Study of Effect of Whitening Creams on Serum Cortisol Level In Egyptian Females At Ain-Shams University Hospital

Thesis

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List of Abbreviations

11β-HSD.....11β Hydoxysteroid dehydrogenase

ACTH.....Adrenocorticotropic Hormone

AHA.....American Heart Association

BMI.....Body Mass Index

BNF.....British National Formulary

CRH.....Corticotropine Releasing Hormone

DBP.....Diastolic Blood Pressure

DNA.....Deoxyribonucleic Acid

ELISA.....Enzyme Linked Immunoassay

GAP.....General Adaptation Syndrome

H_2O_2.....Hydrogen Peroxidase

HPA.....Hypothalamic Pituitary Adrenal axis

LDL.....Low Density Lipoprotein

MAP.....Magnesium Ascrobyle Phosphate

MSH.....Melanocyte Stimulating Hormone

NHI.....National Health Institute

O_2.....Oxygen

RAAS.....Renin Angiotensin Aldosterone System

RBG.....Random Blood Glucose

RNA.....Ribonucleic Acid

SAP.....Sodium Ascrobyle Phosphate

SBP.....Systolic Blood Pressure

TCs.....Topical Corticosteroids

USA.....United State of America

UV.....Ultra Violet

WHO.....World Health Organization

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Abstract

Background: Topical corticosteroids (TCs) are widely used as depigmenting agents alone or in combination with other fairness creams. However, its use may cause secondary adrenocortical insufficiency.

Objective: The aim of the present study is to evaluate the relationship between practicing whitening creams (containing topical corticosteroids) and serum cortisol level in a sample of healthy Egyptian females.

Methods: Ninety females were recruited from students and employees working in Ain Shams University Hospital. Fourty five subjects practicing whitening creams (TCs) over 6 months; matched with fourty five subjects controls (none whitening creams users). Early morning basal serum cortisol level (8:00 am), blood pressure, BMI, blood glucose, serum Na, and serum K were measured.

Results: Early morning serum cortisol level was statistically insignificant among subjects practicing whitening creams with TCs vs. controls **(p value 0.307).** However, **7** out of **45** subjects in the study group **(15.6%)** exhibited low serum cortisol level **(<5ug/dl)** compared to **(0%)** of control group. Subjects with low serum cortisol level were practicing high potency TCs (betamethasone dipropionate 0.1% & clobetasol dipropionate 0.05%) frequently for prolonged duration in large surface area of the body. Highly statistical difference was elicited regarding usage methods of whitening creams **(p value <0.001)** among subjects with low serum cortisol level vs subjects with normal cortisol level in study group. There were, no significant difference found regarding BMI, and arterial blood pressure between study group and controls.

Conclusion: Whitening creams abuse especially high potency TCs among Egyptian females may induce adrenal gland suppression.

Keywords**:** *Serum cortisol level, Whitening creams, TCs.*

INTRODUCTION

Appearance and skin color are main judgmental factors for worth of the women, they try to have lighter skin by several ways though skin color is a fixed feature. Belief in the "white is right" ideology which was transmitted by Western culture. People with dark skin are considered less intelligent ***(Glenn, 2008).***

The history of skin whitening practice goes back to many years in different communities around the world. Actually, in the early era around 1900s some physicians from America proposed utilization of radiation as a skin-bleaching agent ***(Dadzie & Petit, 2009).***

Before, 1900s reported that the attractiveness of a more transparent skin is hinted at by the dating practices of the infamous Cleopatra milk baths to the application of Queen Elizabeth I of ceruse (lead carbonate + lead hydroxyl) and facial powder ***(Peiss & Hopeina, 2011).***

The practice of skin lightening is a complex interplay of historical, cultural, social, psychological and political factors ***(Blay, 2011).***

In addition, skin whitening attributes to the practice, that is inherent in many ethnic groups ***(Naidoo, 2016)***, of using natural or synthetic substances to light the skin tone or provide an even complexion by reducing the melanin concentration in the skin ***(Couteau, 2016).***

Skin whitening products include creams, ointments, soaps, capsules/pills, and injections ***(Darj, 2015).***

The usual active ingredients in these cosmetic products are mainly hydroquinone, mercury, corticosteroids at higher concentrations and some are unknown.

Many additives are added to increase the bleaching effect. Since these products are used usually for long duration, with various concentrations, on a large body surface area, and under hot humid conditions, thus, the percutaneous absorption is enhanced and subsequently complications may occur ***(Dadzie & Petit, 2009).***

Skin whitening agents or lighteners were found in many parts of the world, such as Kenya, Ghana, South Africa, Zimbabwe, USA, Great Britain and Saudi Arabia ***(Dadzie& Petit, 2009).***

It is reported that 25% to 67% of urban-dwelling women in Africa and 20% of women in metropolitan France are affected by this practice ***(Sène et al., 2008).***

Many complications can be caused by whitening creams, some of the common complications are allergic contact dermatitis, steroid induced monomorphic acne ***(Poli, 2007),*** exogenous ochronosis ***(Gandhi et al., 2012),*** diabetes mellitus ***(Nnoruka, & Okoye, 2006),*** nephrotic syndrome ***(Tang et al., 2013),*** and a broad spectrum of cutaneous and postulated endocrinological complications of

corticosteroids such as hypertension, hypercortisolism and also including suppression of hypothalamic-pituitary-adrenal axis (HPA axis) ***(Pitché et al., 2005).***

Skin whitening practice became a common phenomenon around the world, many products are available and easy to get from skin care racks of shopping stores and skin care stores.

Little is known about the effect of whitening creams on basal cortisol level with paucity of data concerning this practice among Egyptian females.

Aim of the Study

The aim of the study is to detect relation between serum basal cortisol level and use of whitening creams.

Chapter One
Skin and Whitening Creams

Structure of the skin:

Skin is the body's largest organ, accounting for one-sixth of the total body weight. Its main role is to act as a chemical and physical barrier to protect the body from harmful external environmental factors such as Ultra Violet (UV) exposure, pathogens, chemical threats, temperature changes and even drought ***(Pullar, 2017).***

The skin consists of three main layers with different underlying structures: (a) the epidermis, (b) the dermis and (c) hypodermis or subcutaneous tissue ***(Katiyar et al., 2007).***

The outermost layer of the epidermis called stratum corneum, consisting of dead cells or corneocytes, underneath the stratum corneum, are living keratinocytes, melanocytes and Langerhans cells ***(Madison, 2003).***

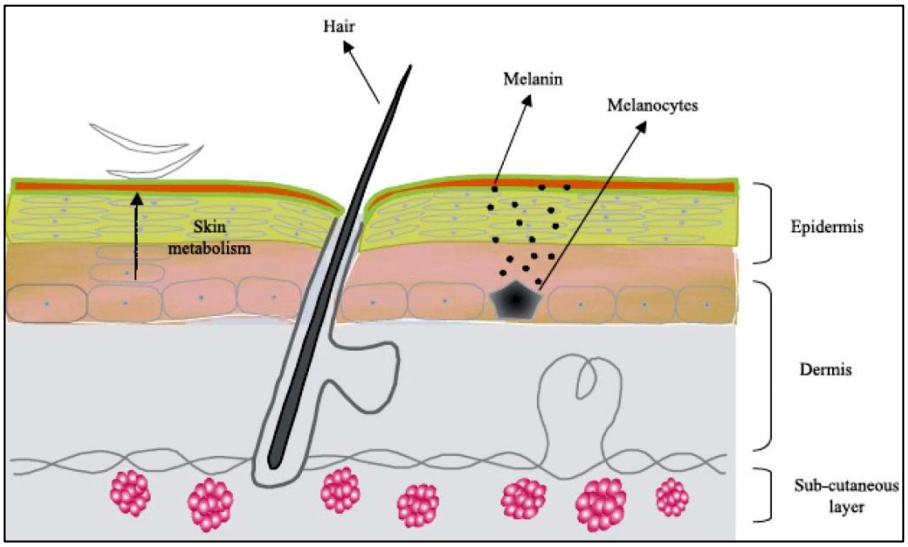

Figure (1): Show structure of the skin. **Copyright © Khartoum Pharmacy Journal 2010**

Melanin is the pigment, which leads to skin color, it protects the skin against the harmful effects of Ultra violet rays of sun and in neutralizing toxic chemicals and drugs ***(Solano et al., 2008).***

Visible pigmentation in mammals results from the synthesis and distribution of melanin in the skin, hair bulbs, and eyes. The melanins are classified into two basic types: eumelanins, which are brown or black, and phaeomelanins, which are red or yellow.

In mammals, typically there are mixtures of both types. Melanins are produced by specialized cells, termed melanocytes, which are located primarily in the skin, hair bulbs, and eyes. Melanocytes synthesize melanin within discrete organelles, termed melanosomes, which are produced in varying sizes, numbers and densities.