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COPPER AND ZINC MICROMINERALS LEVELS IN PATIENTS OF ACNE VULGARIS: A CASE CONTROL STUDY

Biochemistry

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ABSTRACT

Acne vulgaris is one of the most commonly occurring inflammatory disorders among various skin diseases. It is said to be the gift of pubertal age, however it stays for higher age also. Trace minerals like Copper (Cu) and Zinc (Zn) may play an important role in either cause or severity of Acne vulgaris.Present study aimed to estimate serum copper and zinc in patients of acne vulgaris. 140 acne vulgaris patients of different age group and either sex was enrolled for the study. Result showed that levels of serum Cu and Zn was decreased in patients of Acne vulgaris (94.39±28.861 and 65.39±22.104 respectively). These levels also showed significant association with different age groups as well as grade of acne. Hence can be concluded these differences may be associated with severity of acne lesions, age and gender.

KEYWORDS

Acne vulgaris, Micro minerals, Copper, Zinc

INTRODUCTION

Acne vulgaris is a skin condition which is a chronic inflammatory, self-limiting disease of pilosebaceous unit.[1] It is believed to affect adolescents, however persons from all age groups are also prone to have acne. Clinical presentation of acne vulgaris includes comedones, papules, pustules, nodules, and pseudo cysts .Worst scenario of acne may cause lifelong scarring and disfigurement in the skin if it continues for a number of years.[2]

Micro-minerals, copper(Cu), zinc(Zn) play an important role in the metabolic processes and immune system.[3,4,5] Many research showed that elemental content is commonly associated to numerous skin illnesses and trace elements activate a vast number of enzymes that are involved in the disease evaluation and its therapy.[6]

Copper's impact on inflammatory cells and granulocytes is the most significant mechanism in acne.[7] Zinc plays a role in the formation of metallothionein and the regulation of glutathione peroxidase in addition to being a co-factor for superoxide dismutase.[8] The present study has been taken to find out role of micro minerals, Cu and Zinc in development and severity in patients with acne vulgaris.

METHODOLOGY

After due ethical clearance from Institutional Ethical Committee, patients diagnosed as Acne vulgaris were taken from OPD of Skin from January 2021 to July 2022 . Subjects matching age group of cases not having acne vulgaris were enrolled as Control. Written consent was taken prior enrolment to the study. For case and control whose age was less than 18 years consent was taken by parents or guardians. Details were noted as per the proforma and questionnaire.

Samples were collected taking all aseptic precautions and all the biochemical parameters was done in the Biochemistry laboratory. Serum Copper was done by Sodium Diethyl dithiocarbamate Method[9]. Serum Zinc estimation was done by Akita Abe, Yiamashita, S., (1989) Tetsuo Makino, (1991) method[10].

Inclusion Criteria

- Recently detected patients of acne vulgaris.
- Patients reported to have acne vulgaris without any medication for previous three months.
- Age group was between 11 to 35 years.
- Both the sexes.

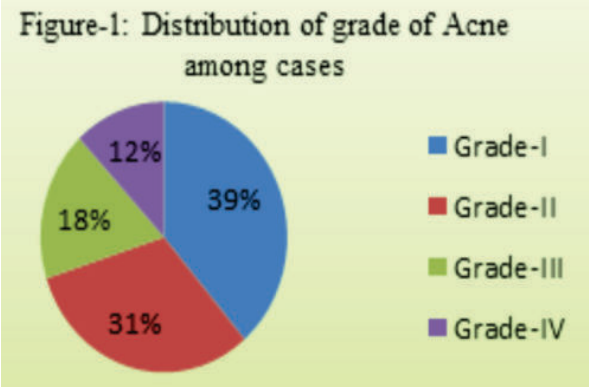
Exclusion Criteria

- Pregnant and Lactating females.
- Females on Oral Contraceptive Pills(OCP'S).
- Those who are in any kind of steroid intake for weight gain or body building. Subjects taking multivitamins or antioxidants.
- Patients with any autoimmune disorders, Diabetes, Smokers.

RESULTS

Table-1: Age distribution between cases and controls

			Group	
			No. of case	No. of change
Age (years)	≤15	Number	3	0
		%	2.1%	0.0%
	16-20	Number	50	37
		%	35.7%	26.4%
	21-25	Number	69	65
		%	49.3%	46.4%
	26-30	Number	17	36
		%	12.1%	25.7%
	>30	Number	1	2
		%	0.7%	1.4%
Total			140	140



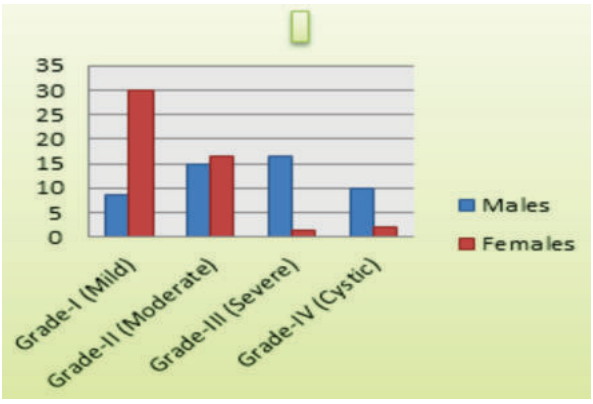


Table-2: Comparison of Serum Zinc levels between groups (case and control)

Group	No. of cases	Mean	Std. Deviation	Std. Error	P-value
Case	140	65.39	22.104	1.868	<0.001
Control	140	88.05	19.644	1.660	

Table-3: Comparison of Serum Copper levels between groups (case and control)

Group	No. of cases	Mean	Std. Deviation	Std. Error	P-value
Case	140	94.39	28.861	2.439	<0.001
Control	140	106.57	27.584	2.331	

DISCUSSION

In present study, higher prevalence of acne vulgaris was reported in patients of age groups of 21-25 years (49.3%) followed by 16-20 years (35.7%) in cases. Whereas 12.1% cases were in the age group of 26-30 years and only 2.1% were in the age group of ≤15 years. Study by Cordain et al. also reported that in cases aged above 25 years, 40% to 54% have facial acne[11] The high prevalence of acne in adults may be partially explained by the higher reporting to the hospital/clinic and better awareness.

In present study, all the cases are categorized into Grade- I (mild), Grade-II (moderate), Grade -III (severe) and Grade -IV (cystic) groups on clinical grounds,38 and it was reported that out of 140 cases, majority had Grade -I (mild) acne (38.6%), followed by 44 cases (31.4%) had Grade-II (moderate) acne, 25 cases (17.9%) had Grade -III (severe) acne and 17cases (12.1%) had Grade -IV (cystic) acne. This finding is comparable with an Indian study by Hazarika and Archana[12] that found that Grade I acne was the most common as it affected 60.2% of participants.

The mean serum copper level (94.39±28.861µg/dl) was significantly lower in patients with acne as compared to control (106.57±27.584µg/dl) with p value of <0.001. Similar findings were seen in a study from Saudi Arabia by Butool and Amanullah where mean serum Copper levels in patients were significantly lower than controls.[13]

Present study reported, the mean serum zinc level was significantly lower in patients with acne (65.39±22.104 µg/dl) as compared to control group (88.05±19.644 µg/dl) (p value< 0.001) which was in agreementwith study done by Kaymak et al where Zinc levels were seen to be significantly lower in cases.[14]

Serum zinc level was significantly lower in patients with age >30 years (58.0) as compared to those having age group between 26-30 years (63.88±22.77), 21-25 years (62.83±22.17), 16-20 years (68.34±21.43) and ≤15 (86.33±25.96). This suggests lower serum zinc level with increasing age of patients. Similarly, a study of Rea I.M. found that mean serum zinc was significantly lower in the elderly male group compared to the young male group with a similar but non-significant trend in female groups.[15]

On comparing the serum copper level with sex distribution, it was found that serum copper level was significantly lower in males (86.11±27.50) as compared to females (102.67±27.97). According to the Butool et al. study, stress among the adolescent girls and acne vulgaris are both associated with significantly decreased serum copper levels in acne vulgaris patients.[13]

The current study revealed that serum zinc level was significantly lower in males (57.57±17.88) as compared to females (73.21±23.24). Zinc levels also differed significantly (P=0.0001) between the either sex in the case group, as reported by the research of Goodarzi et al.[16]

CONCLUSIONS

Present study found that certain individuals with acne vulgaris had lower serum zinc and copper levels than control subjects, and that these differences may have been associated with the severity of acne lesions, age, and gender. Since levels of zinc and copper all were on lower side in the patients with severe acne, this may indicate that these minerals are being used up in the inflammatory process. Inflammation is thought to deplete zinc and copper from the body at the site of the problem, therefore lowering serum levels. In conclusion, increasing antioxidant enzyme activity and taking trace element supplements may greatly lessen the occurrence of acne vulgaris.

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