بسم الله الرحمن الرحيم

تم رفع هذه الرسالة بواسطة / سلوي محمود عقل

بقسم التوثيق الإلكتروني بمركز الشبكات وتكنولوجيا المعلومات دون أدنى مسئولية عن محتوى هذه الرسالة.

ملاحظات:
.....
.....
.....
.....
.....

Serum Interleukin 4 level in asthma patients in relation to body mass index (BMI)

Thesis

Submitted for partial fulfillment of
Master Degree in **Internal Medicine**

By

Sara Mostafa Mohamed Ahmed
M.B.B.CH -Ain Shams University

Under supervision of

Prof. Dr. Maged Mohamed Refaat
Professor of Internal Medicine, Allergy and Immunology,
Faculty of Medicine, Ain Shams University

Ass. Prof. Dr. Eman El-Sayed Ahmed
Assistant professor internal Medicine,Allergy &
Immunology Faculty of Medicine, Ain Shams University

Dr. Osama Mohamed Abdel latif
Lecturer of Internal Medicine, Allergy and Immunology
Faculty of Medicine, Ain Shams University

Faculty of Medicine - Ain Shams University
2021

سورة البقرة الآية: ٣٢

Acknowledgment

First and foremost, I feel always indebted to ALLAH, *the Most Kind and Most Merciful.*

I'd like to express my respectful thanks and profound gratitude to **Prof. Dr. Maged Mohamed Refaat,** *Professor of Internal Medicine, Allergy and Immunology, Faculty of Medicine, Ain Shams University for his keen guidance, kind supervision, valuable advice and continuous encouragement, which made possible the completion of this work.*

I am also delighted to express my deepest gratitude and thanks to **Ass. Prof. Dr. Eman El-Sayed Ahmed,** *Assistant professor internal Medicine, Allergy & Immunology Faculty of Medicine, Ain Shams University, for her kind care, continuous supervision, valuable instructions, constant help and great assistance throughout this work.*

I am deeply thankful to **Dr. Osama Mohamed Abdel latif,** *Lecturer of Internal Medicine, Allergy and Immunology, Faculty of Medicine, Ain Shams University, for his great help, active participation and guidance.*

I would like to express my hearty thanks to all my family for their support till this work was completed.

Last but not least my sincere thanks and appreciation to all patients participated in this study.

Sara Mostafa Mohamed Ahmed

List of Contents

List of Tables

List of Figures

List of Abbreviations

Abb.	Full term
ABG	*Arterial Blood gases*
ACQ	*Asthma Control Questionnaire*
ACT	*Asthma Control Test*
ASM	*Airway smooth muscle*
BHR	*Bronchial hyperresponsiveness*
BP	*Blood pressure*
BPT	*Bronchial provocation tests*
CBC	*Complete Blood Count*
CHD	*Coronary heart disease*
CR	*Chemoattractant receptor*
CRP	*c-reactive protein*
CXR	*Chest X-ray*
EGFR	*Epidermal growth factor receptor*
EOA	*Early-onset allergic*
ET-1	*Endothelin*
FENO	*Fractional nitric oxide concentration in exhaled breath*
FEV1	*Forced expiratory volume in one second*
FGF-2	*Fibroblast growth factor*
FRC	*Functional residual capacity*
FVC	*Forced vital capacity*
GCR	*Glucocorticoid receptor*
GERD	*Gastroesophageal reflux disease*
HRCT	*High resolution computed tomography*
IGF-1	*Insulin-like growth factor*
IL-5	*interleukin 5*
ILC2	*Lymphoid cells Type 2*
ILCs	*INNATE lymphoid cells*
iNKT	*Invariant natural killer T*

List of Abbreviations (Cont…)

Abb.	Full term
LONA	*Pathogenesis of late onset asthma*
LPS	*Lipopolysaccharide*
NAFLD	*Non-alcoholic fatty liver disease*
NASH	*Non-alcoholic steatohepatitis*
OCS	*Oral corticosteroids*
OSA	*Obstructive sleep apnoea*
PDGF	*Platelet-derived growth factor*
PEF	*Peak Expiratory Flow*
PFT	*Pulmonary Function Test*
RV	*Residual volume*
SP-A	*Surfactant protein A*
SSRIs	*Selective serotonin reuptake inhibitors*
TGF	*Transforming growth factor*
TLC	*Total lung capacity*
TLR	*Toll-like receptors*
TNF	*Tumor necrosis factor*
TSLP	*Thymic stromal lymphopoietin*
VCAM	*Vascular cell adhesion molecule*

INTRODUCTION

Asthma is a common long-term inflammatory disease of the airways of the lungs. It is characterized by variable and recurring symptoms, reversible airflow obstruction, and easily triggered bronchospasms Symptoms include episodes of wheezing, coughing, chest tightness, and shortness of breath. These may occur a few times a day or a few times per week depending on the person, asthma symptoms may become worse at night or with exercise **(WHO, 2013).**

Asthma is a major public health issue globally, affecting people of all ages, genders and ethnicities. It is estimated that the number of people with asthma worldwide may be as high as 334 million according to a report from the Global Asthma Network published in 2014 **(GINA, 2014).**

Prevalence has been shown to vary widely both between countries and within countries, and has been steadily increasing along side that of allergy, as modern lifestyles are adopted and communities become more urbanised, a trend that is predicted to continue over the next two decades **(WHO, 2007).**

For those people affected by the disease, it can be a cause of major disability and impact greatly on quality of life. Overweight and obesity are in reported observational studies consistently associated with increased prevalence of asthma

(Beuther et al., 2007) and, to some extent, decreased lung function **(Fenger et al., 2014).**

Overweight defined when body mass index is from 25 to 29.9 While obesity when BMI is 30 or more. Overweight and obesity may affect the lungs in several ways, for example, through inflammation that may predispose to asthma or through a mechanical effect on lung function. Mechanically, increased body mass index (BMI) may lead to decreased static lung volumes **(Jones et al., 2006)** and breathing with smaller tidal volumes which may leave some of the cross bridged myosin-actin in the airways unbroken **(Farah et al., 2012).**

Thereby further narrowing the airways **(Wang et al., 2006).** In addition, the overweight/obesity-related low-grade inflammation may affect lung function and the risk of asthma **(shore et al., 2008).**

IL-4 mediates an important pro-inflammatory functions in asthma, including induction of isotype rearrangement of IgE, expression of VCAM-1 molecules (vascular cell adhesion molecule 1), promoting eosinophilic transmigration through endothelium, mucus secretion and T helper type 2 (Th2) leading to signaling cytokine release. Asthma is a complex genetic disorder that has been associated with IL-4 gene in promoter polymorphism and proteins involved in IL-4

AIM OF THE WORK

To determine relation between serum interleukin (IL-4) level and body mass index (BMI) in astmatic patients.

Chapter 1

BRONCHIAL ASTHMA

Definition of asthma:

The Global Initiative for Asthma (GINA) defines asthma as, "a heterogeneous disease, usually characterized by chronic airway inflammation. It is defined by the history of respiratory symptoms such as wheeze, shortness of breath, chest tightness, and cough that vary over time and in intensity, together with variable expiratory airflow limitation **(Shore et al., 2005).**

Epidemiology:

Asthma is a typical respiratory condition. Clinically, it is described by a gathering of side effects as (hack, wheeze, brevity of breath and chest snugness) in blend with proof of expiratory wind stream impediment. Trouble of breathing let some circulation into of the lungs because of bronchoconstriction, aviation route divider thickening and expanded bodily fluid. Manifestations and wind current confinement can be incredibly factor, both among patients and inside an individual patient at various focuses in time **(GINA, 2019).**

Asthma, the hyper-responsiveness of respiratory tract, is rising as one of the most genuine ailments around the world. Around 1-18% of populace from different nations are sufferers of asthma **(D'Amato et al., 2016).**

Among respiratory issues, asthma is one of the most quickly developing issue which has defrauded around 33% of the total populace and practically 2.5 million patients kick the bucket every year because of extreme intensification **(Amna Rehman et al., 2017).**

Asthma, the hyper-responsiveness of respiratory tract, is rising as one of the most genuine ailments around the world (**D'Amato et al., 2016).**

Around 1-18% of populace from different nations are sufferers of asthma. The reality sheet of the World Health Organization (WHO) uncovered that among the total populace around 235 million individuals are discovered misled by asthma. It is proclaimed to be a general medical issue and doesn't get influenced by the degrees of monetary and auxiliary advancement of the nation. It remained under-analyzed, yet additionally untreated, upsetting all the exercises of its 4 unfortunate casualties for lifetime, making trouble on families, social orders and nations **(WHO, 2017).**

Risk factors:

1-Obesity:

Adults with an elevated body mass index (BMI) are at increased risk of asthma **(Peters** et al., **2018)**. This risk may be greater for nonallergic asthma than allergic asthma **(Chen et**

al., 2006) This well be reviewed later in details in chapter obesity and asthma.

2-Tobacco smoke:

Both active and passive smoking have relationship between smoking and airway hyperresponsiveness.

3-Rhinitis:

Adults with rhinitis are at greater risk than those without rhinitis for developing adult-onset asthma **(Guerra et al., 2002)**

4-Postmenopausal hormone replacement therapy:

Observational studies have reported a modest increase in the incidence of asthma among postmenopausal women taking hormone replacement therapy **(Jarvis et al., 2008)**. Some studies have reported an increased risk associated with combination estrogen-progesterone therapy and others only with unopposed estrogen. In one study, prior histories of allergy or never-smoking appeared to enhance the risk **(Romieu et al., 2010)**

Pathogensis of asthma:

The "classic" signs and symptoms of asthma are intermittent dyspnea, cough, and wheezing. This well-recognized syndrome is characterized by variable airflow limitation and by airway hyperresponsiveness, which represents