

## **Investigation of influential factors of academic and psychological distress in university students.**

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### **Abstract**

**Objective:** To investigate the influence factors and manifestations between acne and psychological distress in university students, so as to reveal their social and psychological inter-reaction mechanism.

**Methods:** A survey of 2381 college and university students in was conducted using the professional survey website. Three questionnaires were included. The prevalence and the severity of acne was determined using the Pillsbury classification, the role of stress in acne formation was examined using the Adolescent Self-Rating Life Events Check List (ASLEC), and the psychological state of acne patients was determined using the Hospital Anxiety and Depression Scale (HADS).

**Results:** A total of 55.4% of university students reported suffering from acne and 19.7% of them were graded as having severe acne. Negative life events were found to exacerbate acne. The most frequently reported negative life event was academic stress or failure, which had a prevalence of 74%. This was followed by criticism or discrimination by others (66%), intra-family conflicts/conflicts with parents (29%) and peer bullying/interpersonal conflicts (26%). Acne-affected groups all had significantly higher HADS-A and HADS-D scores compared with controls (7.31 vs. 4.37, 7.28 vs. 3.85, respectively; P<0.01). The HADS-D score was particularly high in the group with severe acne.

**Conclusion:** Psychological stress has a negative effect on acne and lead to acne exacerbation. The internal relationship and influence mechanism between acne and psychological distress has been complex and affected by multiple social factors. The students, who suffered from academic and interpersonal pressure, are susceptible population to acne. At the stage of semi-matured, the students tend to sustain more psychological burden from acne. More attention and psychological support from school and society should be offered to the acne-attacked university students.

**Keywords:** Acne, Psychological distress, University students, Adolescent self-rating life events check list (ALSEC), Hospital anxiety and depression scale (HADS), Anxiety, Depression.

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### **Introduction**

Acne is one of the most common skin diseases, usually beginning in adolescence and often reoccurring throughout a person's life [1]. Acne can be associated with psychiatric morbidity or even suicide; it may be one of the thorniest physical and psychological problems in students. A plenty of researches about acne have been carried out in adolescences and students in the past decades. It has been confirmed that acne has severe consequences for humans, on both self-image and psychological state and is associated with a relatively high prevalence of depression and suicide [2,3]. Though most of the researchers have realized the unilateral impact of acne on psychological or adverse effect of psychological stress exacerbating [4,5], most of them are inconsistent and bidirectional promotion between them is neglected by most

research scholars. Moreover, the detailed mechanisms of inter-reaction between acne and psychological distress have also not been well studied.

Till now, inadequate studies have been conducted in the China about the epidemiological characteristics in university students, as well as the influence of acne under the background of the latest developed society. With the improvement of living standards and concomitant changes in life style (e.g., rushed urban living, mental tension, sleep reduction, high calorie diets, environmental pollution and public attention to skin care) in China, the incidence of acne and psychological disorders have increased amazingly in recent years [6,7]. Human's increasing desire for beauty and rising incidence of acne become a realistic contradictory and really bother them. Meanwhile, due to the increasing importance of appearance and the influence of

disfigurement on psychological health, a disease, such as 'acne', can have a very significant impact that has been well-confirmed. Specific research addressing in China should be performed to make sense of the discrepancy from the western society as a result of race, life styles, dietary patterns and living conditions [6].

To better understand prevalence and link between psychological well-being and acne among adolescents China, we conducted an epidemiological study by means of the Adolescent Self-Rating Life Events Check List (ASLEC) and the Hospital Anxiety and Depression Scale (HADS). The ASLEC is often used to measure the frequency of daily stress [8] and the HADS is a brief self-report screening scale, to investigate the prevalence of emotional distress among patients at general medical out-patient clinics [9]. This study facilitates an understanding of the detailed social and mental inter-reaction between psychology and acne by means of questionnaires. Three independent questionnaires were submitted to university students in southwest China, via the internet. A bidirectional relationship between psychological stress and acne was identified by investigating the stress levels and the psychological state of acne patients suffering from differing levels of acne severity. Accordingly, in the present study, we obtained a clinical-epidemiological data on this disease in Chinese university students, and thus established a reference base for this important region of the world.

## Methods

### Subjects

The study was administered through a specific Chinese survey website from November 2015 to April 2016. Study subjects are full-time undergraduate students and effective data from 2284 university students was used in this study. All the subjects are Chinese college and university students. Their age ranged from 16 to 25 years with a mean age of (21.03 ± 1.27) years.

### Instruments

**Questionnaire for the prevalence and severity of acne in affected patients:** The question 'Is acne a problem for you now?' was initially asked in order to understand the incidence of acne. Participants had the choice to respond 'yes' or 'no'. A grading system was then implemented to examine the severity of acne among patients that was based on the research of Pillsbury [10-12].

The grading system is shown in Table 1. Patients would be classified as Grade 1 if they had comedones joined with very rare small cysts on the face; As Grade 2 if they had comedones along with very rare pustules and small cysts restricted to the face; Patients who had many comedones with small or large papules and pustules that were spread out, but still restricted to the face were labelled as Grade 3; Patients who had many comedones, combined with deep lesions on the face and the upper trunk were classified as grade 4 (Table 1). We simplify the Pillsbury grading system into three levels according the

external performance of acne: Grade 1 means light, Grade 2 means moderate, Grades 3 and 4 means severe.

**Questionnaire on daily stress:** The Adolescent Self-Rating Life Events Check List (ASLEC) was used to evaluate daily stress. ASLEC measured the frequency of life stress experienced by subjects during the past year and lists 26 negative life events that cover multiple stress domains including family (e.g., 'beaten by parents'), school (e.g., 'failure in an exam'), interpersonal (e.g., 'break up with a close friend'), and individual (e.g., 'serious illness'). Counting all events experienced by the respondent generated a total number of negative life events. The ASLEC has been reported to have satisfactory 2-week test-retest reliability ( $r=0.70$ ) [13].

**Questionnaire on psychological state:** The Hospital Anxiety and Depression Scale (HADS) were employed to investigate the psychological states of patients with different severities of acne. HADS is a 14-item, self-report, screening scale that was originally developed to indicate the possible presence of anxiety and depressive states among patients with physical illnesses and avoid using somatic symptoms [14]. It contains two 7-item subscales: one for anxiety (HADS-A) and another for depression (HADS-D), both with a score range of 0 ± 21. Higher scores imply poorer psychological health.

### Statistical analysis

The main statistical analysis was descriptive and included the whole population of callers who agreed to answer the questionnaire, including interviewees who did not answer all the questions. All these data were expressed as n (%) and compared using  $\chi^2$  test, Fisher's exact test was used for correction when necessary by the software SPSS (version 18.0, Chicago, IL). All P-value were 2 tailed and a P-value less than 0.05 were considered statistically significant.

**Table 1.** Grading system of acne severity.

Grade	Description
Grade 1	Comedones and occasional small cysts confined to the face
Grade 2	Comedones with occasional pustules and small cysts confined to the face
Grade 3	Many comedones and small and large inflammatory papules and pustules, more extensive but confined to the face
Grade 4	Many comedones and deep lesions tending to coalesce and canalize, and involving the face and the upper aspects of the trunk

Note: Four grades based on the external performance of acne.

## Results

### High acne incidence in Chinese university students

Of the 2284 university students who provided effective data, 1156 reported suffering from acne; an incidence of 53.40%. Analysis of gender distribution indicated that male acne subjects accounted for 54.35% (n=671) of cases and female,

52.13% (n=485), a statistically significant difference in rates (P=0.037). Of the 1156 students that reported having acne, 552 reported light acne (47.81%), 376 reported moderate acne (35.54%) and 228 reported severe acne (19.65%). All students stated that the acne occurred mostly on the face or back.

**Negative life events exacerbated acne**

Results from the ALSEC survey indicated four factors that most commonly induced acne in university students. They were academic stress or failure, criticism or discrimination by others, intra-family conflicts/conflicts with parents, and peer bullying/interpersonal conflicts (Table 2). The most frequently reported negative life event was academic stress or failure, which had a prevalence of 74%. This was followed by criticism or discrimination by others (66%), intra-family conflicts/conflicts with parents (29%) and peer bullying/interpersonal conflicts (26%).

There were significant differences in the reported prevalence of the above four events when comparing acne patients to the normal for academic stress or failure (p<0.01), criticism or discrimination by others (p<0.01), intra-family conflicts/conflicts with parents (p=0.047), and peer bullying/interpersonal conflicts (p=0.019). However, there were no apparent differences in other events when comparing acne patients to the normal. Similarly, ALSEC scores were significantly different among patients with different grades of acne (Tables 3 and 4).

**Groups with more severe acne had higher HADS scores**

Two subscales, in the HADS questionnaire, were used to investigate the psychological states of the students: one for anxiety (HADS-A) and another for depression (HADS-D). The HADS score increases as the acne worsens.

HADS-A scores in the light, moderate and severe groups were 6.74, 7.23, and 7.96, respectively, which manifests the HADS score increases as the acne worsens and the average score illustrates that there is statistic difference (p<0.01) between the controls (4.37) and the acne-affected group (7.31).

The HADS-D scores, in the light, moderate and severe groups, were 6.69, 7.04 and 8.12, respectively. The HADS-D score was particularly high in the group with severe acne. The three acne-affected groups together (average score=7.28) had a significantly higher HADS-D score compared to controls (average score=3.85) (p<0.01). However, there has no significant difference between light and moderate group both in HADS-A and HADS-D scores.

**Table 2.** ALSEC scores of patients between the normal and acne patients.

Events	Prevalence		P-value
	Normal (n=1128)	Acne patients (n=1156)	

Academic stress or failure	32%	74%	<0.01*
Criticism or discrimination from others	27%	66%	<0.01*
Intra-family conflict/ conflicts with parents	14%	29%	0.047*
Peer bullying/ interpersonal conflict	15%	26%	0.019*
Family member death	3%	11%	1.204
Family financial difficulty	7%	13%	0.028*
Accidents	2%	9%	1.073
Parent divorce	18%	22%	729
Major disease or physical impairment	3%	7%	0.903
Other negative life events	11%	6%	0.627

Note:  $\chi^2$  test was used to determine whether there was significant difference of ALSEC scores between the normal and acne patients to verify the effect of stress on the occurrence of acne.

**Table 3.** ALSEC scores of patients with different levels of acne severity.

Life events	Prevalence	Mean score of ALSEC of patients at different acne severity level			Kruskal-Wallis test P-value
		Light (n=512)	Moderate (n=356)	Severe (N=248)	
Academic stress or failure	74%	2.08	5.65	8.32	<0.01*
Intra-family conflict/ conflicts with parents	29%	1.46	2.71	5.43	<0.01*
Criticism or discrimination from others	66%	1.78	4	7.11	<0.01*
Family member death	11%	1.38	2.16	3.49	0.012
Peer bullying/ interpersonal conflict	26%	1.34	2.21	4.37	<0.01*
Parent divorce	22%	1.19	1.46	1.93	0.406
Family financial difficulty	13%	1.18	1.79	2.86	0.127
Accidents	9%	1.14	1.55	2.24	0.293
Major disease or physical impairment	18%	1.12	1.29	1.72	0.274
Other negative life events	6%	1.05	1.12	1.47	0.859

Note:  $\chi^2$  test was used to determine whether there was significant difference in the acne group as a whole confirm the effect of acne severity on psychological health. It was not used to determine differences among specific groups.

**Table 4.** Chi-square test of the ALSEC scores of patients with different levels of acne severity.

The most frequent life events	Group	Chi-square test
		P
Academic stress or failure	Light and Moderate	0.238
	Light and Severe	<0.01
	Moderate and Severe	<0.01
Criticism or discrimination from others	Light and Moderate	0.474
	Light and Severe	<0.01
	Moderate and Severe	0.459
Intra-family conflict or parental relationship	Light and Moderate	<0.01
	Light and Severe	0.102
	Moderate and Severe	0.573
Peer bullying or interpersonal conflict	Light and Moderate	0.312
	Light and Severe	<0.01
	Moderate and Severe	0.124

Note: In each most frequent life even, we compared the ALSEC scores between each two groups of acne patients of different severity. Chi-square test was used to determine the significant differences between specific groups.

## Discussion

Acne is a global skin disease that is especially common in adolescents. It has been reported that different people suffer from acne for varying lengths of time and that it can be intermittent or long-term [15]. Based on previous studies: Husain et al. reported that prevalence of acne in males was 50.8% and in females 49.2% respectively in Kaduna [16]. In Nigeria the incidence of acne in 10- to 26-year-old patients was approximately 50.8% in male and 49.2% in female. In Australia, a study showed that 97.8% of boys and 89.8% of girls 16-18 years of age suffered from face and neck acne, and 17% of them had severe nodulocystic acne [17]. In our study, the overall prevalence rate of acne was 53.42% (males, 54.35%; females, 52.13%). It shows higher acne prevalence in university students, which may be associated with studying tension, employment pressure and improving self-image in China recently. We learned that prevalence of acne varied greatly by region. Nevertheless, the surveys from all regions consistently showed a significantly higher prevalence of acne in males than in females, probably because of men's high levels of androgen and the prevalence of acne is increased with the development of the economy, approximately due to the abundant nutrition of dietary habits and life style for most Chinese [18-20].

The presence of acne reduces the quality of life of patients, impacting both social life and a psychological health [21]. Anxiety and depression are the two most common factors that negatively affect psychological health [22]. Though a high prevalence is objective, treatment efficacies of various

therapies used to treat acne (e.g. drug treatment, laser treatment, acupuncture treatment.) are not so ideal [23-26]. At the same time, a great number of adolescents pay close attention to their appearance; therefore, recurrent acne tracks our adolescents into an embarrassing circumstances and it has been proposed that acne may have a psychosomatic component.

The occurrence of acne is known to be closely related to mood and emotion. Loney reported that dermatological-related social anxiety was inversely correlated with self-esteem and dermatological quality of life [27]. Based on the research of Zouboulis [28], a possible mechanism for the exacerbation of acne by stress might be described as follows: psychological stress acts on the Hypothalamus-Pituitary-Adrenal (HPA) axis through the central nervous system, thereby activating the HPA axis. ACTH is then secreted and glucocorticoids suppress immunologic function, weakening the recovery of acne. At the same time, more adrenal sex hormones are secreted, resulting sebaceous hyperplasia and increased secretion of sebum. This eventually leads to the exacerbation and worsening of acne. In the present study, acne patients had higher ALSEC scores compared to the normal population. Academic stress (OR=1.732), interpersonal conflicts (OR=1.653) and family conflicts (OR=1.431) were triggered factors for the onset of acne. This implies that those who are under a greater amount stress tend to be afflicted with acne more often than those who are less stressed. Especially in university students, academic stress became the most influence factors between acne and psychological disorder. Secondly, the criticism or discrimination from others has been another important impact factor, for young men in oriental countries are still inclined to care about other's opinion and evaluation on their appearance. In addition, intra-family or interpersonal conflicts have also increased the psychological impacts on acne occurrence. Interestingly, parent divorce or family member's death, financial problems showed no influence on it, which may indicates more independent character in Chinese adolescents and the reduced social pressure at these aspects in China.

Our survey further confirmed that the occurrence of acne had an impact on psychological status and severe acne patients tend to be trapped in psychological disorders. In our study, the mean scores of both the HADS-A and HADS-D surveys were significantly lower in the normal group than in the acne-affected group. There has no significant difference between light and moderate group both in HADS-A and HADS-D scores, but the severe group acquired higher scores. Different from the original research by Law et al. [29], our results also revealed that the HADS was more affected, as the severity (grading) of the acne were increasing. Therefore, we concluded patients with severe acne may be under a higher risk of serious psychological disorders, especially depression and anxiety. Our results verify that acne should not only be characterized as a superficial disease, but one that also has psychological components. The most intuitive damage resulting from acne is disfigurement. Patients with severe acne tend to reduce social interaction and avoid outdoor activities due to a weakened self-image. Excessive stress is associated with melancholic

depression and anxiety disorders through the stress system. These negative emotions are risk factors in psychological morbidities. It can be concluded that there is a bidirectional function between psychological morbidities and acne. For students, this bidirectional physiological and psychological disorder may be a major impairment to their learning and living.

After questionnaire survey and data analysis, we learned the general epidemiological features of adolescent students' acne in China and explored the contribution of psychological factors to acne pathogenesis. We finally arrive at the conclusion that acne is a common disorder in Chinese adolescents and appears to have a considerable impact on psychological health in this age-group. Adolescents, especially students, should not consider acne to be a mere skin response and they need guidance to establish a positive attitude towards life and control their emotions to help prevent and manage their acne. Low levels of acne knowledge and poor acne management are concerns that should be amenable to a school-based education program.

In conclusion, the available data confirm that psychological stress has a negative effect on acne and lead to acne exacerbation, meanwhile, even mild acne is associated with psychological disorders. The mechanism between acne and psychological distress is complex and influenced by multiple factors. Academic stress may be an important factor on the psychological disorder and acne formation. The excessive self-image and self-respect in Chinese young men, especially the conflict with others, aggravates the symptoms. Relative to these influence factors from school or society, the factors from family have been weaken. As to spiritual symptom, the anxiety and depression are all correlated to acne equally. The symptoms in patients with mild and moderate acne display almost same level, while ones with severe acne show higher psychological disorder.

In consideration of the high prevalence of acne in Chinese university students, therefore, school-based education program appears necessary for acne recognition, prevention and management to improve well-being. Additionally, a positive therapy associated with psychological aid from school and society may be justified to the benefits of acne students.

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