي 0.05.

التوصيات: أوصت الباحثة بضرورة تنفيذ استراتيجيات فعالة للسيطرة على استعمال التبغ والعمل على قياس كمية الكاربون في الهيموجلوبين ويعتبر جزءا روتينيا لتقييم جميع حالات المرضى المصابين بارتفاع لزوجة الدم والعمل على زيادة الوسائل الترفيهية من خلال فتح المراكز و الساحات المخصصة للرياضة والتنزه.

Abstract:

Objective of The study: The study aims to assess the of blood pressure in hyperviscosity patients, and find out the relationship between of blood pressure and secondary polycythemia

Methodology: descriptive design study was starting from 1st of July 2014 to the 1st of September 2014. The study conducted on 54 persons who attended to blood bank to blood donation. The instruments were composed of four parts. The first part was concerned with the socio-demographic characteristics, second part deals the past and present medical history, third part was a personal behavior, and fourth part consist of the measuring hemoglobin level , and Blood Pressure before and after blood donation, the data was collected by using personal interview by responders to fill the personal socio-demographic characteristics, and medical problems, and the researchers measure the hemoglobin level for the persons before blood donation, and measure the blood pressure before and after donation and the data was analyzed by the application of descriptive and inferential statistical methods.

Results: The results revealed that the demographic characteristics of the study sample was 96.3% were males, 22.2% of them at age 23-27 years old, 68.5% were married, 35.2% graduated from secondary school, 37% of them was employment, and 44.4% of them sufficient income, smoking history for the study sample was revealed that 100% of them was smoker, 64.8% of them continues of smoking, 94.3% was intermittent to smoking, 87% of them was used the water pipe, 18.5% of them continuous to used and 90.8% was intermittent for water pipe used.

Conclusion: the study concluded that the range of blood pressure reading for the study sample was changes from before to after blood draw and it is reduced the percent of high blood pressure after blood draw, that there were significant relationship between high level of hemoglobin and elevation of blood pressure at $P \geq 0.05$ value.

Recommendation: Based on the findings of present study the researcher recommended to implementing effective strategies to control tobacco exposure, measurement of carboxyhemoglobin should be a routine part of the evaluation of all hyperviscosity patients, and labor sticking to increase recreation centers and arenas dedicated to sport.

Keywords: Viscosity, secondary Polycythemia, Hyperviscosity, hypertension, blood donation

INTRODUCTION

Blood viscosity is one determinant of total arterial resistance which is usually increased in hypertension. This increase is mainly related to vasoconstriction⁽¹⁾

Hyperviscosity refers to any state in which there is increased viscosity of the blood. Increased serum viscosity usually results from increased circulating serum immunoglobulins (eg, macroglobulinaemia, multiple myeloma) and can also result from increased cellular blood components⁽²⁾. The precise incidence of hyperviscosity syndrome is not known, as it may occur in a large number of conditions. Hyperviscosity may occur at any age, but the etiology of that seen in infants is different from that seen in adults⁽³⁾ hyperviscosity indicates increased red blood cells, white blood cells, and platelets. Most of the time, it is used in place of erythrocythemia, or pure red blood cell increase, such as in secondary polycythemia⁽⁴⁾ Increased red blood cell mass increases blood viscosity and decreases tissue perfusion, potentially predisposing the patient to thrombosis. Symptoms due to high red blood cell mass usually manifest as plethora or a ruddy complexion⁽⁵⁾ The variability in hematocrit arises from genetic factors, gender, diet, environmental conditions, exercise, season, time of the year, and age and leads to corresponding variability in blood viscosity⁽⁶⁾ The prevalence of hypertension increases progressively with age. Results from the Framingham study demonstrate that among middle-aged and elderly persons, the residual lifetime risk of developing hypertension is 90%. In the majority of patients (95%), hypertension is primary or idiopathic; there is no identifiable risk factor. The remainder of these patients have hypertension caused by renovascular disease, primary aldosteronism.⁽⁷⁾ presented that the increasing blood viscosity are associated with an increased risk of incident cardiovascular events⁽⁸⁾ hypertension remained associated with a higher blood viscosity, while the association with cigarette smoking disappeared. Normotensive smokers had the same increase of blood and plasma viscosity and pulse wave velocity as hypertensive nonsmokers. No interactive effects of hypertension or cigarette smoking on blood or arterial variables were observed, suggesting that the effect of these two factors on blood and vascular rheology are cumulative. Smoking and hypertension may change the flow properties of the blood and the behavior of the arterial wall and this may explain the arterial damage observed in cigarette smokers and hypertensive patients⁽⁹⁾

OBJECTIVES OF THE STUDY:

- 1- Measuring Hemoglobin level before the study sample blood donor.
- 2- Measuring the blood pressure reading of the study sample before and after blood donor
- 3- Findout the relationship between the hyperviscosity and elevation of blood pressure before and after blood donor

METHODOLOGY

Design of the Study: A descriptive design study was starting from July 1st to the September 1st 2014

Setting of the Study: The present study was carried out in the blood bank in Baghdad City.

The Sample of the Study: A purposive sample of 54 persons who attending to blood bank center in order to blood donor.

The Study Instrument: The instruments were composed of four parts and introductory page that invite the participate in the study.

Part I: Socio- Demographic Information Sheet: It was consisted of 6 items which included: age, gender, and marital status, level of education, occupational title, and income.

Part II: Past and Present Medical History: It was comprised of 6 items which as (high blood pressure, Diabetes mellitus, blood disease, liver disease, varicose vein, and respiratory disease

Part III: Personal Behavior: It consisted of 3 items which as; smoking, drinking alcohol, and consumption of water pipe

Part: IV: Measuring packed cell volume (PCV), and Blood Pressure before and after blood donation Sheet.

Validity of the Instrument: The content validity of the instrument was established through a panel of (8) experts.

Statistical analysis: The researcher used version 20 of SPSS to data analysis, and used descriptive methods which as (percentage and frequency), and inferential methods which as (paired t. test)

RESULTS:

Table 1: Distribution of the Study Sample by Socio- Demographic Characteristics

No.	Variable	NO.=54	%
1	<u>Gender</u>		
1.1	Male	52	96.3
1.2	Female	2	3.7
2	<u>Age (year)</u>		
2.1	18-22	5	9.3
2.2	23-27	12	22.2
2.3	28-32	10	18.5
2.4	33-37	7	13.0
2.5	38-42	6	11.1
2.6	43-47	6	11.1
2.7	48-52	8	14.8
3	<u>Social status</u>		
3.1	Married	37	68.5
3.2	Single	16	29.6
3.3	Divorced	1	1.9
4.	<u>Level of education</u>		
4.1	Unable to read and write	4	7.4
4.2	Primary Education	18	33.3
4.3	Secondary Education	19	35.2
4.4	Higher Education	13	24.1
5	<u>Employments</u>		
5.1	Government employee	20	37.0
5.2	Private Employment	5	9.3
5.3	Free Jobs	19	35.2
5.4	Retired	3	5.6
5.5	Student	6	11.1
5.6	House Wife	1	1.9
6	<u>Socio-economic status</u>	NO.	%
6.1	Sufficient	24	44.4
6.2	Barely Sufficient	20	37.0
6.3	Not Sufficient	10	18.5

Table 1: The demographic characteristics of 54 blood donors who attended to blood bank were of 96.3% males, 22.2% of them at age 23-27 years old, 68.5% were married, 35.2% graduated from secondary school, 37% of them was government employees, and 44.4% of them sufficient income.

Table 2: Past and present Medical History

	Medical History	NO.	%
1	High blood Pressure	24	44.4
2	Diabetes Mellitus	2	3.7
3	Blood Disease	4	7.4
4	Liver Disease	1	1.9
5	Varicose Vein	1	1.9
6	Respiratory disease	8	14.8
7	Non	14	25.9

Table 2 shows that 44.4% of the blood donors have elevation of blood pressure, and 14.8% have respiratory disease.

Table 3: Smoking History for Blood Donor Persons

Smoking	NO.	%	Continues	%	Intermittent	%
Yes	54	100.0	35	64.8	52	94.3
No	0	0.0	19	35.2	2	3.7
Total	54	100	54	100	54	100

Table 3: revealed that 100% of the study samples were smoker and 64.8% of them continue of smoking, 94.3% was intermittent to smoking.

Table 4: Water Pipe History of the Study Sample

Water Pipe	NO.	%	Continues	%	Intermittent	%
Yes	47	87.0	10	18.5	5	9.2
No	7	13.0	44	81.9	49	90.8
Total	54	100	54	100	54	100

Table 4 revealed that 87% of the study sample was used the water pipe, 18.5% of them continuous to used and 90.8% was intermittent for water pipe used

Table 5: Alcohol Drinking By the Study Sample

Drinking of Alcohol	NO.	Percent
Yes	13	25.0
No	41	75.0
Total	54	100.0

Table 5 revealed that 25% percent of the study sample was drinking alcohol

Table 6: Medical Problems of the Study Sample related to Blood Viscosity

	Medical Problems	Always		Sometimes		Never	
		NO.	%	NO.	%	NO.	%
1	Headache	19	48.2	9	16.7	26	35.1
2	Vertigo	11	20.4	13	24.1	30	55.6
3	Skin Rash	5	9.3	39	72.2	10	18.5
4	Dyspnea	4	7.4	22	40.7	28	51.9
5	Numbness	11	20.4	17	48.5	26	31.1
6	Fatigue	13	24.1	16	29.6	25	46.3
7	Urinary Tract Infection	4	7.4	42	77.8	8	14.8
8	Bleeding from Noise	2	3.7	47	87.0	5	9.3
9	Tinnitus	2	3.7	41	75.9	11	20.4
10	Joint Pain	7	13.0	35	64.8	12	22.2
11	Nausea	4	7.4	37	68.5	12	22.2

Table 6 presented that the high percent of the study sample complain from headache, and sometimes have skin rash, dyspnea, and numbness, and high percent of them have sometimes urinary tract infection, bleeding from noise, tinnitus, joint pain, and nausea.

Table 7: Packed Cell Volume Levels of the Study Sample Before the blood Draw

Packed Cell Volume	Frequency	Percent
50- 52.9	15	27.8
53- 55.9	29	53.7
56- 58.9	6	11.1
60- 70.9	4	7.4
Total	54	100.0

Table 7: Shows that high percent of PCV for the persons who attended to blood draw was 53- 55.9

Table 8: Comparison between Pre and Post Blood Pressure Reading Concerning Blood Donation for the Study Sample

Blood Pressure Reading		Before Blood Draw		After Blood Draw	
		NO.	%	NO.	%
1	90/60- 110/70 mm. Hg	6	11.1	8	14.8
2	120/70- 130/90 mm.Hg	26	48.1	35	64.8
3	140/90- 150/110 mm.Hg	4	7.4	2	3.7
4	160/110 – 190/ 120 mm.Hg	12	22.2	7	13.0
5	200/ 120 – 220/120 mm.Hg	6	11.1	2	3.7
	Total	54	100.0	54	100.0

Table 8 shows that the range of blood pressure reading for the study sample was changes from before to after blood draw and it is reduced the percent of high blood pressure after blood draw.

Table 9: Relationship between Hemoglobin Levels and Elevation of Blood Pressure before Blood Draw for the study sample

Variables'	NO.	Mean	SD	Mean Difference	paired t. test	df	Sig. (2-tailed) $P \geq 0.05$
Hemoglobin Level	54	2.0370	1.00870	2.03704	14.840	53	.000 (H.S.)
Blood Pressure	54	2.6481	1.33399	2.64815	14.588	53	.000 (H.S.)

Table 9 presented that there were significant relationship between high level of hemoglobin and elevation of blood pressure at $P \geq 0.05$ value.

Table 10: Relationship between Blood Pressure Reading before and after Blood Draw for the study Sample

Variables'	N	Mean	Std. Deviation	Mean Difference	paired t. test	df	Sig. (2-tailed) $P \geq 0.05$
Before blood draw	54	2.6481	1.33399	2.64815	14.588	53	.000 (H.S.)
After blood draw	54	2.2593	.99404	2.25926	16.702	53	.000 (H.S.)

Table 10 shows that there was highly significant relationship between before and after blood draw regarding elevation of blood pressure at $P \geq 0.05$ value.

DISCUSSION:

Discussion of Socio-Demographic Characteristics of The study Sample (table1).

The demographic characteristics of 54 blood donors who attended to blood bank were of 96.3% males, 22.2% of them at age 23-27 years old, ⁽¹⁰⁾ presented that the age-standardized prevalence increased significantly from 12.5% in 1998/99 to 19.6% in 2007/08, and the incidence decreased from 2.7 to 2.4 per 100. Among people aged 60 years and older, the prevalence was higher among women than among men, as was the incidence among people aged 75 years and older. The prevalence and incidence were highest in the Atlantic region for all age groups.

Discussion of the Past and present medical problems related to Blood Viscosity (table 2 and 6)

High percent of the blood donors have elevation of blood pressure, and 14.8% have respiratory disease, the high percent of the study sample complain from headache, and sometimes have skin rash, dyspnea, and numbness, and majority of them have sometimes urinary tract infection, bleeding from nose, tinnitus, joint pain, and nausea.⁽¹¹⁾ stated that the one of the most dangerous aspects of hypertension is that you may not know that you have it. In fact, nearly one-third of people who have high blood pressure don't know it. The only way to know if your blood pressure is high is through regular checkups. If the blood pressure is extremely high, there may be certain symptoms to look out for, including: Severe headache, fatigue or confusion, vision problems, chest pain, difficulty breathing, irregular heartbeat, blood in the urine, and pounding in your chest, neck, or ears

Discussion of Smoking, water pipe, and alcohol uses (3,4, and 5)

The smoking history of the study sample was revealed that all of them were smoker, and high percent of them were used the water pipe, the present finding agree with another study who stated in their study that the viscosity of smoker were significantly higher than those non smoker, and there were a higher fibrinogen levels in current smokers than smokers ⁽¹²⁾

Discussion Hemoglobin level and elevation of blood pressure (table 7, 8, and 9)

High percent of PCV for the persons who attended to blood draw was between 53- 55.9 gm/l, the range of blood pressure reading for the study sample was changes from before to after blood draw and it is reduced the percent of high blood pressure after blood draw, and there were significant relationship between high level of hemoglobin and elevation of blood pressure. in another study which found that they predicted in their study a marked decrease in systolic and diastolic blood pressure following multiple donations in donors with baseline pressure in the Stage 2 hypertension range with less pronounced decreases predicted in Stage 1 donors. Little or no change in blood pressure was predicted in donors with baseline normal blood pressure or prehypertension. ⁽¹³⁾

CONCLUSIONS:

The study concluded that all study sample were smoker, and high of them was used water pip, high of them have high level of PCV and the range of blood pressure reading for the study sample was changes from before to after blood draw and it is reduced the percent of high blood pressure after blood draw, and the concluded that there were significant relationship between high level of hemoglobin and elevation of blood pressure.

RECOMMENDATIONS:

Based on the results of study the researcher recommends the following.

- 1- Implementing effective strategies to control tobacco exposure is useful to reduce the hyperviscosity
- 2- Work on the completion of educational programs about the dangers of smoking to reduce the serious complications and a law firm to reduce the phenomenon of water pipe in cafes and clubs

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