

Patients' experience of chronic illness care in a network of teaching settings

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Abstract

Objective To evaluate chronic illness care delivery from the patient's perspective and to examine its main correlates.

Design Cross-sectional, descriptive study using questionnaires and medical chart review.

Setting Nine teaching family practices in Quebec.

Participants A total of 364 patients with diabetes, hypertension, or chronic obstructive pulmonary disease.

Main outcomes measures Score on the Patient Assessment of Chronic Illness Care (PACIC) questionnaire, which evaluates the patient's perspective on the care received based on the chronic care model (CCM); patients characteristics (sex, level of education, number of chronic illnesses); patient-physician relationship (relational continuity, interpersonal communication assessed from the patient's perspective); and interdisciplinary care and technical quality of care abstracted from patients' medical charts.

Results The mean PACIC score obtained (2.8 out of 5) indicates that, on average, CCM-concordant care "generally did not occur" or occurred only "sometimes" in this network of teaching practices. However, with a mean technical quality-of-care score of nearly 80%, physicians in this network showed a high degree of adherence to clinical guidelines for the chronic illnesses under study. Patient education level lower than high school was negatively associated with PACIC scores, while positive associations were found with male sex, number of chronic illnesses, relational continuity, interpersonal communication, interdisciplinary care, and technical quality of care.

Conclusion Patients with less education reported receiving less CCM-concordant care. The patient-physician relationship was the strongest correlate of PACIC scores, while interdisciplinary care and technical quality of care had modest contributions.

EDITOR'S KEY POINTS

- The chronic care model (CCM) is now considered to be an ideal approach for managing chronic illnesses. The CCM is focused on providing proactive, planned, coordinated, and patient-centred care.
- The Patient Assessment of Chronic Illness Care questionnaire is considered the best instrument to evaluate quality of care based on the views of patients with chronic illnesses. This study examines patients' perspectives on the quality of chronic illness care in a network of primary care teaching clinics.
- The mean Patient Assessment of Chronic Illness Care score obtained in this study indicated that, on average, CCM-concordant care occurred "a little of the time" or "some of the time." The results suggest that physicians in the teaching practices studied were better at providing good technical quality of care than at giving optimal CCM care. There seems to be room for improvement in this network of teaching practices in the implementation of CCM care.

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Ce que les patients pensent des soins aux malades chroniques dans un réseau d'établissements d'enseignement

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Résumé

Objectif Évaluer la prestation des soins pour maladies chroniques du point de vue des patients et examiner ses principaux corrélats.

Type d'étude Étude descriptive transversale à l'aide de questionnaires et d'une revue de dossiers.

Contexte Neuf établissements de pratique familiale au Québec.

Participants Un total de 364 patients souffrant de diabète, d'hypertension ou de maladie pulmonaire obstructive chronique.

Principaux paramètres à l'étude Score au questionnaire *Patient Assessment of Chronic Illness Care* (PACIC), lequel évalue ce que les patients pensent des soins reçus par comparaison avec le *Chronic Care Model* (CCM); caractéristiques des patients (sexe, scolarité, nombre de maladies chroniques); relation patient médecin (continuité de la relation, communication interpersonnelle d'après les patients); et soins interdisciplinaires et qualité technique des soins, tels qu'évalués à partir des dossiers des patients.

Résultats Le score moyen obtenu au PACIC (2,8 sur 5) indique que dans ce réseau d'établissements d'enseignement, des soins conformes au CCM « n'ont généralement pas été prodigués » ou « qu'ils ont été prodigués à l'occasion seulement ». Toutefois, comme le score moyen pour la qualité des soins était de près de 80%, il est certain que les médecins de ce réseau ont très bien appliqué les directives cliniques pour les maladies chroniques à l'étude. Chez les patients, une scolarité inférieure au niveau secondaire était inversement reliée au score au PACIC, alors qu'une relation positive était observée avec le sexe mâle, le nombre de maladies chroniques, la continuité de la relation, la communication interpersonnelle, les soins interdisciplinaires et la qualité technique des soins.

Conclusion Les patients moins instruits disaient recevoir des soins moins conformes aux CCM. La relation patient-médecin était le plus important corrélat du score obtenu au PACIC, tandis que les soins interdisciplinaires et la qualité technique des soins n'avaient qu'une contribution modeste.

POINTS DE REPÈRE DU RÉDACTEUR

- À l'heure actuelle, le *Chronic Care Model* (CCM) est considéré comme la façon optimale de traiter les maladies chroniques. Le CCM vise essentiellement la prestation de soins qui soient proactifs, planifiés, coordonnés et centrés sur le patient.

- Le questionnaire *Patient Assessment of Chronic Illness Care* est considéré comme le meilleur instrument pour évaluer la qualité des soins à partir de l'opinion de malades chroniques. Cette étude voulait connaître ce que les patients pensent de la qualité du traitement des maladies chroniques dans un réseau de cliniques universitaires de soins primaires.

- Le score moyen obtenu au *Patient Assessment of Chronic Illness Care* dans cette étude indique qu'en moyenne, des soins conformes au CCM ont été prodigués « très peu souvent » ou « à certaines occasions ». Ces résultats donnent à croire que les médecins de ces établissements de pratique universitaires étaient meilleurs pour prodiguer des soins de bonne qualité technique que pour donner des soins optimaux conformes au CCM. Il y aurait donc place à l'amélioration dans la prestation de soins conformes au CCM dans ce réseau d'établissements d'enseignement.

Cet article a fait l'objet d'une révision par des pairs.
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The chronic care model (CCM)¹ is now considered an ideal approach for managing chronic illnesses. The CCM is focused on providing proactive, planned, coordinated, and patient-centred care. A recent meta-analysis has shown that interventions that include at least 1 of the model's component parts result in better care processes for patients who have chronic illnesses and lead to better clinical outcomes.² Further, CCM-concordant care is now considered a clear indicator of quality.³ Because CCM-based care must be patient-centred, it is crucial to obtain patients' views on the quality of care received. The Patient Assessment of Chronic Illness Care (PACIC) questionnaire⁴ is considered the best instrument to evaluate quality of care based on the views of patients with chronic illnesses.⁵ Many US⁶⁻¹¹ and European studies¹²⁻¹⁷ have used the PACIC to measure CCM-concordant care, but no Canadian study has yet examined this crucial aspect of the quality of care.

Among the factors that could facilitate or hinder CCM-based care, the quality of the patient-physician relationship probably plays an important role. Individuals with chronic illnesses need to learn how to manage their own care to better control their illnesses and prevent complications¹⁸; and to acquire these skills, patients need support from their physicians. Good communication, therefore, needs to be established between the physician and the patient.¹⁹ The quality of interpersonal communication has been positively associated with obtaining CCM-based care^{4,14,16} and with better outcomes for people with chronic illnesses.^{10,20} However, interpersonal continuity (the existence of an ongoing relationship with the same physician)²¹ has never been linked to obtaining CCM-based care. Interpersonal continuity plays an important role in establishing a relationship of trust with the physician^{22,23} and is associated with better care²⁴ and better outcomes for patients with chronic illnesses.²⁵

Beyond the quality of the patient-physician relationship, the role of other professionals is also crucial in determining the quality of care provided to those with chronic illnesses. Nurses, nutritionists, medical specialists, and other health professionals can make important contributions to ongoing care for chronic illnesses and can support self-managed care.²⁶⁻²⁹ It is therefore likely that the involvement of nonphysician professionals helps in providing CCM-based care.

Finally, in addition to CCM concordance, the quality of care provided to those with chronic illnesses also includes specific interventions recommended in clinical practice guidelines (CPGs), such as administering certain tests at regular intervals and prescribing medication. Access to appropriate information, which includes CPGs to support evidence-based care, is in fact 1 of the 6 characteristics of the CCM.¹ This more

technical dimension of quality is usually assessed using a rigorous method for analyzing medical charts.^{27,30,31} To our knowledge, no study has formally addressed the link between these 2 dimensions of quality, CCM concordance and use of CPGs.

Our study was aimed at examining patients' perspectives on quality of chronic illness care in a network of primary care teaching clinics. Our main research question was "What are the correlates of CCM-concordant care?" We formulated 3 specific hypotheses: patients would be more likely to report receiving CCM-concordant care if 1) they had good and sustained relationships with their primary physicians; 2) they received care from other health professionals such as nurses or nutritionists; and 3) they received high technical quality of care (TQC), as determined by abstraction from medical charts.

METHODS

Study design and setting

For this descriptive, cross-sectional study, patients were recruited in the waiting rooms of 9 teaching family practices affiliated with the University of Montreal in Quebec. Five of the practices were located in Montreal, 3 in urban settings outside of Montreal, and 1 in a remote region of the province of Quebec. The organizational characteristics of these teaching units were comparable: located in a public health care centre (community health centre or hospital), 7 to 10 full-time-equivalent family physicians remunerated on an hourly basis (no fee-for-service remuneration), presence of 1 to 3 nurses and a psychosocial professional (social worker or psychologist), 10 to 20 family medicine residents attached to the unit for 2 years, and no electronic medical record. The study was approved by the Ethics Board of the Research Centre of the University of Montreal Hospital Centre.

Populations studied

Hypertension, diabetes, and chronic obstructive pulmonary disease (COPD) were the 3 chronic illnesses selected for study because of their high prevalence in primary care; the existence of unequivocal evidence-based, quality-of-care criteria linking care process indicators to meaningful clinical outcomes; and the availability of indicators for general medicine practices validated in settings comparable to those being studied.^{30,32} To be eligible, patients had to be 18 years of age or older; report having had a diagnosis of type 2 diabetes, hypertension, or COPD for at least 2 years; and have been followed by the practice for at least 2 years, as some indicators required an observation period of more than 12 months. Diagnoses, duration of diagnoses, and length of affiliation to the practice were verified in the medical chart by trained chart abstractors.

Variables studied

The main variable was the CCM concordance of the care provided, as evaluated by the Patient Assessment of Chronic Illness Care (PACIC) survey.⁴ The PACIC is a 20-item self-report questionnaire that assesses the implementation of the CCM from the patient perspective. Patients are asked to rate the frequency with which they receive such care on a 5-point scale ranging from 1 (none of the time) to 5 (always).

Patient characteristics measured were sex, age, education level (elementary school vs high school or greater), and number of chronic illnesses from the Chronic Conditions Checklist of the Primary Care Assessment Survey (PCAS).³³ Three dimensions of the patient-physician relationship were measured: relational continuity, assessed by the PCAS "accumulated knowledge" scale,³³ which refers to patients' perceptions of their physicians' knowledge of their medical history, responsibilities at work, home, or school, and principal health concerns, values, and beliefs; interpersonal communication, calculated as the mean score on the "interpersonal treatment" and "interpersonal communication" PCAS scales³³; and usual-provider continuity, measured from the patient's medical chart as the proportion of medical visits with the usual provider among all that patient's medical visits at the clinic during a 2-year period.

Interdisciplinary care was assessed by the number of visits with nonphysician professionals at the clinic during the previous 2 years, as abstracted from the medical chart. These nonphysician professionals could be nurses, social workers, nutritionists, or psychologists. Technical quality-of-care indicators were based on current guidelines for the management of each chronic illness at the time of the study (in 2007),³⁴⁻³⁶ and on validation work on their applicability to family medicine settings in Canada and in the United Kingdom.³⁰⁻³² In addition, the proposed indicators were reviewed by a panel of family physicians from the teaching units and then piloted on 10 charts for each condition in each of the study settings (270 charts total) to verify their applicability to the study's context. The final set of indicators is shown in **Box 1**. Illness-specific composite scores were computed as the number of indicators for which a patient had received appropriate care, divided by the total number of indicators relevant to that patient, then multiplied by 100. A separate score was calculated for each patient for each chronic illness under study. An overall individual TQC score was then calculated as the mean of all illness-specific scores applicable to each patient. Given that 4 different chart abstractors participated in the project, interrater reliability of this overall TQC score was assessed on 10% of the abstracted charts with intraclass correlation coefficient statistics and proved to be excellent (intraclass correlation coefficient = 0.84, $P < .001$).

Data analysis

Statistical analyses were performed with SPSS, version 16.0. First, descriptive statistics were used to determine the sample's characteristics. Second, bivariate analyses (Pearson correlations for continuous variables and t tests for categorical variables) were conducted to identify the variables significantly ($P < .05$) associated with the main outcome variable (PACIC score) in order to include them in the multivariate regression. Third, a 4-step hierarchical linear regression analysis was conducted to determine the associations between PACIC scores and patient characteristic factors (step 1), patient-physician relationship variables (step 2), interdisciplinary care (step 3), and TQC (step 4).

RESULTS

Patients were recruited from May 2007 to June 2008. **Figure 1** illustrates the recruitment process (response rate of 81.1%). Some patients ($n = 44$) were excluded from the study after chart review showed they were not eligible (diagnosis not confirmed or patients followed for less than 2 years), resulting in a final sample of 364 patients.

Table 1 displays descriptive statistics for the variables under study. Most patients were female, and the mean age was 65 years. Participants had a mean of almost 5 chronic illnesses, and their level of physical and mental functioning was comparable to other samples of chronic illness patients in primary care.^{37,38} Statistical distributions for the 3 chronic illnesses' individual TQC scores in our sample did not differ from one another (data not shown), making the overall TQC score an appropriate variable for further analyses. Overall TQC was high (mean = 78.7), but respondents reported only "sometimes" (mean = 2.8) receiving CCM-concordant care.

Bivariate analysis partly confirmed our hypotheses. The PACIC score was positively related to relational continuity, interpersonal communication, interdisciplinary care, and TQC (**Table 2**). However, no relationship was observed with usual-provider continuity. Relational continuity had the strongest correlation with PACIC score. Some patient characteristics were associated with the PACIC score: men had, on average, higher mean PACIC scores than women did (2.97 vs 2.75, $t = 2.16$, $P < .05$), while patients with elementary educational level had, on average, lower mean scores than those with high school education or greater did (2.62 vs 2.90, $t = -2.20$, $P < .05$). The PACIC score was positively associated with patients' number of chronic illnesses, but negatively correlated with age (**Table 2**).

Variables significantly associated with PACIC scores were included in the multiple regression analyses. Results indicate that each step of the hierarchical linear analysis explained a significant ($P < .001$) amount of the variance

Box 1. Final set of technical quality-of-care indicators: Data were abstracted from patients' medical charts.
Diabetes

1. Note indicating the patient's weight dated within the past 15 mo.
2. Two BP readings done within the past 15 mo.
3. If the last BP reading was > 130/80 mm Hg: Change of treatment or a note indicating that it has been recognized and a follow-up is planned, or a note indicating that BP follow-up at home or in the community is optimal.
4. Note indicating that a visual examination of the feet was done within the past 15 mo.
5. Note indicating that a retinal examination was done within the past 24 mo.
6. Note indicating that the peripheral pulses were checked in the past 15 mo.
7. Peripheral neuropathy screening was done within the past 15 mo (filament test or tuning fork test).
8. If the patient is a man: Indication that erectile dysfunction screening was done within the past 15 mo (questionnaire on sexual function).
9. Results of 2 hemoglobin A_{1c} tests done within the past 15 mo.
10. Results of microalbuminuria screening done within the past 15 mo.
11. If there is microalbuminuria or proteinuria: Note indicating that appropriate follow-up was done.
If there is only one abnormal microalbuminuria result: confirmation of the result.
If microalbuminuria or proteinuria has been confirmed: treatment with an ACEI or ARB if there is no contraindication.
12. Results of serum creatinine testing done within the past 15 mo.
13. Lipid profile done within the past 36 mo.
14. If LDL \geq 2.1 mmol/L: Note indicating that a statin was prescribed, note that the dose of a statin already prescribed was increased, or an explanation provided in the note.
15. Note indicating a prescription for ASA or other antiplatelet medication.
16. Note indicating that instruction in diabetes management (self-care) was provided: Follow-up with another professional in the clinic specifically for diabetes education (nurse, pharmacist, or dietitian); or referral outside the clinic to a dietitian, nurse specialist, specialist physician (endocrinology or internal medicine), or diabetes teaching centre.

Hypertension

1. Note indicating that the patient has had a visit with a health professional at the clinic in the past 9 mo.
2. Note indicating that at least 1 BP reading was done in the office in the past 9 mo.
3. Results in the chart of 1 BP reading done either at home or in the community (CLSC, pharmacy) in the past 15 mo.
4. If the patient does not have diabetes and the last BP reading was > 140/90 mm Hg: Note indicating that the BP readings done in the community were < 135/85 mm Hg or that treatment was adjusted, or a note explaining why the treatment was not changed. (This indicator has already been covered for those with diabetes.)
5. If the patient has been followed for at least 3 y: Presence in the chart of a lipid profile done within the past 36 mo.
6. Note indicating that a creatinine, sodium, and potassium profile was done within the past 15 mo.
7. If the patient has been followed for at least 3 y: Indication in the chart of a fasting glucose result dated within the past 36 mo.
8. Note indicating that instruction in high BP management (self-care) was provided.

COPD

1. The patient's smoking status is noted in the chart.
2. If the patient is a smoker: Note indicating that smoking cessation counseling has been provided within the past 24 mo.
3. Note indicating that the patient was checked for frequent respiratory infections or episodes of exacerbation in the past 15 mo.
4. Assessment of the degree of dyspnea experienced over the past 15 mo.
5. Note indicating a prescription for bronchodilators (short-acting) dated within the past 15 mo (β -agonist or anticholinergic drug).
6. If steroid presence found on inhalation: Note indicating that there is a long-acting bronchodilator (β -agonist or anticholinergic drug).
7. If the patient has moderate to severe COPD: Note that an action plan was explained or prescribed.

ACEI—angiotensin-converting enzyme inhibitor, ARB—angiotensin receptor blocker, ASA—acetylsalicylic acid, BP—blood pressure, CLSC—centres locaux de services communautaires, COPD—chronic obstructive pulmonary disease, LDL—low-density lipoprotein.

in PACIC scores over and above the variance presented in the previous steps of the model (Table 3). The patient-physician relationship was the strongest correlate of the PACIC score, as relational continuity and interpersonal communication accounted for an additional 12% of the explained variance in our analyses. Interdisciplinary care and TQC were positively associated with CCM-concordant care, but their contributions were modest. The final model explained 22% of the overall variance.

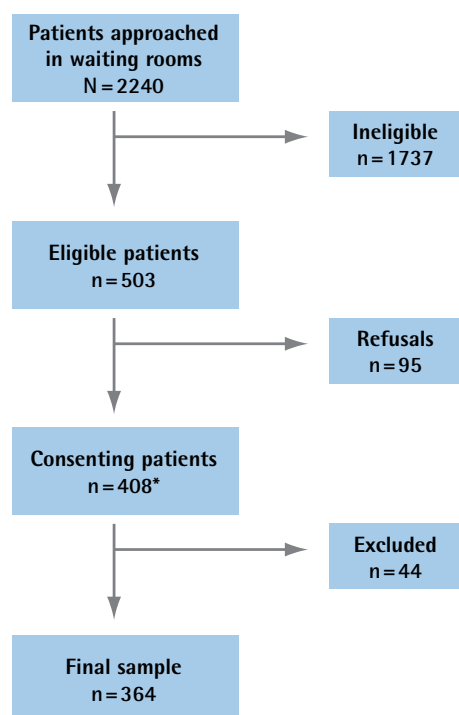
DISCUSSION

The mean PACIC score of 2.8 obtained in our study indicates that, on average, CCM-concordant care occurred "a little of the time" or "some of the time." This result is similar to that found in other samples of patients having 1 or more chronic illnesses,^{4,7,11} although it is inferior to the mean scores of 3.1 and 3.2 reported in some US studies.^{8,9} In a recent study, a high quality of

chronic illness care was defined as having a PACIC score between 4 and 5, indicating that the care process evaluated occurred "most of the time" or "almost always."⁷ In another study, the cutoff value to indicate a high level of CCM concordance was set at 3.5 or higher on the PACIC survey.⁹ Therefore, there seems to be room for improvement in this network of teaching practices in the implementation of CCM care. However, with a mean TQC

score of nearly 80%, physicians in this network showed a high degree of adherence to technical guidelines for the chronic illnesses under study. This can probably be explained in part by the settings' academic context

Figure 1. Patient recruitment process



*Response rate is 408/503 = 81.1%.

Table 1. Descriptive statistics of main study variables: N = 364.

CHARACTERISTICS	VALUES
Mean (SD) age, y	64.9 (11.8)
Sex, n (%)	
• Male	145 (39.8)
• Female	219 (60.2)
Educational level, n (%)*	
• Elementary	78 (23.1)
• High school or greater	25 (76.9)
Chronic illness, n (%)	
• Diabetes	173 (47.5)
• Hypertension	300 (82.4)
• COPD	89 (24.5)
Mean (SD) no. of chronic conditions	4.7 (2.7)
Functional capacity, mean (SD) score (0 to 100)	
• Physical (SF-12 MCS)	41.4 (11.9)
• Mental (SF-12 PCS)	46.8 (11.4)
Interpersonal communication and treatment, mean (SD) score (0 to 10)	9.1 (1.2)
Usual provider continuity, mean (SD) score (0 to 100)	79.9 (24.3)
Mean (SD) TQC score (0 to 100)	78.7 (17.8)
Mean (SD) PACIC summary score (1 to 5)	2.8 (1.0)

COPD—chronic obstructive pulmonary disease, PACIC—Patient Assessment of Chronic Illness Care, SF-12 MCS—Short Form-12 Mental Health Composite Scale, SF-12 PCS—Short Form-12 Physical Health Composite Scale, TQC—technical quality of care.

*Number of patients does not add to 364 owing to missing data.

Table 2. Pearson correlations between PACIC score and study variables

VARIABLE	1	2	3	4	5	6	7
1. Age							
2. No. of conditions	0.06						
3. Relational continuity	0.07	-0.04					
4. Usual provider continuity	0.12*	0.02	0.20 [†]				
5. Interpersonal communication	0.06	0.01	0.60 [†]	0.23 [†]			
6. Interdisciplinary care	-0.08	0.04	0.00	-0.15*	-0.06		
7. TQC	0.00	0.03	-0.08	-0.11*	-0.06	0.16 [†]	
8. PACIC score	-0.10	0.12*	0.30 [†]	0.06	0.13*	0.13*	0.14 [†]

PACIC—Patient Assessment of Chronic Illness Care, TQC—technical quality of care.

*P < .05.

[†]P < .001.

*P < .01.

Table 3. Results of the 4-step hierarchical linear regression analyses on the PACIC score

VARIABLES	STEP 1, β (95% CI) $R^2 = 0.07^*$	STEP 2, β (95% CI) $R^2 = 0.19^*$	STEP 3, β (95% CI) $R^2 = 0.20^*$	STEP 4, β (95% CI) $R^2 = 0.22^*$
Sex (reference female)	0.35 (0.13 to 0.57) [†]	0.34 (0.13 to 0.55) [†]	0.34 (0.13 to 0.54) [†]	0.33 (0.12 to 0.53) [†]
Education (reference high school or greater)	-0.39 (-0.65 to -0.13) [†]	-0.32 (-0.57 to -0.07) [†]	-0.31 (-0.55 to -0.06) [†]	-0.30 (-0.54 to -0.05) [†]
No. of conditions	0.06 (0.02 to 0.10) [†]	0.06 (0.02 to 0.10) [†]	0.06 (0.02 to 0.10) [†]	0.06 (0.02 to 0.10) [†]
Relational continuity		0.10 (0.03 to 0.16) [†]	0.09 (0.02 to 0.16) [†]	0.10 (0.03 to 0.17) [†]
Interpersonal communication		0.17 (0.06 to 0.29) [†]	0.19 (0.07 to 0.30) [†]	0.19 (0.08 to 0.30) [†]
Interdisciplinary care			0.05 (0.01 to 0.08) [†]	0.04 (0.005 to 0.07) [†]
TQC				0.008 (0.002 to 0.01) [†]

PACIC—Patient Assessment of Chronic Illness Care, TQC—technical quality of care.

* $P < .001$.

[†] $P < .001$.

[‡] $P < .05$.

and their teaching mission. Clinical teaching in training settings might focus less on implementation of the CCM than on technical quality, which is more easily evaluated. More specific and precise recommendations concerning CCM-concordant care could be helpful to improve the training of residents.^{39,40}

Contrary to previous studies showing no sex differences in PACIC scores^{6,8,12,14} or slightly better scores in female participants,^{4,16} our study found male sex to be independently and positively associated with CCM-concordant care. This difference is difficult to explain and would need to be replicated in other samples. However, as Jackson et al (2008)⁹ also observed in a sample of patients with diabetes, we found that level of education was inversely associated with PACIC scores. Given the large social inequalities in health in industrialized societies and the fact that they lead to higher mortality rates among the socioeconomically disadvantaged,⁴¹ more studies will be needed to better understand the causes of this disparity in the quality of care provided for chronic illnesses.

Finally, in our study, a high-quality patient-physician relationship, particularly with respect to relational continuity and patient-focused communication, was, of the elements we considered, the most strongly associated with patient-reported degree of CCM-concordant care. These results are consistent with those of earlier studies⁴²⁻⁴⁴ and confirm the importance of taking time to discuss with patients their needs and expectations, and to establish a collaborative relationship to support more effectively the management of their chronic illness.

Limitations

Our study was limited by a cross-sectional design that prevented us from examining causality and thereby determining the direction of the associations observed. Our convenience sample recruited in waiting rooms is biased by the fact that the probability of being recruited

was directly related to the intensity of visits to the clinics. On one hand, the patients recruited were more likely to be those who were best followed; but on the other, it is also possible that these were the patients with whom it was most difficult to achieve target outcomes. Our analyses also did not account for data clustering. However, all of our study practices were teaching units with similar organizational-level characteristics, and our objective was not to examine the associations between these and CCM-concordant care. The fact that the study was conducted in training settings is another limitation in terms of the generalizability of our results.

Conclusion

Optimal management of chronic illnesses in primary care necessarily involves implementing the CCM. Our study shows that patients receiving guideline-concordant technical care for their chronic illness are more likely to report receiving CCM-concordant care, as well. Our results also suggest that physicians are better at providing good TQC than at giving optimal CCM care. The CCM requires a new set of competencies for physicians, and it probably requires more training to implement than do CPGs. This study is not the first to find a negative association between low levels of patient education and CCM-concordant care. This factor needs to be taken into account when offering chronic illness care to vulnerable groups.

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Contributors

All authors contributed to concept and design of the study; data gathering, analysis, and interpretation; and preparing the manuscript for submission.

Competing interests

None declared

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