

: قال الله تعالى

وَقُلْ اَعْمَلُوا فَسَيَرَى اللَّهُ عَمَلَكُمْ وَرَسُولُهُ
وَالْمُؤْمِنُونَ وَسَيُرَدُّونَ إِلَى عَالِمِ الْغَيْبِ
وَالشَّهَادَةِ فَيُنَبِّئُكُمْ بِمَا كُنْتُمْ تَعْمَلُونَ

صدق الله العظيم

سورة التوبة الآية 105

Dedication

- *To my parents*
- *To my wife & my daughter*
- *To my family*
- *To my teachers*
- *To my friends*

Acknowledgement

First and foremost I would like to thank Allah for his help and guidance throughout of my life.

I would like to express my deep sense of gratitude and thanks to my supervisor Dr. Magdi Mansoor Khartoum University, for his help, useful comments and suggestions, his academic advice and revisions provided me with guidance during all phases of this thesis.

My thanks are also extent to my co-supervisor Dr.Salim Bafakeer, Hadhramout University, for his help , support and comments.

I am grateful to Ustaz Abdullah Hasab-Enaby Khartoum University, for his help in my research through reading the results and comment on all slides.

Also my thanks extent to the teachers of Histopathology Department for their faith and help during my study in this College.

I would like to thank all staff of Hadramout university's hospital for their support and help in sample collection.

Finally, I would like to thank my beloved country Yemen for the scholarship that enabled me to continue my graduate studies in Sudan.

Abstract

This study was conducted in Republic of Yemen- Hadramout Governorate in the period between October 2008 to April 2009. aimed to study the effects of smoking on respiratory tract cytology among smokers in Hadramout Governorate.

75 sputum samples were taken from smokers differ in duration of smoking and number of cigarettes per day with age ranged from 22- 68 years, also other 75 sputum samples were taken from non smokers as control group.

Smear was prepared from each sample, fixed in 95% ethyl alcohol then stained with Papanicolaou stain and examine under the microscope.

The study showed that there were an inflammatory cells (neutrophils) in 41 cases of study group (54.7%), but there were no statistical significant between these cells and duration of smoking and number of cigarettes per day.

Also 54.7% of study group were reported to have metaplastic changes, 13.3% were showing dyskaryotic changes, this result was statistically significant with regard to duration of smoking and number of cigarettes per day.

However, the control group were showing some cytological changes that were less severe than the study group, and this difference was statistically significant .

The study suggested that the smoking may be suspected as an important risk factor causing cytological changes in the respiratory tract, so smokers should undergo continuous screening.

On the basis of this study, cytomorphological assessment of sputum is essential for diagnosis of respiratory tract diseases

ملخص الأطروحة

أجريت هذه الدراسة بالجمهورية اليمنية- محافظة حضرموت في الفترة من أكتوبر 2008م إلى أبريل 2009م, بهدف دراسة تأثيرات التدخين على خلايا الجهاز التنفسي للمدخنين, وقد تم أخذ 75 عينة بلع (بلغم) من أشخاص مدخنين لفترات مختلفة وبكميات مختلفة من عدد حبات السجارة في اليوم الواحد حيث تراوحت أعمارهم بين 22 إلى 68 سنة, و 75 عينة أخرى من أشخاص غير مدخنين كفئة ضابطة.

تم عمل مسحة من كل عينة وتثبيتها بالكحول الإيثيلي 95% وصبغها بصبغة بابانيكولا.

أظهرت الدراسة وجود خلايا إلتهاية في 41 حالة من الفئة المستهدفة بنسبة 54.7% مع عدم وجود علاقة ذات دلالة إحصائية بين هذه الخلايا وعدد سنوات التدخين وحبات السجارة المدخنة في اليوم الواحد.

كما أظهرت الدراسة أيضا وجود خلايا متحولة في 41 حالة بنسبة 54.7% وخلايا متعسرة النمو في 10 حالات بنسبة 13.3% وكان لوجود هذه الخلايا دلالة إحصائية مع مدة التدخين وعدد حبات السجارة المدخنة في اليوم. كذلك أظهرت نتائج الفئة الضابطة وجود بعض التغيرات الخلوية ولكن بنسب بسيطة جدا مقارنة بالفئة المستهدفة وذات دلالة إحصائية.

إتضح من خلال هذه الدراسة أن التدخين من أكثر العوامل خطرا على خلايا الجهاز التنفسي, لذلك من الأفضل أن يخضع متعاطوه لفحص دوري من وقت لآخر.

وعلى ضوء هذه الدراسة فإن تقييم النمط الخلوي في عينات البلع له دور فعال في تشخيص الحالات المرضية المصاحبة.

LIST OF CONTENTS

Content	Page
الآية	I
Dedication	II
Acknowledgement	III
Abstract	iv
ملخص الأطروحة	v
List of contents	vi
List of tables	vii
List of figures	viii
List of photographs	ix
Chapter one	
Introduction	1
Scientific Background	3
Respiratory system	3
Anatomy and physiology of respiratory system	3
Histology of Respiratory Tract	4
Normal cytology	4
Risk factors for lung cancer	5
Occupational	5
Genetic and Familial Predisposition	5
Cigarettes smoking	6
History and components of tobacco	6
Tobacco and health	7
Respiratory tract diseases	9
Infection of respiratory tract	9
Bacterial infections	9
Viral infection	9
Fungal infection	9
Lung abscess	9
Pulmonary fibrosis	9
Pulmonary tuberculosis	9
Chronic obstructive pulmonary disease(COPD)	10
Asthma	10
Pneumonia	10

Lung Tumors	11
World Health Organization(WHO) Classification of primary lung tumor	11
Benign tumors	11
Malignant tumors	11
Squamous cell carcinoma	12
Adenocarcinoma	12
Bronchioloalveolar cell carcinoma	13
Large cell anaplastic carcinoma	13
Small cell anaplastic carcinoma	13
Mesothelioma of pleura	13
Investigation of Respiratory Tract Diseases	14
Histological examination	14
Pleural biopsy	14
Bronchoscopy	14
Lung biopsy	14
Cytological examination	14
Bronchial Aspirates and Washing	15
Bronchoalveolar lavage (BAL)	15
Fine Needle Aspirsation (FNA)	15
Fibreoptic bronchoscopy	15
Sampling and cytopreparatory techniques	16
Sputum	16
Fresh and Unfixed sputum	17
Prefixed sputum	17
Induced sputum	17
Fixation and fixatives	17
Staining of cells	17
Papanicolaou stain	18
Haematoxylin	18
Harris`s Haematoxylin	19
Romanowsky stains	19
Special stains	20
Literature Review	21
Justifications	27
Objectives	27
Chapter Two	
Materials & methods	28

Study design	28
Study area	28
Sample size	28
Study population	28
Ethical consideration	28
Sample collection and preparation	28
Chapter Three	
The results	30
Chapter Four	
Discussion	49
Chapter Five	
Conclusion and Recommendation	52
Chapter Six	
References	53
Chapter Seven	
Appendixes	60

LIST OF TABLES

No	Description	Page
1	Age distribution among study and control groups	33
2	The cytological findings in study group compared to control group.	38
3	Correlation between inflammatory changes and age group in study and control group.	39
4	Correlation between metaplasia and age group in study and control groups.	40
5	Correlation between dyskaryosis and age group in study and control groups.	41
6	Correlation between cytological changes and duration of smoking by years	42
7	Correlation between cytological changes and number of cigarettes per day.	43

LIST OF FIGURES

No	Description	Page
1	Duration of smoking by years among study group	34
2	Number of cigarettes per day among study group	35
3	The percentages of different cytological changes according to duration of smoking by years.	36
4	The percentages of different cytological changes according to number of cigarettes\day.	37

LIST OF PHOTOGRAPHS

No	Description	Page
1	Normal sputum cytology- Pap. Stain ($\times 10$)	44
2	Normal sputum cytology- Pap. Stain ($\times 40$)	44
3	Pulmonary macrophages- Pap. Stain ($\times 10$)	45
4	Pulmonary macrophages- Pap. Stain ($\times 40$)	45
5	Inflammatory changes- Pap. Stain ($\times 10$)	46
6	Inflammatory changes- Pap. Stain ($\times 40$)	46
7	Metaplastic changes- Pap. Stain ($\times 10$)	47
8	Metaplastic changes- Pap. Stain ($\times 40$)	47
9	Dyskaryotic changes- Pap. Stain ($\times 10$)	48
10	Dyskaryotic changes- Pap. Stain ($\times 40$)	48