

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

قال الله تعالى

نَرْفَعُ دَرَجَاتٍ مَنْ نَشَاءُ وَفَوْقَ كُلِّ ذِي عِلْمٍ عَلِيمٌ

صدق الله العظيم

سورة يوسف الآية 76

Dedication

Firstly 1 dedicated this study to the bright light that started from Makkah to cover all over the world, the prophet Mohammed the prayers and peace from Allah to him.

To my parents

Supervisor.....

Teachers

.....

Friends

.....

Family

and.....

Anyone one help me to complete this research.

Acknowledgements

I would like to express my appreciation to my supervisor **Dr. Abdalla Abdalkarim** for his guidance and support during the conduction of this study, his keen supervision, valuable advice, and continuous encouragement to make this research possible. Many thanks also extended to the teachers. Best regards and thanks to the contribution of the staff of hematology department my colleagues and friends, for their participation in this study and my appreciations to all those who helped me to realize the importance of this research.

ملخص الدراسة

هذه دراسة وصفية تحليلية اجريت فى الفترة من اغسطس 2013 الى نوفمبر 2013 لتحديد اثر تدخين السجائر فى بعض مكونات الدم المختلفة فى فئة الرجال بولاية شمال دارفور عدد الافراد المشتراكين فى هذه الدراسة مائة فرد . ثمانون فرد من المدخنين للسجائر وعشرون فرد غير مدخنين بمثابة ضابط للتحليل الاحصائى. تم تجميع عينات الدم بعد ملء استبيان الدراسة و هو (Sysmex KX2-1N) عد الدم الكامل و القيم المطلقة لكرات الدم الحمراء تم قياسه بواسطة جهاز جهاز تحليل ذاتى كامل للدم . و ايضا تم فحص مسحة الدم الطرافى لمعرفة شكل الخلايا نتائج هذا البحث اظهرت ان المدخنين للسجائر ذات دلالة زائدة ذى مستوى عد كرات الدم الحمراء (R.B.Cs) (P<0.00) وكتلة حجم الخلايا (Hb) (P<0.00) و الهيمو قلوبين (PCV) (P<0.00) و ايضا المتوسط لمتوسط حجم كررة الدم الحمراء (WBCs) (P<0.02) و عدد كرات الدم البيضاء و متوسط (MCHC) و اما المتوسط لمتوسط تركيز الهيمو قلوبين ذى الخلية (MCV) (P<0.00) اظهر دلالة تناقصية فى المدخنين مقارنة مع غير المدخنين و هذه (MCH) الهيمو قلوبين فى الخلية الدراسة توافق مع الدراسات التى اجريت فى تركيا و اليابان.

Abstract

This descriptive and analytic study which was conducted in period between August 2013 and November 2013 to assessment the effect of cigarette smoking on haematological values in male population of North Darfour state. The subjects participated in this study were eighty male cigarette smokers compared with twenty non-smokers as control.

The blood samples were collected after study questionnaire were filled, full blood count was measured by Sysmex KX2-1N fully automatic haematological analyzer, also peripheral blood smear was examined to show the morphology of the cells.

The results were showed that the smokers had significant higher level of red blood cell count ($P<0.00$), haemoglobin ($P<0.00$), packed cell volume ($P<0.00$), white blood cell count($P<0.02$) and the mean of MCV ($P<0.00$). The mean MCHC and mean of MCH was significantly decrease on smokers rather than non-smokers. This result agreed with others result done in Turkish and Japan.

Abbreviations:

CO: Carbon monoxide.

CO₂: Carbon dioxide.

EDTA: Ethylene diamine tetra-acetic acid.

Hb: hemoglobin.

HbCO: Carboxyhemoglobin.

HbHi: Methemoglobin.

HbS: Sulfhemoglobin.

HCT: Hematocrite.

Mg: Milligram.

N.K: Natural killer cells.

PCV: Packed cell volume.

Plt: Platelets.

RBCs: Red blood cells.

WBCs: White blood cells.

nm: Nanometer.

MCV: Mean cell volume.

MCH: Mean cell hemoglobin.

MCHC: Mean cell hemoglobin concentration.

Fl: Femtoleter.

Pg: Pico-gram.

TLC: Total leukocyte count.

TWBC: Total white blood cells count.

List of Tables

Table	Description	Page no
3.1	Haematological profile of the Study population	19
3.2	Correlation of TWBC classification in the smokers and non- smokers	24
3.3	Association of WBC classification and the chronicgity of smocking	25
3.4	Association between period and WBC classification in the studied group	25

List of Figures

Figure	Description	Page no
3.1	Showed age group distribution	16
3.2	period of smocking	17
3.3	Frequencies of cigarte among somokers	18
3.4	Relationship between mean of RBC count in the patients and control:	20
3.5	Mean Hb in the smokers and non-smokers	21
3.6	Relationship in the Packed cell volume between smokers and non-smokers	22
3.7	Mean cell volume between smokers and non-smokers	23
3.8	MCHC between smokers and non-smokers	23
3.9	TWBC classification in the smokers	24

Contents

		Page no
	آدی	I.
	Dedication	II.
	Acknowledgment	III.
	ملخص الدراسة	IV.
	Abstract	V.
	List of Abbreviation	VI.
	List of Tables	VII.
	List of figures	
	Contents	VIII.

Chapter One Introduction and literature review

1.1	Introduction	1
1.2.1	Blood	2
1.2.1.1	Functions of blood	2
1.2.1.2	Hematopoiesis	3
1.2.1.2.1	Structure and function of bone marrow	3
1.2.1.2.2	Erythropoiesis	3
1.2.1.2.3	Granulopoiesis	4
1.2.1.2.4	Megakaryopoiesis	4
1.2.2	Blood Constituents	5
1.2.2.1	Red blood cell	5
1.2.2.2	Leukocytes	6
1.2.2.2.1	Neutrophils	7

1.2.2.2.2	Monocytes	7
1.2.2.2.3	Eosinophils	8
1.2.2.2.4	Basophiles	8
1.2.2.2.5	Lymphocytes	8
1.2.3	Some chemical component of cigarette Smoking	8
1.2.3.1	Nicotine	8
1.2.3.2	Carbon Monoxide (CO)	9
1.2.3.3	Irritants	9
1.2.3.4	Tars	9
1.2.4	Previous Studies	10
1.3	Objectives	11
1.3. 1	General Objective	11
1.3.2	Specific Objectives	11
1.4	Rationale:	12

Chapter Two

Material and Methods

2.1	Study design	13
2.2	Study population	13
2.2.1	Inclusion criteria	13
2.2.2	Exclusion criteria	13
2.3	Sample size	13
2.4	Sampling	13
2.5	Tools of Data Collection	13
2.6	Principle of hematology analyzers Sysmex (KX2-1N)	13
2.6.1	Procedure of Sysmex KX-21N:	14

2.6.2	Reagents and Materials	14
2.7	Preparation of thin Blood Film	15
2.7.1	Principle of Leishman stained peripheral smear	15
2.8	Ethical Consideration	15
2.9	Data Presentation	15

Chapter three Results

3.1.	Demographic details	16
3.1.1	Age group distribution	16
3.1.2	Distribution of the smokers based on the period of smocking per years	17
3.1.3	Frequencies of the numbers of cigarette among smokers	18
3.2	Laboratory data	18
3.2.1	Relationship between mean of RBC count in the patients and control:	20
3.2.2	Mean Hb in the smokers and non-smokers	21
3.2.3	Relationship in the Packed cell volume between smokers and non-smokers	22
3.2.4	TWBC classification in the smokers	24
3.2.5	Correlation of TWBC classification in the smokers and non-smokers	24

Chapter four Discussion, conclusion and recommendation

4.1	Discussion	26
4.2	Conclusion	28
4.3	Recommendation	29
	References	30 – 32