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MONA MAGHRABY

شبكة المعلومات الجامعية

التوثيق الالكتروني والميكروفيلم

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Epidemiological and Biochemical Factors (Serum Ferritin and Vitamin D) associated with Premature Graying of Hair

Thesis

Submitted for Partial Fulfillment of Master Degree in Dermatology, Venereology and Andrology

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2020

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Acknowledgment

First and foremost, I feel always indebted to Allah *the Most Beneficent and Merciful.*

I wish to express my deepest thanks, gratitude and appreciation to **Prof. Dr. Nermeen Samy Abdel Fattah**, Professor of Dermatology, Venereology and Andrology, Faculty of Medicine, Ain Shams University, for her meticulous supervision, kind guidance, valuable instructions and generous help.

Special thanks are due to **Dr. Rania Mahmoud Elhusseiny**, Lecturer of Dermatology, Venereology and Andrology, Faculty of Medicine, Ain Shams University, for her sincere efforts, fruitful encouragement.

Nawres Taher Alrgig

List of Abbreviations

AAP	American Academy of Pediatrics
BMI	Body mass index
CAD	Coronary artery disease
DM	Diabetes mellitus
DNA	Deoxy Ribonucleic acid
EILSA	Enzyme-linked immunosorbent assay
HDL	High‑density lipoprotein
HDL-C	High‑density lipoprotein cholesterol
HTN	Hypertension
IL	Interleukin
PABA	Para-amino benzoic acid
PC	Personal computer
PGF2α	Prostaglandin F2 alpha
PHG	Premature hair graying
PSS	Perceived stress scale
RNA	Ribonucleic acid
mRNA	Messenger Ribonucleic acid
ROS	Reactive oxygen species
SD	Standard deviation
SPSS	Statistical package for Social Science
TCM	Traditional Chinese medicine
TGF-B2	Transforming growth factor-beta 2
UV	Ultraviolet
UVB	Ultraviolet-B
αMSH	Alpha melanocyte stimulating hormone
μg	Microgram

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ABSTRACT

Background: Premature graying of hair (PHG) is defined as graying of hair before the age of 20 years in Caucasians and before 30 years in Blacks. Several factors contribute to development of hair graying as genetics, environmental factors, life style and stressful events. Also, many biological markers were associated with development of hair graying as vitamin D, ferritin, vitamin B12 and many other electrolytes as calcium and magnesium.

Aim of the study: assess various epidemiological factors and biochemical variables (serum ferritin and vitamin D) associated with premature graying of hair.

Patients and methods: The current study included 75 premature hair graying patients, and 75 apparently healthy controls of matched age and sex. Assessment of epidemiological, clinical characteristics, estimation of serum levels of vitamin D and ferritin was done for included subjects.

Results: We detected positive correlation of life style, stress perception and family history with PHG development**.** No significant difference of vitamin D between the two groups, while low serum ferritin was significantly associated with PHG patients.

Keywords: premature hair graying, PSS-10, vitamin D and ferritin.

Introduction

Graying of hair is a sign of aging that depends on the progressive reduction of melanocytic function, although there is no universal consensus regarding gray hair count to define premature hair graying. (***Pandhi and Khanna, 2013)*.** The term premature hair graying (PHG) or premature canities is used when graying occurs before the age of 20 in Caucasians, 25 in Asians, and 30 in Africans ***(Chakrabarty et al., 2016)*.**

As hair has an important role in people's social, and sexual communication, PHG can be annoying resulting in loss of self-esteem, especially in young people. The exact etiology of PHG is unknown, but it is considered that PHG occurs in genetically predisposed people exposed to various environmental factors. The relationship between PHG and some specific autoimmune diseases such as pernicious anemia, hyperthyroidism, and hypothyroidism has been reported ***(Pandhi and Khanna, 2013)***.Because hair graying is a clear indicator of biological aging, PHG was assumed to be an indicator of aging of organs; studies performed to explore the relationship between PHG and cardio vascular disease and osteopenia have had conflicting results ***(Orr et al., 1997)*.** Smoking, family history, and obesity were found

to be associated with PHG in a recent study of young men ***(Shin et al., 2015)***.

Furthermore, the process of hair graying includes a decrease in melanogenesis enzymes, disruption of DNA repair, and loss of antioxidant mechanisms ***(Commo et al., 2004).*** Repressed catalase protein expression and hydroxyl radical scavenging activities were recently found in gray hair follicles, and therefore noted that PHG is a result of oxidative damage in hair follicle melanocytes ***(Shi et al., 2014).***

Moreover, the relationship between oxidative stress and psychological disorders (emotional stress, anxiety, and depression), alcohol intake, and atherosclerosis has been reported previously ***(Srivastava & Batra., 2014).***

Bhat et al., (2013) found that serum ferritin was significantly lower in cases as compared to controls. Similarly, ***Chakrabarty et al., (2016)*** observed that mean serum ferritin was significantly lower in cases as compared to controls. Many studies have postulated that iron affects melanogenesis. There is evidence provided by studies for the role of iron in the modulation of tyrosinase. It is reported that in a tautomerization reaction by dopachrome tautomerase, which is one of the later stages of melanin biosynthesis, the

isomerization of dopachrome to dihydroxyindole-2-carboxylic acid occurs. This enzyme is an iron (ferrous) dependent enzyme ***(Chakraborty et al, 1992).***

Chakrabarty et al. (2016) found that there was no statistically significant difference between serum Vitamin D levels in cases and controls. However, ***Bhat et al. (2013)*** had reported significantly lower levels of serum Vitamin D in patients of PHG compared to controls.