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Association of acne and intake of dairy products and carbohydrates with high glycemic index: a case-control study

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ABSTRACT: Acne is a chronic inflammatory skin disease, particularly common in adolescence often continues to adulthood. It follows many social and psychological adverse effects for patients. Maturity is the main trigger of acne. Other causes of acne are heredity, stress, hormonal changes and dietary choices. The different studies of diet have shown different results. This study aimed to determine the association between intakes of dairy products and high glycemic index carbohydrate with acne and designed for the first time in Iranian society. This case-control study was conducted on 70 women with acne and 70 healthy women aged 18-30 years. Dietary intakes of peoples obtained using 147-item food frequency semi quantitative questionnaire. Diagnosis and severity of acne was evaluated by a dermatologist. Statistical analysis was performed with the software SPSS 16. Intake of high glycemic index carbohydrate, milk, yogurt, and ice cream in cases was significantly higher than controls (P<0.001). Likely foods with low glycemic index and balance in milk and dairy products consumption can reduce the rate of acne.

Keywords: Acne, Glycemic index, Dairy products, Women, Iran

INTRODUCTION

Acne is a chronic inflammatory skin disease, particularly common in adolescence often continues to adulthood. It is estimated that over 45 million people in the United States have acne vulgaris (Lehmann et al, 2002). Prevalence of acne differs from zero to more than 90% in different countries and societies (Ghodsi et al, 2006) and in adolescents in Tehran, Ardabil, Hamedan, Mashhad was reported 91%, 87.3%, 79.7% and 78.5%, respectively (Ghodsi et al, 2006; Ansar et al, 1997; Edalatkhah et al, 2002; Moein et al, 1995). The disease has consequences far beyond of few signs that may appear on the face and its importance should not be underestimated, Because this condition may lead to many social and psychological impacts on person, including loss of self-esteem, social withdrawal, depression, confusion and embarrassment (Koo, 1995; Gaputa, 1990). Rising levels of androgens in puberty is the most important factor in incidence of acne. Androgen or testosterone as male hormones has been shown to cause increasing oil production and keratosis (James WD, 2005). Other causes of acne are heredity, stress, hormonal changes and diet (Ballangera F et al, 2005; Chiu Annie et al, 2003; USA, 2012; Ferdowsian HR, 2010). The different studies on diet have shown different results. Many previous reports have shown that there is no link between diet and acne (Michaelsson G, 1981; Rasmussen JE, 1977; Loeffel ED, 1972). However, recent studies confirm the role of dietary factors particularly milk and carbohydrates with high glycemic index on acne (Adebamowo et al, 2005; Adebamowo et al, 2006; Adebamowo et al, 2008; Kaymak, 2007; Smith RN, 2007; Smith R, 2008). This study is the first dietary intake of women with acne using

semi-quantitative food frequency questionnaire in Iran. So, the relationship between milk and dairy products and carbohydrate intake, especially carbohydrates with high glycemic index and acne was assessed.

METHODS AND SUBJECTS

This study was designed as case-control. Sample size was determined based on the average glycemic index of foods are eaten by women with acne (as cases) and healthy women (as controls) with a minimum of 15 units different and hypothesis of no effect of glycemic index on the acne in level of error probability α=0.05 and 1-β 0.80 can be rejected. Based on similar studies, standard deviation of glycemic index was δ=31 (Noorhasani et al, 2012). The sample size in each group was 70. Study was conducted on 70 women with acne referred to dermatology clinic of Imam Khomeini hospital and 70 healthy women (Healthy women who referred to the dermatology clinic with patients, also women due to bites, hives, itching referred to the clinic recent days). The inclusion criteria were having mild or moderate acne, the first referring to treat and women with 18-30 years of age. The no inclusion criteria were age less than 18 years and more than 30 years, having hormonal problems or any disease, consumption of drug, and exclusion criterion was lack of cooperation by the end of the study. The researcher after of explanation about study and completion of informed consent, to assess dietary intake semi-quantitative food frequency questionnaire (FFQ) was used. Semi-quantitative FFQ included a list of 148 foods with a standard size and have been validated in glucose and lipid study of Tehran in 2004. The subjects were asked to report their frequency of consumption of each food according to its value in the past year. The frequency of food consumption was by day, week or month in question. The amounts were listed and converted to grams for each food using household scales. Foods based on glycemic index are categorized to three groups including, foods with a low glycemic index (less than or equal to 55), moderate (56 to 69) and high (higher than or equal to 70). According to foods such as bread, pita, baguette, potato, carrot, white bread, barley bread and Bam date are foods with a high glycemic index, and foods such as peas, Barbari bread, split peas, fresh corn, lentils, beans with skin, bread, fried potatoes, beans, dried berries, bread, raisins, red bean, yellow Zahedi dates, dried figs and beans are foods with low glycemic index. Characterizing and grouping carbohydrates with a high glycemic index (GI>70) was done using data of glycemic index of Iranian foods (Taleban et al, 1999). After data collection, the statistical software SPSS16 and Nutritionist3 (designed software for glucose and lipid study of Tehran) were used for entry and analysis of them. P-values less than 0.05 were significant.

RESULTS

Seventy percent of women in both groups were married and remaining single. The difference of education level in cases and controls was significant, so that 54% of cases and 33% of controls were diploma or higher than it (P<0.005). Other of differences have presented in tables 1 and 2.

Table 1. Mean and standard deviation of dietary glycemic index in cases and controls

Dietary GI	controls Mean ± SD	cases Mean ± SD	P-value (t-student)
Foods with a high glycemic index (≥70)	253.61 ±198.41	328.393±429.02	<0.0001
Foods with a low glycemic index (≤55)	378.04 ± 542.14	339.44 ±255.50	<0.0001

Table 2. Mean and standard deviation of dairy products in cases and controls

Foods (gr)	cases Mean ± SD	controls Mean ± SD	P-value)t-student(
Milk	150.04 ± 197.98	66.29 ± 88.43	<0.0001
Yogurt	113.86 ± 187.95	60.54 ± 96.25	<0.0001
Cheese	13.22 ± 25.11	11.43 ±23.95	0.4
Ice	18.04 ±23.24	6.56 ±4.14	<0.0001

DISCUSSION

This study showed a significant positive relationship between intake of high glycemic index foods and acne. In this study the most of women with acne consume foods with a high glycemic index, while the most of healthy women received foods with a low glycemic index, so that differences were significant and this can be

attributed to acne. The results of this study are consistent with the most recent studies. It is noted that the methodology of this study is different from other studies and this study has been performed for the first time in Iran. In a case-control study in Malaysia, it was shown that the consumption of foods with high glycemic index is higher in people with acne (Noorhasani et al, 2012). In another study in which the intervention was conducted on men 15-25 years old with acne, eating a low GI diet could be effective to improve symptoms of acne (Smith RN et al, 2007). Another case-control study in Korea showed that consumption of vegetables is higher in peoples without acne and foods with high-glycemic index play a role in aggravating acne (Jung JY et al, 2010). Foods with high glycemic index due to increasing of the insulin-like growth factor (IGF-1) may attribute to acne. Foods with a high glycemic index lead to hyperglycemia and consequently hyperinsulinemia that result is increasing of IGF-1 bound to IGFBP-3. IGFBP-3 prevents IGF-1 from binding to its receptor and as a result, IGF-1 is increased. IGF-1 is essential for stimulation the production of sebum in acne. Also IGF-1 stimulates the synthesis of androgens by the ovaries and testes, inhibits the synthesis of sex hormone binding globulin that may result in an increase of circulating androgens, which stimulates sebum production (Noorhasani et al, 2012; Jung JY et al, 2010; Cordain et al, 2002). In the present study a significant positive relationship was observed between milk, yogurt, ice cream and acne (Table 2). The results of this study are consistent with the most of recent studies. In a case-control study in Korea was shown that dairy foods are involved in the exacerbation of acne (Jung JY et al, 2010). Another cohort study showed that milk and cheese are associated with acne (Adebamowo et al, 2005). Also, in Malaysia study the consumption of milk and ice cream was more in peoples with acne and found no association between acne and consumption of cheese probably because of the low cheese consumption (Noorhasani et al, 2012). Milk contains bioactive hormones and molecules such as androgen, estrogen, progesterone and IGF-1. So, milk through increase stimulation of IGF-1 leads to the production of sebum and therefore acne (Danby FW, 2010; Hartmann, 1998). Furthermore, androgen in circulation stimulates the production of sebum. In the present study was found no association between intake of other food groups and acne, which is consistent with previous studies.

CONCLUSION

Carbohydrates with high glycemic index, milk, yogurt and ice cream are positively and significantly associated with acne. These findings support the hypothesis of effect of dietary intakes on acne. In order to prevent acne should replace foods with low glycemic index and maintain the balance in consuming of milk and dairy products.

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REFERENCES

Adebamowo CA, Spiegelman D, Berkey CS, Danby W, Rockett HH, Colditz GA, Willet WC, Homes MD. 2006. Milk consumption and acne in adolescent girls. Dermatol Online J 12(4): 1-6

Adebamowo CA, Spiegelman D, Berkey CS, Danby W, Rockett HH, Colditz GA, Willet WC, Homes MD. 2008. Milk consumption and acne in teenaged boys. J Am Acad Dermatol 58(5): 787–793.

Adebamowo CA, Spiegelman D, Danby FW, Frazier AL, Willett WC, Holmes MD. 2005. High school dietary dairy intake and teenage acne. J Am Acad Dermatol 52(2):207–214.

Ansar A, Markazi moqadam N, Ramezani I. 1997. The prevalence of acne pimples (acne vulgaris) in Hamadan. Report [In Persian]

Ballangera F, Baudrya P, N'Guyenb JM, Khammaria A, Dréno Heredity B. 2005. A Prognostic Factor for Acne. Archives of Dermatology 2(5): 1-6.

Chiu A, Chon Susan Y, Kimball Alexa B. 2003. "The Response of Skin Disease to Stress: Changes in the Severity of Acne Vulgaris as Affected by Examination Stress". Archives of Dermatology 139 (7): 897–900.

Cordain L, Lindeberg S, Hurtado M. et al. 2002. Acne vulgaris: a disease of Western civilization. Archives of Dermatology 138: 1584-90.

Danby FW. 2010. Nutrition and acne. Clin Dermatol 28: 598–604.

Edalatkhah H, Sadeqi F. 2002. Prevalence and severity of acne vulgaris and its psychological impact on high school female students in Ardabil in 1379. Journal of Ardabil University of Medical Sciences 1 (3): 27-32 [In Persian].

Ferdowsian HR, Levin S. 2010. "Does diet really affect acne?". Skin Therapy Lett 15 (3): 1–5.

Gaputa Au, Gaputa AK, Schork NJ, Ellis CN, Voorhees JJ. 1990. Psychiatric aspects of the treatment of mild to moderate facial acne: some preliminary observations. Int J Dermatol 29: 719-21.

Ghodsi Z, Hatmi Z, Nikfarjam A, Safar F, Normohamadpor P, Asheqan M. 2006. Prevalence of acne in high school community-based study. Journal of School of Medicine of Tehran University of Medical Sciences 64(3): 37-43 [In Persian].

Hartmann S, Lacorn M, Steinhart H. 1998. Natural occurrence of steroid hormones in food. Food Chem 62: 7-20.

James WD. 2005. "Clinical practice. Acne". N Engl J Med 352 (14): 1463–72.

Jung JY, Yoon MY, Min SU, Hong JS, Choi YS, Suh DH. 2010. The influence of dietary patterns on acne vulgaris in Koreans. Eur J Dermatol 20: 768–772.

Kaymak Y, Adisen E, Ilter N, Bideci A, Gurler D, Celik B. 2007. Dietary glycemic index and glucose, insulin, insulin-like growth factor-I, insulin-like growth factor binding protein 3, and leptin levels in patients with acne. J Am Acad Dermatol 57(5): 819–823.

Lehmann HP, Robinson KA, Andrews JS, Holloway V and et al. 2002. Acne therapy: a-methodologic review. JAM Acad Dermatol 47: 231-40.

Loeffel ED. 1972. Foods and acne. J Tenn Med Assoc 65: 918.

Michaelsson G. 1981. Diet and acne. Nutr Rev 39: 104-6.

Moein A, Kariman Z, Fallah N, Koo J. 1995. The psychosocial impact of acne: patient's perceptions. J Am Acne dermal 32: 26-30.

Noorhasani I, Abdulmanaf Z, Noorzalmy A. 2012. High glycemic load, milk and ice cream consumption are related to acne vulgaris in Malaysian young adults: a case control study. BMC Dermatology 12: 13-18.

Rasmussen JE. 1977. Diet and acne. Int J Dermatol 16: 488-92.

Smith R, Varigos G, Braue A, Mann NJ. 2008. The effect of a low glycemic load diet on acne vulgaris and the fatty acid composition of skin surface triglycerides. J Dermatol Sci 50(1): 41–52.

Smith RN, Mann NJ, Braue A, Makelainen H, Varigos GA. 2007. A low-glycemic-load diet improves symptoms in acne vulgaris patients: a randomized controlled trial. Am J Clin Nutr 86(1): 107–115.

Taleban F, Esmaeeli M. 1999. Glycemic index of foods, Iranian Research Institute of Nutrition and Food Technology. Book [In Persian].

USA. 2012. "Acne is Not Associated with Yet-Uncultured Bacteria". Ncbi.nlm.nih.gov. http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2566126/. Retrieved 2012-08-26.