

Medical Education

Assessment of physician competency in patient education: Reliability and validity of a model-based instrument

Jan C. Wouda^{a,*}, Linda C. Zandbelt^b, Ellen M.A. Smets^b, Harry B.M. van de Wiel^a^a Wenckebach Institute, University Medical Centre, Groningen, The Netherlands^b Dept. of Medical Psychology, Academic Medical Centre, Amsterdam, The Netherlands

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ABSTRACT

Objective: Establish the inter-rater reliability and the concept, convergent and construct validity of an instrument for assessing the competency of physicians in patient education.**Methods:** Three raters assessed the quality of patient education in 30 outpatient consultations with the CELI instrument. This instrument is based on a goal-directed model of patient education and assesses distinctive skills for patient education categorized in four subcompetencies. The inter-rater reliability was calculated. The concept validity was explored by factor analysis. The convergent validity was established by a comparison with two measures of patient-centred behaviour. The construct validity was explored by relating the subcompetencies with physician gender and patient satisfaction.**Results:** The inter-rater reliability for the subcompetencies varied between 0.65 and 0.91. The factor analysis distinguished the four subcompetencies. All subcompetencies correlated with the measures of patient-centred behaviour. Female physicians performed better than male physicians on three subcompetencies. Positive correlations were found for three subcompetencies and patient satisfaction. **Conclusion:** The CELI instrument appears to be a reliable and valid instrument. However, further research is needed to establish the generalizability and construct validity.**Practice implication:** The CELI instrument is a useful tool for assessment and feedback in medical education since it assesses the performance of distinctive skills.

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1. Introduction

Patient education takes place in most medical consultations and is an essential component of the physicians' role as a communicator, as described in the CanMEDS competency framework for the training of physicians [1]. In Groningen, the Netherlands, we offer the residents a compulsory postgraduate communication curriculum which focuses on challenging issues in patient education. With patient education we refer to the use of educational methods, such as the provision of information, advice and behaviour modification techniques, to influence the patients' knowledge, opinions and health and illness behaviour in order to ensure that the patient is able to co-operate effectively in deciding on the care which he receives and can make the best possible contribution to that care [2]. Especially the challenging communication issues which are mentioned in the CanMEDS framework such as breaking bad news and dealing with conflicts, are dealt

with in the curriculum [1]. For this curriculum we needed a reliable and valid assessment instrument.

In the CanMEDS framework as well as in consensus statements about the communication in medical encounters a patient-centred approach is recommended [3–5]. However, patient-centredness is a complex and elusive concept which does not offer a theoretical framework from which the objectives of a consultation can be derived [6–8]. The current evidence about a relationship between patient-centred communication and patient outcomes is also limited [9]. Furthermore, most teaching programmes that aim to enhance the patient-centred behaviour of the participants are obscure or inconsistent in the description of their educational goals and the skills taught, and show incongruity between the teaching objectives and the instruments used to assess the educational effects [10–12].

In order to give in to these criticisms the first (J.W.) and fourth (H.W.) authors developed a goal-directed model of patient education which guided them in the formulation of the teaching objectives for their curriculum and in the construction of an assessment instrument with which they could assess the patient education competency of the residents and give them feedback on their performance. This article describes the so-called CELI model, the CELI assessment instrument and the results of a study of the reliability and validity of the CELI instrument.

* Corresponding author at: Wenckebach Institute, FC33, University Medical Centre, P.O. Box 30001, 9700 RB Groningen, The Netherlands. Tel.: +31 50 3612045; fax: +31 50 3619326.

E-mail address: j.c.wouda@psb.umcg.nl (J.C. Wouda).

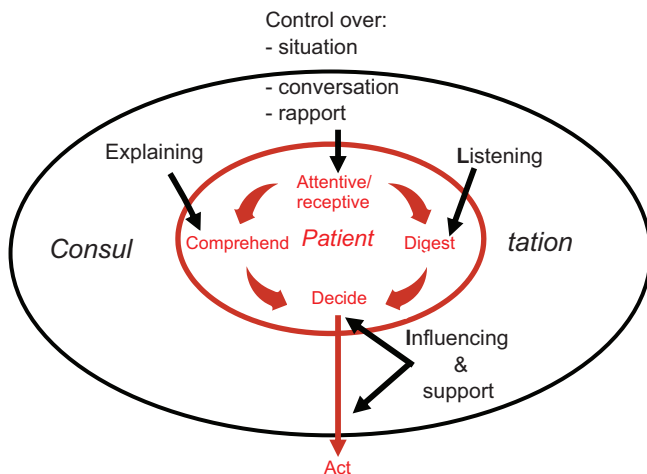


Fig. 1. The CELI model of patient education.

1.1. The CELI model of patient education

According to the above definition patient education implies that a physician must not only provide information, but also must help the patient to comprehend and digest the information. Subsequently the physician can help the patient to make a considered decision based on the information, and to adapt his behaviour if necessary.

The inner oval in Fig. 1 contains the psychological processes which take place in the patient. These are the immediate goals of patient education in a medical consultation. The CELI model which is derived from the classic Yale model of persuasion [13], distinguishes the tasks a physician has to perform in a consultation in order to reach these immediate goals. The outer oval in Fig. 1 represents the consultation in which the physician performs these tasks. These tasks and their matching subcompetencies are Control, Explaining, Listening and Influencing and are clarified below. Appendix A contains an overview of the distinctive skills of the subcompetencies.

The medical consultation is a meeting with pre-set goals and the physician is primarily responsible for the attainment of these goals. Therefore, the physician must control the conversational flow. However, control does not mean that the patient is a passive contributor to the consultation. On the contrary, good control implies that the physician invites the patient to actively participate in the conversation [5]. The Control task relates to three aspects of the consultation: (1) control over the situation in order to have an undisturbed and private conversation. In Fig. 1 this control task is positioned outside the outer oval since the physician must perform this task before the consultation starts; (2) governing the conversation in order to reach the pre-set goals [14,15]; (3) fostering the relationship which enables the patient to be attentive and receptive to the provided information [5,16]. Control in the consultation includes activities such as initiating and ending the session, structuring the conversation, building and monitoring rapport, encouraging patient participation and collaboration and using the available time efficiently.

Effective Explaining results in patients' comprehension and recall of the provided information (cognitive digestion). In order to reach these goals the physician must take the pre-existing knowledge and additional information needs into account. He has to present the information in a structured and intelligible manner and he has to check regularly patients' understanding [5,17].

By Listening to the feelings and opinions of the patient, the physician encourages the patient to digest the information emotionally. Active or attentive listening is promoted as an

important competency for physicians as part of a patient-centred style of communication [3,5,18,19].

Influencing means that the physician helps the patient to reach a decision, such as consenting to a medical procedure or change his behaviour, and to act accordingly. In Fig. 1, acting by the patient is positioned outside the outer oval since this behaviour takes place after the consultation.

Although in some models of the medical consultation the function of decision making is separated from the function of influencing the patients' behaviour [16], in the CELI model these functions are considered as an entity [20]. Nowadays, the shared decision making (SDM) model is promoted as the preferred, patient-centred approach for decisions. Makoul proposed a framework and integrative definition of SDM in which essential and ideal elements (i.e. specific observable behaviours) of SDM are included [21]. According to this model the degree of sharing in the decision process can vary with physicians leading the discussion and making decisions at one end, patients leading the discussion and making decisions at the other, and truly shared discussion and decision making in the middle. The nature of SDM will be qualitatively different as encounters depart from the midpoint and the necessary skills of the physician vary accordingly [21]. Sometimes a direct instruction or recommendation is required [22], while at other times a counselling, motivational or empowering approach is advisable [23]. Occasionally, conflict management skills can be required to influence a patient's decision and behaviour [24]. Influencing also includes the support which a physician can offer by entering into clear agreements, establishing a contingency plan, providing decision aids [25] or arranging further professional help.

1.2. The context of the CELI model

The CELI model fits in more comprehensive models of the medical consultation [16,26–29]. According to these models patient, physician and consultation characteristics determine the quality of the communication between physicians and their patients. This quality in turn determines the outcomes of the consultation. One could therefore expect associations between the performance of the educational skills which are specified in the CELI model, with determining factors on the one hand and outcomes on the other hand.

1.3. Purpose of the study

The purpose of this study was to determine the inter-rater reliability, concept validity, convergent validity and construct validity of the CELI instrument, which is described in Section 2.2.1. To study the convergent and construct validity we took patient-centredness as a 'gold-standard', since this concept has dominated the medical communication literature for the past 20 years. To establish the convergent validity we compared the CELI instrument with two measures of patient-centredness, used by Zandbelt et al. [30], i.e. the Patient-centred Behaviour Coding Instrument (PBCI) and the Eurocommunication Scale (ES). These instruments are described in Section 2.2.2. For the exploration of the construct validity we used the data provided by Zandbelt et al. [31,32]. We decided to focus on two variables which are frequently studied and are fairly consistent related to patient-centred behaviour: physician gender as determining factor and patient satisfaction as outcome variable. Physician gender is one of the most studied determining factors of communication behaviour of physicians [33–35]. From her review Roter and Hall [34] concluded that female physicians are more competent in patient-centred communication. Patient satisfaction is a frequently studied outcome of patient-provider communication [9,26,27,36]. Although the literature is not conclusive about the relationship between the

communication of physicians and patient satisfaction [9,32], many studies found a positive relationship between patient satisfaction and different elements of patient-centred communication, such as building rapport, information exchange, disclosure of patient concerns and involving the patient in the consultation and decision making [9,26,27,36–38].

We expected to find:

- (1) good to excellent inter-rater reliability i.e. ICC2(A,1) > .75 [39], for the CELI subcompetencies since the CELI instrument assesses observable and distinctive skills in patient education;
- (2) four distinctive factors resulting from a factor analysis of the mutual correlations of the subcompetencies, which represent the four subcompetencies and support the content validity of the CELI-instrument;
- (3) support for the convergent validity from the positive correlations between the CELI subcompetencies and the two measures of patient-centred behaviour;
- (4) support for the construct validity from the better performance of the CELI subcompetencies by female physicians and from the positive correlations between the CELI subcompetencies and patient satisfaction with several aspects of the consultation, as described in Section 2.2.3.

2. Methods

2.1. Sample and procedures

In their study of patient-centred communication Zandbelt et al. [30] recorded 323 consultations of 30 medical specialists. The recordings were made in the outpatient department of internal medicine of an academic teaching hospital in Amsterdam, the Netherlands. All consultations were coded with the PBCI and the ES. After each consultation the patients completed a short questionnaire about their visit-specific satisfaction.

For each of the 30 participating physicians in the Zandbelt study we selected the consultation with the highest percentage of educational activities. This selection was based on available data about the time spent on different activities during the consultation. The principal investigator (JW) and two psychology students assessed the quality of the patient education in the 30 selected consultations using the CELI instrument. Both students were trained in the use of the instrument by the principal investigator, they had ample experience in the rating procedure within the scope of other research and they were guided by a manual. The raters worked independently and observed each consultation at least twice in order to obtain accurate assessments. They gave preliminary ratings during the first observation and adjusted and completed their ratings during the second observation.

2.2. Measures

2.2.1. Competency in patient education: the CELI instrument

The CELI instrument assesses the quality of the educational competency of a physician by assigning scores to the performance of the distinctive communication skills that belong to each of the four subcompetencies. A communication skill is defined as a discrete and observable verbal and/or non-verbal utterance of the physician that contributes to the efficient attainment of the conversational objectives [10]. The performance of a skill is assessed on a four point scale: –2 = bad, –1 = inadequate, +1 = adequate, +2 = good. The skills are evaluated for their intrinsic quality, i.e. how well the skill was performed, and for their contextual quality, i.e. at which moment in the consultation the skill was performed [12]. Every utterance of the physician receives one score for the performance of the skill which the utterance represents. This score consists of the

letter of the subcompetency to which the skill belongs and a performance score. For example, when the physician adequately reflects the feelings of the patient, this utterance is scored L + 1, meaning the adequate performance of a listening skill. Depending on the goals and the consultation process, some skills are evaluated frequently, some skills only infrequently and some skills are not relevant. When the physician does not perform a skill where the performance is advisable, the skill is scored –1 (= advisable) or –2 (= strongly advisable). The rules for these ratings with illustrations are laid down in the manual.

The performance score of a subcompetency is calculated by adding the scores belonging to that subcompetency and dividing the total by the sum of the absolute values of the scores of that subcompetency. This fraction is converted into a *subcompetency score* which varies between 0 (bad performance of all skills) and 10 (good performance of all skills). This range of 0–10 is common in the Dutch school system and therefore easy to interpret for Dutch people. A score of 5, which represents an equal number of positive and negative scores, means a mediocre performance of the subcompetency.

The performance score for the overall competency in patient education is obtained by adding the scores of all four subcompetencies, dividing the total by the sum of the absolute values of these scores and converting this fraction score into a *sum score* which varies between 0 (very bad performance) and 10 (excellent performance). A sum score of 5 means a mediocre performance of the overall competency in patient education.

The three raters also gave each consultation an *overall mark* for its functional quality, i.e. the effectiveness and efficiency of the educational performance of the physician, varying between 0 (disastrous quality) and 10 (outstanding quality) with 5 (mediocre quality) in between. This overall mark was given after the first observation of a consultation and before the CELI scores were counted and the performance scores were calculated.

2.2.2. Patient-centred behaviour of physicians

The Patient-centred Behaviour Coding Instrument (PBCI) measures two dimensions of patient-centred behaviour: *facilitating behaviour* which represents the behaviour of a physician that aims to elucidate the patients' perspective on illness and treatment, and *inhibiting behaviour* which represents the behaviour that restrains the patient from expressing his or her views. Counts of individual facilitating and inhibiting behaviours were weighted according to categorical principal component analysis (CATPCA). For each consultation, the resulting weighted sum scores (z-scores) were used to represent the physicians' facilitative

Table 1
Physician, patient and consultation characteristics.

	Freq./mean ^a	Perc./SD ^b
<i>Physician characteristics</i>		
Male/female	15/15	50/50
Staff physician/resident	15/15	50/50
Mean age (years)	37.8	7.8
Mean years in practice (residency included)	8.6	8.3
<i>Patient characteristics</i>		
Male/female	13/17	43/57
Mean age (years)	46.2	13.9
Educational level: lower/middle/higher	15/7/7	52/24/24
Acquainted with physician: yes/no	27/3	90/10
<i>Consultation characteristics</i>		
Subspeciality of internal medicine	15/5/10	50/17/33
General/rheumatology/gastro-enterology		
Mean duration of consultation (min)	13.1	2.5
Mean percentage patient education	71	13

^a Frequencies or mean values (N = 30).

^b Percentages or standard deviations.

Table 2Inter-rater reliability coefficients ICC2(A,1) and mutual correlations^a of the CELI subcompetencies.

CELI subcompetencies	ICC2(A,1)	Conf. interval (95%)		Bivariate Pearson correlations (N = 30)				
		Upper	Lower	Control	Explain	Listen	Influence	Sum score
Control	0.80	0.67	0.89	1				
Explaining	0.65	0.47	0.80	0.57	1			
Listening	0.91	0.84	0.95	0.56	0.55	1		
Influencing	0.88	0.79	0.93	0.61	0.64	0.47	1	
CELI sum score	0.93	0.88	0.97	0.83	0.77	0.77	0.85	1
Overall mark	0.93	0.88	0.96	0.82	0.79	0.74	0.86	0.99

^a Bivariate Pearson correlation coefficients. All correlations are significant ($p < .01$; $N = 30$).

and inhibiting approaches. In the Zandbelt study the inter-rater reliability coefficients were 0.92 for facilitating and 0.53 for inhibiting behaviour [30]. The Eurocommunication Scale (ES) is a three-item checklist (range: 0–1) which assigns global ratings for the patient-centredness of a consultation. In the Zandbelt study the internal reliability (Cronbach's alpha) of the scale was 0.79 and the inter-rater reliability was 0.68.

2.2.3. Patient satisfaction

A five-item Patient Satisfaction Questionnaire (PSQ) measured patient satisfaction with the following aspects of the consultation: (1) how well needs were addressed, (2) active involvement in the interaction, (3) adequacy of information received, (4) involvement in decision-making and (5) emotional support received [40]. The items were answered on visual analogue scales (range: 0–100). An overall satisfaction score was obtained from principal component analysis of the scores for the five items. This analysis yielded a first component which explained 79% of the total variance. Component scores (z-scores) were used as measures of patients' overall satisfaction.

2.3. Statistical analyses

- (1) Inter-rater reliability was assessed by calculating the Intraclass Correlation Coefficients for absolute agreement = ICC2(A,1) for the three individual raters in a two-way random effects model.
- (2) Content validity was explored using a principal component analysis with varimax rotation of the correlation matrix of the scores for the CELI subcompetencies and the overall mark.
- (3) Convergent validity was investigated by correlation analysis of the CELI scores with the PBCI scores and the ES scores, followed by a multiple regression analysis with stepwise introduction of the CELI subcompetencies to predict the values of the two dimensions of the PBCI and the values of the ES.
- (4) Construct validity was explored through an one-way analysis of variance (ANOVA) of the CELI scores using physician gender as independent variable, and through a correlation analysis of the CELI scores with the scores of the separate items of the PSQ and with the overall satisfaction score.
- (5) All statistical analyses were performed with SPSS 15.0.0 [41].

3. Results

3.1. Sample characteristics

The physician, patient and consultation characteristics of the 30 selected consultations are presented in Table 1. In the selected consultations an average of 71% of the time was spent on patient education compared with 56% in the unselected consultations ($N = 292$). In the selected consultations the patients were younger, experienced more psychological distress and were less satisfied with the consultation than the patients in the unselected consultations. The other patient characteristics (male/female ratio, educational level and acquaintance with the physician) and the

mean duration of the consultation were the same in the selected and in the unselected consultations.

3.2. Inter-rater reliability

In Table 2, the ICC2(A,1)s of the three raters for each of the four subcompetencies, for the CELI sum score and for the overall mark are presented. The ICC of the explaining subcompetency was 0.65 and the ICCs of the other subcompetencies were 0.80 or higher which are adequate reliabilities for research purposes [42]. These values warrant the application of the average CELI scores from the three raters as scores of the CELI subcompetencies in our further analyses.

3.3. Concept validity

The varimax rotated solution in Table 3 of the principal component analysis of the mutual correlations, as presented in Table 2, yielded four factors. Each of these factors accounted for approximately the same proportion of variance and represents one of the subcompetencies. The overall mark loaded evenly on each of the four factors.

3.4. Convergent validity

As shown in Table 4, all subcompetencies correlated with facilitating behaviour, with the highest correlation for the

Table 3

Varimax rotated principal components of the CELI subcompetencies and the overall mark.

CELI subcompetencies	Varimax rotated components			
	1	2	3	4
Control	0.31	0.32	0.24	0.86
Explaining	0.19	0.28	0.92	0.22
Listening	0.93	0.21	0.17	0.25
Influencing	0.23	0.87	0.30	0.30
Overall mark	0.54	0.56	0.43	0.44
Explained variance	1.34	1.30	1.20	1.14
Percentage of total variance	26.8	26.0	24.1	22.8

Table 4Correlations^a between CELI subcompetencies and measures of patient-centred behaviour.

CELI subcompetencies	Patient-centred behaviour		
	Facilitating	Inhibiting	Euro score
Control	0.38*	−0.55**	0.56**
Explaining	0.40*	−0.24	0.70**
Listening	0.72**	−0.51**	0.58**
Influencing	0.38*	−0.44*	0.67**
CELI sum score	0.53**	−0.57**	0.76**
Overall mark	0.52**	−0.54**	0.80**

^a Bivariate Pearson correlation coefficients ($N = 30$).* Indicates a significant correlation at the $p < .05$ level.** Indicates a significant correlation at the $p < .01$ level.

Table 5

Mean scores of the CELI subcompetencies of male physicians and female physicians.

CELI subcompetencies	All (N=30)	Male (N=15)	Female (N=15)	F-value ^b
	Mean (SD) ^a	Mean (SD)	Mean (SD)	(df = 1;28)
Control	5.24 (2.20)	4.46 (2.08)	6.02 (2.09)	4.20*
Explaining	6.64 (1.52)	6.06 (1.36)	7.22 (1.49)	4.93*
Listening	3.85 (1.83)	3.08 (1.56)	4.62 (1.79)	6.28*
Influencing	6.54 (1.84)	6.08 (1.89)	7.00 (1.74)	1.95
CELI sum score	5.46 (1.47)	4.87 (1.47)	6.06 (1.24)	5.78*
Overall mark	5.84 (1.54)	5.21 (1.48)	6.47 (1.38)	5.77*

^a Standard deviations (SD) in parentheses.^b F-values for inequality of means (ANOVA).* Indicates a significant F-value at the $p < .05$ level.**Indicates a significant F-value at the $p < .01$ level.

listening subcompetency. The correlations between inhibiting behaviour and the subcompetencies were all negative, although the correlation with the explaining subcompetency was not significant. All subcompetencies correlated with the Eurocommunication scores, with the highest correlations for the explaining and influencing subcompetencies. The sum score and the overall mark correlated in the expected direction with both dimensions of the PBCI and the ES.

A multiple regression analysis with stepwise introduction of the scores for the CELI subcompetencies clarified these relations. The listening subcompetency had the most predictive power for facilitating behaviour ($R^2_{adj} = 0.50$) and the control subcompetency was the best predictor for inhibiting behaviour ($R^2_{adj} = 0.27$). The other subcompetencies did not contribute further to the prediction of the two PBCI dimensions. The Eurocommunication score was best predicted by the explaining subcompetency ($R^2_{adj} = 0.46$). The Influencing subcompetency predicted an additional 0.08 (R^2_{adj}) of the variance of the ES scores.

3.5. Construct validity

The mean performance scores for the subcompetencies of all physicians varied between 3.85 and 6.64. The results of the ANOVA show that the female physicians performed better on the Control, Explaining and Listening subcompetencies. Their CELI sum scores and overall marks were also significantly higher (see Table 5).

The correlations in Table 6 show that Satisfaction with involvement in decision-making (item 4 of the Patient Satisfaction Questionnaire) correlated with the Control, Listening and Influencing subcompetencies. This item also correlated with the CELI sum score and the overall mark. Satisfaction with involvement in the interaction (item 2) correlated with the Listening and Influencing subcompetencies. Satisfaction with the information received (item 3) correlated with the Influencing subcompetency. Satisfaction with needs addressed (item 1) and satisfaction with emotional support (item 5) did not correlate with any of the

Table 6Correlations^a between CELI subcompetencies and patient satisfaction.

CELI subcompetencies	Patient Satisfaction Questionnaire					Component score
	Item 1	Item 2	Item 3	Item 4	Item 5	
Control	0.09	0.13	0.20	0.48**	0.12	0.24
Explaining	−0.10	0.17	0.14	0.20	−0.04	0.09
Listening	0.03	0.42*	0.31	0.38*	0.20	0.31
Influencing	0.19	0.40*	0.47**	0.61**	0.30	0.47**
CELI sum score	0.09	0.34	0.36	0.56**	0.22	0.37*
Overall mark	0.09	0.34	0.34	0.53**	0.20	0.36

^a Bivariate Pearson correlation coefficients (N=30).* Indicates a significant correlation at the $p < .05$ level.** Indicates a significant correlation at the $p < .01$ level.

subcompetencies. The overall satisfaction score correlated with the Influencing subcompetency and the CELI sum score.

4. Discussion and conclusion

4.1. Discussion

In this study we investigated the reliability and validity of a model-based instrument to assess the quality of patient education of residents and medical specialists. Thirty outpatient consultations were assessed by three trained raters. The inter-rater reliability of the scores of the four subcompetencies of the CELI instrument (Control, Explaining, Listening and Influencing) were moderate (.65) to excellent (.91). It appears that with adequate instruction, independent raters are able to agree sufficiently on the quality of the performance of the educational skills corresponding to the four subcompetencies. However, the inter-rater reliability of 0.65 for the explaining subcompetency was lower than the reliability of 0.75 and 0.80 recommended by Streiner and Norman [39] and Nunnally and Bernstein [42], respectively. One reason for this low reliability appeared to be a systematic bias between the raters, since the Intraclass Correlation Coefficient for consistency between the three raters = ICC2(C,1) was 0.70. This means that we must critically examine the instruction for assessing the skills of the explaining subcompetency.

The raters also agreed on the overall mark for the educational quality of the whole consultation. This overall mark correlated strongly with the sum score of the CELI subcompetencies. We conclude that the CELI sum score reflects the overall impression of functional quality, i.e. the effectiveness and efficiency of the patient education performed by the physician, although some rater bias in this overall mark cannot be excluded since this overall mark was given after the first consultation rating. The factor-analysis with varimax rotation showed that each of the four subcompetencies contributes evenly to this overall impression. These results support the content validity of the instrument.

The convergent validity of the CELI instrument is indicated by the strong correlations between the CELI subcompetencies and the two dimensions of the Patient-centred Behaviour Coding Instrument and the Eurocommunication Scale. The listening subcompetency showed the strongest correlation with facilitating behaviour. This result is in line with our expectation since facilitating behaviour focuses on listening skills. Furthermore, Control, Listening and Influencing subcompetencies were negatively related to inhibiting behaviour. Apparently, the CELI instrument measures the quality of some characteristic elements of patient-centredness [30].

The construct validity of the CELI instrument is supported by the finding of female physicians performing better in three subcompetencies with the greatest difference in the listening subcompetency which corresponds with the results of other studies [33–35]. The construct validity is further supported by the positive correlations between one or more CELI subcompetencies and patient satisfaction with several aspects of the consultation. Patient satisfaction with involvement in decision-making correlated with the overall competency and with three subcompetencies especially the influencing subcompetency. This means that the physicians' competency in patient education and especially his competency in involving the patient in the decision which is part of the influencing subcompetency, matches the evaluation of the decision-making process by the patients. Furthermore, a good performance of listening skills and influencing skills was positively related to patient satisfaction with their involvement in the interaction. However, satisfaction with the information received was not associated with the explaining subcompetency. This was unexpected since provision of information has been found to be positively related to patient satisfaction [36]. Maybe patient satisfaction with the information as assessed with the

PSQ, is more determined by the (medical) content of the information than by the way it is presented which is the focus of the explaining subcompetency. Furthermore, the two aspects of satisfaction which make an appeal to the listening skills of the physician, i.e. addressing the patients' needs and giving emotional support, did not correlate with the listening subcompetency. This is also unexpected since many studies found a positive relationship between the listening skills of physicians and patient satisfaction [5,18,26]. However, facilitating behaviour which is mainly the performance of listening skills, did not correlate either with these two aspects of patient satisfaction. Moreover, Zandbelt found in her study only a small association between facilitating behaviour and patient satisfaction which disappeared in a multi-variate model [32].

Since in our study patient satisfaction with the consultation was predominantly associated with the Influencing subcompetency of the physician and only modestly associated with the Control, Explaining and Listening subcompetencies, we conclude that further research into the construct validity of the CELI instrument is needed.

The mean scores of the subcompetencies indicate that the physicians in our study were inadequate in their listening skills, mediocre in their control/rapport skills and adequate in their influencing and explaining skills. These findings correspond to the findings of Aspegren and Lonberg-Madsen [14] who studied the communication skills of senior registrars taking a history and giving information to a (simulated) patient. The majority of these physicians gave adequate explanations, but less than 50% controlled the conversation adequately, while rapport building and exploring the patients' views and concerns were hardly done. Aspegren's study did not rapport on influencing activities.

Although the use of the CELI instrument to assess the quality of patient education is promising, this study has some limitations. First, the educational competency of only 30 physicians working in one university hospital in the Netherlands was assessed. The generalizability of the results of this study to other physicians and situations is therefore limited. Second, in this study we found significant correlations between the CELI subcompetencies and several aspects of patient consultation satisfaction. However, we did not investigate the relationships between the CELI subcompetencies and other patient outcomes, such as comprehension, recall, consent, health beliefs and adherence. For this reason the support for the construct validity of the CELI instrument is still limited.

4.2. Conclusion and practice implications

The CELI instrument appears to be a reliable and valid instrument for the assessment of physician competency in patient education. The instrument is based on a goal-directed model of patient education in medical consultations which matches the CanMEDS competency framework for the training of physicians [1]. Since the instrument assesses the quality of the performance of distinctive skills and yields performance scores for each of four subcompetencies and for the overall competency in patient education, the CELI instrument can be a valuable tool for feedback and assessment in medical education and in clinical practice.

Appendix A. Summary of patient education skills

C = Control and rapport

- invitational start of the consultation
- summary of the foregoing (resume)
- agreement upon the goal and subjects of the consultation
- guiding the course of the conversation, keeping the prescribed conversational structure

- control of patient's attention to the conversation
- control of attention and participation when more than one interlocutor is present
- extensive summary when changing to a new subject or closing the consultation
- general verbal and nonverbal presentation of genuineness, empathy, care and competence
- announcing and explaining activities, such as physical examination or writing
- reinforcement of patient behaviour which benefits the conversation and relationship
- social conversation in order to show interest in the patient and put the patient at ease
- a clear and friendly completion of the consultation

E = Explaining

- true in contents, realistic
- use of clear and comprehensible language (choice of words, short sentences)
- concise and structured with an introduction, paragraphs and short summaries
- interactive with pauses for reaction, dosed, guided by response – emotional or other
- fitting in to the frame of reference of the patient
- convincing, vivid with appealing examples, referring to patients' experiences
- repetition and support with visual aids
- comprehension checks

L = Active listening

- verbal and nonverbal attending behaviour, minimal encourages to talk
- use of silence
- paraphrasing
- reflection of feelings and opinions
- asking correct open and closed questions to elicit facts, feelings and opinions
- acquiring relevant information
- concretizing
- shading and confronting
- summarizing the patient's story

I = Influencing (= instruction, advice, counselling, shared decision-making, support)

- offering suggestions (and no orders), leaving room for contemplation
- useful and acceptable phrasing of instructions and advice
- reinforcement of patient problem-solving behaviour
- realistic presentation of advice, possibilities, promises and limitations
- taking into account the 'bad news' nature of some information and advice
- counselling, assisting with difficult decisions
- constructive negotiation
- rephrasing a problem into a shared problem
- promoting the mutual acknowledgement of feelings and opinions
- phasing the decision process, offering time for contemplation
- making clear agreements and contingency plans
- checks of approval of suggestions, instructions, advice, decisions and agreements

- offering educational material (leaflets, internet) and/or useful contact addresses
- offering personal support or professional help after the consultation

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