Description of students' dieting on the event of acne vulgaris at medical faculty, Universitas Kristen Indonesia 2016

Vidi Posdo A Simarmata[1*], Dartri Cahyawari[2]
[1] Department of Medical Community, Medical Faculty, Universitas Kristen Indonesia, Jakarta, Indonesia
[2] Department of Dermatology and Venereology, Medical Faculty, Universitas Kristen Indonesia, Jakarta, Indonesia

Abstract
Acne vulgaris (AV) is a skin disorder of the pilosebaceous unit chronic inflammation. In Indonesia, AV occurs in 80% of adolescents who generally begin at puberty around the age of 12-15 years. The cause of AV is not known with certainty, but the food is thought to be one of the triggers for acne. Foods that trigger acne having high glycemic index, high in saturated fat, high-calorie foods, dairy products, high iodine levels and processed chilly foods. This study aims to determine the description of eating patterns on the incidence of AV in students of the Medical Faculty, UKI 2016. The method of this study uses a descriptive observational design with a cross-sectional approach with 60 respondents. The results showed that the highest frequency consumed by Medical Faculty, UKI 2016 students in 2016 was carbohydrate in white rice, protein in chicken meat, processed food in the form of fried food, fibre in vegetables, and fat in vegetable oil. This research concludes that Medical Faculty, UKI 2016 students have a diet that is high in carbohydrates and high protein.

Keywords: dietary habit, AV, food

Introduction
Acne vulgaris is a skin disorder in the form of chronic inflammation of pilosebaceous unit [1], which clinically manifests in the form of inflammatory lesions (papules, pustules and nodules), non-inflammatory lesions (open and closed comedones) that can cause scars. The distribution of AV depends on the density of pilosebaceous units, generally on the face, neck, shoulders, upper arms, chest and back [2]. Acne vulgaris is a common skin disease that occurs in almost all people globally in any age [1], but mostly causing problem in adolescents and young adults. In the United States, the prevalence of AV is 85%, occurring in 12-24 years. While in Indonesia, the prevalence of AV occurs in 80% of adolescents [3]. The incidence of AV in adolescents in Indonesia varies, generally starting at puberty, around the age of 12-15 years, with the highest severity at the age of 17-21 years and reaching 83-85% and men aged 16-19 years reaching 95-100% [4]. Although AV does not cause death, it can interfere with a person's appearance, affecting psychological and social conditions such as a decrease in one's self-confidence [5].

The leading cause of AV is complex, including inflammation and immune response [1]. However, four basic pathogenesis have the most influence on the cause of AV, namely the increased sebum production, hyperproliferation of pilosebaceous unit, colonisation of Propionibacterium acnes (*P. acnes*), and inflammatory process. Race, genetic, hormones as intrinsic factor, and extrinsic factors include environment (hot climate, cosmetics and smoking), stress, drugs and diet [6]. Diet is one of the factors that are thought to cause acne. In 2007, the American Academy of Dermatology issued a recommendation that calorie restriction can impact the treatment of AV, and there is strong evidence to link the consumption of certain foods to AV. Another study published in the Academy of Nutrition and Dietetics found that people who have a poor diet are more likely to develop acne [7].

Foods that can trigger acne are foods with a high glycemic index, foods high in saturated fat, dairy products and processed chilly foods. Foods with a high glycemic index (candy, bread, cakes, pasta, ice cream, chocolate, biscuits, cereals and others) can cause acne to increase insulin concentration or hyperinsulinemia. Hyperinsulinemia can trigger the development of acne through androgen hormones which will cause an increase in sebum secretion.

Foods high in saturated fat (fried foods, milk, butter, mayonnaise, processed meats, nuts, cheese) will increase sebum production and cause inflammatory processes that worsen acne conditions. Dairy products can trigger acne because milk contains estrogen, progesterone and androgen precursors. Milk also contains carbohydrates, namely lactose which can produce a glycemic response and hyperinsulinemia. Processed food, chilly, or spicy food is suspected of causing AV.

The problem in this study is how the picture of eating patterns on AV in students and students of the Medical Faculty, UKI 2016 in 2016 is? The study aims to find out the description of eating patterns on the incidence of AV in students and students of the Medical Faculty, UKI 2016 in 2016.

Literature Review
Diet is a planned activity of a person or group of people as a reference in the selection of food and the use of food ingredients in daily food consumption, which includes the type of food, the amount of food and the frequency of eating which aims to meet physiological, psychological and sociological needs. Physiological goals are efforts to fulfil the desire to eat (hunger) or obtain the body's nutrients. The psychological goal is to fulfil emotional satisfaction or taste, while the sociological goal is to maintain human relationships in the family or society [8]. In general, diet is defined as a person or group of people choosing food to be consumed every day. The diet has three components: the type of food, the amount of food, and the eating frequency [9].

Type of food is the diversity of food consumed every day consisting of main meals and snacks. Main meals include staple foods, side dishes, vegetables and fruit. At the same time, snacks or snacks are usually consumed for 2-3 hours before the main meal. Based on the type of snack is divided into dry, wet and gravy snacks. The amount of food is the amount of food consumed by a person at each meal. In general, the staple food of an individual is food that contains carbohydrates in the form of rice, instant noodles and bread. The recommended daily consumption of staple foods for adults is 300-500 grams or about 3-5 plates of rice. Side dishes consist of vegetable groups and animal groups. The recommended consumption of vegetable side dishes for adults is 100-150 grams or about 4-6 pieces of medium-sized tempeh.

Meanwhile, the recommended consumption of animal side dishes for adults is 100 grams or about two meat/fish/chicken pieces in a day. Vegetables are food ingredients that come from plants. The recommended consumption of vegetables for adults is 150-200 grams a day. In general, fruit is used as a dessert after consuming the main meal. The recommendation to consume fruit for adults is 200-300 in a day. Drinks consist of various types with different consumption recommendations. However, the recommendation to drink water in a day is eight glasses. The amount for consumption of snacks in a day is not limited.

The frequency of eating is the number of times a person eats in a day, including breakfast, lunch, and dinner [10]. Various aspects influence human actions towards food. Eating is like showing meal times (morning, afternoon and evening). Eating can be seen from the time used to eat and whether each time is always used to eat. Eating habits, in this case, are seen from how to eat, other activities carried out when eating and where to eat [10]. How to eat is seen from how the person eats, such as sitting, standing, lying down. In addition, does the person eat with their hands, spoons? Where to eat is seen from what kind of place can make one's appetite increase and what other activities are carried out while eating so that someone can finish their food. Eating is done because of physiological needs (hunger) and psychological needs (feelings, moods, moods). Sociological needs (prestige, influence of friends, family or other society). Eating is a fun activity. If a person is served with the type of food he likes, that person will be happy, and his appetite will increase. Conversely, if someone is served food that is not liked, there will be a decrease in appetite, and even the food will not be touched at all. Someone will consider the number of calories in food, especially if the person is on a diet, either to form a beautiful body or for treatment.

Carbohydrates are organic compounds that contain carbon, hydrogen and oxygen atoms. Carbohydrates are the primary source of energy for human life. In Indonesia, 80-90% of energy needs come from carbohydrates because the staple food of most Indonesian people, namely rice, contains carbohydrates. Carbohydrates in food are usually in the form of cereals, tubers and plant stems [11]. Apart from vegetables, carbohydrates can also be obtained from animals formed in small amounts through glycogen biosynthesis. In the body, carbohydrates are metabolised and produce glucose contained in the blood, while carbohydrates are synthesised in the liver in the form of glycogen used by cells in muscle tissue as a source of energy.

Proteins are peptide macromolecules composed of several L-amino acids linked by peptide bonds. Amino acids contain the elements C, H, O and N. In addition, protein molecules contain phosphorus, sulfur and there are types of proteins that contain metal elements such as copper and iron [12]. In the body, protein functions as the primary source of energy in addition to carbohydrates, as a regulatory substance for metabolic processes in the form of enzymes and hormones as a defence mechanism of the body against various kinds of microorganisms and substances that are toxic to the body, as building blocks and proteins play a role in storing and pass on hereditary traits.

Fats or lipids are heterogeneous organic compounds that occur in nature and are relatively insoluble in water but soluble in non-polar organic solvents. Fat is found in almost all foodstuffs with different contents. Animal fats contain much cholesterol, while vegetable fats contain phytosterols and contain more unsaturated fatty acids, so generally, vegetable fats are in liquid form. Fat is a substance rich in energy that serves as a source of energy for the body's metabolic processes. one gram of fat can provide 9 kcal [13; 14; 15]. As a body protector from shallow temperatures, as a primary material for synthesising hormones and vitamins, as the highest energy producer, as a solvent for vitamins (A, D, E, K) and as a building block for cell membranes.

Vitamins are organic compounds needed by the body in small amounts for various biochemical functions and are generally not synthesised by the body, so they need to be supplied from various types of food. Based on their nature, vitamins are divided into fat-soluble vitamins and water-soluble vitamins. Minerals play an essential role in maintaining body functions at the level of cells, tissues, organs and overall body functions. Minerals can be obtained from the consumption of foodstuffs of both animal and plant origin [16]. Minerals are divided into macrominerals and micro minerals. Macrominerals consist of calcium, chlorine, magnesium, potassium, phosphorus, sodium and sulfur. In contrast, micro minerals consist of iron, manganese, cobalt, copper, iodine, selenium and zinc [17]. Water is an essential nutrient for the body. In 1 day, the body needs 6-8 glasses or 1-2,5

litres of water. Water serves to help the digestive process, regulates food substances in the body, regulates body metabolism, and regulates body balance.

There are several types of foods that are thought to act as triggers for AV, namely: Foods with a high Glycemic Index (GI)-Cordain and colleagues stated that foods with a high glycemic index (candy, bread, pasta, chocolate, biscuits, cakes, ice creams, cereals can influence the development of AV through hyperinsulinemia. Hyperinsulinemia can trigger endocrine processes and affect the development of acne through androgen hormones, IGF-1, IGFBP-3 and retinoid receptor signalling pathways. The interaction of these factors influences the pathogenesis of acne by influencing excessive follicular epithelial proliferation, abnormal keratinisation and androgen-mediated sebum secretion [18].

Foods high in saturated fat (nuts, processed meats, fried foods, milk, butter, and cheese) will increase sebum production and cause inflammation. Milk contains estrogen, progesterone, androgen precursors. In addition, milk contains bioactive molecules that act on the pilosebaceous gland, such as glucocorticoids, Transforming Growth Factors-β (TGF-β), and peptide hormones [19].

The chronic inflammation of the pilosebaceous unit in acne vulgaris begins with blockage and accumulation of the primary keratin material with clinical manifestations in the form of comedones (open and closed), papules, pustules, nodes, cysts, leading to various scars on the face, neck and neck, chest and back [20]. The main cause of AV is uncertain, but several factors are thought to play a role as a cause of AV, namely genetic and hormonal, race, diet, stress, climate, cosmetics.

Acne vulgaris lesions are usually polymorphic, with the most predilection areas being on the face and neck (99%), back (60%), chest (15%), and shoulders and upper arms. The skin of a person who has AV tends to be oily and sometimes complains of itching and pain. Clinical manifestations of AV can be in the form of non-inflammatory lesions (open and closed comedones), inflammatory lesions (papules, pustules, nodes and cysts) [21]. Blackheads can arise due to desquamation of follicular corneocytes in the pilosebaceous duct, resulting in the formation of microcomedones and oxidized. Microcomedoes can develop into non-inflammatory lesions in the form of open and closed comedones. Inflammatory lesions in AV in the form of papules, pustules, nodes and cysts. Scars or scar tissue is a connective tissue that replaces the epidermis or dermis that has been lost due to the severe inflammatory process in nodulocystic lesions.

Classification of the degree of acne is divided into mild, moderate, severe [22]. Assessments in the classification include the number of comedones, the number of pustules/papules, the number of nodules and cysts, the amount of inflammation. Four pathogenesis has the most influence on the incidence of AV, including increased sebum production, hyperproliferation of pilosebaceous unit, bacterial colonisation, and inflammatory processes.

Research Method

This type of research is descriptive observational research with a cross-sectional approach where data concerning the independent and dependent variables are collected simultaneously. This research was conducted at the Medical Faculty, *Universitas Kristen Indonesia.* Sampling in this study was carried out in September-October 2019. The population in this study were all students of the Medical Faculty, UKI 2016 who had AV. There is no sample in this study because this study uses a total population. In this study, researchers collected data by distributing questionnaires to students of the Medical Faculty, UKI, 2016, who had AV. The data collected is primary data using a questionnaire distributed to students and students of the Medical Faculty, UKI 2016 who have AV. Data processing and analysis using the SPSS program.

Result and Discussion

This research was conducted from September to October 2019 at the Medical Faculty, the UKI, to find out the description of diet on the incidence of AV in students and students of the Medical Faculty, UKI, 2016. The study results are primary data obtained from the 2x24 Food Recall questionnaire hours and a Modified Qualitative Food Frequency Questionnaire form using a population of 60 people. The research data is then processed using SPSS version 16.0 software or program with testing results such as univariate analysis using descriptive results, seen in tables and pie charts.

The univariate analysis in this study discusses the description of the frequency distribution and percentage of demographic data consisting of gender and age of the respondents as well as the distribution of frequency and percentage regarding the incidence of acne, acne onset, frequency of consumption of food sources, food names and total calories which aims to determine the characteristics of the respondents who were sampled in this study.

Table 1: Frequency Distribution of Respondents' Gender

Gender	Frequency (n)	%
Male	15	25.0
Female	45	75.0
Total	60	100.0

Based on table 1, it is known that the description of the gender of the respondents is known. Of the 60 respondents, 45 (75%) were female, and 15 (25%) were male.

Table 2: Frequency Distribution of Respondents Age

Age	Frequency (n)	%
20	13	21.7
21	36	60.0
22	8	13.3
23	3	5.0
Total	60	100.0

Based on table 2, it is known the description of the age of the respondents. Of the 60 respondents, 13 people (21.7%) were 20 years old, 36 people (60%) were 21 years old, eight people (13.3%) were 22 years old, and three people (5%) were 23 years old.

Table 3: Frequency Distribution of Respondents' Acne

Have Acne	Frequency (n)	%
Yes	60	100.0

Based on table 3, it is known that the description of the incidence of acne in respondents. Of the 60 respondents, all respondents (100%) had acne.

Table 4: Distribution of Respondents' Acne Onset Frequency

Onset	Frequency (n)	%
<1 week	12	20.0
>1 week -1 month	16	26.7
>1 month	7	11.6
>2-6 month	4	6.7
>1 year	21	35.0
Total	60	100.0

Based on table 4, it is known the description of the respondent's acne onset. From 60 respondents, 12 people (20%) had acne onset for <1 week, 16 people (26.7%) had acne onset for >1 week-1 month, 7 people (11.6%) had acne onset for >1 month. One month, four people (6.7%) had acne onset for >2-6 months, and 21 people (35%) had acne onset for >1 year.

Table 5: Frequency Distribution of Respondents AV

	Frequency (n)	%
Mild acne	45	75.0
Moderate Acne	15	25.0
Total	60	100.0

Based on Table 5, it is known the description of the gradation of respondents' acne. Of the 60 respondents, 45 (75%) had mild acne, and 15 (25%) had moderate acne.

Table 6: Distribution of Frequency of Eating and Types of Carbohydrate Sources of Respondents

No	Types of Food	Frequency								N
		>1x/day		4-6x/week		1-3x/week		Never		
		N	%	N	%	N	%	N	%	
1	Rice	48	80.0	10	16.6	1	1.7	1	1.7	60
2	Cassava	0	0.0	0	0.0	25	41.7	35	58.3	60
3	Sweet potato	0	0.0	0	0.0	16	26.7	44	73.3	60
4	Bread	6	10.0	18	30.0	32	53.3	4	6.7	60
5	Noodles	5	8.3	19	31.7	30	50.0	6	10.0	60
6	Sweet Drink	9	15.0	22	36.7	24	40.0	5	8.3	60

Based on table 6, the frequency of eating description and the type of carbohydrate source of the respondents is known. Of the six types of carbohydrate sources, the most frequently consumed by respondents was rice. As many as 48 people (80%) consumed rice with a frequency of >1x/day, ten people (16.6%) consumed rice with a frequency of 4-6x/week, one person (1.7%) consumed rice with a frequency of 1-3x/week and one person (1.7%) never consumed rice.

Table 7: Distribution of Frequency of Eating and Types of Respondents' Protein Sources

No	Types of Food	Frequency								N
		>1x/day		4-6x/week		1-3x/week		Never		
		N	%	N	%	N	%	N	%	
1	Beef	4	6.7	27	45.0	28	46.7	1	1.7	60
2	Chicken meat	36	60.0	18	30.0	6	10.0	0	0.0	60
3	Lamb	0	0.0	4	6.7	30	50.0	26	43.3	60
4	Chicken eggs	12	20.0	29	48.3	17	28.3	2	3.3	60
5	Fresh fish	12	20.0	23	38.3	23	38.3	2	3.3	60
6	Tempe/tofu	8	13.3	32	53.3	18	30.0	2	3.3	60
7	Nuts	2	3.3	9	15.0	33	55.0	16	26.7	60

Based on table 7, the frequency of eating description and the type of protein source of the respondents is known. Of the seven types of protein sources, the most frequently consumed by respondents was chicken meat. As many as 36 people (60%) consumed chicken meat with a frequency of >1x/day, 18 people (30%) consumed chicken with a frequency of 4-6x/week and six people (10%) consumed chicken with a frequency of 1-3x/week.

Table 8: Distribution of Frequency of Eating and Types of Respondents' Source of Fat

No	Types of Food	Frequency								N
		>1x/day		4-6x/week		1-3x/week		Never		
		N	%	N	%	N	%	N	%	
1	Full cream milk	7	11.7	23	38.3	23	38.3	7	11.7	60
2	Vegetable oil	22	36.7	15	25.0	13	21.7	10	16.7	60
3	Innards	2	3.3	1	1.7	26	43.3	31	51.7	60
4	Cheese	4	6.7	17	28.3	33	55.0	6	10.0	60
5	Butter	4	6.7	15	25.0	31	51.7	10	16.7	60
6	Coconut cream	4	6.7	11	18.3	33	55.0	12	20.0	60

Based on table 8, it is known that the frequency of eating description and the type of fat source of the respondents. Of the six types of fat sources, the most frequently consumed by respondents was vegetable oil, as many as 22 people (36.7%) consumed vegetable oil with a frequency of >1x/day, 15 people (25%) consumed vegetable oil with a frequency of 4-6x/day. Weeks, 13 people (21.7%) consumed vegetable oil with a frequency of 1-3x/week, and ten people (16.7%) never consumed vegetable oil.

Table 9: Distribution of Frequency of Eating and Types of Respondents' Prepared Food/Snack

No	Types of Food	Frequency								N
		>1x/day		4-6x/week		1-3x/week		Never		
		N	%	N	%	N	%	N	%	
1	Fast food	7	11.7	28	46.7	22	36.7	3	5.0	60
2	Softdrink	7	11.7	16	26.7	26	43.3	11	18.3	60
3	Fried food	30	50.0	16	26.7	13	21.6	1	1.7	60

Based on table 9, it is known that the description of the frequency of eating and the type of prepared food/snack of the respondents. Of the three types of ready-to-eat food/snacks, the most frequently consumed by respondents was fried food. As many as 30 people (50%) consumed fried foods with a frequency of >1x/day, 16 people (26.7%) consumed fried foods with a frequency of 4-6x/week, 13 people (21.7%) consumed fried foods with a frequency of 1-3x/week and one person (1.7%) never consumed fried foods.

Table 10: Distribution of Frequency of Eating and Types of Fiber Sources of Respondents

No	Types of Food	Frekuensi								N
		>1x/day		4-6x/week		1-3x/week		Never		
		N	%	N	%	N	%	N	%	
1	Vegetables	26	43.3	21	35.0	12	20.0	1	1.7	60
2	Fruits	15	25.0	27	45.0	17	28.3	1	1.7	60

Based on table 10, the frequency of eating description and the type of fibre source of the respondents is known. Of the two types of fibre sources, the most frequently consumed were vegetables. As many as 26 people (43.3%) consumed vegetables with a frequency of >1x/day, 21 people (35%) consumed vegetables with a frequency of 4-6x/week, 12 people (20%) consumed vegetables with a frequency of 1-3x/week and one person (1.7%) never consumed vegetables.

Conclusion

Based on the results of research and discussion on the description of eating patterns on the incidence of AV in students of the Medical Faculty, UKI, 2016, it can be concluded that: a) The characteristics of respondents based on gender are primarily women; b) Characteristics of respondents based on age most are 21 years old; c) Characteristics of respondents based on the degree of AV are 60 respondents, 45 respondents have mild acne, and 15 respondents have moderate acne; and d) Respondents who have mild and moderate acne have a diet high in saturated fat and contain a high glycemic index. Students and the community are expected to be able to apply a healthy diet and reduce calorie intake. For that reason, it is still necessary to do further and more in-depth research on comparing the diet of college students and college students who have acne with those who do not have acne to see the effect of diet on the incidence of incidence acne.

References
1. Kang, Sewon. *Fitzpatrick's Dermatology, 2-Volume Set Fitzpatricks*, 2019.
2. Ak, Mohiuddin. "A comprehensive review of acne vulgaris." J Clin Pharm,2019:1:17-45.
3. Bernadette, I. "Patogenesis Akne Vulgaris." *Kelompok Studi Dermatologi Kosmetik Indonesia Akne. Fakultas Kedokteran Universitas Indonesia*, 2018.
4. Kristiani, Ni MS, Marlyn G. Kapantouw, and Thigita A. Pandaleke. "Hubungan Indeks Massa Tubuh dan Angka Kejadian Akne Vulgaris pada Siswa-siswi di SMA Frater Don Bosco Manado." *e-CliniC*,5(2):2017.
5. Feton-Danou, N. "Psychological impact of acne vulgaris." In *Annales de Dermatologie et de Vénéréologie*,. Elsevier Masson,2010:137(12):15-18.
6. Gollnick, Harald P., and Christos C. Zouboulis. "Not all acne is acne vulgaris." *Deutsches Ärzteblatt International*,2014:111(17):301.
7. Burris, Jennifer, William Rietkerk, and Kathleen Woolf. "Acne: the role of medical nutrition therapy." Journal of the Academy of Nutrition and Dietetics,2013:113(3):416-430.
8. Grisaffe Douglas B, Hieu P, Nguyen. "Antecedents of emotional attachment to brands." Journal of business research,2011:64(10):1052-1059.
9. Llauradó E, Albar SA, Giralt M, Solà R, Evans CEL. "The effect of snacking and eating frequency on dietary quality in British adolescents." European journal of nutrition,2016:55(4):1789-1797.
10. Pfeiffer, Cynthia, Melanie Speck, and Carola Strassner. "What leads to lunch—How social practices impact (non-) sustainable food consumption/eating habits." Sustainability,2017:9(8):1437.
11. Moongngarm, Anuchita. "Chemical compositions and resistant starch content in starchy foods." American Journal of Agricultural and Biological Sciences 8, no. 2 (2013): 107.
12. Becker, J. Sabine, Miroslav Zoriy, Udo Krause-Buchholz, J. Susanne Becker, Carola Pickhardt, Michael Przybylski, Wolfgang Pompe, and Gerhard Rödel. "In-gel screening of phosphorus and copper, zinc and iron in proteins of yeast mitochondria by LA-ICP-MS and identification of phosphorylated protein structures by MALDI-FT-ICR-MS after separation with two-dimensional gel electrophoresis." Journal of analytical atomic spectrometry,2004:19(9):1236-1243.
13. Wang, Tony Y, Min Liu, Piero Portincasa, David Q-H. Wang. "New insights into the molecular mechanism of intestinal fatty acid absorption." European journal of clinical investigation,2013:43(11):1203-1223.
14. Feinman, Richard D., and Eugene J. Fine. "Thermodynamics and metabolic advantage of weight loss diets." Metabolic syndrome and related disorders,2003:1(3):209-219.
15. Avram, Alison Sharpe, Mathew M. Avram, and William D. James. "Subcutaneous fat in normal and diseased states: 2. Anatomy and physiology of white and brown adipose tissue." Journal of the American Academy of Dermatology,2005:53(4):671-683.
16. Murphy, Suzanne P, Lindsay H. Allen. "Nutritional importance of animal source foods." *The Journal of nutrition*,2003:133(11):3932S-3935S.
17. Kumar Sudhir, Anil Kumar Pandey, Waquar Ahmed Abdul Razzaque, Dinesh Kumar Dwivedi. "Importance of micro minerals in reproductive performance of livestock." Veterinary world,2011:4(5):230.
18. Gollnick Harald. "Current concepts of the pathogenesis of acne." Drugs,2003:63(15):1579-1596.
19. Donnet-Hughes A, Duc N, Serrant P, Vidal K, Schiffrin EJ. "Bioactive molecules in milk and their role in health and disease: The role of transforming growth factor-β." Immunology and Cell Biology,2000:78(1):74-79.
20. Tuchin Valery V, Elina A Genina, Alexey N Bashkatov, Georgy V Simonenko, Olga D Odoevskaya, Gregory B Altshuler. "A pilot study of ICG laser therapy of acne vulgaris: photodynamic and photothermolysis treatment." Lasers in Surgery and Medicine: The Official Journal of the American Society for Laser Medicine and Surgery,2003:33(5):296-310.
21. Suva Manoj A, Ankita M, Patel Neeraj Sharma, Chandrayee Bhattacharya, Ravi K Mangi. "A brief review on acne vulgaris: pathogenesis, diagnosis and treatment." Research & Reviews: Journal of Pharmacology,2014:4(3):1-12.
22. Wu, Xiaoping, Ni Wen, Jie Liang, Yu-Kun Lai, Dongyu She, Ming-Ming Cheng, and Jufeng Yang. "Joint acne image grading and counting via label distribution learning." In Proceedings of the IEEE/CVF International Conference on Computer Vision,2019:10642-10651.