Role of Vitamin D in Chronic Rhinosinusitis

A systematic review and Meta-analysis study

For Partial Fulfillment of Master Degree in Otorhinolaryngology

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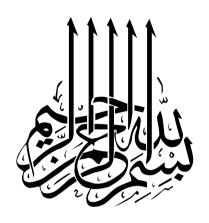
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2016





ACKNOWLEDGMENT

First and foremost thanks to Allah, the Most Merciful.

J wish to express my deep appreciation and sincere gratitude to **Prof. Dr. Hassan Alaa AlEbiary**, Professor of Otorhinolaryngology, Ain Shams University, for his close supervision, valuable instructions, continuous help, patience, advices and guidance. He has generously devoted much of his time and effort for planning and supervision of this study. It was a great honor to me to work under his direct supervision.

I wish to express my supreme gratitude to **Prof. Dr. Amr Gouda Shafik**, Professor of Otorhinolaryngology, Ain Shams University, for his kind supervision, indispensable advice and great help in this work.

I wish to express my great thanks and gratitude to **Prof. Dr. Mohammed**Amir Hassan, Professor of Otorhinolaryngology, Ain Shams University, to whom

I owe more than words that can express for his generous co-operation and support all of the time.

Also I wish to express my sincere gratitude to Prof. Dr. Mohammed Shehata Taha, Professor of Otorhinolaryngology, Ain Shams University Hospitals, for his continuous help, cooperation and encouragement. He has been very kind, generous with scientific advice and a strong motivating force to produce an accurate research for him I will remain humbly grateful.

Last and not least, \mathcal{I} want to thank all my staff, my family, my colleagues,, for their valuable help and support.

Finally ${\mathcal I}$ would present all my appreciations to my patients without them, this work could not have been completed.

Yahya Mohammed Ahmed AlNajjar

Thank you

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LIST OF ABBREVIATIONS

Abbr.	Full Term
1,25(OH)2VD3	1,25-dihydroxyvitamin D3
AFRS	Allergic fungal rhinosinusitis
CD4	Cluster of differentiation 4
CL	Confidence limits
CRS	Chronic rhinosinusitis
CRSsNP	Chronic rhinosinusitis without nasal polyps
CRSwNP	Chronic rhinosinusitis with nasal polyps
CS	Cigarette smokers
CT	Computed tomography
DCs	Dendritic cells
DF	Degrees of freedom

Abbr.	Full Term
FEM	Fixed-effects method
HIV	Human immunodeficiency virus
HNSCC	Head and neck squamous cell carcinoma
I^2	I-square
IgE	Immuno-globulin type E
IgG	Immuno-globulin type G
IL	Interleukin
IU	International unit
Lscc-	Laryngeal squamous cell carcinoma
MRI	Magnetic resonance imaging
ng/ml	Nanogram/milliliter
NJ, USA	New Jersey, United States of America
nmol/L	Nanomoles per litre

Abbr.	Full Term
Non-CS	Non-cigarette smokers
ORL	Otorhinolaryngology
REM	Random-effects method
SE	Standard error
SMD	Standardized mean difference
Th	T-helper Cells
TMJ	Temporo-mandibular joint
U.S.	United states
UVB	Ultraviolet B
VD3	Vitamin D3
VDR	Vitamin d receptor
VS.	Versus

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INTRODUCTION

Chronic rhinosinusitis (CRS) is one of most common diseases affecting people all over the world due to inflammation of mucosal lining of nose and nasal sinuses. No specific treatment can treat CRS long life, but different drugs and modalities to control the disease and decrease the attacks. Recent guidelines defined CRS depends on symptoms, endoscopic examination and radiological finding (Fokkens, 2012). Pathological explanation of CRS is still unclear. Most theories refer CRS to host (human body) and the surrounding environment interaction. (Bachert, 2007). CRS can be presented in many forms as chronic rhinosinusitis without nasal polyps (CRSsNP) and chronic rhinosinusitis with nasal polyps (CRSwNP) (Schleimer, 2009).

Vitamin D was usually linked with bone mineralization, calcium level in plasma and deposition in bone, but now vitamin D is considered to have an immunomodulatory role specially in allergic diseases (**Hewison**, 2008). Low vitamin D3 level is considered now as one of the risk factors for many of allergic diseases as asthma and recurrent upper respiratory tract infection (**Brehm**, 2009). Vitamin D3 is initially generated in

the skin from non-enzymatic conversion of pro-vitamin D3 to pre-vitamin D3. The liver contains 25-hydroxylase, which catalyzes the conversion of pre-vitamin D3 to 25-hydroxy-vitamin D3, the form that most accurately relates to skin and dietary exposure. 25-hydroxy-vitamin D3 finally converted to the active metabolite 1,25-dihydroxy-vitamin D3 by the kidneys, although other tissues, including respiratory epithelial cells, also contain functioning $1 - \alpha$ -hydroxylase (**Rosen, 2011**).

The ability of vitamin D3 to augment innate and adaptive immune responses has sparked interest in its immunologic role in allergy. Results of recent studies indicate that vitamin D3 plays a significant role in maintaining skin integrity, reducing pathogenic colonization, and dampening sensitization in atopic dermatitis (**Benetti, 2015**).

Recently, **Mostafa** *et al* (2016) found that patients with CRS have vitamin D level lower than normal, specially CRSwNP and allergic fungal rhinosinusitis (AFRS).

Also the available evidence indicates that is a significant relationship between low vitamin D3 levels and polypoid CRS phenotypes. The association between vitamin D3 levels and disease severity and vitamin D3 potential for drug therapy

remains unclear, which warrants further research in the area " (Stokes et al, 2016)