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CLINICAL REPORT

A Community-based Epidemiological Study of Acne Vulgaris in Hong Kong Adolescents

CHI KEUNG YEUNG, LYNN HWEE YING TEO, LEI HONG XIANG and HENRY HIN LEE CHAN

Division of Dermatology, Department of Medicine, Queen Mary Hospital, The University of Hong Kong, Hong Kong

Using a questionnaire survey, the prevalence and severity of acne were assessed in a randomized sample of 522 persons (aged 15–25 years) out of 5,522 telephone interviews in Hong Kong. The prevalence of self-reported acne was 91.3%. At the time of interview, 52.2% had acne. More acne scars and pigmentation were present (52.6%) than in a Western population; 26.6% were disturbed psychologically by acne and 82.9% by its physical appearance. Only 2.4% had sought the advice of a doctor for managing acne, while 41.5% had tried some form of medical treatment. Topical treatment comprised 94.7% of medications used for acne. The results show that acne and its complications are common problems. The treatment of acne scars and pigmentation is difficult and complicated by Asian skin phototypes. The findings suggest the need for refined educational programmes to ensure that adolescents know what effective treatments are available so that complications can be reduced. ***Key words: Asians; acne complication; prevalence.***

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Henry H. L. Chan, Department of Medicine, Queen Mary Hospital, Pokfulam, Hong Kong. E-mail: hhlchan@hkucc.hku.hk

Acne vulgaris is a common skin condition that often begins in adolescence. In studies on its prevalence in adolescents, the frequency varies from 30% to 100% (1). The diagnostic criteria of acne vary. To date, there have been no population-based prevalence studies on acne in Hong Kong. These data are useful for estimating the cost and use of health services. They can also be used as a guide to whether there is a need for education of those affected and those who provide care for them. This study reports the prevalence and severity of acne in a representative sample of adolescents in Hong Kong. In addition, information was collected with respect to whether treatment had been sought for acne and in what way. Knowledge and psychological impact of acne were also assessed.

MATERIAL AND METHOD

This cross-sectional study was a telephone survey of the prevalence of acne in Hong Kong adolescents in July 1999. The questionnaire included items on gender, age, frequency of acne (including a question on whether the interviewee suffered from "acne at the moment"), the etiology of acne, presence of psychological disturbance related to acne, whether and in what form the treatment had been used, and the efficacy of treatment adopted. Telephone numbers were first selected randomly from the Hong Kong Residential Telephone Directory 1999. In the second stage, one family member aged between 15 and 25 years was further selected for the telephone interview after the chosen families were successfully contacted by telephone.

Ten thousand telephone numbers were randomly selected in the first step and 5,522 families were successfully contacted. Finally, a sample of 552 selected subjects in this age group participated in the telephone interview and completed the questionnaire. The response rate of this survey was 56.3% after the targeted population was contacted.

Data collected from questionnaires were entered. The Statistical Package for Social Sciences (SPSS Version 8) was used for analysis. Prevalence estimates were expressed in terms of prevalence rates with 95% confidence intervals (CI).

Validation of the questionnaire

In order to assess the accuracy of self-reported acne by telephone interview, we randomly selected 22 subjects aged between 15 and 25 years from our dermatology outpatient clinic to assess the presence of acne clinically during consultation. The diagnostic criteria of acne include the presence of papules, pustules, nodules and comedones. The subjects were asked by one of the authors whether they thought that they had acne currently before dermatological examination. There was good agreement for discerning whether they had acne by themselves and by clinician (positive predictive value 81%; negative predictive value 100%).

Another 25 students aged between 15 and 25 years were randomly selected from the nursing school to assess the presence of acne scarring and pigmentation by the same author after their self-reporting of these complications. Subject and clinician agreement was satisfactory on the judgment of scarring and pigmentation (positive predictive value 75% and negative predictive value 100%), indicating that the questionnaire was useful in screening for scarring and pigmentation.

RESULTS

In total, 552 adolescents (56.3%) (272 boys and 280 girls aged 15–25 years) were interviewed successfully via telephone from 1,120 selected suitable subjects.

Prevalence of acne. Overall, the prevalence of self-reported facial acne in the age group 15–25 years (adjusted for the age and sex distribution of the total adolescent population in Hong Kong) was 91.3% (95% CI 88.9–93.7), with 52.2% (95% CI 48.0–56.4) having

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Table I. *Comparison of prevalence of facial acne in adolescents between different countries*

Study place	Study population (n)	Age range (years)	Study design	Data source	Prevalence (%)	Point prevalence (%)
Hong Kong (present study)	522	15–25	Cross-sectional	Community based	91.3	52.2
Australia (7) 1998	2491	10–19	Cross sectional	School student	81	/
Peru (21) 1998	2214	12–18	Cross sectional	School student	/	41.7
Glasgow/UK (21) 1989	2014	12–17	Cross sectional	School student	72	/
Singapore (4) 1994	9273	0–16	Retrospective	Skin clinic	/	3
Brazil (22) 1981	9955	6–16	Cross sectional	School student	/	2.7
Mexico (23) 1972	10,000	0–18	Retrospective	Skin clinic	/	2.5
Hong Kong (2) 2000	1006	8–21	Cross sectional	Student health center	/	9.9
France (17) 1996	923	11–18	Cross sectional	School children	/	7.2

acne at the time of interview. It was more common in boys (53.6%) than in girls (50.8%), but the difference was not statistically significant. There was higher prevalence among the 15–20 year age group (55.9%) than among the 21–25 year age group (43.5%) ($p = 0.012$).

Frequency of acne. Frequent facial acne was present in 14.3% of adolescents; 40.9% had acne occasionally (less than once per week); and 36.1% seldom had acne (less than once per month). The sex and age difference in acne frequency was negligible, though there was a trend towards more frequent acne among the younger age group (15–20 years of age).

Complication of acne. The presence of acne scars or pigmentation on the face was considered to be a reflection of the severity of the acne. Acne scarring and pigmentation were reported in 52.6% (95% CI 48.2–57.0), more commonly so in females than in males (57.0% and 48.0%, respectively). The sex difference was statistically significant ($p = 0.05$). The proportion with acne scars and pigmentation increased from 50.3% at 15–20 years to 57.8% at 21–25 years, but the difference was not statistically significant.

Knowledge of etiology of acne. Of respondents, 24.4% and 20.5% knew that acne was due to increased sebum production and blockade of pilosebaceous units, respectively; 7.8% could indicate the role of bacteria in causing acne. There was no significant gender difference in this aspect of knowledge. However, up to 12.4% of replies indicated a total lack of knowledge on the causation of acne.

Psychological impact of acne. Of respondents, 26.6% were disturbed psychologically at least to some extent (19.3% in males and 33.7% in females) and 4.9% were significantly bothered by acne; 82.9% of the stress was related to physical appearance. Adolescent girls were more susceptible than boys to the negative psychological effects of acne ($p < 0.001$). No significant difference was detected between younger and older age groups.

Management of acne. Of the 504 respondents, only 2.4% with acne had sought advice or treatment from their family doctor or dermatologist; 39.7% of males and 27.0% of females did nothing; 31% used skin care products obtained from sources other than the pharmacy to treat their acne; 41.5% had used medications from the pharmacy for acne and 94.7% of these were for topical use; 88.8% thought that their acne had improved to varying extents with these medications, but recurrence was noted in 58.7%; 65.0% were unaware that there was highly efficacious treatment for acne vulgaris.

DISCUSSION

This is the first Asian community-based study examining the prevalence and complication of acne among adolescents and young adults. Previous studies in Asian countries have focused on a different age group or hospital-based population and therefore did not truly reflect the dimension of acne prevalence (2–4). Our study showed that the prevalence of self-reported acne was 91.3%, which is consistent with other Caucasian population-based studies reporting prevalence between 81% and 95% in males and between 79% and 82% in females (5, 6). A community-based study in Australia suggested that the prevalence of acne was lower among Asians than among Australians (7). Our study looked at an older age group (15 to 25), whereas their study population ranged in age from 12 to 16 years. As suggested by the Australian authors, young Asians may be less likely to report acne because of cultural bias (7).

The point prevalence of acne in our study was 53.6%

in boys and 50.8% in girls, with a higher prevalence in the younger age group (15–20 years). A previous study conducted in Leeds, UK, also showed that the 18-year age group had the highest prevalence of clinical acne, which then declined in both men and women (8). This observation may have been due to the declining serum levels of dehydroepiandrosterone sulphate that subsequently led to the resolution of acne in adults. In addition, pilosebaceous follicles may be more sensitive to comedogenic stimuli during adolescence because of the lack of effective stratum corneum barrier (9).

A shortcoming in our study was the lack of objective assessment and its self-reporting nature. Indeed, unlike the previous Australian study (1), which indicated moderate to severe acne to be more common in males, self-reporting may have led to a higher female prevalence in our study, as females tend to be more appearance conscious. Nonetheless, our validation study demonstrated a high degree of sensitivity and specificity, suggesting that the questionnaire is valid in such a population study.

In our study, 52.6% of subjects reported scarring and pigmentation due to acne, in contrast to 14% of women and 11% of men having acne scarring in a survey of adults by Goulden et al. (10). The trend of increased scarring reported with age is consistent with the direct relationship between the degree of scarring and disease duration (11). An increased risk of post-inflammatory pigmentation is to be expected given the dark skin type of our study population (Fitzpatrick III/IV) (12). Indeed, previous reports have indicated that there is a significantly higher degree of post-inflammatory hyperpigmentation among dark-skinned patients after carbon dioxide laser resurfacing (13). To reduce the risk of post-inflammatory hyperpigmentation, the management regime for Asian patients must be modified. While the tetracycline group of medications, especially minocycline, are effective anti-acne agents, they can be associated with an increased risk of hyperpigmentation owing to their phototoxic property, particularly in the oriental skin type (14, 15). The same applies in both topical and systemic retinoid therapy. Sun avoidance and sun protection is therefore essential. Agents, such as erythromycin, that carry a lower risk of hyperpigmentation should be used as first-line treatment. However, there is a worldwide increase in resistance of *Propionibacterium acnes* to erythromycin and clindamycin (16) and their use should therefore be combined with other agents that have both anti-acne and depigmentary properties, such as alpha-hydroxy acid and azelaic acid.

Another interesting aspect demonstrated in our study is the low awareness in term of the etiology and treatment of acne in the general public. Fewer than 1/4 respondents were able to indicate the correct etiology of acne. Over half of them did not know whether effective treatments were available. Despite the fact that a considerable proportion of the adolescents were bothered psychologically by the presence of acne, the majority (33.1%) did not take any action for acne and only 2.4% sought the advice of a clinician. The consultation rate was low compared with a study in France, where 27% of subjects received treatment from dermatologists (17). This might be due to difference in the accessibility of specialist care. The dermatologist to patient ratio in Hong Kong is 0.83 per 100,000 population, whereas the ratio of the United States is 3.3 per 100,000 population (18, 19). Inadequate public awareness is also reported in acne studies in the United Kingdom and Australia (8, 11).

In summary, this study has demonstrated that acne is common in Hong Kong adolescents and young adults. Further education about acne is necessary in schools and among the public so that one knows where to seek appropriate advice and receive early effective treatment. As acne scarring is difficult to treat, even with modern expensive therapy, every effort should be made to reduce acne complications in adolescents in order to improve their overall psychosocial well-being.

REFERENCES

1. Kilkenny M, Merlin K, Plunkett A, Marks R. The prevalence of common skin conditions in Australian school students: 3. Acne vulgaris. Br J Dermatol 1998; 139: 840–885.
2. Fung WK, Lo KK. Prevalence of skin disease among school children and adolescents in a student health service center in Hong Kong. Pediatr Dermatol 2000; 17: 440–446.
3. Chau-Ty G, Goh CL, Koh SL. Pattern of skin diseases at the National Skin Centre (Singapore) from 1989–1990. Int J Dermatol 1992; 31: 555–559.
4. Goh CL, Akarapanth R. Epidemiology of skin disease among children in a referral skin clinic in Singapore. Pediatr Dermatol 1994; 11: 125–128.
5. Lello J, Peral A, Arroll B, Yallop J, Birchall NM. Prevalence of acne vulgaris in Auckland senior high school students. NZ Med J 1995; 108: 287–289.
6. Lucky AW, Biro FM, Huster GA, Morrison JA, Elder N. Acne vulgaris in early adolescent boys: correlations with pubertal maturation and age. Arch Dermatol 1991; 127: 210–216.
7. Kilkenny M, Stathakis V, Hibbert ME, Patton G, Caust J, Bowes G. Acne in Victorian adolescents: associations with age, gender, puberty and psychiatric symptoms. J Paed Child Health 1997; 33: 430–433.
8. Cunliffe WJ, Gould DJ. Prevalence of facial acne vulgaris in late adolescence and in adults. BMJ 1979; 1: 1190–1110.
9. Thiboutot DM, Lookingbill DP. Acne: acute or chronic disease? J Am Acad Dermatol 1995; 32: S2–5.
10. Goulden V, Stables I, Cunliffe WJ. Prevalence of facial acne in adults. J Am Acad Dermatol 1999; 41: 577–580.
11. Layton AM, Cunliffe WJ. Phototoxic eruptions due to doxycycline – a dose-related phenomenon. Clin Exp Dermatol 1993; 18: 425–427.
12. Child FJ, Fuller LC, Higgins EM, Du Vivier AW. A study of the spectrum of skin disease occurring in a black population in south-east London. Br J Dermatol 1999; 141: 512–517.

13. Nanni CA, Alster TS. Complications of carbon dioxide laser resurfacing. An evaluation of 500 patients. Dermatol Surg 1998; 24: 315–320.
14. Dwyer CM, Cuddihy AM, Kerr RE, Chapman RS, Allam BF. Skin pigmentation due to minocycline treatment of facial dermatoses. Br J Dermatol 1993; 129: 158–162.
15. Jimbow M, Jimbow K. Pigmentary disorders in oriental skin. Clin Dermatol 1989; 7: 11–27.
16. Eady EA, Jones CE, Tipper JL, Cove JH, Cunliffe WJ, Layton AM. Antibiotic resistant propionibacteria in acne: need for policies to modify antibiotic usage. BMJ 1993; 306: 555–556.
17. Daniel F, Derno B, Poli F, Auffret N, Beylot C, Bodokh I, et al. Descriptive epidemiological study of acne on scholar pupils in France during autumn 1996. Ann Dermatol Venereol 2000; 127: 273–278.
18. Chan HH, Woo J, Chan WM, Hjelm M. Teledermatology in Hong Kong: a cost-effective method to provide service to the elderly patients living in institutions. Int J Dermatol 2000; 39: 774–778.
19. Resneck J. Too few or too many dermatologists? Difficulties in assessing optimal workforce size. Arch Dermatol 2001; 137: 1295–1301.
20. Freyre EA, Rebaza RM, Sami DA, Lozada CP. The prevalence of facial acne in Peruvian adolescents and its relation to their ethnicity. J Adolescent Health 1998; 22: 480–484.
21. Rademaker M, Garioch JJ, Simpson NB. Acne in school-children: no longer a concern for dermatologist. BMJ 1989; 298: 1217–1219.
22. Bechelli LM, Haddad N, Pimenta WP, Pagnano PM, Melchoir E Jr, Fregnan RC, et al. Epidermiological survey of skin diseases in schoolchildren living in the Purus Valley (Acre State, Amazonia, Brazil). Dermatologica 1981; 163: 78–93.
23. Ruiz-Maldonado R, Tamayo Sanchez L, Velazquez E. Epidermiology of skin diseases in 10,000 patients of pediatric age. Bol Med Hosp Infant Mex 1977; 34: 137–161.