

Parent cough-specific quality of life: Development and validation of a short form

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Background: Cough is a distressing symptom and has a significant effect on many children and their families. Quality-of-life (QOL) measures provide important outcome indicators for clinicians and aid in evaluating the efficacy of interventions. **Objective:** The aim of this study was to develop and validate a short cough-specific QOL questionnaire for pediatric use.

Method: Two sources provided data to establish a shortened version of the Parent Cough-specific Quality of Life (PC-QOL) questionnaire. The first (n = 240, 137 boys; median age, 29 months [interquartile range, 14-64 months]) was used for development and cross-validation. Stepwise regression was used to select the reduced set of items, and analyses of reliability, validity, and minimally important differences determined psychometric strength and sensitivity to change. The second independent dataset (n = 320, 190 boys; median age, 39.5 months [interquartile range, 16-77 months]) was used as a confirmatory sample.

Results: Forward-step regression identified 8 items that accounted for 95% of the variance in the full-scale PC-QOL questionnaire. This shortened version (PC-QOL-8) was internally consistent (Cronbach α = 0.84), had good test-retest reliability (intraclass correlation coefficient = 0.66), and demonstrated strong validity (significant correlations with a cough verbal category descriptor score, cough visual analog scale, and subscales of the Short Form-12 General Health scale, the Pediatric Quality of Life Inventory, and the Depression, Anxiety, and Stress Scale). The reduced scale was responsive to change, and a minimally important difference of 0.9 was suggested. These findings were confirmed with the second dataset.

Conclusion: The PC-QOL-8 questionnaire is a short, reliable, and valid instrument for assessing the effect of a child's chronic cough. It demonstrated sensitivity to change, and its length and psychometric properties should enhance its potential uptake

and routine use in clinical practice and research. (*J Allergy Clin Immunol* 2012;■■■:■■■-■■■.)

Key words: *Quality of life, pediatric cough, psychometrics, minimally important difference*

Cough is a widespread and distressing symptom representing a significant health problem for many children¹ and influencing theirs and their families' lives in substantial and important ways.² It is associated with significant physical, social, and psychological effects¹ and therefore warrants further investigation. Health-related quality of life (QOL) is a multidimensional construct referring to a person's physical, psychological, and social well-being and functioning.³ Measuring QOL is important in understanding the burden of disease and evaluating health care interventions and as an outcome indicator in epidemiologic and interventional studies.⁴ It can be evaluated by using generic (eg, Pediatric Quality of Life Inventory 4.0 [PedsQL]⁵) or disease-specific (eg, Asthma Quality of Life Questionnaire⁶) instruments. However, disease-specific QOLs have shown enhanced specificity and sensitivity over generic QOLs,⁷ and this includes cough-specific QOL instruments for children and adults.⁸

A number of validated questionnaires designed to examine the effect of adult chronic cough on QOL have been developed (eg, the Leicester Cough Questionnaire⁹), and these have been shown to be reliable and valid and cover a range of dimensions (eg, physical, psychosocial, and emotional). However, the importance of pediatric-specific QOL instruments has been increasingly recognized because QOL tools designed for adults are inappropriate for pediatric use.⁵ Thus we developed the 27-item Parent Cough-specific Quality of Life (PC-QOL) questionnaire.^{10,11} The 27-item PC-QOL questionnaire has been shown to be reliable and valid^{10,11} and provide an accurate measure in determining the effect of treatments and clinical trials.¹²

Although many QOL instruments, including the cough-specific measures, have proved useful for a variety of clinical and research purposes, they are often believed to be too long by both clinicians for inclusion in their interventions and by parents juggling the many demands on their time. Empirical work in other domains, such as general health¹³ and chronic obstructive pulmonary disease,¹⁴ have shown that shortened instruments can retain strong psychometric properties without loss of information, thus enhancing their routine uptake in research and, more importantly, clinical care. Use of simple and short instruments could substantially enhance routine clinical assessments.

In light of this, the aim of the present research was to develop a short, reliable, and validated parent-completed child's chronic cough QOL instrument that would be simple, easy to complete, and not time demanding. This brief tool would need to show sensitivity to change and be easy to interpret so that it might be readily incorporated into routine clinical practice and research. Using an exploratory and confirmatory sample set, we determined whether a shorter form has similar psychometric properties and

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Abbreviations used

DASS: Depression, Anxiety, and Stress Scale
 ICC: Intraclass correlation coefficient
 MID: Minimally important difference
 PC-QOL: Parent Cough-Specific Quality of Life
 PedsQL: Pediatric Quality of Life Inventory
 QOL: Quality of life
 SF-12: Short Form 12-item health survey
 VAS: Visual analog scale
 VCD: Verbal categorical descriptive

reproduces scores that would be sensitive to change without loss of information compared with the long version of our PC-QOL questionnaire.

METHODS

Data sources

Data for the present study came from 2 sources (Fig 1). The first was an expanded dataset (from the original set of $n = 170$) that led to the initial development and validation of the PC-QOL questionnaire (PCS dataset).¹⁰ Two hundred forty-two children (137 boys and 105 girls; median age, 29 months [interquartile range, 14–64 months]) and 1 parent of each child were recruited after an initial presentation to the Royal Children's Hospital, Brisbane, Australia, for newly referred chronic cough.

The second source originated from a prospective multicenter cohort study called the Multicentre Study on Chronic Cough Assessment and Pathway Evaluation (MSCAPE) conducted in 5 major city hospitals and 3 rural-remote clinics in Australia (MSCAPE dataset).¹⁵ Although 346 children were in this dataset, complete PedsQL questionnaires in the final assessment were only available for 320 children (190 boys and 130 girls; median age, 39.5 months [interquartile range, 16–77 months]). In this dataset the inclusion criteria were children who were newly referred with chronic cough to any of the participating sites. All were referred either from primary care or general pediatricians or were parent initiated.

The exclusion criteria for both studies were similar: children were excluded if they had a known chronic respiratory illness previously diagnosed by a respiratory physician or had diagnoses confirmed on objective tests (eg, cystic fibrosis and bronchiectasis) before referral. In both studies parents provided written consent, and the studies were approved at each participating site by the respective ethics committees.

Data collection

Both datasets provided 2 data collection points. For the PCS dataset, parents completed a range of measures, including the PC-QOL questionnaire,¹⁰ the Short Form 12-item health survey (SF-12) version 2,¹³ the PedsQL4.0,⁵ and the Depression, Anxiety, and Stress Scale (DASS),¹⁶ along with 2 measures aimed to quantify the severity of the child's cough: a cough verbal categorical descriptive (VCD) score and a cough visual analog scale (VAS). Parents repeated all questionnaires at a follow-up visit 2 to 3 weeks after the initial visit. Parents in the MSCAPE study completed the PC-QOL questionnaire and PedsQL together with the cough VCD and VAS severity measures at an initial visit and then again at follow-up approximately 6 weeks later or at cough resolution.

Materials

Cough measure. The severity of the child's current cough was operationalized by using 2 measures: the VCD and the VAS. For the VCD, parents rated their child's cough on a 6-point scale (0 = no cough to 5 = severe cough and cannot perform activities), with increasing scores reflecting greater interference with usual activities. This rating (a cough scoring diary) has been previously validated against an objective cough meter, with changes in this

subjective cough rating reflective of changes in cough counts.¹⁷ For the cough VAS, parents rated how troublesome their child's cough was on a 10-point scale (1 = no trouble to 10 = troublesome all the time).

PC-QOL questionnaire.¹⁰ The PC-QOL questionnaire is a previously validated 27-item questionnaire designed to assess the level of parents' frequency of feelings (15 items) and worry (12 items) related to their child's cough. Participants respond on a 7-point Likert-type scale, with higher scores reflecting a greater QOL (ie, less frequent and fewer worry concerns). Research indicates that the PC-QOL questionnaire is both reliable and valid and taps 3 domains of functioning: psychological (11 items), physical (11 items), and social (5 items).¹¹ To simplify the presentation, this PC-QOL questionnaire will be referred to as the PC-QOL-27 questionnaire.

SF-12 version 2.¹³ The SF-12, a shortened version of the SF-36, provides a measure of health functioning and computes to 8 subscales: physical functioning, role limitations as a result of physical health problems, role limitations because of emotional problems, mental health, bodily pain, general health perceptions, vitality, and social functioning. The 8 scales have reported satisfactory reliability estimates, ranging from 0.73 to 0.87.¹⁸ For all scales, higher scores reflect better health status.

PedsQL.⁵ This generic multidimensional questionnaire is designed for parental reports of the child's QOL. Each of the 23 items has a 5-point Likert-type scale (0 = never a problem to 4 = almost always a problem), which were reverse scored so that higher scores reflected more positive functioning. Five dimensions of functioning have been identified: psychosocial, physical, emotional, social, and school functioning. The inventory caters to 4 age groups (2–4, 5–7, 8–12, and 13–18 years) and has been used to validate disease-specific and symptom-specific QOL scores.¹⁹ The PedsQL Generic Core Scales have demonstrated reliability and validity and are reported to be applicable across a variety of settings, including clinical trials and research.²⁰

DASS-21.¹⁶ The DASS-21 measures the domains of depression, anxiety, and stress. Seven items explore each of the domains, and participants respond on a 4-point severity scale from 0 (did not apply to me) to 3 (applied to me very much or most of the time), with the past week as the referent period. Higher scores reflect greater severity. The DASS-21 has been shown to be a reliable and valid measure.²¹

Statistical analysis

The aim of the statistical analyses was to arrive at a short form (reduced item set) of the PC-QOL-27 questionnaire and to ensure this shortened version remained a reliable and valid instrument. Forward-step regression of the PC-QOL questionnaire items on the total score was first used to identify the best subset of items. This method begins with an empty model and adds items one at a time if they meet an entry statistical criteria (eg, $P = .05$). Those items with the highest correlation are entered into the equation first, and the process continues until the remaining items do not satisfy the entry criteria. This method of item reduction is useful in developing a subset of items predicting an outcome while eliminating those items that do not provide any additional prediction.²² It is a method commonly used in creating short-form versions of questionnaires (eg, the SF-12¹³).

Once the subset of items was finalized, the psychometric properties of reliability and validity were investigated (Fig 1). Reliability is concerned with whether an instrument is internally consistent or reproducible. Internal consistency refers to the extent to which items within a scale measure the same concept and is assessed with the Cronbach α value. Test-retest reliability takes account of variation over time and is usually assessed with intraclass correlation coefficients (ICCs). Validity refers to whether an instrument measures what it intends to measure and is assessed in multiple ways. In this study we have concentrated on construct and discriminant validity. Evidence of construct validity is shown through patterns of strong correlations with variables with which that it should be correlated (ie, convergent validity). Evidence of discriminant validity (known groups validity) is demonstrated when scores on the instrument differentiate between groups of participants with different health status or illness severity levels. In the present study this was investigated

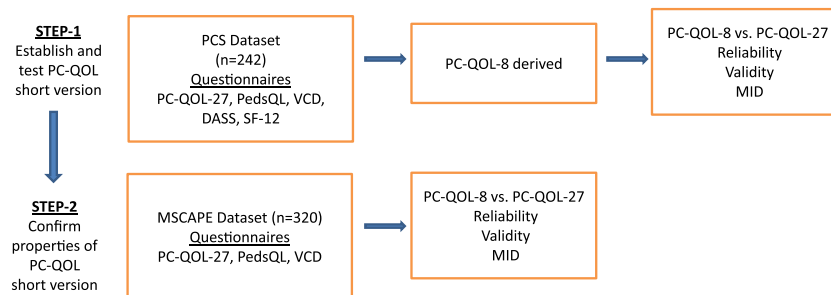


FIG 1. Data sources for the development of the PC-QOL-8 questionnaire.

with paired-samples *t* tests comparing scores from the initial visit with those from the follow-up visit.

Three approaches to minimally important difference (MID) analyses have been described in the literature. The first, a distribution-based method, links change to the statistical characteristics of the sample, such as the effect size,²³ the SE of measurement,²⁴ and the SD of the scale change scores.²⁵ The second, an anchor-based method, examines changes in instrument scores against changes in an external but meaningful anchor.²⁶ For the present analyses, this external anchor was the evaluation of cough severity as indicated by VCD ratings. A small change over time, or MID, was defined as an absolute change of 1 on the VCD, and the mean PC-QOL questionnaire scores for participants in this small-change group were computed and determined to be the MID. A third approach suggests combining both distribution- and anchor-based methods to arrive at a range of plausible MIDs.²⁷ These calculations consider the anchor-determined MIDs in light of the distribution-based calculations of SEMs and effect sizes. All 3 methods will be reported. Responsiveness to change²⁸ was examined in 2 steps. Initially, the proportions of participants who had and had not improved based on the MID (anchor-based) were calculated. These were then compared across those who had reported no cough and those who still reported cough at follow-up. This analysis was only relevant for the PCS dataset because all participants in the MSCAPE dataset had reported no cough at follow-up. Data were analyzed with SPSS software (version 20; SPSS, Chicago, Ill).

RESULTS

Item reduction

For the PCS data, forward-step regression identified 8 items as the best predictors of total QOL scores ($R^2 = 0.95$, $F[8209] = 453.49$, $P < .001$). The 8 items (henceforth simplified to the PC-QOL-8 questionnaire) along with their descriptive data are presented in Table I. The MSCAPE data were then used to confirm the ability of the 8 identified items to reliably predict QOL scores. The 8 items together accounted for 94.2% of the variance in the total full-scale PC-QOL-27 scores ($F[8297] = 606.93$, $P < .001$). For both the PCS and MSCAPE datasets, the total scores from the 27-item full-scale PC-QOL questionnaire were then compared with those computed from the 8-item reduced PC-QOL questionnaire. The average scores of the full version (PC-QOL-27) and the shortened version (PC-QOL-8) varied by less than 0.12, and the SD varied by 0.03 or less at any one time point (Table II).

Reliability

For the PCS data, this 8-item short-form instrument was internally consistent (Cronbach $\alpha = 0.84$) and reproducible (test-retest ICC = 0.62). Similarly, there was high internal consistency within the MSCAPE data (Cronbach $\alpha = 0.88$) and test-retest reliability after a 6-week interval (ICC = 0.54). These

TABLE I. Descriptive data for the items of the PC-QOL-8 questionnaire (scale: 1-7, with higher numbers representing fewer worries/concerns) from the PCS dataset ($n = 240$)

	Mean	SD	Median	IQR
1. Did you feel helpless because of your child's cough?	3.23	2.05	3	1-4
2. Were you worried/concerned about your child not sleeping because of cough?	3.69	2.10	3	2-6
3. Did you feel overprotective because of your child's cough?	4.54	2.12	4	2-6
4. Did you feel upset because of your child's cough?	3.72	2.00	3	2-5
5. Were you worried/concerned about leaving your child with others because of his/her cough?	4.43	2.15	5	3-7
6. Did you feel scared because of your child's cough?	4.50	2.02	4	3-7
7. Were you worried/concerned about your child being able to lead a normal life?	4.47	1.93	4	3-6.5
8. Were you awakened during the night because of your child's cough?	3.38	1.97	3	1.75-5

IQR, Interquartile range.

TABLE II. Descriptive data comparing full-scale 27-item PC-QOL questionnaire average scores with shortened 8-item average scores for the PCS¹⁰ and MSCAPE¹⁵ datasets at the 2 response times

	PCS data		MSCAPE data	
	Initial visit	After initial visit	Initial visit	After initial visit
Full 27 items, mean (SD)	3.88 (1.31)	5.41 (1.32)	3.95 (1.42)	5.95 (1.27)
Shortened 8 items, mean (SD)	3.99 (1.41)	5.43 (1.39)	4.04 (1.45)	5.98 (1.29)

reliability estimates, although lower, compare favorably with full-scale internal consistency estimates of 0.94 (PCS data) and 0.96 (MSCAPE data).

Validity

As can be seen in Table III, the PC-QOL-8 questionnaire demonstrated strong convergent validity, with significant correlations with the VCD and VAS scores, the 3 subscales of the DASS, 4 of the 5 subscales of the PedsQL, and 5 of the 8 subscales of the SF-12. The scale was responsive to change over time ($t[42] = 4.41$, $P < .001$); that is, after a medical intervention for the child's

TABLE III. Pearson product moment correlations of PC-QOL-8 questionnaire total score with cough measures and subscales of DASS, PedsQL, and SF-12 for the PCS¹⁰ and the MSCAPE¹⁵ datasets

QOL short form								
Cough	VCD	VAS						
PCS	−0.29†	−0.45†						
MSCAPE	−0.32‡	−0.80						
DASS	Depression	Anxiety	Stress					
PCS	−0.33‡	−0.40‡	−0.39‡					
SF-12	PF	RP	BP	GH	VT	SF	RE	MH
PCS	0.16	0.21*	0.07	−0.04	0.18*	0.25†	0.28†	0.26†
PedsQL	Psychosocial	Physical	Emotional	Social	School			
PCS	0.34*	0.56‡	0.35*	0.11	0.40*			
MSCAPE	0.48‡	0.41‡	0.54‡	0.32†	0.28†			

BP, Bodily pain; GH, general health; MH, mental health; PF, physical functioning; RE, role limitations caused by emotional problems; RP, role limitations caused by physical health; SF, social functioning; VT, vitality.

* $P < .05$.

† $P < .01$.

‡ $P < .001$.

cough, scale scores improved from baseline (mean, 3.99; SD, 1.41) to after the initial visit (mean, 5.43; SD, 1.39). For the MSCAPE data, correlations with cough measures and the PedsQL are shown in Table III and demonstrate strong convergent validity. There was also a significant improvement in QOL scores from the initial visit (mean, 4.04; SD, 1.45) to a “cough-free” visit at 6 weeks (mean, 5.98; SD, 1.29; $t[267] = 20.99$; $P < .001$), indicating that the reduced scale was responsive to change over time. These findings replicate those of the PC-QOL-27 questionnaire for discriminant validity^{10,11} and represent a much improved standing of convergent validity.

MID

The distribution-based methods for computing MIDs involved calculating effect sizes, the SE of measurement, and the SD of the sample in relation to the PC-QOL questionnaire change scores. The anchor-based approach considered a small change in VCD score (ie, change of ± 1 across the 2 time points) as the criterion for the MID and equated this with average QOL scores for that group. The results of these analyses are presented in Tables IV and V.^{10,15} With the distribution-based methods, the 27-item full scale and the shortened 8-item scale of the PCS data yielded relatively consistent MIDs (range, 0.32–0.71). The MSCAPE values were greater and more varied than those from the PCS data (range, 0.46–1.44). This might reflect (1) the longer time interval for the MSCAPE (6 weeks) compared with the PCS (2–3 weeks) data collection and (2) the substantial improvement of the children in the MSCAPE but not the PCS datasets to being cough free at follow-up.

Similar conclusions can be drawn from the anchor-based calculations. Overall, these MIDs are greater than the distribution-based calculations at 0.90 for the PCS and 1.42 for the MSCAPE dataset. Following the recommendations of Yost et al^{27,29} that a combination approach to calculating MIDs is less sample specific and more plausible, effect sizes associated with the anchor method were calculated to determine whether the MIDs were reasonable. The MID from the MSCAPE dataset with an effect size of 1.00 to 1.03 would represent a “significant” rather than “minimal” change and therefore was not considered

TABLE IV. Distribution-based calculations of MID scores for the shortened 8-item PC-QOL questionnaire compared with the full-scale 27-item PC-QOL questionnaire for both the PCS¹⁰ and MSCAPE¹⁵ datasets

PC-QOL dataset	SD	1/3 SD*	1/2 SD*	ICC	SEM*	ES*
PCS data						
Twenty-five items	1.25	0.42	0.63	0.68	0.71	0.36
Eight items	1.26	0.42	0.63	0.71	0.68	0.32
MSCAPE data						
Twenty-seven items	1.38	0.46	0.69	0.54	0.94	1.44
Eight items	1.42	0.47	0.71	0.54	0.96	1.38

ES, Effect size.

*Scores in these columns are estimates of MIDs.

feasible. The anchor-based MID from the PCS dataset satisfies this criterion with an effect size of 0.66 to 0.72. It also satisfies the criterion that the MID should be greater than measurement error (ie, SEM)³⁰ and suggests that a value of 0.9 for QOL change scores to be a reliable indicator of minimally important change for the PC-QOL-8 questionnaire.

Responsiveness to change compared the percentage of participants who improved based on the MID (anchor-based) across a ceased coughing/still coughing dichotomy at follow-up for the PCS dataset. For both the PC-QOL-8 and PC-QOL-27 questionnaires, the percentage of improved MIDs within the group that had ceased coughing (both 47.6%) was significantly greater than the percentage in those who were still coughing (both 23.1%, $\chi^2[1] = 7.13$, $P = .008$), suggesting that an MID of 0.9 was sufficient to accurately detect a change, if it had occurred.

DISCUSSION

Using data from 2 different cohorts of children as validation and confirmatory large datasets, we have shown that the PC-QOL-8 questionnaire is a valid, reliable, and responsive tool as an outcome measure for chronic cough in children. The MID for the PC-QOL-8 questionnaire derived from a combination of the anchor and distribution methods was 0.9.

A challenge in the “downsizing” of measures is to balance the number of questionnaire items against the comprehensiveness of

TABLE V. Anchor-based calculations of MID for the shortened 8-item PC-QOL questionnaire compared with the full-scale 27-item PC-QOL questionnaire for both the PCS¹⁰ and MSCAPE¹⁵ datasets

Scale	VCD score change group			
	No change	Small change*	Moderate change	Large change
PCS data				
Twenty-seven items				
Mean (SD) ES	0.15 (0.48) 0.12	0.90 (0.66) 0.72	1.81 (0.97) 1.45	—
Eight items				
Mean (SD) ES	0.18 (0.38) 0.14	0.83 (0.53) 0.66	1.81 (0.89) 1.44	—
MSCAPE data				
Twenty-seven items				
Mean (SD) ES	1.37 (1.33) 0.99	1.42 (1.07) 1.03	2.05 (1.35) 1.49	2.54 (1.46) 1.84
Eight items				
M (SD) ES	1.33 (1.36) 0.94	1.42 (1.10) 1.00	2.05 (1.39) 1.44	2.42 (1.37) 1.70

ES, Effect size; VCD, cough verbal category descriptor (scale 0-5 with higher scores representing more severe cough).

*Scores in this column are estimates of MID.

the content and the statistical parameters of the scale.¹³ The PC-QOL-8 questionnaire represents a significant step in successfully meeting this challenge. This 8-item shortened scale reproduced more than 94% of the variance in the longer 27-item PC-QOL questionnaire, produced an accurate replication of the 27-item scale scores, yielded strong internal consistency and validity statistics, was sensitive to change over time, and produced an MID that was consistent with the longer version and was sufficiently sensitive to change. In fact, a significant degree of correspondence between the 27- and the 8-item PC-QOL questionnaires was achieved, with this 70% reduction in the PC-QOL questionnaire length resulting in no loss of measurement precision. These statistical parameters of the 8-item scale were confirmed in a second large-sample dataset. Our findings highlight that more items need not necessarily reflect improved psychometric properties. Indeed, if items are of high quality and define the domain of interest with less measurement error, then fewer items might be a better representation of the domain. Perhaps even more importantly from a practical perspective, the reduction in the number of items from 27 to 8 would allow the instrument to be printed on a single page and be self-administered in less than 5 minutes, thus enhancing its potential uptake in both clinical practice and research.

The item-reduction process adopted strategies previously used in reducing questionnaire length.³¹ The final 8 items cover the QOL domains of physical (2 items), psychological (4 items), and social (2 items) well-being. Validity was shown, with significant correlations with cough severity, generic health, and generic QOL measures. That these correlations, although significant, were not greater than 0.6 (ie, 36% of variance explained) indicate that this new shortened measure was not merely duplicating an established generic measure of QOL. The PC-QOL questionnaire demonstrated strong discriminative properties being responsive to change. However, validation is a continuous process, and further research is needed to test its psychometric properties. The present datasets included children aged 14 to 77 months of age, and therefore the findings must be interpreted with caution and limited to this age group. Further validation outside this age range would enhance the generalizability of the PC-QOL-8 questionnaire's use. An important area for research would also be to gather international data to ensure its cultural and linguistic validity across a number of settings and languages.

Assessments of validated outcomes are important in the clinical setting, as well as in research.¹³ In the area of cough, the quality of studies has been hampered by the lack of use of validated outcomes. Outcomes for assessing the efficacy of interventions for cough include objective outcomes (cough counts and cough receptor sensitivity) and subjective measures (cough score and QOL).^{10,32-34} Although these outcomes relate to each other, they are not interchangeable.³⁵ Validated cough-specific QOL measurements are useful in adult and pediatric clinical studies across a variety of conditions dominated by chronic cough.^{11,15,18} Development of this PC-QOL-8 questionnaire is an advancement for its brevity and ease of use.

This study is not without its limitations. The PC-QOL-8 questionnaire is limited to parental assessment of QOL and not the child's own reporting. Given the age of the children, it is difficult for them to be able to verbally express themselves and report on their own QOL. Although it is common practice for parents to be proxy assessors of their young child's medical condition,³⁶ a further line of research would be to develop a brief measure that can be completed by older children or having parents report on the child's own QOL response to the cough (eg, not being able to sleep or engage in vigorous activities). Self-report measures (eg, the VCD score or VAS) as an outcome against which validation is determined might suffer from response biases, and therefore their use is questionable. However, we have demonstrated¹⁷ that self-reported cough measures are valid indicators of objective metered cough counts and can reliably reflect changes in cough. The variation in the MID calculated under the different approaches raises the question of which is the most appropriate for use in clinical and research practices. Both the anchor-based and distribution-based methods have advantages and disadvantages³⁷; however, multiple or combination strategies are seen to be relevant in determining clinical significance.³⁸ On the basis of a multiple-strategy approach, our MID of 0.9 would seem appropriate, although continuing and more varied sample research in this area is necessary.

Instruments that measure QOL are useful in studies in which the efficacy of interventions is an outcome. They are useful in clinical practice in identifying and prioritizing health problems for patients, identifying hidden or unexpected health problems, monitoring changes in a patient's health status, and detecting responses to treatment.³⁹ On the basis of the evidence presented here, the choice of the PC-QOL-8 questionnaire is justified in both research and clinical practice.

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Key messages

- Chronic cough is a substantial health problem that affects the lives of children and their families.
- Measuring QOL is important in understanding the burden of disease, in evaluating interventions, and as an outcome indicator in clinical studies.
- The brief PC-QOL questionnaire is a valid, reliable, and responsive tool for measuring the burden of chronic cough in children.

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