Evaluation of the therapeutic diet for enhancement of acne status

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ABSTRACT

Medical nutrition therapy was as a potential treatment for acne because it play very important role in control on condition. The objective of this study was to identify the role of diet on pathogenesis and enhancement of acne cases. The study included30 patients with mean age (12-24 y) with two degrees of acne (mild and sever) .they were divided into three groups every group included 10 patients (5 males and 5 females) The first group treated by drug, second group treated by experimental diet and third group treated by both of drug and experimental diet .The study began in the period from April 2015 to December 2016. Our results showed that correlation coefficient food intake with biochemical analysis in the studied groups .There relationship between deficiency vitamins with deficiency GSH and increased androgens hormones .also, there was correlated between deficiency zinc, calcium, magnesium and vitamins with increased cholesterol, triglycerides, and androgen hormones .also, there was high significant correlation positive between deficiency ca, mg zinc intake with decrease GST. Conclusion, macronutrients (carbohydrates, proteins, fiber and fats) and micronutrients (vitamins and minerals essential from a nutritional point of view) preserve the skin from worsening acne and improve its appearance.

***Key words**: acne, nutrition therapy, diet, dairy, carbohydrate glycemic*

INTRODUCTION

Acne is the most common disease of the skin that affects individuals in all ages **(Wolf et al., 2004).**Teenagers are the most common suffers of acne, purely because of the hormonal shifts that are associated with puberty. Current figures indicate nearly 85% of people will develop acne at some point between the ages of 12 and 25years **(Torrelo, et al., 2005)**. A large body of evidence now exists showing how diet may directly or indirectly influence the following 5 proximate causes of acne:

Increased proliferation of basal keratinocytes within the pilosebaceous duct, incomplete separation of ductal corneocytes from one another via impairment of apoptosis and subsequent obstruction of the pilosebaceous duct, androgen-mediated increases in sebum production, colonization of the comedo by Propionibacterium acnes and inflammation both within and adjacent to the comedo **(Cordain 2005).**

A low glycemic load (LGL) diet improved symptoms and insulin sensitivity in acne patients **(Stear ,S. 2001)**.Convincing data exist supporting the role of dairy products and high-glycemic index (GI) food in influencing hormonal factors, which can increase acne prevalence and severity **(Adebamowo et al., 2005)**.

Current research determining the association between dietary modification and acne severity is relatively inconclusive. Although several studies investigating the relationship between acne severity and dairy products, carbohydrates, glycemic index, and high glycemic load exist, data supporting these relationships is inconsistent (**Ismail et al., 2012)**. This lack of clarity is primarily due to the lack of randomized clinical trials with adequate power and applicability.

This study proposal would like to provide a more conclusive, well-designed trial to help tease out the evidence from the convoluted data.

Subject & Methods

Subject:

Total number of 30 patient(15 male and 15 female) with acne were from moderate and sever degree randomly selected from attending the university hospital in Tanta .The study was conducted in the period from April 2015 to December 2016.Each group of study groups received experimental diet for 120 continuous days. Each group of study groups included 10 patient with two degreesof acne(mild and sever) were divided into 5 males and 5 females .These groups were as follows:

-First group as treated by oral doxycycline dose (antibiotic) and Clindamycin in some casesor Benzyl peroxideIn other cases by topical.

-Second group was treated by experimental diet that was the recommended LGL diet consisted of 25% energy from protein, 45% from low-GI carbohydrates and 30% energy from fats according to **(Smith et al., 2007),** as well as nutritional recommendations for vitamins and minerals.

-Third group was treated by both of drug and experimental diet.

Informed consent was obtained from all patients and controls. The Medical Ethics Committee of the Faculty of Medicine, Tanta University approved the study protocol**.**

The examination diagnosis and follow-up were performed by a dermatologist

Method design:

Three formulated tools were used in the study:

***First tool*:** Interviewing questionnaires that included three parts:

- Questions related to food habits
- Food intake
- Diet history according to**(Abdel-kader.,2001).**

Second tool: Biochemical analysis including lipid profile{ total cholesterol and triglycerides according to

Manzoor et al (2016)}; androgen hormones**{**free testosterone for males according to **Smith, et al. (2007).** and progesterone for females **(Arora ,et al .2011)**},glutathione according to **Michaelsson & Edqvist (1984)**, blood glucose according to **Smith, (2008)** and CBC according to **David and Dugdale (2012).**

Samples were taken before and after the experiment, so as to compare and analyze the results statistically.

Three tool: Drug and dietary intervention

Statistical analysis:

Results were collected, tabulated and statistically analyzed by SPSS version 20. Data were described in terms of mean ± SD, frequencies. For comparison by t-test and p.Pearson to measure correlation coefficient were used P< 0.05 was considered to be statistically significant**.**

RESULTS & DISCUSSION:

The results showed there was no significant differences in the medicine group between before and after test for macronutrients while in diet and mixture groups, there was significant difference at ($p<0.001$) between before and after test in energy, protein, fat, fiber and carbohydrates, these results were in agreement with **(Smith, et al .2007).**

The results in table (2) ,(3), showed that there was no significant in medicine group for food intakes from micronutrients between before and after test, while there was significant difference at ($p<0.05$) between before and after in diet and mixture group for sodium, calcium, iron, zinc, vitamin .A,vitaminB1, vitaminB2, and magnesium these results were in agreement with **(Obikoya.2010)**.

In table (4),(5) Current study showed increase in levels of Triglycerides and total Cholesterol before test in experimental groups

because increased the consumption of dietary fat leaded to increased sebum production. Deduced on that increased serum total cholesterol level mayaffect the development of acne vulgaris by increasing androgens are synthesized from plasma cholesterol, according to **Manzoor, et al (2016).**

In the same table, results showed that testosterone level was higher in medicine ,diet and mixture groups before test than after the experience of the observed low levels of testosterone in groups received experimental food compared with before the experiment, these results agreed with **(Smith et al.,2007).**

Also, shows a higher serum level of progesterone was found in patients with acne vulgaris. this result agreed with **Arora et al., (2011).** The influence of progesterone seems to be more complicated in acne, because premenstrual changes correlate with peak levels of progesterone, but natural and artificial progesterone display both ant androgenic activity and androgenic activity according to **Zouboulis (2003).**

The study showed that the level of glutathione was lower in studied groups before test this agree with **Ikeno et al., (2011)** who mention that a decline in antioxidative activity led by a decrease in GSH quantity may play an important role in pathogenesis of acne vulgaris.

Food intake before the experiment was lacking vitamin B6, riboflavin, and selenium which were required in the manufacture of glutathione, and adequate dietary consumption of food rich in these vitamins and minerals can help the body to optimize glutathione production **(Jones et al 1992).**

There was no difference between the groups before the experiment in level of glucose blood becausehigh-GI

carbohydrates may be a significant cause of acne, these results agreed with **Cordain et al ., (2001)** The evidence suggests that high glycemic load (HGL) diets may trigger acne by inducing hyperinsulinemia while the differences was after test in both the diet group because Low glycemic load (LGL) diets may play a dual role in the prevention of hyperinsulinemia by lowering the postprandial insulin according to **Willett et al.** (**2002)**.

In addition, Cordain **et al (2001)** proposed that diet induced hyperinsulinemia may elicit an endocrine response that simultaneously promotes follicular epithelial growth and enhanced sebaceous gland activity two factors responsible for acne proliferation. Therefore, it is possible that a high dietary GL may account for higher prevalence of acne in Western societies.

The results in table (6a), (6b) and (6c) were showed correlation coefficient of food intake ingredient with biochemical analysis in the studied groups.

There was high positive significant correlation ($p< 0.01$) among calories intake with cholesterol, triglycerides and free testosterone**;** while, it correlated negative significantly higher ($p>0.01$) with GST. This results harmony with **Roopam et al (2014)** who reported that increased fat content leads to increased lipid peroxidation and hence the generation of Reaction Oxygen Species (ROS) which cause oxidative damage in acne patients.

There was high negative significant correlation ($p< 0.01$) among dietary fiber with total cholesterol this agreed with **Brown et al, (1999)** who found that various soluble fibers reduce total cholesterol and increasing soluble fiber can make only a small contribution to dietary therapy to lower

cholesterol. Also, the present results showed negative correlation between dietary fibers with blood glucose. The high intake of dietary fiber is associated with enhanced insulin sensitivity according to **Katrina et al., (2003).**

In addition, there was negative correlation between cholesterol and protein intake this data agree with results don by **Pang et al., (2017)**.

There was high significant negative correlation ($p< 0.01$) among calcium and magnesium with cholesterol, this results harmony with **Ditscheid et al , (2005)** who explained it that calcium work by binding to bile acids and cholesterol in the small intestine, similar to the way fiber and bile acid resins work. By binding to cholesterol in the small intestine, cholesterol is not absorbed into the blood and is instead excreted out of the body in the feces.

Amber et al (1949) mention to that deficiency of calcium and magnesium from the diet markedly increases the free fatty acid.

In the same tables results could be noticed that there was high significant negative correlation ($p<0.01$) among zinc with cholesterol, triglycerides, free testosterone and progesterone. Also, there was high significant positive correlation ($p<0.01$) with GST.

CONCLUSION:

The present study suggested that nutrition-related lifestyle factors play a role of acne pathogenesis. It's should be guided to avoid high glycemic load diets (ie, processed foods, refined sugars). Nutrients (carbohydrates, proteins, fats) and micronutrients (vitamins and minerals essential from a nutritional point of view) preserve the skin from worsening acne and improve its appearance. Changes in the nutritional status that alter the structure

and function of the skin can directly affect the appearance of the skin and worsen the condition.

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Table (1): (mean±SD) and (%) from Recommended Dietary Allowances (RDA) for Macronutrients (g) among experimental groups before and after test.

Category	Medicine		Diet		Mixture	
Variable	Before	after	before	after	Before	after
Energy(k cal)						
Mean±SD	2755.2± 257	2683.8± 332	2770.9± 249	1718.5± 149	2758.2± 275	1799.8± 319
%from RDA	140%	141%	145%	90%	145%	94%
P.value	0.598		0.000*		0.000*	
Protein(g)						
Mean±SD	28± 6.1	30± 5.4	31± 5.8	51.5± 12.1	29± 5.5	52.7± 5.5
%from RDA	56%	60%	62%	102%	58%	104%
P.value	0.956		0.000*		0.000*	
Fat(g)						
Mean±SD	113± 18.9	112.8± 17.6	117.7± 24.7	71.9± 6.04	113± 32.9	67.9± 6.4
%from RDA	158%	156.6%	164.6%	100%	158%	94.9%
P.value	0.982		0.000*		0.000*	
Fiber(g)						
Mean±SD	12.2± 0.56	11.8± 0.52	13.8± 0.56	26.8± 5.9	12.24± 0.56	26.05± 6.2
%from RDA	46%	45%	52%	100	46.1	100
P.value	0.119		0.000*		0.000*	
Carbohydrates(g)						
Mean±SD	384.7± 45.2	354.8± 123.5	416.2± 60.1	288.6± 14.5	443.8± 49.09	280.8± 12.7
%from RDA	128%	118%	138%	96.2%	147.9%	93.6%
P.value	0.481		0.000*		0.000*	

Note: significant differences was p<0.05

Table (2): mean±SD and (%) from Recommended Dietary Allowances (RDA) for Micronutrients "meniral"among experimental groups before and after test.

Category	Medicine		Diet		Mixture	
Variable	before	after	before	after	Before	after
Sodium(mg)						
Mean±SD	2751.5± 214.9	2680.5± 288.1	2609.7± 184.5	2339± 146.5	2751.5± 214.9	2311± 111
%from RDA	117%	116%	111%	99%	117%	98.5%
P.value	0.429		0.001*		0.001*	
Calcium(mg)						
Mean±SD	398.9± 64.4	381.6± 67.4	458.3± 24.1	1068.2± 139.7	398.9± 64.4	955.7± 351.6
%from RDA	39.9%	38%	45%	97%	39.9%	96.8%
P.value	0.550		0.000*		0.000*	
Magnesium(mg)						
Mean±SD	132.2± 24.6	137.5± 48.3	114.4± 18.7	390.9± 15	132.2± 24.6	384± 24.8
%from RDA	33%	34.3%	28.6	97.7%	33%	96%
P.value	0.761		0.001*		0.004*	
Iron(mg)						
Mean±SD	12.7± 2.4	12.7± 1.6	12.42± 2.8	17.1± 5.19	12.7± 2.4	18.9± 5.3
%from RDA	70.5%	70.5%	70.4%	95%	70.2%	100%
P.value	.307		0.000*		0.000*	
Zinc(mg)						
Mean±SD	8.19± 1.7	8.37± 1.4	9.16± 1.5	15.82± 2.3	7.87± 1.2	14.7± 1.5
%from RDA	58.5%	59%	60%	100%	57%	99.9%
P.value	.806		0.000*		0.000*	

Note: significant differences was p<0.05

Table (3): mean±SD and (%)from Recommended Dietary Allowances(RDA) for Micronutrients "vitamin"among experimental groups before and after test.

Category	medicine		Diet		Mixture	
Variable	before	after	before	after	before	after
V.A(ug)						
Mean±SD	317.1± 31.9	314.8± 30.3	326.6± 37.5	931.5± 121.3	315.1± 31.9	991.5± 125
%from RDA	31.7%	31.5%	32.4%	93.15	31%	95.8%
P.value	0.811		0.000*		0.000*	
V.C(mg)						
Mean±SD	29.6± 2.8	32± 1.9	26.9± 2.8	56.8± 7.8	31.6± 2.8	55.8± 7.4
%from RDA	53.8	58%	48.9%	100%	57.9%	100%
P.value	0.993		0.000*		0.000*	
V.B1(mg)						
Mean±SD	0. 74±0.12	0.56 ±0.12	0. 48± 0.13	1.4± 0.9	0. 74± 0.11	1.3± 0.9
%from RDA	49.3%	37.3%	32%	99.5%	49.3%	99.1%
P.value	0.455		0.000*		0.000*	
V.B2(mg)						
Mean±SD	0.37± 0.11	0. 74± 0.12	0. 25± 0.14	1.5± 0.2	0.57± 0.11	1.7± .07
%from RDA	21.7%	49.3%	14.7%	88.2%	33.5%	100%
P.value	0.532		0.000*		0.000*	

Note: significant differences was p<0.05

Table (4): Comparison mean ±SD for biochemical analysis in serum among experimental groups

Category	Medicine		diet		mixture	
Statistical	**Before**	**After**	**Before**	**after**	**Before**	**after**
Total Lipids						
Total cholesterol(mg/dl)						
mean±SD	248±51	254±37.4	227±22.3	162±20.78	258±±51.7	139.9±29.9
P.value	0.744		0.000*		0.000*	
Triglycerides(mg/dl)						
mean±SD	237.9±5.6	240.4±46.1	244.1±52.9	101.4±16.5	233.7±97.5	96.9±21.3
P.value	0.916		0.000*		0.000*	
Androgen Hormones						
Free. Testosterone (pg/ml) n=5 (male)						
mean±SD	252±23.16	250.6±10.64	256.8±13.88	184.6±24.7	270.6±18.8	166.6±32.01
P.value	0.917		0.000*		0.000*	
Progesterone(ng/ml) n=5 (female)						
mean±SD	3.16±1.4	2.52±0.49	3.2±0.36	1.7±0.882	3.58±0.38	1.6±0.497
P.value	0.362		0.009*		0.000*	
Blood glucose						
Fasting blood glucose(mg/dl)						
mean±SD	87.9±9.5	93.2±12.09	90.8±16.7	88.6±10.4	89.8±10.4	86.3±6.7
P.value	0.291		0.041*		0.036*	
Post perindial .blood glucose(mg/dl)						
mean±SD	107.7±51.8	109.9±37.4	107±19.5	106±12.9	108.9±12.04	105.7±8.57
P.value	0.686		0.035*		0.050*	

Note: significant differences was p<0.05

Table (5): Comparison mean ±SD for biochemical analysis in whole blood among experimental groups

Category	Medicine		diet		mixture	
Statistical	Before	After	Before	after	Before	after
Glutathione (GPX)						
mean±SD	31.8± 6.7	34.9± 6.3	31.4± 5.5	173.9± 54.36	32.8± 8.35	255.1± 91.06
P.value	0.306		0.000*		0.000*	
CBC						
Hemoglobin(g/ml)						
mean±SD	12± 1.3	12.8± 0.95	11.9± 1.4	13.6± 0.7	11.7± 0.58	13.5± 0.71
P.value	0.010*		0.005*		0.000*	
White blood cells count(mm^6)						
mean±SD	10661± 254.9	6883± 1323.6	11354± 2785.5	6458± 1158.2	7629± 2856.3	5732± 702.7
P.value	0.000*		0.000*		0.000*	
Lymphocytes(%)						
mean±SD	22.30%± 6.10	34%± 4.90	23%± 7.30	37.9%± 2.4	21%± 5.90	31%± 4.25
P.value	0.000*		0.000*		0.000*	
Neutrophils(%)						
mean±SD	74.6%± 7.37	59.7%± 6.14	71.9%± 7.9	59%± 5.6	76%± 5.98	58.9%± 4.04
P.value	0.000*		0.001*		0.000*	

Note: significant differences was p<0.05

Table (6a): Correlation coefficient between biochemical analysis and food intake

Variable	Cho		TG		Free. Test		progesterone		GST		F.B.G		pp.B.G	
	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd
Calories(1st)	-.126	-.146	.105	-.026	.461	.550	.210	-.463	.211	-.017	-.177	.007	.152	.171
Calories(2nd)	.149	.707**	-.178	.714**	-.236	.832**	-.089	.463	.007	-.816**	-.150	.436*	.046	.219
Protein(1st)	.416	.452*	.026	.230	-.413	.433	-.208	-.114	.179	-.219	.168	-.130	.120	-.151
Protein(2nd)	-.090	.712**	.007	-.838**	.162	-.885**	-.016	-.533	-.011	.831**	.116	-.414	.011	-.292
Fat(1st)	-.381	-.591*	.360	-.297	.493	-.227	.319	-.244	.428	.395	.112	-.004	-.011	.261
Fat(2nd)	.316	.834*	-.078	.758**	-.620	.674*	-.453	.338	.127	-.808**	-.096	.219	.039	-.028
Carbohydrate(1st)	-.454	-.450*	-.140	-.365	.592	-.036	-.016	-.003	.009	.353	-.401	-.239	-.478*	.111
Carbohydrate(2nd	.282	.836**	.099	.896**	-.546	.623	-.031	.680*	-.024	-.802**	-.039	.169	.011	.000

**correlation is significant at the 0.05 level (2-tailed).* ***correlation is significant at the 0.01 level (2-tailed).*

(1) is before test (2)is after test.

Table (6b): Correlation coefficient between biochemical analysis and food intake

Variable	Cho		TG		Free. Test		progesterone		GST		F.B.G		pp.B.G	
	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd
Fiber(1st)	.247	-.017	.286	-.085	-.039	-.495	-.147	-.390	-.147	.056	.656**	-.041	.543*	.136
Fiber(2nd)	-.193	-.772**	-.028	-.857**	.326	-.877**	.017	-.648*	-.031	.892**	.090	-.239	.001	-.039
Sodium(1)	-.009	.278	-.052	.189	-.383	-.437	.054	.108	.151	-.086	-.238	.151	.084	.261
Sodium(2)	.256	.885**	.885**	-.036	-.509	.733*	-.202	.578	.044	-.848**	-.069	.179	.086	.063
Calcium(1)	.069	.490*	-.222	.280	-.653	.038	-.776**	.065	.056	-.375	..063	.205	-.112	.041
Calcium(2)	-.238	-.826**	.113	-.857**	.370	-.787**	.046	-.633*	.032	.857**	.167	-.035	.026	-.061
Magnesium(1st)	-.885	.268	-.240	.173	-.228	.636*	.486	.382	.150	-.313	-.215	.096	.101	.051
Magnesium(2nd)	-.213	-.563**	.087	-.658**	.224	-.709*	.221	-.324	.081	.878**	.026	-.245	-.039	-.445*
Iron(1st)	-.025	-.157	.263	.126	.121	.051	.414	.373	.212	-.123	.152	.290	.178	.164
Iron(2nd)	-.280	-.778**	.200	-.799**	.355	-.627	.030	-.708*	.063	.821**	.164	-.238	.013	-.110
Zinc(1st)	.185	.060	.046	-.056	-.043	.254	.106	-.365	-.077	-.038	-.163	-.068	-.127	-.376
Zinc(2nd)	-.243	-.823**	.090	-.869**	.308	-.808**	-.060	-.761*	-.005	.816**	.153	-.217	.018	-.051

**correlation is significant at the 0.05 level (2-tailed).* ***correlation is significant at the 0.01 level (2-tailed).*

(1) is before test (2)is after test.

Table (6c): Correlation coefficient between biochemical analysis and food intake

Variable	Cho		TG		Free. Test		Progesterone		GST		F.B.G		pp.B.G	
	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd
V.A(1st)	-.245	-.291	-.180	-.068	-.302	-.288	.157	.168	-.299	.068	.093	.215	-.072	.067
V.A(2nd)	-.206	-.807**	.057	-.861**	.375	-.821**	-.010	-.666*	-.024	.853**	.192	-.256	.483	.007
V.C(1st)	-.179	-.308	.149	-.049	-.206	-.513	.239	-.071	-.062	.084	-062	.024	.108	-.261
V.C(2nd)	-.250	-.856**	.073	-.891*	.358	-.819**	.023	-.648*	-.020	.883*	.169	-.254	.031	-.087
V.B1(1st)	-.036	-.365	-.551*	-.422	.224	-.040	.088	-.245	-.082	.344	-.137	.028	.100	.041
V.B1(2nd)	-.252	-.841**	.036	-.895**	.310	-.847**	.013	-.667*	-.057	.858**	.133	-.239	.010	-.056
V.B2(1st)	-.035	-.881	-.118	-.094	.250	-.345	-.621	-.460	-.101	.053	.081	.277	.054	.298
V.B2(2nd)	-.252	-.841**	.037	-.894**	.310	-.847**	.011	-.668*	-.057	.858**	.133	-.239	.010	-.056

*correlation is significant at the 0.05 level (2-tailed). **correlation is significant at the 0.01 level (2-tailed).

(1)is before test (2)is after test.

تقييم النظام الغذائي العلاجي في تحسين حالات حب الشباب

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الملخص العربى :

حب الشبا ب هو مرض التهابى مزمن يظهر في مرحلة المراهقه نتيجة النشاط الزائد للهرمونات في هذه الفتره , تهدف الدراسة الى التعرف على دور النظام الغذائى ف تفاقم الحاله و تحسين الحاله . الدراسه اجريت على ٣٠ حالة من المصابين بحب الشباب من الدرجة التانيه والثالثه وتتراوح اعمارهم من ١٢- ٢٤ عام وتم تقسيمهم الى ٣ مجموعات كل مجموعة شملت ١٠ مصابين (٥ ذكور و٥ اناث) . بدات الدراسه في الفتره من ابريل ٢٠١٥ الى ديسمبر ٢٠١٦ .. اشتملت الدراسة على تصميم استبيان مكون من ٥ اجزاء للتعرف على الحاله الصحيه والغذائيه للمصابين والتعرف على انماط الاستهلاك الغذائى واسترجاع ٢٤ ساعه من خلال سرد ما تم تناوله من اطعمه وباستخدام جدول التحليل الغذائى تم تحويل الكميات المرادفه من العناصر الغذائيه . ايضا تم اجراء التحاليل المعلمية قبل وبعد التجربه للتعرف على نسبة كل من : الكوليستيرول والدهون الثلاثيه , الهرمونات وتشمل هرمون التيستوستيرون الحر فى الذكور والبروجستيرون فى الاناث , سكر الدم , الجلوتاثيون , صورة دم كامله للتعرف على نسبه كل من الهيموجلوبين وكرات الدم البيضاء والنتروفيل والليمفاويات وقد تلقت كل مجموعه من مجموعات الدراسه العلاج المخصص لها لمدة ١٢٠ يوم متواصل. اجرى التحليل الاحصائى لمقارنة النتائج قبل وبعد التجربه وكانت النتايج كالاتى : كان الماخوذ الغذائى من البروتين والمعادن الاساسيه والفيتامينات والالياف الغذائيه اقل من التوصيات الغذائيه قبل التجربه بينما كان اعلى فى السعرات الكليه والكربوهيدرات والصوديوم والدهون . ايضا لوحظ ارتفاع في نسبة الكوليستيرول والدهون الثلاثيه والهرمونات وكرات الدم البيضا في كل المجموعات بينما قلت نسبتهم بعد التجربه في المجموعات التى تلقت النظام الغذائى ايضا بينت الدراسه وجود نقص فى الجلوتاثيون قبل التجربه بينما ارتفعت نسبته بعد التجربه في المجموعات التى تلقت النظام الغذائى المختبر . ايضا بينت الدراسه وجود علاقه طرديه بين نقص الفيتامينات ونقص نسبة الجلوتاثيون بينما وجدت علاقه عكسيه بين نقص الماخوذ الغذائى من الفيتامينات وارتفاع نسبة الهرمونات . ايضا لوحظ وجود علاقه عكسيه بين نقص الكالسيوم والماغنسيوم والزنك والفيتامينات وارتفاع نسبة الكوليستيرول وكذلك وجود علاقة طرديه بين نقص الماخوذ الغذائى من تلك العناصر ونقص نسبة الجلوتاثيون . وقد خلصت النتائج الى ان المغذيات الكبرى (البروتين ,الدهون , الكربوهيدرات , الالياف الغذائيه) والمغذيات الصغرى(الفيتامينات والمعادن من مصادر غذائيه) تعمل معا على تحسين مظهر الجلد وتحسن حالات حب الشباب والسيطره على تفاقم الحاله .

الكلمات المفتاحية *حب الشباب , التغذيه العلاجيه , النظام الغذائى , مؤشر سكر الدم*