STUDY THE ESSENTIAL ROLE OF SOME TRACE ELEMENT LEVELS AND THE CORRELATED ANTIOXIDANT ENZYMES IN IRAQI WOMEN WITH ACNE VULGARIS

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ABSTRACT

Background: Acne in adult female may start during adolescence and persist or have an onset in adulthood. Acne has various psychosocial effects that impact patients’ quality of life. Treatment of acne in adult women. This study aimed to evaluate the effect the of some trace element levels such as Zinc, Copper, Manganese, and iron (Zn, Cu, Mn, and Fe) and the correlated antioxidant enzymes, SOD1 and GRx in Iraqi women with acne vulgaris.

Subjects and Methods: This study enrolled of 50 woman with acne vulgaris completed diagnosis and 40 woman without any apparent skin disorders as control group. The two groups were compared in light of the measured variables. Determination of Zn, Cu, Mn, and Fe were done by spectrophotometric kits while GPx and SOD were estimated by ELISA.

Results: The results of present study suggesting significant differences in levels of Zn, Cu, and Mn (p-value<0.05) between both groups but also the results not showing any statistically differences in levels of iron (p-value>0.05). from the current study we suggesting statistical significant differences in antioxidant enzymatic activity of SOD1 and GRx between AV and control group (p-value<0.05).

Conclusion: The levels of trace element Zn, Cu, and Mn decrease in AV group but Fe not change, the SOD1 and GRx activity decrease in AV group compare to control

Keyword: Acne, Iraqi women, trace elements, antioxidant

I. INTRODUCTION

Acne vulgaris (AV) is a disease of the pilosebaceous unit that causes non-inflammatory lesions (open and closed comedones), inflammatory lesions (papules, pustules, and nodules), and varying degrees of scarring. AV is an extremely common condition with a lifetime prevalence of approximately 85% and occurs mostly during adolescence (1). AV can persist into adulthood, with a 50.9% prevalence rate of acne in women ages 20 to 29 years versus 26.3% in women ages 40 to 49 years (2). Female patients account for two thirds of visits made to dermatologists for acne, and one third of all dermatology office visits for acne are by women who are older than 25 years (3). Trace elements are found in small quantities in the body, but have important structural functional roles in a variety of biological processes(4). The equilibrium of trace elements is essential for a healthy nervous system due to their key roles in activation of specific enzymes in many pathways of the central nervous system function and metabolism. Anti-oxidative defense mechanisms are important pathways involving trace elements (5). Zinc the most important elements in the body that is necessary for normal brain function. Also, it is an important cofactor for different enzyme such as DNA and RNA polymerases (6). Zinc plays an important role in cell proliferation, differentiation, and metabolic activity of the cell as well (7). Cu is an integral component of many enzymes, including ceruloplasmin (copper transporter and ferroxidase), cytochrome c oxidase (electron transport), zinc-copper superoxide dismutase (antioxidant defense), dopamine-mono-oxygenase (neurotransmitter synthesis), lysyl
oxidase (collagen cross-linking, bone formation), dopamine beta-hydrolase (skin pigmentation), and tyrosinase (melanin production) (8-9). Manganese acts as an activator of many enzymes and as a component of metalloenzymes such as manganese superoxide dismutase (MnSOD) that is mainly responsible for scavenging ROS in mitochondrial oxidative stress. In addition, it is involved in the glucose and lipids’ metabolism, acceleration of protein synthesis, vitamin C, and vitamin B, catalysis of hematopoiesis, regulation of the endocrine, bone and tissue formation, skeletal growth, reproduction, and immune function improvement (10).

II. MATERIALS AND METHODS

Study design:
In the present study, SOD1, GRx, and trace elements (Zn, Cu, Mn, and Fe) were marker tests were measured for 90 women (40 women as control and 50 women completed diagnosis with AV). Under aseptic conditions, five milliliters of blood were collected from each women (case and control). The blood sample was then centrifuged and the serum separated and kept frozen at -20°C for study analysis.

Determination of Zn, Cu, Mn, and Fe

Zn, Cu, Mn, and Fe were analysis by spectrophotometric methods depends on company kits.

Determination of SOD1 and GRx

SOD1 and GPx was assayed by ELISA using Sunlong (China) Human ELISA which depends on the Immunosorbent assay. This used Sandwich-ELISA as the principle method. The Micro-ELISA strip plate provided has been pre-coated with an antibody specific to SOD1 and GRx. Standards and samples were added to the appropriate Micro-ELISA strip plate wells and combined to the specific antibody to SOD1 and GRx.

Statistical analysis

All values were reported as mean± SD. Statistical significance was assessed using Student’s t-test. P-value <0.05 considered significant.

Results

Figure 1 showing the standard curve of SOD1 and GRx enzyme activity were estimated by ELISA

![Standard curve of SOD1 and GRx](image)

Fig.1: Standard curve of SOD1 and GRx

Table 1, indication of the effects of the ages, BMI, and durations of AV in both AV and control groups
Table 1: Effects of age, BMI, duration on AV and control groups

<table>
<thead>
<tr>
<th>PARAMETERS</th>
<th>AV N=50</th>
<th>CONTROL N=40</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>AGE (Years)</td>
<td>26</td>
<td>25</td>
<td>0.322</td>
</tr>
<tr>
<td>BMI (Kg/m2)</td>
<td>27.45</td>
<td>23.75</td>
<td>0.001</td>
</tr>
<tr>
<td>Duration (Years)</td>
<td>2-6</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

Table 2, represented the serum levels of trace elements for acne women compare to healthy controls.

Table 2: Comparison between trace element levels in AV and control group

<table>
<thead>
<tr>
<th>TRACE ELEMENTS (μg/dl)</th>
<th>AV N=50 Mean±SD</th>
<th>Control N=40 mean±SD</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Zn</td>
<td>111±9.3</td>
<td>151±8.1</td>
<td>0.0000</td>
</tr>
<tr>
<td>Cu</td>
<td>44±4.2</td>
<td>54±2.7</td>
<td>0.0000</td>
</tr>
<tr>
<td>Mn</td>
<td>0.49±0.09</td>
<td>0.66±0.11</td>
<td>0.001</td>
</tr>
<tr>
<td>Fe</td>
<td>84±4.1</td>
<td>87±3.9</td>
<td>0.124</td>
</tr>
</tbody>
</table>

Table 3 showing the comparison analysis between SOD1 and GRx levels in AV and control group

<table>
<thead>
<tr>
<th>PARAMETERS</th>
<th>AV N=50</th>
<th>CONTROL N=40</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>SOD1 (IU/l)</td>
<td>11.31±4.7</td>
<td>8.99±4.2</td>
<td>0.001</td>
</tr>
<tr>
<td>GRx (IU/l)</td>
<td>1.76±0.21</td>
<td>0.98±0.06</td>
<td>0.001</td>
</tr>
</tbody>
</table>

Figure 2 showing the effects of duration of AV on study parameters levels

Fig.2: Effects of duration of AV on study parameters
III. DISCUSSION

The previous studies mention that AV affects those areas of the women body which have hormonally sensitive sebaceous glands, predominantly the face, neck, chest, upper arms and upper back. The amplitude of acne vulgaris has increased significantly in many countries of the world in recent decades (11). Trace elements or micro-minerals are essential to various biochemical processes in human body which are also involved in immunological functions. Trace elements play versatile roles in our body ranging from immunity development to providing antioxidant defense (12). The results of present study suggesting significant differences in levels of Zn, Cu, and Mn (p-value <0.05) between both groups but also the results not showing any statistically differences in levels of iron (p-value>0.05), from the current study we suggesting statistical significant differences in antioxidant enzymatic activity of SOD1 and GRx between AV and control group (p-value<0.05). From our results can be explain that the levels of trace element Zn, Cu, and Mn decrease in AV group but Fe not change, the SOD1 and GRx activity decrease in AV group compare to control. In present work, SOD and GPX activities were low (p-value <0.05) in AV women compared to controls. Nasiri et al. in 2009 concluded from their study that zinc as anti-inflammatory element may play a role in the pathogenesis of acne, and there is a need for further studies (13). Decrease the trace elements in AV women may be effects on hormonal levels or secretion and this may be disturbance in skin health. Other study showing that the normal level of trace elements in our blood is very important for healthy skin (14-15). The results of present work showing declines in levels of trace elements accepted iron with the time duration of AV (tow–six years) and this agreements on study (16) of antioxidant enzymes. Although, this study showed that BMI was risk factor to incidence of AV and there were no significant differences in serum iron level among AV women with different durations of acne with control groups. Suggested that trace elements play a crucial role in immunity system and alteration of normal homeostasis of these elements in our body may adversely affect different biological processes leading to unwanted complications (17).

IV. CONCLUSION

In this study, we suggested the main role for some trace elements Zn, Cu, and Mn in addition to lowers the levels of antioxidant enzymes SOD and GRx and this will increase the risk of AV in Iraqi women.

Conflict of interest

No potential conflict of interest relevant to this manuscript was reported.

REFERENCES