

QUALITY OF LIFE

Assessing Quality of Care in Pediatric Asthma: Applicability of a Revised Version of the QUOTE-CNSLD Questionnaire

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Aim. To establish the validity and applicability of a revised version of the Quality Of care Through the patient's Eyes-Chronic Non Specific Lung Disease (QUOTE-CNSLD) instrument in a population of children with controlled and partly controlled asthma. **Methods.** Randomized controlled trial evaluating quality of care in three follow-up settings: follow-up by the general practitioner, the pediatrician, and the specialized asthma nurse, for a period of 2 years. **Results.** One hundred and seven children were recruited, 45 from general practice and 62 from hospital practice. The revised QUOTE-CNSLD instrument completed by parents at baseline (T0), after 1 year (T1) and after 2 years (T2) showed that a process-, a structure-, and an asthma-specific domain could be deduced (Cronbach's α of 0.81, 0.82, and 0.62). A separate five-item "child-specific" questionnaire about their caregiver, completed by children, has a Cronbach's α of 0.88. The revised instrument could discriminate between quality of care in different follow-up settings for children with stable asthma, and the asthma-specific domain showed particularly discriminative properties. Quality aspects with potential for improvement could be derived from the scores in all three study groups. **Conclusion.** The revised QUOTE-CNSLD instrument is applicable in a pediatric population with stable asthma and it has discriminative value between different follow-up settings.

Keywords asthma, child, nurse practitioner, pediatrics, quality of health care

INTRODUCTION

This study focuses on parents' and patients' views and judgments about the treatment of children for asthma in three different health-care settings. (1, 2) These views are a vital part of quality assurance (QA) and the expected outcome of care. Patient's satisfaction and experiences in health care play an important role in promoting and maintaining compliance, adherence to practice guidelines, and (clinical) outcomes of care (3–7). Previously, patients' views were assessed by means of patient satisfaction questionnaires. This approach has a number of flaws. Instruments that assess patient satisfaction (1) often produce skewed scores, (2) produce absolute scores, unrelated to individuals' levels of expectation, needs, and wishes, (3) contain items that are formulated on the basis of desk research, (4) evaluate services from suppliers instead of consumers "perspectives," and (5) contain generic, not disease-specific items.

From a theoretical viewpoint, studies of patient satisfaction focus on results ("patient satisfaction/dissatisfaction") and not on the two basic components, related to this concept; needs (or expectations) and experiences.

Patient satisfaction can be seen as a function of performance, expectations, and the degree to which performances relate to these expectations (8–10). Dissatisfaction results

from unmet expectations, and with fulfillment of expectations, satisfaction increases (11, 12). Or, according to the SERVQUAL model, the size and direction of the relationship between expected and perceived services determine the level of patient satisfaction, whereas the actual service delivery and external communications are important dependent co-variables (13, 14).

Theoretical models developed in market research are the basis for new instruments that measure patient satisfaction and patient experiences, for example, the questionnaires used by the Commonwealth Fund, the Picker Institute Europe, the American CAHPS Organization, and the Dutch Consumer Quality Indexes (CQIs). A disease-specific example is the Quality Of care Through the patient's Eyes-Chronic Non Specific Lung Disease (QUOTE-CNSLD) questionnaire. It was developed by van Campen et al. (15) for noninstitutionalized adult patients with chronic nonspecific lung disease (CNSLD—asthma and chronic obstructive pulmonary disease (COPD)). The instrument is reliable and valid in assessing the quality of care from the perspective of this patient group. Although the group of patients with CNSLD differs from the group of children aged 6–16 years with moderate asthma, the QUOTE-CNSLD instrument seemed to be an appropriate questionnaire for this study, comparing asthma treatment in children in three different settings, namely 2 years of follow-up by a general practitioner (GP), a pediatrician (PP), or a specialized asthma nurse (AN). Moreover, to our knowledge, alternative child-specific instruments are not available. The aim of this study was to determine whether a revised version of the QUOTE-CNSLD instrument is applicable in these settings.

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The authors formulated the following questions:

- (1) Can analyzing and rearranging the questions of the QUOTE-CNSLD instrument in a pediatric population define different domains of quality of care?
- (2) Can the QUOTE-CNSLD instrument be used to measure differences in the level of care between different settings?
- (3) Which quality aspects measured with a revised version of the QUOTE-CNSLD instrument need quality improvement from the perspective of parents/representatives in a pediatric population with asthma?
- (4) How do the scores derived from the revised version of the QUOTE-CNSLD instrument, completed by parents, relate to the experiences of their children?

To evaluate the validity and psychometric properties of the QUOTE-CNSLD instrument, we conducted a randomized controlled trial (RCT) about follow-up in children with asthma by their GP, a PP, or a specialized AN. The parents of the subjects completed the questionnaire at baseline, after 1 year and after 2 years, and the children completed a simple child-specific questionnaire.

METHODS

Patients

Children with stable asthma were recruited from the outpatient department of a large general hospital and from 18 GPs in the same region in the Netherlands. Patients from primary care were selected by evaluating electronic patient files. The selection was based on a doctor's diagnosis of asthma, use of inhaled corticosteroids (ICSs), age limit of 6–16 years, and an ensuing short telephone interview. Children fulfilling the criteria for moderate asthma as defined by the relevant Dutch guidelines (NHG Standaard Asthma bij kinderen) (16) and who are on continuous use of ICS were invited to participate. Patients in hospital care were treated by two pediatric pulmonologists. During consecutive follow-up visits, children aged 6–16 years with moderate asthma, according to the guidelines of the Dutch pediatric pulmonologists, who used ICS for at least 9 months prior to the study, were assessed (17–19). These guidelines are similar to the GINA guidelines (20), except for the use of theophylline's which are not incorporated in the Dutch guidelines.

Because of the complexity of care, children with severe asthma, as defined according to the same guideline, were excluded (step 4, unstable asthma despite treatment with high-dose ICS and the addition of long-acting beta-agonists (LABA/ICS) and/or montelukast) (18). Furthermore, children not able to perform lung function tests and those with other chronic diseases were excluded. Children were randomly allocated to one of the three follow-up arms: GP, PP, or AN.

Sealed, numbered envelopes with designated follow-up arms, based on a randomized computer-generated list, were used. Treating physician prior to recruitment stratified

randomization (GP or PP). The AN worked strictly according to the guidelines of the Dutch Pediatric Association and could count on consultative support from one of the PPs at any time. Written informed consent was obtained from all parents and from patients 12 years and older. This study was part of a more extended trial about the follow-up in the denominated settings (21, 22) (see consort diagram).

The Medical Ethics Committee of the Medical Centre "Rijnmond" South, Rotterdam, approved the study protocol (Dutch Medical Ethical Committee registration number: nl.17972.101.07).

Study Design and Instruments

Children were followed for 2 years by their allocated AN, GP, or PP and were treated according to the guidelines of the Dutch pediatric pulmonologists. At the baseline visit (T0), parents of participating children completed the revised version of the QUOTE-CNSLD questionnaire (Table A1). During the same visit, children filled out a simple five-item "child-specific" questionnaire about their caregiver (Table A2). Items were selected on the basis of validity at face value and their relevance for (young) children. They were formulated in a child-friendly way. A seven-point answering scale was used, ranging from "extremely well" to "extremely poorly." These questionnaires were also completed in all three study groups: after 1 year (T1) and after 2 years (T2).

Statistics

To establish psychometric characteristics of both instruments, quality aspects were subjected to item analyses, inter-item analyses, and explorative factor analyses with oblique rotation and reliability analyses. These analyses, as well as a comparison between hospital and general practice data at the beginning of the study using *t*-test statistics, were performed on the dataset collected at T0. To establish the applicability of the instruments in multiple measurement design and to compare different caregivers, data collected at T0 were compared with T1 and T2 data, using a linear multilevel regression analysis (23). The lower level variables are T0, T1, and T2, the higher level variable was "children," the dependant variables are the scale scores (process-, structure-, asthma-specific, and child-specific), and the independent variables are treatment groups (GP, PP, and AN) and treating physician prior to randomization (GP, PP). Intraclass correlations (ICCs) were calculated to determine which model best explained the data. *P*-values are presented to identify differences between the models.

Scale scores for the revised QUOTE-CNSLD instrument can vary between 1 (100% of respondents did not/never receive the quality of care they expected per aspect) and 4 (100% of respondents always received the quality of care they expected per aspect). Scale scores for the "child-specific quality" instrument range from 1 (100% of respondents rate all items as "extremely bad") to 7.

(100% of respondents rate all items as "extremely well"). For comparison purposes, average scale scores and 95% confidence intervals are presented.

STATA version 11.2 statistical software was used. The multilevel analysis was performed with ML Win version 2.24.

RESULTS

One hundred and seven children were randomized, 45 from general practice and 62 from hospital practice. The mean age of children was 11 years in both groups. Girls formed 47% of the study population in the GP group and 35 % in the pediatric group (see consort diagram in Appendix).

Validity of the Revised QUOTE-CNSLD Instrument in a Pediatric Setting

Item analyses revealed that in three asthma-specific quality aspects (3, 22, and 24, Table A1), all participants scored identically and were therefore excluded from further analysis. One aspect (14, Table A1) was excluded because its negative formulation caused interpretation problems.

Factor analyses (oblique rotation) and reliability analyses revealed three quality dimensions: “process quality” with 12 items (Cronbach’s $\alpha = 0.81$), “structure quality” with 8 items (Cronbach’s $\alpha = 0.82$), and “asthma-specific quality” with 6 items (Cronbach’s $\alpha = 0.62$).

The five quality aspects filled in by the children formed a reliable “child-specific quality” scale (Cronbach’s $\alpha = 0.88$) (Table 1).

Discriminative Properties of the Revised QUOTE Instrument in Different Settings

At T0, no differences were found between GPs and PPs on the process and structure quality dimensions. In “asthma-specific” quality of care, PPs scored better than GPs ($p < .05$). The children also gave higher quality ratings to the care provided by PPs ($p < .05$) (Table 1).

At T0 after randomization, all groups’ quality scores did not significantly differ between the three groups.

At T1, for process and structure quality no statistical differences were found between groups. For asthma-specific and child-specific quality, the ratings for the PP and specialized AN are higher than for the GP. Within all study groups, quality ratings did not significantly improve between T1 and T2 (Table 2).

Subjects were recruited either from primary care or from hospital care. After randomization, follow-up was by a GP, a PP, or an AN. Therefore, six sub-groups could be distinguished, based on the situation prior to T0 (asthma care by either the GP or the PP) and the situation at T1 and T2 when participants were assigned to the GP, the PP, or an AN.

TABLE 2.—The QUOTE pediatric asthma instrument: mean scores and confidence intervals (CIs) for the three study groups after 1 (T1) and 2 (T2) years.

	Years	General practice (GP) mean (95% CI)	Pediatric practice mean (95% CI)	Asthma nurse (AN) mean (95% CI)
Process quality	T1	3.29 (3.13–3.45)	3.55 (3.43–3.67)	3.60 (3.50–3.70)
	T2	3.37 (3.19–3.55)	3.66 (3.54–3.78)	3.64 (3.52–3.76)
Structure quality	T1	2.95 (2.71–3.19)	3.24 (3.03–3.45)	3.14 (2.86–3.42)
	T2	3.17 (2.91–3.43)	3.33 (3.10–3.56)	3.20 (2.92–3.48)
Asthma-specific quality	T1	2.29 (2.09–2.52)	2.98 (2.80–3.16)	2.98 (2.80–3.16)
	T2	2.37 (2.12–2.62)	3.13 (2.94–3.32)	3.14 (2.92–3.36)
Child-specific quality	T1	5.09 (4.87–5.31)	5.79 (5.48–6.10)	6.06 (5.82–6.30)
	T2	4.98 (4.64–5.32)	5.92 (5.63–6.21)	6.17 (5.84–6.50)

Multilevel linear regression analyses for all scales show a significant improvement compared with the ordinary least squares model (data not shown). Table 3 shows that for three of the four scales (process-, structure-, and asthma-specific), the inclusion of visit resulted in a significant improvement of the model ($p < .01$), indicating that average scores were higher for these scales at T1 and T2 compared with T0. Addition of the treatment groups (GP, PP, and AN) to the model was significant only for the asthma-specific and child-specific scales ($p < .01$). Table 3 also shows that the scale scores for GP were lower and that the scale scores for AN were higher than those for PP. Finally, for the asthma-specific and child-specific scales, the model significantly improved upon the addition of the treating physician before randomization (GP or PP). Scale scores were higher for PP than for GP.

Indexing the mean score for each group at T0 to 100%, the changes over time for each of the groups are plotted as a percentage of the score at T0 (Figure 1). The mean scores and standard errors at T0, T1, and T2 are presented in Table A3.

Quality Aspects with Potential for Quality Improvement

Table 4 presents a top five list of aspects with the lowest scores in the three study groups, indicating the greatest potential for improvement. For all three groups, “providing a yearly list of my medicine use” is the most important. Other high ranking quality aspects amenable to improvement are an extended specialized exam (e.g., lung function, airway hyperresponsiveness, and allergy testing) at least once a year, instructions on what to do in emergency situations, the use of instruction materials when explaining

TABLE 1.—Taxonomy of the QUOTE pediatric asthma instrument and mean scores for GPs and PPs on the sub-scales, before randomization.

Domain	Items	Cronbach’s α	GP mean (95% CI)	Pediatrician mean (95% CI)
Process quality	01, 02, 09, 10, 11, 12, 13, 15, 28, 30, 32, 33	0.81	3.34 (3.21–3.47)	3.41 (3.29–3.53)
Structure quality	16, 17, 18, 19, 20, 21, 29, 31	0.82	2.84 (2.62–3.06)	3.04 (2.88–3.20)
Asthma-specific quality	05, 06, 07, 08, 26, 27	0.62	2.24 (2.06–2.42)	2.85 (2.70–3.00)
Child-specific quality	01, 02, 03, 04, 05	0.88	5.15 (4.90–5.40)	5.86 (5.59–6.13)

TABLE 3.—The QUOTE pediatric asthma instrument: multilevel linear regression models for the four scales comparing the empty model to that including visit number, treatment group (GP, PP, and AN), and treating physician prior to randomization (GP or PP). The table describes the estimates for all variables included in the different models.

	Empty model		Visit		Visit and treatment group (GP,PP,AN) ^a		Visit, treatment group, and treating physician prior to randomization (GP ^b or PP)	
	Estimate	SE ^c	Estimate	SE ^c	Estimate	SE ^c	Estimate	SE ^c
Process								
Constant	3.4700	0.0333	3.3830	0.0416	3.4550	0.0625	3.4190	0.0744
Visit 2 vs. 1			0.0952	0.0444	0.0943	0.0444	0.0937	0.0444
Visit 3 vs. 1			0.1731	0.0447	0.1723	0.0447	0.1718	0.0447
GP ^b					−0.1789	0.0795	−0.1741	0.0794
AN					−0.0307	0.0801	−0.0282	0.0798
GP or PP, prior to randomization							0.0591	0.0656
ICC ^d	42.33		44.71		42.82		42.54	
−2 log LH ^e	313.28		298.75		293.03		292.22	
P-value	<.01		<.01		.06		.37	
Structure								
Constant	3.0900	0.0557	2.9450	0.0677	3.0260	0.1050	2.9800	0.1253
Visit 2 vs. 1			0.1707	0.0694	0.1699	0.0694	0.1689	0.0694
Visit 3 vs. 1			0.2822	0.0699	0.2816	0.0699	0.2806	0.0699
GP ^b					−0.1203	0.1352	−0.1145	0.1352
AN					−0.1173	0.1368	−0.1146	0.1366
GP or PP, prior to randomization							0.0741	0.1121
ICC ^d	45.84		50.54		50.18		50.04	
−2 log LH ^e	572.30		556.34		555.33		554.90	
P-value	<.01		<.01		.60		.51	
Asthma specific								
Constant	2.7270	0.0550	2.5920	0.0660	2.7460	0.0959	2.5640	0.1108
Visit 2 vs. 1			0.1464	0.0652	0.1446	0.0651	0.1421	0.0651
Visit 3 vs. 1			0.2698	0.0655	0.2696	0.0654	0.2683	0.0654
GP ^b					−0.4712	0.1229	−0.4470	0.1184
AN					0.0296	0.1239	0.0414	0.1191
GP or PP, prior to randomization							0.2938	0.0978
ICC ^d	50.28		52.60		46.56		43.74	
−2 log LH ^e	578.78		562.39		542.90		534.24	
P-value	<.01		<.01		<.01		<.01	
Child specific								
Constant	5.6260	0.0739	5.5670	0.0947	5.7650	0.1274	5.5640	0.1470
Visit 2 vs. 1			0.0708	0.1052	0.0671	0.1048	0.0634	0.1047
Visit 3 vs. 1			0.1129	0.1060	0.1105	0.1057	0.1075	0.1056
GP ^b					−0.7221	0.1566	−0.6956	0.1525
AN					0.1553	0.1577	0.1684	0.1533
GP or PP, prior to randomization							0.3257	0.1261
ICC ^d	39.73		39.86		29.19		27.06	
−2 log LH ^e	819.46		818.30		786.72		780.24	
P-value	<.01		.56		<.01		<.01	

^aPediatric practice (PP) is the reference category for treatment group.

^bGP prior to randomization is reference category.

^cStandard error.

^dICC—Intraclass correlation.

^e−2 log LH: −2log likelihood.

symptoms caused by asthma, and a yearly check of correct use of (inhaler) medication (for the GP).

Correlation Between Parental and Child's Perception of Quality

Table 5 presents correlation coefficients for the three QUOTE-CNSLD scales and the “child-specific quality” scale of the total dataset at T0. The “child-specific quality” scale correlates relatively poorly with the QUOTE-CNSLD scales.

DISCUSSION AND CONCLUSIONS

This is the first study exploring whether the revised version of the QUOTE-CNSLD instrument is applicable to children with asthma.

We found that the three components of the original QUOTE-CNSLD instrument were applicable in evaluating quality of care. By means of explorative factor analyses, three quality dimensions of care could be revealed, resembling the taxonomy of the original instrument, with Cronbach α values varying from acceptable (0.62 asthma-

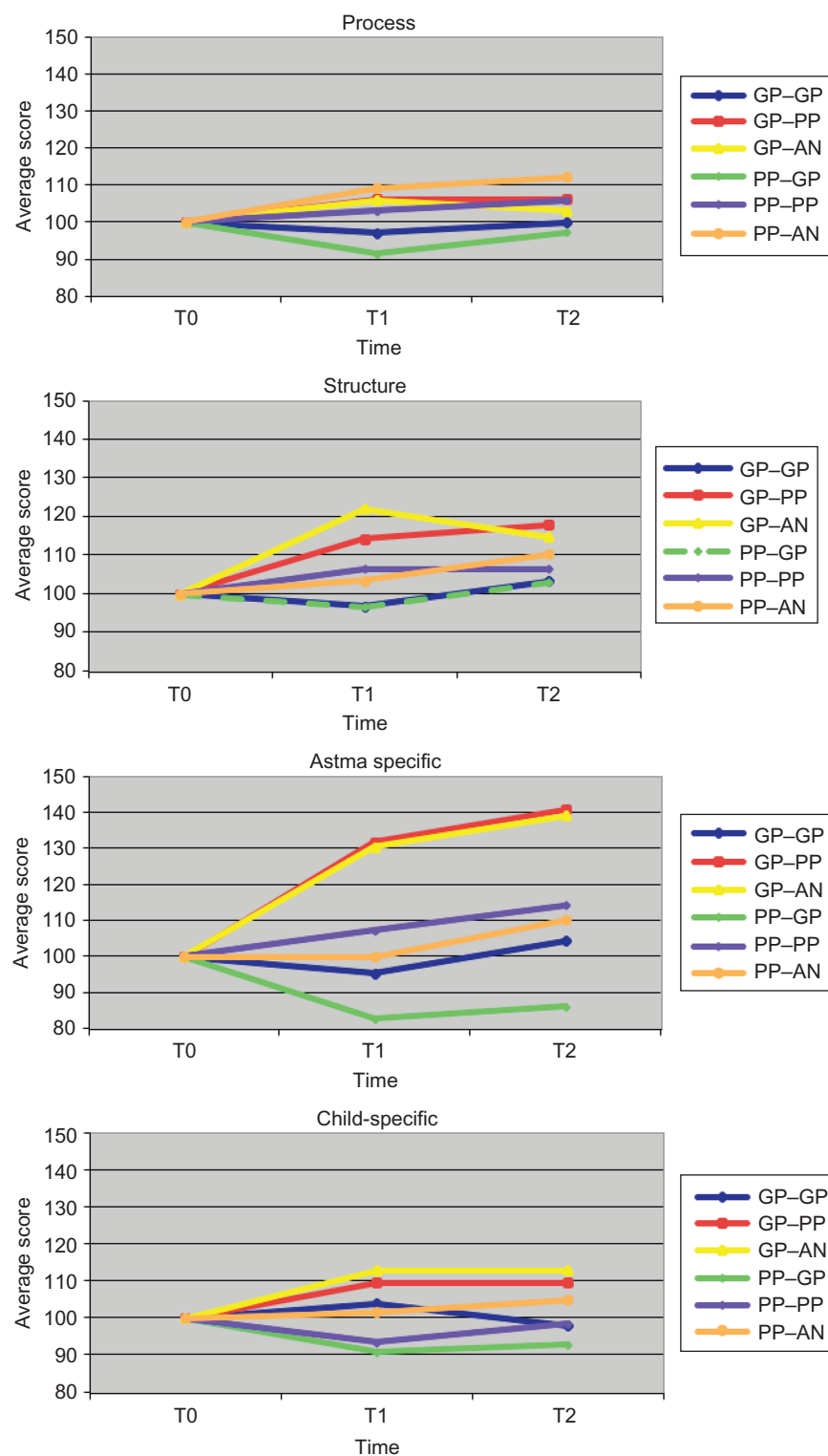


FIGURE 1.—Changes in the quality of care ratings between T0, T1, and T2 for the six sub-groups of children with asthma of the four quality of care dimensions.

specific quality) to good (0.82 structure quality). This indicates that the revised QUOTE-CNSLD instrument is applicable in pediatric populations.

We did not expect that the instrument of measurement in its original format would be applicable in a pediatric setting. In the first place, the instrument was developed for adults. In the second place, the instru-

ment was developed for patients with CNSLD. In pediatrics, asthma is highly prevalent, while COPD is not.

The revised instrument is suitable to detect differences in quality of care between different settings. This was statistically significant for the “asthma-specific” domain, where the ratings for specialized nurses and PPs were

TABLE 4.—Top five improvement aspects based on the results at T2.

GP	Quality aspect	Score 1–4 scale
1	05 A yearly list of medicine use	1.31
2	07 A yearly extended specialized exams (lung function test, etc.)	1.91
3	08 Yearly check if child uses his/her medication in the correct way	1.97
4	23 Use instruction devices when explaining complaints caused by asthma	2.03
5	06 Instructions on what to do in emergency situations	2.14
PP		
1	05 A yearly list of medicine use	2.03
2	23 Use instruction devices when explaining complaints caused by asthma	2.12
3	06 Instructions on what to do in emergency situations	2.82
4	21 Balancing costs and benefits of the treatment	3.06
5	07 A yearly extended specialized exams (lung function test, etc.)	3.12
AN		
1	05 A yearly list of medicine use	2.21
2	21 Balancing costs and benefits of the treatment	2.79
3	23 Use instruction devices when explaining complaints caused by asthma	2.85
4	07 A yearly extended specialized exams (lung function test, etc.)	2.97
5	06 Instructions on what to do in emergency situations	3.06

TABLE 5. —Correlations between the revised QUOTE-CNSLD scales and the “child-specific quality” scale.

	Process quality	Structure quality	Asthma-specific quality	Child-specific quality
Process quality		0.61 (<i>p</i> < .01)	0.44 (<i>p</i> < .01)	0.24 (<i>p</i> < .01)
Structure quality			0.53 (<i>p</i> < .01)	0.18 (<i>p</i> = .06)
Asthma-specific quality				0.34 (<i>p</i> < .01)

higher than for GPs. In the sub-group analysis, these differences became more explicit.

An explanation might be the higher level of perceived expertise of the PP as a medical specialist and the specialized AN as opposed to the GP as a generalist. Another explanation could be that in hospital care regular review is routine, while this is often not the case in general practice.

It was possible to derive specific quality aspects with potential for improvement, from the revised instrument, with a written list of medicine use as the main item in all groups.

The questionnaire completed by children showed a higher appreciation of PPs compared with GPs. Although this simple questionnaire is not officially validated it may reflect greater experience by PPs in the approach to children. Another possible explanation is the higher review frequency combined with a higher esteem for doctors in a hospital setting.

Children gave higher appreciation ratings to caregivers compared with their parents. Correlation coefficients between the scores on the two instruments are relatively low. This finding is in line with the results from other studies that explored the relationship between the ratings of children and their parents (24) and casts doubt on the

validity of using parents' opinions about the quality of care experiences of their children as representative of the ideas of the children dubious.

To our knowledge, there is no child specific “quality of care” instrument for children with asthma and/or for other sub-specialties in pediatrics and it would be very worthwhile to validate the revised QUOTE-CNSLD instrument in future research. This instrument was developed according to the insight that health-care consumers perspectives should be incorporated (25).

A trial comparing nurse-led care and physician-led care in a pediatric constipation clinic (26) used an adapted version, derived from a questionnaire developed in rheumatology, apparently due to the lack of a child-specific instrument. The lack of such an instrument is remarkable, because a relation between perceived quality of care and adherence to treatment recommendations is a very credible assumption.

“Does a patient adhere to the medical advice given by a physician or other caregiver, while he/she perceives the quality of care as poor?” In pediatric asthma it is known that adherence is strongly related to parental illness beliefs and perceptions (27). Numerous interventions striving to improve adherence contain “quality of care” components (28, 29). A recent article, making use of the database of the “European Social Survey” directly, addressed the link between nonadherence and doctor–patient relationship (30).

Our study had a number of limitations. First, due to the character of the study, blinding was practically impossible. To what extent this may have induced bias is hard to say. Second, for the recruitment of children in the general practice group we had to depend on GPs, who were enthusiastic about participating in research concerning respiratory care in children. An unselected sample of subjects recruited from an unselected sample of general practices was not practically feasible. This might have caused bias in that the results in our general practice group may have been more favourable, than those in an unselected sample of

GPs. Third, the simple questionnaire filled out by the children was made by physicians.

It is worthwhile to validate this revised instrument in future research by additional focus groups with involvement of children and parents and to establish test-retest reliability and criterion validity.

We conclude that the revised QUOTE-CNSLD instrument is applicable in a pediatric population with asthma and that by analyzing and rearranging the questions of the QUOTE-CNSLD instrument in a pediatric population one can define different domains of quality of care. Furthermore, the revised QUOTE-CNSLD instrument can be used to measure differences in three different pediatric care settings. Areas for quality improvement can be derived from a revised version of the QUOTE-CNSLD instrument. Finally, the scores derived from the revised version of the QUOTE-CNSLD instrument, completed by parents relate to the experiences of the children with modest correlation coefficients.

ACKNOWLEDGMENTS

The following GPs actively contributed to this research; AC Poppelaars, RA Dingjan, JCG Corten, CJM Beukers, J Snobl, PAM van Hellenberg Hubar, CJJ van der Schelling van der Zwet, NCJ Wisse, HJ Weltevrede, POEM Lutken, MEJM van Teefelen, HLPAM van Valkenburg, JA Oudraad, B Nikkels, AFM Veenman, HAM Haverkamp, FPC de Beer, and HAJM Gabriëls.

S Suelmann and J Matthijssen performed lung function testing and all other data acquisition.

Prof. N Walsh (Department of Pathology, Dalhousie University, Halifax, Canada) critically reviewed the article.

DECLARATION OF INTEREST

The authors report no conflicts of interest. The authors alone are responsible for the content and writing of the article.

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APPENDIX

Assessing quality of care in pediatric asthma.
Applicability of a revised version of the QOUTE-CNSLD questionnaire.

Consort diagram of recruitment and randomization of subjects.

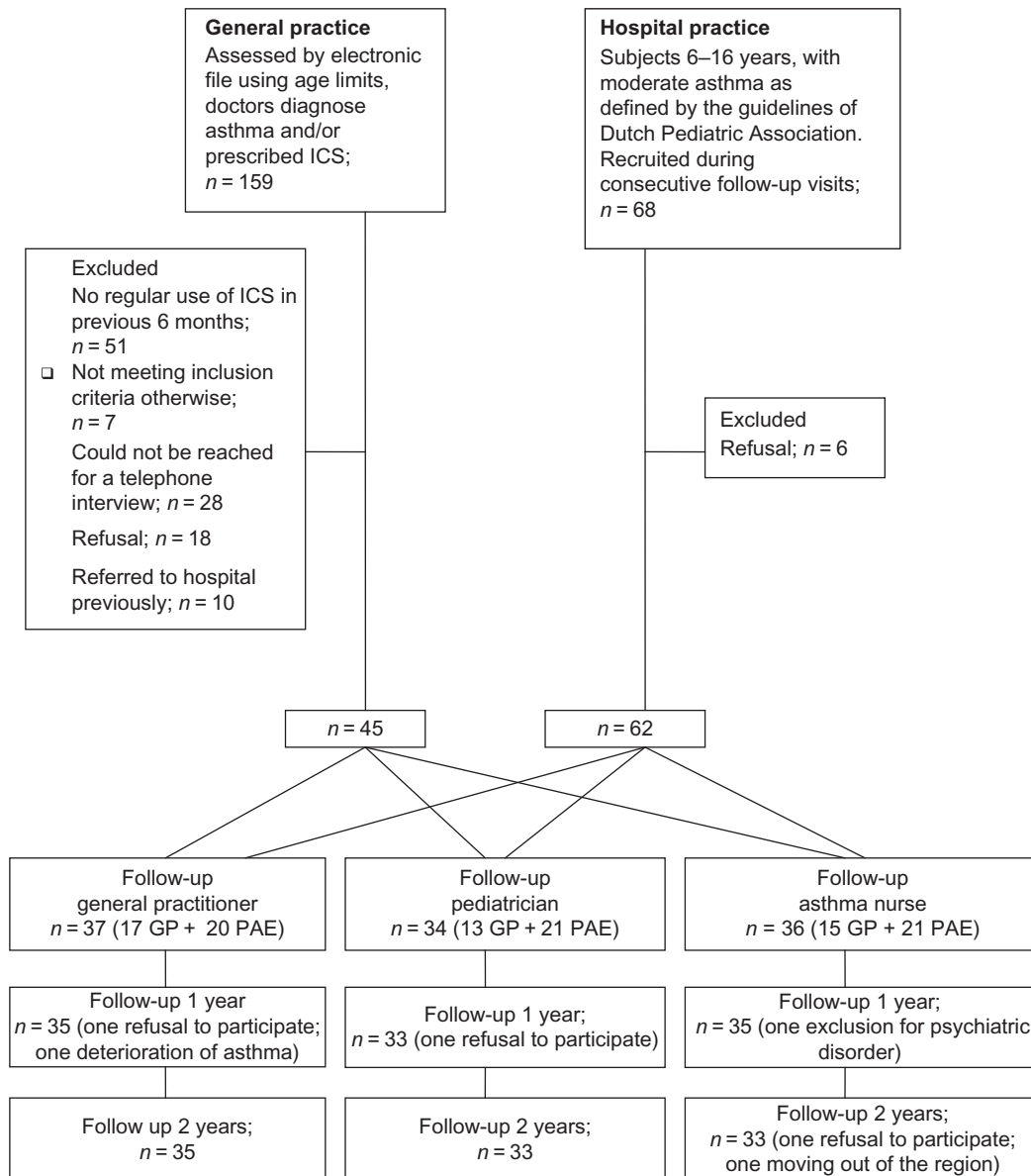


TABLE A1.—Quality aspects included in the revised version of the QUOTE-CNSLD instrument.

The general practitioner/pediatrician, who treated my child during the past year	Conversion			
	No	Actually not	Actually yes	Yes
				Original QUOTE
				Revised QUOTE
1 Knows the problems of my child well				Process (1)
2 Lets me and my child choose another physician when there is no good patient/physician "match"				Process (7)
3 Knows how my child's inhalation device works				Specific (17)
4 Empathizes with my child as an asthma patient				Deleted
5 Provides a yearly list of the medication to use				Specific (21)
6 Tells me what to do in emergency situations				Specific (23)
7 Performs at least once per year extended specialized exams (lung function test, airway hyperresponsiveness allergy testing, X ray)				Specific (25)
8 Checks at least once per year the inhalation technique of my child.				New specific
The general practitioner/pediatrician, who treated my child during the past years				New specific
9 Works efficiently	Never	Some-times	Mostly	Always
10 Involves me and my child in the decisions about treatment or other care				Process (2)
11 Takes my child seriously				Process (3)
12 Keeps to appointments punctually				Process (4)
13 Allows me to look into my child's chart				Process (5)
14 Never has a waiting room delay that extends 15 minutes				Process (6)
15 Tells me what to do if my child uses other medicines beside the prescribed ones				Structure (8)
16 Makes sure that the prescribed medication is reimbursed				Process (9)
17 Is well accessible by telephone				Structure (10)
18 Arranges that my child can consult a specialist soon after referral				Structure (12)
19 Arranges home care directly at discharge from hospital of my child				Structure (13)
20 Coordinates other care delivered by other health-care providers to my child				Structure (14)
21 Carefully balances the financial costs and the benefit of the treatment				Structure (15)
22 Is somebody who labels the physical troubles caused by my child's asthma as psychological				Structure (16)
23 Uses instruction materials (video, pictures, and models) when explaining complaints caused by the asthma to me and my child				Specific (20)
24 Has a waiting room and a consulting room free of smoke				Specific (22)
25 Has a waiting room and a consulting room free of dust				Specific (27)
26 Arranges that specific medicines are available within 24 hours				Specific (28)
27 When absent ensures that his/her colleague has access to my child's files				Specific (30)
28 Listens well to my child				Specific (31)
29 Allows to reimburse costs, concerning my child's treatment first, before paying the declaration				New
30 Informs me and my child about side effects of medication				Structure (11)
31 Has information brochures about the disease of my child available in the waiting room				New
32 Is willing to discuss matters, which don't go well in my opinion				New
33 Informs other health-care providers about the help my child gets				New

Notes: Included on the original QUOTE-CNSLD instrument and no longer in revised version:

- When administering anesthetics, one should take into account that I am an asthma/COPD patient (QUOTE-specific 18).
 - When inhalation equipment in hospitals is used by several people, the mouthpiece should be cleaned after each use (QUOTE-specific 19).
 - As an asthma/COPD patient, I should be treated with priority at a hospital emergency ward (QUOTE-specific 24).
 - In each hospital, asthma/COPD-specialized staff should be on duty 24 hour a day (QUOTE-specific 26).
 - A hospital should have a special department for pulmonary diseases (QUOTE-specific 29).
 - Medicines should be delivered with directions for use (QUOTE-specific 32).
- Some items originating from other QUOTE instruments (e.g., QUOTE-diabetes, QUOTE-RA, QUOTE-IBD, etc.) such as items 8, 28, 30, 31, and 32 were included. Item 7 is new and was added because its relevance for today's treatment of young asthma patients. Item 33 was added to emphasize the relevance of good care coordination.

TABLE A2.—Simple child-specific questionnaire completed by children.

Do you think of your general practitioner/pediatrician as nice?	<i>O¹ Yes he/she is super nice</i> <i>O² Yes he/she is very nice</i> <i>O³ Yes he/she is nice</i> <i>O⁴ He/She is not unfriendly, but also not unpleasant</i> <i>O⁵ No he/she is unfriendly</i> <i>O⁶ No he/she is very unfriendly</i> <i>O⁷ No he/she is totally unpleasant</i>
Do you think of your general practitioner/pediatrician understands you well?	<i>O¹ Yes, he/she understands me totally well</i> <i>O² Yes, he/she understands me very well</i> <i>O³ Yes, he/she understands me well</i> <i>O⁴ He/She understands me not well, neither poor</i> <i>O⁵ No, he/she misunderstands me</i> <i>O⁶ No, he/she misunderstands very much</i> <i>O⁷ No, he/she totally misunderstands me</i>
Do you think of your general practitioner/pediatrician explains you well how to use your medicines?	<i>O¹ Yes he/she does that extremely well</i> <i>O² Yes he/she does that very well</i> <i>O³ Yes he/she does well</i> <i>O⁴ He/She does that not well, but also not bad</i> <i>O⁵ No he/she does that poorly</i> <i>O⁶ No he/she does that very poorly</i> <i>O⁷ No he/she does that extremely poorly</i>
Do you think of your general practitioner/pediatrician explains you well about what asthma is?	<i>O¹ Yes he/she does that extremely well</i> <i>O² Yes he/she does that very well</i> <i>O³ Yes he/she does well</i> <i>O⁴ He/She does that not well, but also not poorly</i> <i>O⁵ No he/she does that poorly</i> <i>O⁶ No he/she does that very poorly</i> <i>O⁷ No he/she does that extremely bad</i>
Do you think of your general practitioner/pediatrician explains you well about what you must do when you have an asthma attack?	<i>O¹ Yes he/she does that extremely well</i> <i>O² Yes he/she does that very well</i> <i>O³ Yes he/she does well</i> <i>O⁴ He/She does that not well, but also not poorly</i> <i>O⁵ No he/she does that poorly</i> <i>O⁶ No he/she does that very poorly</i> <i>O⁷ No he/she does that extremely poorly</i>

TABLE A3.—Changes in the quality of care ratings between T0, T1, and T2 for the six sub-groups of children with asthma.

Setting	Process quality T0 mean 95% CI	T1 mean 95% CI	T2 mean 95% CI
GP-GP	3.36 (3.10–3.62)	3.34 (3.06–3.62)	3.39 (3.05–3.73)
GP-PP	3.29 (3.05–3.53)	3.47 (3.27–3.67)	3.53 (3.25–3.81)
GP-AN	3.37 (3.17–3.57)	3.64 (3.52–3.76)	3.51 (3.27–3.75)
PP-GP	3.47 (3.29–3.65)	3.24 (3.06–3.42)	3.36 (3.16–3.56)
PP-PP	3.50 (3.32–3.68)	3.60 (3.44–3.76)	3.74 (3.64–3.84)
PP-AN	3.26 (3.00–3.52)	3.57 (3.43–3.71)	3.74 (3.64–3.84)
Structure quality			
GP-GP	2.96 (2.60–3.32)	2.91 (2.47–3.35)	3.17 (2.65–3.69)
GP-PP	2.79 (2.41–3.17)	3.16 (2.88–3.44)	3.33 (2.99–3.67)
GP-AN	2.74 (2.36–3.12)	3.31 (2.89–3.73)	3.13 (2.69–3.57)
PP-GP	3.09 (2.87–3.31)	2.99 (2.73–3.25)	3.17 (2.91–3.43)
PP-PP	3.10 (2.78–3.42)	3.29 (3.01–3.57)	3.32 (3.00–3.64)
PP-AN	2.91 (2.59–3.23)	3.03 (2.65–3.41)	3.24 (2.86–3.62)
Asthma-specific quality			
GP-GP	2.19 (1.89–2.49)	2.11 (1.81–2.41)	2.25 (1.89–2.61)
GP-PP	2.18 (1.92–2.44)	2.89 (2.71–3.07)	3.08 (2.70–3.46)
GP-AN	2.34 (1.98–2.70)	3.02 (2.72–3.32)	3.11 (2.79–3.43)
PP-GP	2.90 (2.66–3.14)	2.44 (2.10–2.78)	2.46 (2.12–2.80)
PP-PP	2.80 (2.48–3.12)	3.03 (2.77–3.29)	3.16 (2.96–3.36)
PP-AN	2.86 (2.64–3.08)	2.94 (2.72–3.16)	3.16 (2.86–3.46)
Child-specific quality			
GP-GP	4.91 (4.57–5.25)	5.14 (4.86–5.42)	4.84 (4.46–5.22)
GP-PP	5.17 (4.65–5.69)	5.68 (5.10–6.26)	5.68 (5.16–6.20)
GP-AN	5.42 (4.96–5.88)	6.07 (5.63–6.51)	6.10 (5.44–6.76)
PP-GP	5.51 (5.13–5.89)	5.04 (4.70–5.38)	5.09 (4.55–5.63)
PP-PP	6.16 (5.78–6.54)	5.85 (5.49–6.21)	6.06 (5.72–6.40)
PP-AN	5.90 (5.32–6.48)	6.05 (5.75–6.35)	6.22 (5.90–6.54)

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