

Validation of a Chinese version of the Cardiff Acne Disability Index

CME

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Objectives To assess the validity (face validity and criterion-related validity) and reliability (test-retest reliability and internal consistency) of a Cantonese (the Chinese dialect predominantly used in Guangdong Province) version of the Cardiff Acne Disability Index.

Design Questionnaire study.

Setting Two secondary schools in Hong Kong.

Participants The Chinese Cardiff Acne Disability Index was translated according to international guidelines including forward-backward translation, reconciliation, and cognitive debriefing. A questionnaire, which was composed of the resultant Chinese Cardiff Acne Disability Index and the Cantonese Dermatology Life Quality Index (for those aged more than 16 years) or the Cantonese Children's Dermatology Life Quality Index (for those aged 16 years or less) was administered to 85 eligible secondary school students.

Main outcome measures Establishing face validity, criterion-related validity, internal consistency, and test-retest reliability by standard testing.

Results The face validity was satisfactory. The strength of the relationship between the Chinese Cardiff Acne Disability Index and Dermatology Life Quality Index was large ($\gamma_s=0.58$) and significant ($P=0.004$). The strength of relationship between the Chinese Cardiff Acne Disability Index and Cantonese Dermatology Life Quality Index was also large ($\gamma_s=0.72$) and significant ($P<0.001$). Regarding internal consistency, Cronbach's alpha was 0.763. Thirty-three students completed the test-retest reliability test, and the resulting correlation of the first and second administration of the Chinese Cardiff Acne Disability Index was strong ($\gamma_s=0.795$, $P<0.001$). The intra-class correlation coefficient was satisfactory (0.784, $P<0.001$).

Conclusion The Chinese Cardiff Acne Disability Index was equivalent to the original English version, and constitutes a valid and reliable tool for day-to-day clinical use.

Introduction

Acne is neither a life-threatening nor systemic disease, yet its associated morbidity can be devastating.¹⁻³ It is typically present on facial skin, which is readily apparent to others. It therefore has a role in informing others on how to perceive the person behind it.⁴ Disfigurement due to acne is perceived as destructive for affected adolescents, who are undergoing drastic physical, emotional, and social developmental changes.⁵⁻⁷ Regrettably, it is believed that acne patients and their doctors often comprehend the impact of acne differently,⁸ since the dermatological and psychological damage from acne lesions do not necessarily follow a positive correlation.⁹⁻¹¹ Thanks to the increasing awareness of quality of life (QOL), this parameter has become the basis for clinical management as well as other outcome measures in relation to health care research.^{12,13} Thus, a more balanced understanding of patients' discomfort and distress is made possible, adding a patient-orientated dimension to medical records and enabling a better and more holistic care approach for acne sufferers.

There exists a number of dermatology-specific¹⁴⁻¹⁷ or disease-specific¹⁸⁻²² questionnaires, which could be used to assess the impact of acne on QOL. The Cardiff

Key words

Acne vulgaris; Disability evaluation;
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Acne Disability Index¹³ (CADI) is a five-question scale designed to assess the disability caused by acne—question one and two address the psychological and social consequences of acne in general; question three targets those with acne of the chest or back; question four enquires into the patient's psychological state; and question five asks for the patient's (subjective) assessment of current acne severity. The response to each question is scored from 0 to 3; the higher the score is, the greater the disability. The original language of the CADI was English, and currently it has been translated into French,²³ Persian,²⁴ and Ukrainian.²⁵ At the time of writing, there was no acne-specific QOL questionnaire in Chinese language. The goal of this study was to assess the validity (face validity and criterion-related validity) and reliability (test-retest reliability and internal consistency) of a Chinese version of the CADI.

Methods

Translation

Written permission from the copyright holder of CADI to translate the index into Chinese was obtained. The repeated forward-backward translation process was adopted as it is the most popular, pragmatic, and adaptable strategy for this procedure. The CADI was translated into Chinese following the international recommendations.²⁶ No professional translators were involved in the process, and thus hopefully a more representative translation for the wider public was produced. The translators emphasised conceptual equivalence rather than a word-for-word translation. The translation from English into Chinese was performed by two independent bilingual subjects. During the translation process, both noted what the problems were and why there were problems. They then discussed their translations and produced a reconciled joint version. Two other independent bilingual individuals translated the joint version back into English. Any discrepancies from the original English version were noted and changes made to the translation followed by further checking and back-translation. Discrepancies and difficult issues were discussed with the original author (Prof Andrew Finlay) and thereby resolved through subsequent refinement. Seven secondary school students were cognitively debriefed with respect to comprehensibility, ambiguity of the items, and relevance to social context. Final adjustments were made as necessary (Appendix).

Validation study

Two secondary schools offered a convenient sample, and were chosen because they had participated in previous studies conducted by the authors. The students were familiar with research procedures and

中文版卡的夫暗瘡指數問卷的心理測量特性

目的	探討中文版卡的夫暗瘡指數問卷的效度（表面效度和效標關聯效度）及信度（重測信度和內在一致性）。
設計	問卷調查。
安排	香港兩所中學。
參與者	根據國際指引，包括前後向翻譯、調節、認知訪談等，翻譯成中文版的卡的夫暗瘡指數問卷。問卷由中文版卡的夫暗瘡指數、廣東版皮膚病生活質量指數（給16歲以上的問卷填寫者）或廣東版兒童皮膚病生活質量指數（給16歲或以下的問卷填寫者）組成。分別發給85位合資格的中學生填寫。
主要結果測量	用標準試驗來找出表面效度、效標關聯效度、內在一致性，以及重測信度。
結果	問卷的表面效度令人滿意。中文版卡的夫暗瘡指數和皮膚病生活質量指數顯著相關（ $\gamma_s=0.58$ ， $P=0.004$ ），而中文版卡的夫暗瘡指數和廣東版皮膚病生活質量指數強烈相關（ $\gamma_s=0.72$ ， $P<0.001$ ）。內在一致性方面，Cronbach's alpha為0.763。共33位學生完成重測信度測試，發現第一次和第二次使用中文版卡的夫暗瘡指數有強烈相關性（ $\gamma_s=0.795$ ， $P<0.001$ ）。組內相關係數（0.784， $P<0.001$ ）令人滿意。
結論	中文版卡的夫暗瘡指數與原文英文版一樣，可以作為一個有效及可信賴的臨床工具。

capable of providing reliable data. Besides, the two schools were both co-educational and government-aided, which are typical of secondary schools in Hong Kong. The subjects sampled were considered suitable for our study. Students aged from 14 to 20 years and with Cantonese (a Chinese dialect) as their mother tongue were randomly selected and invited to participate. Notably, written Chinese is the same for all dialects. Each subject was asked to fill in a questionnaire consisting of the Chinese CADI and Cantonese Dermatology Life Quality Index (DLQI; for those >16 years) or the Cantonese Children's DLQI (for those aged ≤16 years), without any time limit. Both the Cantonese DLQI and Cantonese Children's DLQI had been previously validated.^{27,28} The clinical severity of acne was assessed using the Global Acne Grading System²⁹ (GAGS) score. One of the authors was systematically trained and validated by a specialist dermatologist to rate the GAGS. To minimise bias due to study subjects declining adequate exposure for full examination of their chests and upper backs, only the facial region was examined. The GAGS score was modified and divided into four categories—mild acne if the score was 1 to 13; moderate if it was 14 to 22; severe if it was 23 to 28; and very severe if it was 29 to 32.

To assess the face validity, some of the subjects

TABLE 1. Results of the questions examining face validity

	Question No.				
	1	2	3	4	5
Relevance of the question to acne					
Mean (SD*)	2.8 (1.1)	3.0 (1.4)	2.2 (1.1)	3.1 (1.2)	3.9 (1.1)
Median	3	3	2	3	4
Range	1-5	1-5	1-5	1-5	1-5
Clarity of the question					
Mean (SD)	3.7 (1.1)	4.0 (0.9)	3.6 (1.2)	3.3 (1.2)	3.6 (1.1)
Median	4	4	4	3	4
Range	1-5	2-5	1-5	1-5	1-5
Appropriateness of applying the question to patients with acne					
Mean (SD)	3.6 (1.4)	3.6 (1.2)	2.9 (1.4)	3.3 (1.3)	4 (1.1)
Median	3	4	3	3	4
Range	1-5	1-5	1-5	1-5	1-5

* SD denotes standard deviation

answered three aspects concerning each CADI question with a 5-point Likert scale: (a) relevance of the question to acne; (b) appropriateness of application of the question to acne patients; and (c) clarity of the questions. To assess the criterion-related validity, the correlations of the Chinese CADI scores with the Cantonese DLQI or Cantonese Children's DLQI of all subjects were analysed, as were those for the GAGS scores. In addition, to evaluate the test-retest reliability, some of the subjects were asked to fill in the Chinese CADI again after a mean of 14 days (standard deviation [SD], 3 days). This interlude was supposed to be short enough to preclude any changes in health status and long enough to prevent the students remembering their prior answers.

The face validity was presented with descriptive data. The criterion-related validity was assessed by analysing the correlation between the Chinese CADI scores and the Cantonese DLQI or Cantonese Children's DLQI, using the Spearman rank order correlation coefficient (γ_s). For comparison, a similar analysis was performed for GAGS scores. A correlation coefficient of ≥ 0.4 was deemed satisfactory.²⁴ Internal consistency was analysed by Cronbach's alpha coefficient, for which ≥ 0.7 was considered satisfactory.³⁰ The test-retest reliability was analysed by γ_s and the intra-class correlation coefficient (ICC), for which ≥ 0.7 was regarded as satisfactory.^{31,32} Descriptive analysis was performed whenever appropriate. All data analyses were carried out with the Statistical Package for the Social Sciences (Windows version 13.0; SPSS Inc, Chicago [IL], US).

Students were free to choose whether to participate or not. Informed consent was obtained before the study commenced. The protocol of this

study was approved by our Clinical Research Ethics Committee.

Results

All seven students taking part in the cognitive debriefing were satisfied that the CADI could be comprehended readily. No item was considered ambiguous or irrelevant in terms of social context. No further amendments were made.

Among the 96 students invited, 95 (response rate, 99%) consented to participate. Ten failed to fully complete the questionnaire and therefore 85 subjects completing it (completion rate at 89%) were included in the final analysis. Twenty-five (29%) were male and 60 (71%) were female. The mean (SD) age of the subjects was 16 (2) years; 50 (59%) were aged 16 years or less, and 35 (41%) were older. Forty-four of the subjects had mild acne, 32 had moderate acne, nine had severe acne, and none had very severe acne.

A total of 55 students were asked to answer questions examining face validity, which gave satisfactory results (Table 1). Among the 85 students included in the final analysis, the relationship between the Chinese CADI and DLQI was strong ($\gamma_s=0.58$) and significant ($P=0.004$). The strength of the relationship between the Chinese CADI and Cantonese DLQI was also large ($\gamma_s=0.72$) and significant ($P<0.001$). Regarding internal consistency, Cronbach's α was 0.763 for the collective analysis of scores for all five questions. The correlation between the Chinese CADI score and GAGS score was not strong ($\gamma_s=0.352$, $P=0.001$). A total of 33 students completed the test-retest reliability test; the resulting correlation of the first and second administration of Chinese CADI was strong ($\gamma_s=0.795$, $P<0.001$). The ICC of 0.784 was satisfactory ($P<0.001$). Descriptive data of the Chinese CADI and the comparison with the original English CADI are shown in Table 2.

Discussion

We developed the Chinese version of the CADI according to international guidelines. We also fulfilled the standard requirement for establishing face validity, criterion-related validity, internal consistency, and test-retest reliability. To the best of our knowledge, this was the first properly validated acne-specific QOL questionnaire in the Chinese language. It is succinct, for day-to-day clinical use, and more importantly, it adds a patient-orientated dimension to medical records, identifies patients with unusually high levels of disability, and increases relevant information on which physicians can base therapeutic decisions.

There are two reasons why we translated the CADI into Chinese, the written language common to

TABLE 2. Results of the validation study for the Chinese version of the Cardiff Acne Disability Index (CADI) and the reported study of the original English version¹⁹

Question	Results of the validation study of the Chinese CADI			Results of a reported study of the English CADI ¹⁹		
	Mean (SD) score	Median score	Range	Mean score	Median score	Range
All subjects (n=85)				(n=49)		
1	0.54 (0.65)	0	0-3	1.24	1	0-3
2	0.26 (0.54)	0	0-3	0.97	1	0-3
3	0.08 (0.32)	0	0-2	0.82	0	0-3
4	1.06 (0.66)	1	0-3	1.86	2	1-3
5	0.96 (0.84)	1	0-3	1.58	2	0-3
Total	2.91 (2.23)	2	0-12	6.47	6	2-14
Subjects with mild acne (n=44)						
1	0.3 (0.46)	0	0-1			
2	0.16 (0.37)	0	0-1			
3	0.02 (0.15)	0	0-1			
4	0.93 (0.59)	1	0-2			
5	0.66 (0.65)	1	0-2			
Total	2.07 (1.52)	2	0-6			
Subjects with moderate acne (n=32)						
1	0.81 (0.69)	1	0-3			
2	0.34 (0.65)	0	0-3			
3	0.13 (0.41)	0	0-2			
4	1.22 (0.71)	1	0-3			
5	1.25 (0.92)	1	0-3			
Total	3.75 (2.42)	3	1-12			
Subjects with severe acne (n=9)						
1	0.78 (0.83)	1	0-2			
2	0.44 (0.73)	0	0-2			
3	0.22 (0.44)	0	0-1			
4	1.11 (0.78)	1	0-2			
5	1.44 (0.88)	1	0-3			
Total	4.0 (3.04)	3	1-9			

all dialects. We assumed that a quality questionnaire written in the official language should not only assure accuracy and consistency for data collection, but also minimise loss to follow-up. Notably, Cantonese is the dialect predominantly spoken by people living in Guangdong Province where Hong Kong is located. Thus, a Chinese CADI enables identical questions being asked both in a written and oral context. This is particularly advantageous for collecting QOL data via phone calls from those who default follow-up visits. Another reason is that some patients may be illiterate and need to have the questionnaire read aloud to them.

The correlation of acne sufferers' QOL and clinical severity elucidated from our results was weak, which was incongruent with the Persian validation

study.²⁴ This, however, should not be regarded as a weakness of the CADI validation process, since all other statistical tests attained the required standard for validating a translated instrument. In fact, the dissociation of clinical severity and impact of acne has been reported in many other studies.^{9,10,33} It highlights the indispensable need for filling the gap between the clinical definition of acne and patients' self-perceived impact of the skin problem, echoing the aim of developing and validating QOL measurement for patients of acne.

Face validity refers to how valid a measurement 'looks', which is generally regarded as just a crude and subjective glimpse at validity. We attempted to quantify the three aspects of face validity using a three 5-point Likert scale of responses. Almost all

questions attained a satisfactory rating except the question dealing with “relevance of the question to acne” and “appropriateness of applying the question to patients with acne”. This may be due to insufficient cross-cultural adaptation, but the real reason needs further study. To the best of our knowledge, the currently published CADI validation studies²³⁻²⁵ did not report the data for crude face validity. We included such data in our study in an attempt to elucidate the respondents’ subjective opinions of our validation with a relatively quantifiable measure.

The limitations of this study were its small sample size and that our subjects had lower CADI scores for the Chinese version than were encountered in studies validating the English CADI version (Table 2). There is no acne clinic in Hong Kong and we had difficulty in reaching patients with ‘clinical acne’ within our limited resources. Further studies extending the sampling base are therefore called for. Besides, the male-to-female ratio in our study might hint at a discordance in customarily held beliefs about acne. However, the severity of acne in Asian populations noted in recent Hong Kong³⁴

and Singapore³⁵ community-based studies did not yield significant differences between the males and females.

Conclusion

Our Chinese CADI, with equivalent to the original English version, constituted a valid and reliable tool for day-to-day clinical use.

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Appendix

卡尔夫暗瘡指數問卷

1. 睇過去一個月裏面，你有無因為暗瘡而變得暴躁，沮喪，或者覺得尷尬？	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	(a) 非常嚴重 (b) 嚴重 (c) 些少 (d) 完全唔會
2. 睇過去一個月裏面，暗瘡有無影響到你嘅日常社交生活，社交活動，或者同異性嘅關係？	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	(a) 非常嚴重，影響所有嘅活動 (b) 中等嚴重，影響大多數嘅活動 (c) 間中，或者有啲活動 (d) 完全唔會
3. 睇過去嘅一個月內，你有無因為暗瘡而避免使用公眾更衣設施或者避免着泳衣/泳褲？	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	(a) 經常 (b) 好多時候 (c) 間中 (d) 完全唔會
4. 你會點樣形容過去一個月內，你對你嘅皮膚外表嘅感覺？	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	(a) 非常抑鬱同埋淒慘 (b) 通常都會掛住 (c) 間中會掛住 (d) 無影響
5. 請指出你覺得你而家嘅暗瘡有幾差？	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	(a) 最差嘅情況 (b) 係一個大問題 (c) 係一個小問題 (d) 唔會構成問題