Original Article

Questionnaire Study of Preferences in Acne Treatments among First-Year Students in Ubon Ratchathani University

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Objective: To evaluate the preference and cost of acne treatments among first-year students in Ubon Ratchathani University.

Materials and Methods: Two thousand fifty-one first-year students of various faculties in Ubon Ratchathani University were asked to do a self-report questionnaire about acne and were examined by physicians to grade the severity of acne.

Results: The study population consisted of 1,427 (69.6%) females and 624 (30.4%) males. More than half had treated themselves with over-the-counter remedies. The higher severity acne patients, both as evaluated by themselves or by a physician, tended to seek medical attention. Monthly expenses for acne treatment averaged 300 baht. The cost would increase according to acne grade.

Conclusion: Almost half of the university students spent a portion of their monthly allowance treating acne, mostly with over-the-counter remedies, which were inappropriately used in some cases. The more severe the acne, the more money they spent and the more they sought medical treatment.

Keywords: Acne vulgaris, Treatment, Preference, Adolescent, Thai

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Acne vulgaris is a common adolescent dermatological problem[1] with worldwide prevalence at 9.4%. It ranked eighth on the world's most pervasive disease, though the incidence varies among ethnic groups[2-4]. Studies in Thai population unveil 98.5% of high school students have had acne, 2.5% of which suffered severe acne while the rest experienced non-severe forms[5]. Apart from the obvious physical impact, to some population, facial acne not only results in depression but also anxiety and ultimately, quality of life[6-9]. Patients with more severe acne tend to seek physicians' treatment more than those with less severe.

Acne treatment behavior varies among race and ethnicity[10]. In Thailand, many patients have preconceived notions that lead to awry treatment, partly from increasing media influence and lack of health education. Since there has been only one previous community-based study conducted in Bangkok in 2005, on Thai students' opinions and perceptions on acne, the present study aimed to evaluate current preferences in acne treatments and subsequent cost among first-year students in Ubon Ratchathani University.

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Materials and Methods

Study design

The present study obtained ethics approval from the Ethics Committee of Ubon Ratchathani University, Thailand (ID: UBU-REC-21/2559). The self-reported questionnaire, to be completed by the first-year students of Ubon Ratchathani University, and an acne assessment form, to be used by doctors from The College of Medicine and Public Health, were also approved by the ethics committee. All participants gave informed consent before taking part in the study. Physician's facial examination, incorporated as part of check-up service for all new students, was done in August 2016.

Participants

Four thousand eight hundred thirty-seven new first-year students scheduled to be examined by doctors at outpatient clinic were eligible to participate in the present study. They were informed of their right to refuse to participate or to withdraw from the study as desired. The appropriate sample size (n) for estimating

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the proportion of the population was 888, which was calculated using the formula "$n = [NZ_{\alpha/2}^2 - p(1-p)] / [E^2(N-1) + Z_{\alpha/2}^2 p(1-p)]$", where N (population size) = 4,837, $Z_{\alpha/2}$ (critical value for a confidence level of 95%) = 1.96, p (sample proportion) = 0.87, and E (margin of error) = 0.02. The sample proportion was estimated by the prevalence of acne examined by physicians reported in the previous study[5] in Bangkok, Thailand.

Instruments

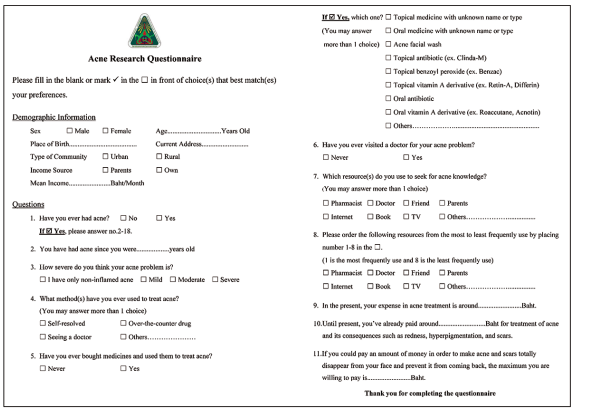
The present study's purpose was to evaluate the preference and cost on acne treatment, and then the self-report questionnaire as shown in Figure 1 was created to serve the study's goal. It consisted of demographic data, onset and severity of acne, means of treatment used, source of knowledge on acne management, cost of treatment, and willingness-to-pay [WTP]. Draft questionnaire was tested on randomly selected group of students.

In order to calibrate acne diagnosis and severity evaluated by many doctors, the Leeds revised acne grading system[11], a photographic classification, was chosen over descriptive ones because of higher reproducibility and accuracy. The Leeds system was then recategorized from 12 grades of inflamed acne and three grades of non-inflamed acne to four grades classified as non-inflamed, mild, moderate, and severe under the supervision of an experienced dermatologist as shown in Figure 2. The 15 sample pictures, duplicated from The Leeds revised acne grading system, were color printed on A3 glossy paper and placed in all OPD rooms to aid the doctor's grading decision.

The facial acne evaluation form was created for physician use. It consisted mainly of presence and severity grading of facial acne. The presence and characteristics of acne-related scar were also noted during facial examination and were further subdivided into pitted or hypertrophic scar.

Procedures

One week prior to the physical examination, a brief was held for all twelve doctors to ensure agreement on the study protocol and acne grading. Comparing pictorial pretest and post-test quiz on acne grading, the accuracy in grading acne and scar type among the doctors significantly increased. On test day, participants were given instruction shortly before given the surveys to minimize any misunderstanding that might occur. Students then underwent facial inspection process after they returned the questionnaire.



Acne Research Questionnaire

Please fill in the blank or mark ✓ in the ☐ in front of choice(s) that best match(es) your preferences.

Demographic Information

Sex ☐ Male ☐ Female Age.....Years Old
Place of Birth..... Current Address.....
Type of Community ☐ Urban ☐ Rural
Income Source ☐ Parents ☐ Own
Mean Income.....Baht/Month

Questions

1. Have you ever had acne? ☐ No ☐ Yes
If ☑ Yes, please answer no.2-18.
2. You have had acne since you were.....years old
3. How severe do you think your acne problem is?
☐ I have only non-inflamed acne ☐ Mild ☐ Moderate ☐ Severe
4. What method(s) have you ever used to treat acne?
(You may answer more than 1 choice)
☐ Self-resolved ☐ Over-the-counter drug
☐ Seeing a doctor ☐ Others.....
5. Have you ever bought medicines and used them to treat acne?
☐ Never ☐ Yes

If ☑ Yes, which one? ☐ Topical medicine with unknown name or type
(You may answer more than 1 choice) ☐ Oral medicine with unknown name or type
☐ Acne facial wash
☐ Topical antibiotic (ex. Clinda-M)
☐ Topical benzoyl peroxide (ex. Benzac)
☐ Topical vitamin A derivative (ex. Retin-A, Differin)
☐ Oral antibiotic
☐ Oral vitamin A derivative (ex. Roaccutane, Acnotin)
☐ Others.....
6. Have you ever visited a doctor for your acne problem?
☐ Never ☐ Yes
7. Which resource(s) do you use to seek for acne knowledge?
(You may answer more than 1 choice)
☐ Pharmacist ☐ Doctor ☐ Friend ☐ Parents
☐ Internet ☐ Book ☐ TV ☐ Others.....
8. Please order the following resources from the most to least frequently use by placing number 1-8 in the ☐.
(1 is the most frequently use and 8 is the least frequently use)
☐ Pharmacist ☐ Doctor ☐ Friend ☐ Parents
☐ Internet ☐ Book ☐ TV ☐ Others.....
9. In the present, your expense in acne treatment is around.....Baht.
10. Until present, you've already paid around.....Baht for treatment of acne and its consequences such as redness, hyperpigmentation, and scars.
11. If you could pay an amount of money in order to make acne and scars totally disappear from your face and prevent it from coming back, the maximum you are willing to pay is.....Baht.

Thank you for completing the questionnaire

Figure 1. The self-reported questionnaire used in the study.

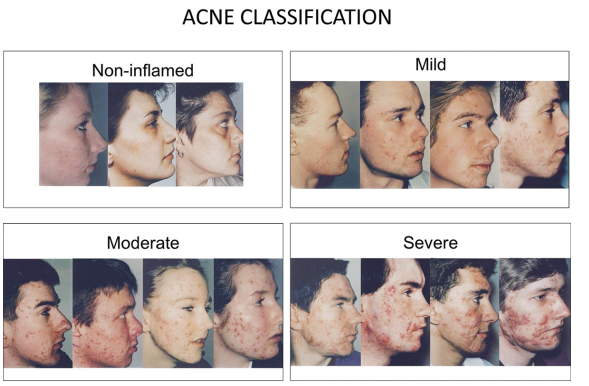


Figure 2. The re-categorized Leeds revised acne grading system used in the study[11].

Statistical analysis

Data from survey were computed using SPSS version 23.0. Demographic data, means of treatment, source of knowledge on acne management, cost of treatment, and WTP were described using descriptive statistics such as mean, median, minimum, maximum, and percentage. The prevalence and severity of acne were compared to other data using Pearson's Chi-square test, Fisher's exact test, and Kruskal-Wallis test. A *p*-value of less than 0.05 was considered statistically significant.

Results

Demographic data

The questionnaires were completed and returned by 2,051 students of which 1,427 (69.6%) were female and 624 (30.4%) were male. Age of the participants ranged from 17 to 22 years old, with an average age (SD) of 18.48 (0.65) years old. Of 2,051 students, 1,961 (95.6%) reported having acne either before or at the time of the study. The mean age (SD) of onset of acne

was 14.12 (1.64) years old, ranging from 9 to 20 years old. Demographic data is shown in Table 1.

Afterwards, 1,978 of 2,051 students were facially examined by instructed physicians. Presence of facial acne was noted in 1,480 (72.2%) of 1,978 students, of which 716 (48.4%), 664 (44.9%), 86 (5.8%), and 14 (0.9%) were graded as non-inflamed, mild, moderate, and severe acne, respectively. Acne scar was also noted in 865 (43.7%) students, of which 850 (98.2%) were classified as pitted scars and 37 (4.2%) as hypertrophic scars. Figure 3 shows the study participants of Ubon Ratchathani University.

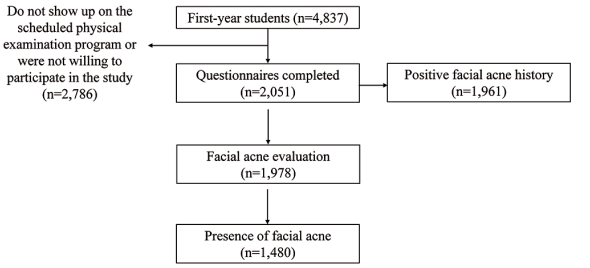


Figure 3. Study participants of Ubon Ratchathani University, Thailand.

Table 1. Demographic data of 2,051 participants

Characteristics	Number	%
Age (years) (n = 2,051)		
17	13	0.6
18	1,167	56.9
19	764	37.3
20	83	4.0
21	19	0.9
22	5	0.2
Gender (n = 2,051)		
Female	1,427	69.6
Male	624	30.4
Current regional address (n = 1,961)		
Northeast	1,922	98.0
Central	28	1.4
Sourthern	10	0.5
Eastern	1	0.1
Northern	0	0.0
Community type* (n = 1,899)		
Countryside	1,501	73.2
Urban	398	19.4
Source of income* (n = 1,912)		
Parents	1,901	99.4
Own occupation	11	0.6
Income (Thai baht)* (n = 1,290)		
≤2,500	116	9.0
2,501 to 5,000	845	65.5
5,001 to 7,500	210	16.3
7,501 to 10,000	100	7.8
≥10,000	19	1.5
Age of onset of acne (years)* (n = 1,919)		
Mean (SD)	14.12 (1.64)	
Type of acne scar** (n = 865)		
Pitted	850	98.2
Hypertrophic	37	4.2

* Some participants did not answer the question

** Some participants had more than one type of scar

Association with gender

On physical examination, 1,034 (74.7%) of 1,385 females and 446 (75.2%) of 593 males were noted having acne. No statistical association were found on objective acne prevalence (p = 0.795) or severity (p = 0.065) and gender. Similarly, results from the questionnaire reported by 2,051 participants also showed no significant differences between subjective acne prevalence (p = 0.135) or severity (p = 0.385) and gender as shown in Table 2 and 3. However, students significantly reported having more severe acne than objective grading (p<0.001). From the 1,439 participants that both completed the questionnaire and examination process, 1,146 (79.6%) reported having more severe acne than the examination result.

Environmental factor

Overall, 1,922 (98.1%) of the present study population lived in the northeastern part of Thailand. About 79.3% students reported living in the countryside, while the others lived in the city. There was no association between neither objective acne prevalence (p = 0.211) nor severity (p = 0.455) and community type as shown in Table 4.

Table 2. Subjective and objective acne prevalence and gender

Gender	Acne prevalence, n (%)					
	Subjective (n = 2,051)			Objective (n = 1,978)		
	Never had acne	Had had acne before	Total	No facial acne	Had facial acne	Total
Female	69 (4.8)	1,358 (95.2)	1,427 (100)	351 (25.3)	1,034 (74.7)	1,385 (100)
Male	21 (3.4)	603 (96.6)	624 (100)	147 (24.8)	446 (75.2)	593 (100)
Total	90 (4.4)	1961 (95.6)	2,051 (100)	498 (25.2)	1,480 (74.8)	1,978 (100)

Total of 2,051 participants answer the question and total of 1,978 participants were examined by physicians

Table 3. Subjective and objective acne severity and gender

Gender	Acne severity, n (%)									
	Subjective (n = 1,961)					Objective (n = 1,480)				
	Non-inflamed	Mild	Moderate	Severe	Total	Non-inflamed	Mild	Moderate	Severe	Total
Female	144 (10.6)	398 (29.3)	649 (47.8)	167 (12.3)	1,358 (100)	506 (48.9)	468 (45.3)	54 (5.2)	6 (0.6)	1,034 (100)
Male	50 (8.3)	191 (31.7)	287 (47.6)	75 (12.4)	603 (100)	210 (47.1)	196 (43.9)	32 (7.2)	8 (1.8)	446 (100)
Total	194 (9.9)	589 (30.0)	936 (47.7)	242 (12.3)	1,961 (100)	716 (48.4)	664 (44.9)	86 (5.8)	14 (0.9)	1,480 (100)

Total of 2,051 participants answer the question and total of 1,978 participants were examined by physicians

Table 4. Objective acne prevalence and severity and community type

Community type	Objective acne prevalence (n = 1,978), n (%)			Objective acne severity (n = 1,978), n (%)				
	No facial acne	Had facial acne	Total	Non-inflamed	Mild	Moderate	Severe	Total
Countryside	353 (24.2)	1,104 (75.8)	1,457 (100)	519 (47.0)	507 (45.9)	68 (6.2)	10 (0.9)	1,104 (100)
Urban	84 (22.5)	289 (77.5)	373 (100)	146 (50.5)	126 (43.6)	13 (4.5)	4 (1.4)	289 (100)
Total	437 (23.9)	1,393 (76.1)	1,830 (100)	665 (47.7)	633 (45.4)	81 (5.8)	14 (1.0)	1,393 (100)

Total of 1,978 participants were examined by physicians

Management of acne

Of 1,961 students who reported having acne, 875 (44.6%) had never sought medical treatment. Nonetheless, 1,134 (57.8%) had treated themselves with over-the-counter products and 543 (27.7%) had visited physicians. Management modalities of acne are shown in Table 5. No significance differences were found between gender of participants and management modalities chosen, ($p = 0.171$ that never sought treatment, $p = 0.079$ that used over-the-counter products, and $p = 0.587$ that visited physicians). To soothe acne lesions, patients with more severe acne, both by self-evaluation ($p<0.001$) and by physician examination ($p<0.001$), were significantly more likely to buy over-the-counter products and even more likely to seek medical attention, while those with less severe acne prefer observation, then over-the-counter products and then going to infirmaries.

Table 6 showed types of over-the-counter products used by students. Of 1,134 students, 950 (83.8%), 340 (30.0%), 246 (21.7%), and 107 (9.4%) had bought medicated facial wash, topical antibiotics, topical benzoyl peroxide, and topical retinoids, respectively. Of 340 participants, 213 (62.6%) used topical antibiotics alone. Oral antibiotic was purchased by 38 (3.4%) students, 163 (14.4%) students paid for oral vitamin A derivatives, while 24 (63.2%) graded themselves as mild and moderate acne. Unknown topical and oral acne medications were also used by 52 (4.6%) and 50 (4.4%) students, respectively.

Educational resource

The internet is used for the seeking of acne knowledge by 81.5% of the participants and was ranked by 56.6% as the most used educational resource. Friends (56.5%) and families (40.5%) were second and third resources most students looked for. Only 16.2% manage to get information from physicians.

Table 5. Management modalities of acne of 1,961 participants

Management modalities of acne	Number*	%
Visiting physician		
Female	381	28.1
Male	162	26.9
Total	543	27.7
Using over-the-counter product		
Female	803	59.1
Male	331	54.9
Total	1,134	57.8
Never sought medical treatment		
Female	614	45.2
Male	261	43.3
Total	875	44.6

* Some participants had more than one technique

Table 6. Type of over-the-counter products used by 1,134 students

Type of over-the-counter products	Number*	%
Medicated facial wash	950	83.8
Topical antibiotics	340	30.0
Topical benzoyl peroxide	246	21.7
Topical vitamin A derivatives	107	9.4
Unknown topical acne drugs	52	4.6
Oral antibiotics	38	3.4
Oral vitamin A derivatives	163	14.4
Unknown oral acne drugs	50	4.4

* Some participants used more than one product

Cost of treatment

Almost all students reported having acne (99.4%) referred to parents as their source of income. Others earned money from their own jobs. The median monthly income was 4,000 baht.

The 858 (43.8%) of 1,961 students, reported having acne, spent a portion of their allowance treating acne. Monthly expenses for acne treatment and its consequences such as redness and scar varied from 10 to 11,000 baht, with a median of 300 baht. Students who believed they had severe acne paid median of 500 baht per month, which was significantly more than other groups whose median expenses were at 300 baht (p<0.001). There was a statistical significant difference in cost spent monthly between objective acne severity groups (p<0.001). The median expenses were 300, 415, 600, and 1,600 baht per month for non-inflamed, mild, moderate, and severe acne, respectively.

Since they had had acne, participants paid a median total amount of 2,000 baht, ranging from 10 to 100,000 baht, for their treatment. There was also a statistically significant difference comparing total cost spent between both subjective (p<0.001) and objective acne severity groups (p<0.001). The median total expenses for the subjective groups were 1,000, 1,000, 2,000, and 4,000 baht for non-inflamed, mild, moderate, and severe acne, respectively. Higher cost was calculated in higher severity. On the contrary, the median total expenses for the objective groups were 1,590, 2,350, 3,500, and 3,000 baht for non-inflamed, mild, moderate, and severe acne, respectively. No correlation could be determined for objective severity groups.

Ideally, they were willing to pay a median amount of 2,000 baht, ranging from 100 to 500,000 baht, to be completely cured and never recurred. There was no statistically significant difference in WTP between groups of acne severity in both subjective (p = 0.067) and objective (p = 0.899) grading groups as determined. The WTP as a percentage of annual income ranged from 0.02 to 833.33%, with a median of 3.33%.

Discussion

Although there were differences in the communities and time of the studies, the prevalence of acne in the present study (95.6%) was similar to Suthipinittharm et al's study[5] (98.5%) conducted in Bangkok, Thailand, 2005. However, the objective graded severities between both studies were not similar. Number of subjects examined to have moderate to severe acne in the present study (6.7%) was much less than in Suthipinittharm et al's study[5] (28.3%). Apart from different grading techniques used in the two studies (Washington DC acne classification in Suthipinittharm et al's study[5] and the modified Leeds revised acne grading system in the present study), the disassociation may be due to different environmental impacts in the capital city as Bangkok and a provincial city as Ubon Ratchathani. Recently, several studies[12-17] showed that acne etiology is multifactorial and related to genetic, diet, exercise, oxidative stress, etc. Regarding divergent settings, acne vulgaris incidence varied among ethnic groups and were higher in westernized than non-westernized societies, yet acne severities were hard to compare because of varieties of grading system[18]. The present study found no association on neither acne prevalence nor severity between participants who lived in the city and the countryside. The congruence may be due to scarcely distinguishable environment and lifestyle of the population in both areas in Ubon Ratchathani province.

Results from the Suthipinittharm et al's study[5], also showed that many participants reported more severe subjective acne severity than objective grading. Over ten years, the number of students who overestimated their acne severity rose from 42% to 79.6%. Yet, complications, such as acne scars, were still observed in 43.7% of students, which reflect insufficient treatment of acne among the subjects. Difficult or delay access to physician and proper knowledge on acne management may lead to inadequate self-care and psychological distress.

Suthipinittharm et al's[5] stated that girls significantly evaluated themselves as having more severe acne than boys. Hassan et al's study[18] also concluded that women with acne demonstrated greater self-consciousness of appearance and negative self-concept than men. However, the present study found no significant differences in acne prevalence and severity reported from male and female subjects. In addition, no significance differences were found between gender of participants and management modalities chosen. Increasing media's influence and boys' interest in physical appearance may explain the discordance.

Some participant (3.4%) reported that they could buy oral vitamin A derivatives, which is usually strictly restricted to be prescribed only by dermatologist, over-the-counter. According to acne management guidelines[19,20], oral isotretinoin is recommended for the treatment of severe nodular acne and patient taking the medicine must be closely monitored by a physician. Topical antibiotic is not recommended as monotherapy

due to increasing Propionibacterium acnes resistance of over 50%[21-23]. Nevertheless, the present study found that 62.6% of participants used topical antibiotic they bought alone. Additionally, 18.8% of participants did not know the name of topical or oral acne drugs they bought.

Most students acquired information regarding acne treatment from the internet, which is mostly provided by non-medical professionals that could conflict with genuine medical knowledge[24,25] and undermined the treatment.

Costs of treatment reported varied widely. Students who thought they had more severe acne were more likely to pay more money. The WTP, which is a measure of disease burden, also extremely differed among participants, regardless of the acne severity. The median WTP as a percentage of annual income found in the present study was, in comparison with Anne's study[26] in the US, higher than patients with acne, psoriasis, eczema, contact dermatitis, and basal cell carcinoma. Lower age of the present study's sample might be a reason for the greater value. Adolescents and young adults may be more concerned of the impact of acne disease, thus, they may need special designed care on both physical and emotional impact of acne and its complications to promote better quality of life.

The limitations of the present study were recall bias, which could be found from the questionnaire study and the study population that was confined to Ubon Ratchathani University. Therefore, the result from the present study could not represent the total population of Thailand. The strengths of the present study were the large sample size and the use of the photographic Leeds revised acne grading system, which was more practical and easier to use than other descriptive classifications. The physician conference held before the data collection also helped improve the accuracy in facial acne examination.

Conclusion

Almost half of the students spent a portion of their earning treating acne, mostly with over-the-counter remedies. The more severe the acne, the more money they spent and the more they sought treatment from medical professionals. Male students not only reported similar acne prevalence and severity as female students, but also used over-the-counter product and paid a visit to physician at the same proportion as female students. There was some inappropriate usage of over-the-counter products. Most students sought acne knowledge from the internet, which can provide unreliable information. From the above data, educational campaign for choosing appropriate medication among acne patients may be helpful to yield effective treatment outcome along with lower drugs' side effects, antibiotic resistance, and excessive patient's concerns.

What is already known on this topic?

Acne vulgaris is a common adolescent dermatological problem worldwide that can cause both physical and psychological impact on patients. In Thailand, there has been only one former community-based study, conducted in Bangkok in 2005, on Thai students' opinions and perceptions on acne. It found high prevalence and high emotional distress, especially in female. Some of the students also had misconceptions about the disease and self-management of acne. Recently, several studies showed that acne etiology is multifactorial and related to genetic, diet, exercise, oxidative stress, etc. Thus, different acne prevalence and severity could be found in different communities. Furthermore, at present, many Thai patients have preconceived notions that lead to ineffective and potentially dangerous treatment, partly from increasing media influence and lack of health education.

What this study adds?

This study aimed to evaluate current preferences in acne treatments and subsequent cost among first-year students in Ubon Ratchathani University, a region of the northeast of Thailand. We found similar acne prevalence to the former study in Bangkok, but much lesser severity of acne. Study subjects, both boys and girls, had increasingly overestimated their acne severity. Some inappropriate usage of over-the-counter products were reported that could lead to poor outcome of treatment and drug side effects. The authors measured the cost of treatment and the quality of life in the "WTP" aspect. The findings show patients' concern and how they manage their facial acne before they seek help from physicians. The present study also supports an educational campaign for choosing appropriate medication among acne patients. It may be helpful to yield better outcome of treatment along with lower drugs' side effects, antibiotic resistance, and excessive patient's concerns.

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Potential conflicts of interest

The authors declare no conflict of interest.

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