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The Children’s Dermatology Life Quality Index: validation of the cartoon version

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Summary

Background In 1995 the Children’s Dermatology Life Quality Index (CDLQI) was developed as a tool to allow quality of life assessment of children with skin conditions. This initial questionnaire was in a written format.

Objectives Using the same validated questions, a full-colour cartoon version has been developed. The aim of this study was to validate this against the initial written questionnaire in a three-part study.

Methods The first part of the study piloted the use of both versions in an outpatient setting. One hundred and one children completed both versions of the CDLQI in a random order. A further 66 children completed the cartoon CDLQI in outpatients, and subsequently completed the cartoon version on the same day at home, which was returned by post. The scores were compared. In the second part, in more controlled conditions to eliminate parental and investigator bias, 107 children with current dermatological problems were administered both versions of the CDLQI in a random order. The scores were analysed, and time to complete each version, and the child and parental preferences, were recorded. The third part assessed compliance by asking 546 children recently reviewed in dermatology clinics to return a single completed postal CDLQI. Half of the children were given the text, and half the cartoon version.

Results The median age of participating children was 11 years. There was no significant difference in scores between the two versions in both parts 1 and 2, but the cartoon version was completed faster (median 90 s) than the written version (median 120 s) \( (P < 0.0001) \). Both children and their parents significantly preferred the cartoon version and found it easier to use. Forty-six per cent of the postal CDLQI questionnaires were returned; there was no difference in compliance between the two versions.

Conclusions The cartoon CDLQI is equivalent to the previously validated written CDLQI version, but is faster and easier for children to use, and is preferred by both children and parents.

Key words: cartoon, child, Children’s Dermatology Life Quality Index, dermatology, quality of life

Skin disease in children can have profound effects on their quality of life (QOL). It may disrupt family and social relationships, interfere with play, sport and school, and affect normal development. Inflammatory skin diseases such as eczema can cause sleep disruption and loss of school time,\(^1\) while even relatively minor conditions such as viral warts may result in social isolation by peers or being banned from swimming. Health-related QOL can be measured for adults with skin disease, using a number of specifically designed tools.\(^2\) In 1995 the Children’s Dermatology Life Quality Index (CDLQI) was developed as a simple questionnaire to measure QOL in children with skin disease.\(^3\) This original version consisted of 10 written questions, each with four possible replies, scored 0–3, giving a

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Figure 1. The cartoon Children's Dermatology Life Quality Index (CDLQI), which is printed on both sides of an A4 paper sheet. CDLQ©M.S.Lewis-Jones, A.Y.Finlay, June 1993. Illustrations©Media Resources Centre, UWCW, December 1993.

OVER THE LAST WEEK

7a

Either

If school time: How much did your skin affect your school work?

7b

Or

If holiday time: How has your skin problem interfered with your holiday plans?

8

How much trouble have you had because of your skin with other people calling you names, teasing, bullying, asking questions or avoiding you?

9

How much has your sleep been affected by your skin problem?

10

How much of a problem has the treatment for your skin been?

Please check that you have answered EVERY question. Thank you.

Figure 1. CDLQ©M.S.Lewis-Jones, A.Y.Finlay, June 1993. Illustrations©Media Resources Centre, UWCM, December 1993.
maximum overall score of 30. To make the questionnaire more child-friendly we developed a pictorial version. A friendly dog was chosen as the cartoon character, to avoid the need to represent sex or age. This cartoon version uses the exact original text of the CDLQI, in association with colour cartoons, presented on both sides of an A4 paper sheet (Fig. 1). An initial validation against the original text version in an outpatient setting in North Wales\textsuperscript{4} was followed by a more formal comprehensive evaluation based in Cardiff, Swansea and Dundee.

**Subjects and methods**

**Part 1**

Ethical permission for this study was given by the North Wales Health Authority Wrexham Ethics Committee. Children aged 4–16 years with skin disease were recruited from the paediatric dermatology clinics at Wrexham Maelor Hospital. At an outpatient consultation 50 children completed the cartoon CDLQI before the text version, while 51 children were administered the text version before the cartoon version. After completing an initial cartoon CDLQI, a further 66 children were asked to complete a second that same day at home, and return it to the department in a reply-paid envelope. Because the scores were open to confounding factors such as parental and investigator bias, part 2 performed a similar analysis under more controlled conditions.

**Part 2**

Ethical permission for the following two sections of the study was obtained from Iechyd Morgannwg Health Authority, Swansea, Bro Taf Health Authority, Cardiff and Tayside Research Ethics Committee, Dundee. One hundred and seven children were interviewed. There were 56 girls and 51 boys, both with a median age of 11 years (girls: LQ 9, UQ 13; boys: LQ 8, UQ 14). There was no statistical difference between the scores of written and cartoon questionnaires ($P = 0.405$). The most common diagnoses were naevi (22%), acne (21%), atopic dermatitis (17%), viral warts (13%) and psoriasis (9%). Forty-two (64%) cartoon CDLQI questionnaires were received from the second test-retest. A significant difference was found between the two scores (Kruskal–Wallis test $P = 0.029$), demonstrating a possible treatment-period effect.

**Part 3**

In order to measure the compliance rates of using the two versions of the CDLQI, a postal study was conducted, where the measure of compliance was taken to be the rate of return of a fully completed questionnaire. Five hundred and forty-six children aged 5–16 years who had attended the hospital outpatient departments with dermatological conditions in the preceding 12 months were identified from hospital records. Each was sent a single version of the questionnaire and asked to return it in a reply-paid envelope. Equal numbers of each type of questionnaire were sent out.

Statistical analysis was carried out using an SPSS statistical package. The Wilcoxon signed ranks test was used to assess for differences in scores between the two versions and to examine the ages of the children. Using techniques for cross-over trials, the Mann–Whitney $U$-test was used to analyse for period and treatment-period effects in time taken to complete the questionnaires.\textsuperscript{5} The $\chi^2$ test with Yates’ correction was used to assess child and parental preference.\textsuperscript{6}

**Results**

**Part 1**

One hundred and one children were interviewed, with a median age of 11 years. There were 55 girls [median age 11 years; lower quartile (LQ) 7, upper quartile (UQ) 14] and 46 boys (median age 12 years; LQ 7.25, UQ 14). There was no statistical difference between the scores of written and cartoon questionnaires ($P = 0.405$). The most common diagnoses were naevi (22%), acne (21%), atopic dermatitis (17%), viral warts (13%) and psoriasis (9%). Forty-two (64%) cartoon CDLQI questionnaires were received from the second test-retest. A significant difference was found between the two scores (Kruskal–Wallis test $P = 0.029$), demonstrating a possible treatment-period effect.

**Part 2**

One hundred and seven children were interviewed. There were 56 girls and 51 boys, both with a median age of 11 years (girls: LQ 9, UQ 13; boys: LQ 8, UQ 13). Fifty-four children completed the cartoon before the text version (20 boys, 34 girls), while 53 were given the text version first (31 boys, 22 girls). The median age of children in both groups was also 11 years. There was no significant difference between the scores of the...
cartoon and written versions ($P = 0.427$), and analysis suggested no period ($P = 0.203$), carry-over ($P = 0.233$) or treatment ($P = 0.355$) effect. The mean scores for the text and cartoon versions of the CDLQI are given for the 107 children in Fig. 2. The diagnosis was recorded for 102 of the 107 children (95%). The most common diagnoses and their mean CDLQI scores are illustrated in Fig. 3.

There was a significant difference in the time taken to complete the two versions of the CDLQI: the median time for the text version was 120 s (LQ 90, UQ 140), while that for the cartoon version was 90 s (LQ 60, UQ 120) ($P < 0.0001$). Analysis for a period effect suggested that it was statistically quicker to complete the version administered second when compared with that given first ($P = 0.017$), but that this learning effect was the same irrespective of version, as there was no statistical difference in carry-over effects ($P = 0.805$).

Analysis for a period or treatment-period effect on preference was not performed as analysis of the CDLQI scores did not suggest an effect. Sixty-eight per cent of parents and 63% of children preferred the cartoon to the text questionnaire. There was no statistical difference between the children or their parents preferring the cartoon version ($\chi^2 P = 0.56$). Sixty-seven per cent of parents and 69% of children stated that they found the cartoon version easier to use, and again there was no significant difference between these two groups ($\chi^2 P = 0.88$). Questions that were thought particularly relevant were numbers 1, 2, 8, 9 and 10; on this aspect there was no difference between the two versions. There were no statistical differences between the scores of the cartoon questions where the cartoon dog was smiling (questions 1, 3, 5, 6 and 10) and the corresponding text questions ($P = 0.45, 0.66, 0.35, 0.94$ and $0.85$, respectively), nor was there between the cartoon questions where the dog appeared unhappy (questions 2, 4 and 8) and the corresponding text version questions ($P = 0.95, 0.21$ and $1.0$, respectively).

**Part 3**

The cartoon and text versions were returned in almost equal numbers; there were 249 completed postal CDLQI replies (126 cartoon, 123 text), representing a 46% response rate. The median age in both groups was 12 years (LQ 9, UQ 14 for both groups) and the male:female ratio was the same between the two groups.

**Discussion**

The effect of dermatological conditions on QOL from a child’s viewpoint can be difficult to assess in routine clinical practice. However, the impact of skin conditions in childhood can profoundly affect a variety of lifestyle parameters that have important personal consequences both in the short term and over the longer term, affecting that child’s physiological and psychological development. The last decade has witnessed the recognition of the importance of assessment of QOL parameters for children for a number of reasons. Measurement can assist in aspects of clinical management, including decision making, and in assessment of the efficacy of treatments or management techniques. Particularly in this setting it provides an objective measure of patients’ preferences and perceptions. In addition, measurement of QOL measures are important end-points of clinical trials, may be utilized to justify
allocation of finite health resources, and can demonstrate the degree of handicap that skin conditions may impose upon individuals. Prior to the development of the CDLQI by our group in 1995, there were no well-validated instruments that assessed children’s QOL in relation to dermatological conditions. The CDLQI is a simple, practical measure for children of school age, which can be quickly and easily completed. Following its introduction it has been widely used in several languages, both in clinical practice and in studies relating to conditions such as atopic eczema and vitiligo, and to assess the effect of treatments such as phototherapy, systemic ciclosporin and topical tacrolimus. We felt that development of a cartoon version would be more visually appealing to children, and thus facilitate further utilization.

Analysis of our study population and their parents has shown that the use of cartoons does not result in any significant change in scores between the written and cartoon versions, suggesting that the two are equivalent. Furthermore, the cartoon CDLQI is significantly faster to complete, suggesting that far from the cartoons distracting children from answering the questions posed, they may engage the child more effectively. This effect is not isolated to children, however, as both children and their parents found the cartoon version significantly more easy to use. It is possible that this effect may not apply to non-Western cultures where cartoons may be less frequently encountered. Additionally, in some societies the use of a dog motif may not be appropriate. For example, a Japanese version of the cartoon CDLQI currently under development instead uses cartoon children. In view of the preference of both children and adults in the U.K. for the cartoon CDLQI, its introduction for use in trials and routine clinical practice should be a valuable asset in the rapid assessment of the impact of dermatological conditions on children’s QOL.

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References
