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Growth of Self-Perceived Clinical Competence in Postgraduate Training for General Practice and its Relation to Potentially Influencing Factors

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Abstract. *Objective:* To examine the increase in self-perceived clinical competence during a three-year postgraduate training in general practice and to explore the relation between the growth of self-perceived competence and several background variables.
Design: Cohort, 1995–1998.
Setting: Three-year Postgraduate Training for General practice in the Netherlands
Participants: All Dutch trainees who followed postgraduate training from September 1995 to September 1998 ($N=191$).
Intervention: We asked the trainees at the start and at the end of their postgraduate training to complete a questionnaire, which assessed their self-perceived knowledge, clinical skills and consultations skills. We collected information about potentially influencing background variables. Amongst these were variables such as: age, gender, prior medical experience, the effort someone has spent upon her/his education, insight in weak and strong areas of clinical competence and knowledge and skills levels.
Main outcome measure: Self-perceived competence.
Results: A total of 127 trainees completed both questionnaires (190 at the first administration and 128 at the second one). We found statistically significant growth of self-perceived clinical competence. Self-perceived consultation skills increased more than self-perceived knowledge and clinical skills. The afore mentioned background variables did not relate in any way with the growth of self-perceived clinical competence.
Conclusion: This study shows that a 3-year postgraduate training in general practice enhances self-perceived clinical competence. However, we still do not know how to explain this improvement. Further study into the theoretical concept of self-assessment in medical education and into the factors contributing to the feeling of being competent, is required.

Key words: contribution of an educational program to the feeling of being competent, factors contributing to the feeling of being competent, growth of self-perceived clinical competence, lifelong learning, postgraduate training in general practice, self-assessment of clinical competence, self-perceived clinical competence, theoretical concept of self-assessment

Introduction

The value of self-assessment of clinical competence as part of the individual learning process of medical students, trainees and doctors is obvious (Boud, 1989; Purdy, 1997). Many authors emphasize the importance of it as a basis for lifelong maintenance of competence and for professional autonomy (Miller, 1976; Gordon, 1991; Irvine, 1997; Oermann, 1998; Mattheos et al., 2004). However, the value of self-assessment for the purpose of evaluation of clinical competence is less clear (Boud, 1989; Purdy, 1997; Ward et al., 2002). Validity and accuracy of self-assessment used for this purpose have been extensively investigated in medical education. Although substantial variation in study design existed, all studies attempted to validate self-assessment by comparing the results of self-assessment to those of expert ratings or objective tests. Research evidence has provided little support for the validity of self-assessment in relation to external evaluations (Arnold et al., 1985; Calhoun et al., 1990; DiMatteo and DiNicola, 1981; Donald and Thomson, 1993; Gordon, 1991; Harrington et al., 1997; Harris and Schaubroeck, 1988; Fox et al., 2000; Friedlich et al., 2001; Jansen et al., 1998; Johnson and Cujec, 1998; Kegel-From, 1975; Martin et al., 1998; Rezler, 1989; Risucci et al., 1989; Stuart et al., 1980; Tracey et al., 1997; Ward et al., 2002; Woolliscroft et al., 1993). Even repeated personal feedback based on objective knowledge and skills scores did not improve the accuracy (Jansen et al., 1998). From these findings it may be concluded that self-assessment of clinical competence apparently reveals to what extent someone considers her/himself competent (self-perceived competence) (Kegel-From, 1975; Marel et al., 2000; Speechly et al., 1994) rather than actual clinical competence (Calhoun et al., 1990; DiMatteo and DiNicola, 1981; Jansen et al., 1998; Johnson and Cujec, 1998; Purdy, 1997).

It is obvious that from a medical training it may be expected that it not only will support the transfer of knowledge and skills but also the extent to which learners consider themselves competent. This is especially applied for postgraduate training that prepares trainees to take formal responsibility for patient care. Moreover, a postgraduate training often comprises both a rich clinical context (general practice or hospital setting) and additional special educational programs. This combination may give trainees a good opportunity to increase their sense of competence.

In the present study we examined the effect of a postgraduate training for general practice on the development of self-perceived clinical competence. We expected to find an increase of it. Because little is known about predictors of self-perceived clinical competence, we also explored the relation between the growth of self-perceived competence and several background variables that may potentially be of influence to it. We recognised the following variables: age, gender, prior medical experience, the effort someone has spent upon her/his education and insight in weak and strong areas of clinical competence. Furthermore, although a direct relation between self-perceived and actual clinical competence seems not to exist, knowledge and skills may influence the growth of self-perceived competence. Therefore, we have also explored the relation between knowledge test scores and growth of self-perceived competence.

Methods

Procedure and subjects

We asked all Dutch trainees ($N = 191$) who started their postgraduate training in September 1995 to complete a questionnaire, which assessed their self-perceived clinical competence, at the start and at the end of their training. We also collected among them information about potentially influencing background variables. We compared the results of both measurements to each other and analysed the relative contribution of the potentially influencing background variables to the outcome.

Context of the study

The curriculum under study was the Dutch postgraduate training in general practice from 1995 to 1998, briefly outlined in Box 1 (Dubois et al., 1987). A 3-years training program was employed comprising per week 4 days for practical learning and 1 day for special training and reflection at the training institute. Eight institutes were involved in the organisation of the training. The content of the program was based on the Basic Job Description for the general practitioner and generally aimed at the acquisition of knowledge relevant to general practice, skills and attitudes. The course of the program was structured around three blocks of 1 year; starting with general practice training, followed by rotation schemes in hospitals, clinics for chronically ill patients and psychiatric outpatients clinics and finished by, again, general practice training.

Box 1. Dutch postgraduate training in general practice at the time of the study (1995–1998)

Content	Basic job description for the general practitioner			
Structure	Three blocks of equal length		Throughout the curriculum	
	Block 1	General practice training	One day per week for: special training and reflection, in groups of trainees, at the training institute	Half-day per week for: self-directed learning
	Block 2	Rotations through hospitals, clinics for chronically ill patients and psychiatric outpatients clinics		
	Block 3	General practice training		
Learning objectives	Block 1	Acquisition of knowledge, skills and attitudes with emphasis on common problems		
	Block 2	Acquisition of additional knowledge, skills and attitudes that cannot be learned in general practice itself		
	Block 3	Integration of the new knowledge, skills and attitudes with emphasis on management of complex situations		

Instrument

We constructed a self-assessment questionnaire according to the learning objectives of the training program: the acquisition of knowledge, clinical skills and consultation skills.

The domain of *knowledge* was represented by the International Classification of Primary Care (ICPC) (Lamberts and Wood, 1987). For the 17 categories of the ICPC we asked the trainees to estimate their knowledge level on a 3-point scale (none, some, considerable knowledge).

The domain of *clinical skills* was represented by both the ICPC and a list of specific patient groups (children, the elderly, working population, migrants, violence victims, addicts, patients with acute or chronic diseases, dying persons). We asked the trainees to estimate their level of these skills on a 4-point scale (hardly any, moderate, reasonable, good mastery).

The domain of *consultation skills* was represented by a list of five items, summarising the main aspects of the consultation process (systematic approach of the encounter, diagnostic and therapeutic management, maintenance of a good patient-doctor relationship, support of the continuity of care and preventive activities). We asked the trainees to estimate their level of these skills on a 4-point scale (hardly any, moderate, reasonable, good mastery).

The reliability (Cronbach's alpha) of the start and end measurement was 0.8/0.9 for knowledge, 0.8/0.9 for clinical skills and 0.7/0.7 for consultation skills, respectively. These are satisfactory reliabilities, particularly for the interpretation of group results as is required in this study.

Factors influencing self-perceived clinical competence

Based on the literature and on common sense, we recognised the following factors as potentially influencing growth of self-perceived clinical competence.

Age and *prior medical experience* were chosen, because they reflect (life) experience that may result in increased self-confidence. Bleys et al. found that prior medical experience has a positive effect on self-perceived growth in some aspects of competence during a short training program (Bleys et al., 1986). Prior medical experience was defined as the time between graduation and the start of postgraduate training.

Gender has been identified as a factor that may influence self-assessment. Women are perhaps more self-critical than men, resulting in less self-perceived competence (Coutts and Rogers, 1999).

Although the main content, structure and learning objectives of the training program were similar for the eight *training institutes*, variations existed between the ways this program was performed at the individual institutes. This may have lead to differences in self-perceived clinical competence of trainees.

Personal *effort* has been recognised as a factor that may influence self-assessment: the greater the effort someone put in her/his medical education, the higher the self-assessment of clinical competence (Risucci et al., 1989). Therefore, we asked the trainees, at completion of their training, to rate the effort they had spent upon their postgraduate training.

Furthermore, we asked them to what extent teachers had given them *insight* in their weak and strong areas throughout the course. This insight was expected to result in more growth of self-perceived competence.

Finally, we used the start and final *knowledge test scores* of the participating trainees as background variables, to examine the influence of knowledge and clinical skills on the growth of self-perceived clinical competence. In Dutch postgraduate training knowledge tests are regularly administered. These tests have a progress-testing format, so that each test has the intention to reflect the cognitive final objectives of the curriculum, and are constructed according to a blueprint based on the ICPC. To enhance general practice relevance, items are embedded in vignettes representing real consultations. Two different tests exist: a General Knowledge Test (GKT) and a Knowledge Test of Skills (KTS) (Kramer et al., 2002, 2003a, b). For the KTS

research has shown that it can predict performance of clinical skills in an OSCE (Kramer et al., 2002).

Analysis

At each measurement moment, we computed the mean scores and standard deviations for the domains of self-perceived knowledge, clinical skills and consultation skills. Differences were tested using a paired *t*-test.

In order to explore the relation between the growth of self-perceived clinical competence and the potentially influencing background variables (age, gender, prior medical experience, effort, insight, knowledge test scores), we calculated the partial correlations between these variables and the final self-assessment score (post-test), controlling for the self-assessment score at the start of training (pre-test), thereby introducing 'growth' as the actual dependent variable (Cronbach, 1970). For the influence of the training institute on growth, a General Linear Model (GLM) analysis was applied (Anonymous, 1997). To investigate whether a combination of potentially influencing background variables could better explain the growth of self-perceived competence, we performed a multiple regression analysis. Moreover, in a regression analysis the growth of knowledge and skills during the course was introduced by controlling the knowledge test scores on the end measurement for those on the start measurement.

Results

Subjects

Out of 191 trainees, 190 completed the first self-assessment questionnaire and 128 the second one. The 127 responders who completed both questionnaires did not significantly differ from the non-responders with respect to age, time between graduation and the start of postgraduate training, entry level of general knowledge and knowledge of skills (*t*-test, $p > 0.05$). The percentage male trainees of the responders were a little higher than the one of the non-responders (47% vs. 41%). Seven of the 8 Dutch training institutes were represented with a minimum of 4 and a maximum of 34 trainees.

Self-assessment questionnaire

In Table I the results per domain of self-perceived clinical competence are presented. Self-perceived knowledge increased from 'some knowledge' to a level between 'some-' and 'considerable knowledge'. For self-perceived clinical skills trainees started with a level between 'moderate' and 'reasonable'

Table I. Mean scores and standard deviations (SD) of the domains knowledge, clinical skills and consultation skills of the self-assessment questionnaire

Domain	*N*	Start of training Mean (SD)	End of training Mean (SD)	Significance*
Knowledge (3-point scale)†	123	2.0 (0.2)	2.5 (0.3)	$p < 0.001$
Clinical skills (4-point scale)**	125	2.5 (0.4)	3.2 (0.3)	$p < 0.001$
Consultation skills (4-point scale)**	127	2.1 (0.4)	3.4 (0.4)	$P < 0.001$

**t*-test.
†1 = none, 2 = some, 3 = considerable.
**1 = hardly any, 2 = moderate, 3 = reasonable, 4 = good.

Table II. Partial correlations between *the growth of* self-perceived knowledge, clinical skills and consultation skills, respectively, and the potentially influencing factors

Potentially influencing background variables	Self-perceived knowledge		Self-perceived clinical skills		Self-perceived consultation skills	
	Corr	*N*	Corr	*N*	Corr	*N*
Age	−0.07	118	0.02	120	−0.07	122
Prior medical experience	−0.07	120	0.01	122	−0.06	124
Gender	−0.09	120	0.12	122	−0.03	124
Effort	−0.10	119	−0.16	121	−0.10	123
Insight	0.04	120	0.04	122	0.05	124
GKT* start measurement	−0.03	120	−0.0	122	−0.04	124
GKT* end measurement	0.19	107	0.10	109	0.1	111
KTS† start measurement	0.01	120	0.07	122	−0.05	124
KTS† end measurement	0.07	85	−0.07	87	−0.1	89

*General knowledge test.
†Knowledge test of skills.

mastery and it increased to 'more-than-reasonable' mastery. Self-perceived consultation skills showed the greatest increase, from 'moderate' mastery to a level between 'reasonable' and 'good' mastery. All differences were statistically significant.

Background variables

Background variables were normally distributed. Table II shows the partial correlations, representing the relation of the variables age, prior medical

experience, gender, effort, insight and knowledge test scores with the growth of self-perceived knowledge, clinical skills and consultation skills.

For none of these background variables a relation with growth in self-perceived competence was demonstrated. Training institute as background variable also showed no influence on the growth of self-perceived competence.

The regression analyses yielded no evidence for a significant contribution of the chosen variables to the growth in self-perceived knowledge, clinical and consultation skills, respectively. For the three domains less than 25% of the variance was explained by all variables in combination.

Discussion

The results of this study show that a three-year postgraduate training in general practice, comprising both learning in a clinical setting and additional special education, improved the extent to which trainees considered themselves competent in performing knowledge relevant to general practice, clinical skills and consultation skills. Moreover, they felt themselves sufficiently competent on all aspects at the end of the course. With regard to the three examined domains of clinical competence, we found a somewhat different 'growth' pattern. At the start of the course trainees considered themselves more or less as competent in knowledge as in clinical skills, whereas they felt less competent in consultation skills. At the end this was the opposite. Apparently, the training enhanced the feeling of being competent in consultation skills more than in knowledge and clinical skills.

Our second research question was whether or not background variables could be found that explained the growth of self-perceived competence. With regard to the selected variables (age, prior medical experience, gender, training institute, the effort someone has spent upon her/his education, insight in weak and strong areas of clinical competence and knowledge test scores), the results of this study did not provide conclusive evidence.

The overall result of the first part of our study confirmed what we assumed: postgraduate training supports self-perceived clinical competence. The difference in growth between the three distinguished domains was unexpected but consistent with the results of the second part of the study, that is that an increase in self-perceived clinical competence cannot be explained by an increase in objectively measured clinical competence. As it happens, we have examined in three other studies, including the same cohort of trainees, the growth of objectively assessed knowledge, clinical skills and communication skills (Kramer et al., 2003a, b, 2004). In these studies an increase of knowledge and clinical skills was shown but not for communication skills. So, here again we see a difference between objectively measured

and self-assessed growth. From the literature we know that a direct relation between self-assessed and objectively measured clinical competence seems not to exist (Kegel-From, 1975; Marel et al., 2000; Speechly et al., 1994). Our study shows that also the growth of both of them during training seems not to be related to each other. This finding confirms the assumption that self-assessment of clinical competence measures something different than objectively measured clinical competence.

Apparently, factors other than an increase of 'real' competence enhance the feeling of being competent. Unfortunately, our study does not seem to reveal the identity of such factors, as the other examined background variables also did not explain the growth of self-perceived competence. For instance, it is surprising that insight in weak and strong areas of clinical competence was not related to an increase of self-perceived competence.

Our findings extend the confusion about what is measured by self-assessment of competence. In the literature several aspects have been mentioned that may refer to the concept of it: self-confidence (Kegel-From, 1975; Swanwick 2005), potential or ideal performance and effort (Risucci, 1989; Woolliscroft et al., 1993), defensiveness (Harris and Schaubroeck, 1988), maintenance of self-esteem (Woolliscroft et al., 1993; Swanwick 2005), non-cognitive competence (Arnold et al., 1985), self-attributions (Gordon, 1991) and 'more analogous to a personal characteristic than to problem solving behaviour' (Fitzgerald, 2000). Although all these interpretations may be plausible, we have not found a publication in which the theoretical concept of self-assessment in medical education has been explained profoundly. As self-assessment of competence is widely used as an assessment procedure in medical education, and even becomes more prominent in competency-based curricula, and the importance of it for self-directed learning and professional autonomy is well established (Miller, 1976; Gordon, 1991; Irvine, 1997; Oermann, 1998; Ward et al., 2002; Mattheos et al., 2004), the need for such a theoretical explanation is urgent. Very recently, Eva and Regehr came to the same conclusion after a thorough reflection on the functions of self-assessment for a health care professional and a review of psychology literature focused on self-assessment (Eva and Regehr, 2005).

In conclusion, we have shown in this study that a 3-year postgraduate training in general practice enhances the self-perceived competence in knowledge, clinical skills and consultation skills. However we still do not know how to explain this improvement. More study into the theoretical concept of self-assessment and into the factors contributing to the feeling of being competent, is required.

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