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ABSTRACT

Background: Achieving glycaemic control in diabetes reduces complications and improves outcomes. Glycaemic control requires both good quality clinical care and effective self-management support. However, the relationship between these factors in routine clinical practice is unclear.

Aims: To evaluate baseline levels of self-management and clinical quality of care in patients with type 2 diabetes in primary care in Mexico and to explore relationships between measures of self-management and clinical quality of care.

Methods: The sample consisted of adults (N=205) diagnosed with type 2 diabetes for over a year and registered at one of five practices in the Mexican Institute of Social Security in Aguascalientes. Self-management and quality of care were measured using medical record review and interviews, including validated measures of diabetes knowledge, self-care behaviours, self-efficacy, treatment intensification, continuity of care, doctor-patient communication, and patient satisfaction with diabetes care. HbA1c and cholesterol tests were taken.

Results: There were few associations between measures of self-management, and between measures of the quality of clinical care. ‘Strong’ knowledge about medical prescription was associated with higher diabetes knowledge (OR = 1.2, 95% CI 1.08 to 1.32). Diabetes self-efficacy was associated with self-care behaviours (OR = 1.51, 95% CI 1.26 to 1.81). Patient-doctor communication was associated with continuity of care (Chi-squared = 11.03, P <0.05), with patient satisfaction ($\beta = 6.17$, 95% CI 4.47 to 7.93) and with diabetes self-efficacy ($\beta = 0.70$, 95% CI 0.19 to 1.20, P <0.01). Patient satisfaction was associated with continuity of care (F = 7.82, P <0.001).

Conclusion: The associations between measures of self-management and quality of care were modest. Patients who were achieving high levels of one aspect of care were not necessarily receiving high levels of the other. This indicates that different factors are likely to be driving each aspect of care and highlights the importance of measuring their relative importance.

Keywords: type 2 diabetes mellitus, primary care, self-management, quality of healthcare.

How this fits in with quality in primary care

What do we know?

• Good quality of care and effective self-management can improve diabetes outcomes but the relationship between these aspects of care is not clear.

What does this paper add?

• There are multiple dimensions relevant to self-management and quality of care.

• Although different measures of quality of care are correlated, and different measures of self-management are correlated, measures of quality of care and self-management do not show strong association.

• Many patients are not receiving high levels of clinical quality of care and/or practicing good self-management. Self-management and quality of care dimensions should be evaluated separately to find out their contribution to diabetes outcomes.

Introduction

Improving the management of long-term conditions such as diabetes is a priority for health systems worldwide because the global burden of diabetes is rising. The number of people with diabetes is increasing with an estimate of 381.8 million for 2013 and 591.9 million for 2035 (increase of 55%). In 2013, diabetes accounted for 5.1 million deaths and 11% of total health care expenditure worldwide.
Models such as the Chronic Care Model (CCM) have been proposed to drive quality improvement activities and to improve outcomes. The CCM includes six elements to achieve optimal care: community resources and policies, health care organisation, self-management support, delivery system design, decision support, and clinical information systems. The core assumption is that changes in these elements of care will impact on both the delivery of high quality clinical care and effective patient self-management. High quality clinical care includes processes such as appropriate monitoring and treatment of glycaemic control, diabetes complications, and other risk factors. Effective self-management includes attention to patients’ lifestyle behaviour in terms of healthy diet, physical activity, medication concordance, monitoring of glycaemic control and foot care. Achieving good outcomes requires that patients receive both high quality clinical care and effective self-management.

One of the methodological difficulties faced by complex, multifaceted interventions such as the CCM is that the effect attributable to each element of the model is often unclear. Although the CCM has been proposed as a ‘unified package’, systematic reviews have found that the number of CCM elements included in the studies has not been associated with better outcomes. Those that have focused on the self-management support element of the CCM have shown improvements in process and outcomes of care and this CCM element (together with delivery system design) have been associated with the largest improvements in outcomes. One review concluded that ‘it appears that incorporating self-management support into other intervention components is more likely to achieve sustained improvement in diabetes care’, . However, there is a lack of high quality data on the relative importance of the different components of the CCM on the same outcomes. Very few observational studies have measured both self-management and quality of care at the same time, and most randomised controlled trials focusing on diabetes have not assessed the relative importance of these components.

This study was done within the context of the Mexican National Health System (MNHS). The MNHS provides health services through the Ministry of Health, social security institutions, and private services. Social security institutions provide care for workers and their families who receive full coverage of health services in primary and specialist care. Funding for social security institutions comes from employers, employees, and the government. The main social security is the Mexican Institute of Social Security [Instituto Mexicano del Seguro Social-IMSS] covering nearly half of the total population in Mexico. The Ministry of Health covers those who do not have access to social security institutions. Private services are available to anyone who has the capacity to pay for their health services.

The primary care system in the United Kingdom (UK) and IMSS in Mexico have some differences and similarities. The provision of primary care services in the UK involves multiple providers in different locations (e.g. general practices, pharmacies, dental surgeries) while IMSS provides most primary care services at a common site. The number of primary care services provided at IMSS depends on the size of the site, and smaller sites are usually rural. In both countries patients attend hospitals to receive care that practices are not equipped for (e.g. laboratory tests). General practitioners (GPs) in the UK generally work as part of a team, but GPs in the IMSS system usually work alone. GPs are the first point of contact and gatekeepers to secondary and specialist care in both the UK and IMSS.

In this paper, we explore the following research question:

What is the relationship between self-management and clinical quality of care in patients with type 2 diabetes?

**Patients and methods**

**Context**

This study population was patients with type 2 diabetes recruited from five primary care practices within the Mexican Institute for Social Security in the city of Aguascalientes, Mexico (December 2009 – April 2010). Although there are 6 IMSS primary care practices located in this city, the sixth practice was opened recently (2012) and was not included in the study. The Mexican Institute for Social Security provides health care to most salaried private–sector workers and their families in Mexico. General practitioners act as gatekeepers in IMSS. GPs use an electronic medical record system which includes a template to register and record aspects of diabetes care (i.e. medical prescriptions). The authors used the clinical practice guideline from the Mexican Institute for Social Security, which recommends target levels of fasting blood glucose (FBG) ≤130mg/dl (7.21 mmol/L) or HbA1c ≤7.0%.

The study used a cross-sectional design, with a variety of measures of quality of care and self-management.

Quality of care and self-management are both complex constructs with multiple and diverse aspects that are potentially relevant to outcomes. This study was based on a model (Figure 1) including multiple measures of both quality of care and self-management.

**Figure 1: Model of predictors of glycaemic control in patients with type 2 diabetes.**
management to evaluate the effect attributable to each component and the relative importance of these components in the glycaemic control of patients with type 2 diabetes. In this model, patients’ diabetes knowledge and self-efficacy influence diabetes self-care behaviours.\textsuperscript{15,16} Quality of care for individuals included two dimensions: access (continuity of care) and effectiveness (clinical care and interpersonal care).\textsuperscript{17}

**Measures**

Most of the questionnaires were available in both English and Spanish from the original studies. Three questionnaires were originally developed in Spanish (Medical Prescription Knowledge Questionnaire, Patient Doctor Communication Scale, and Patient Satisfaction with Diabetes Care) and Spanish versions of the other questionnaires were used. Seven interviewers and data extractors were trained to standardise the interview and data extraction procedures.

The questionnaires are described below.

**Self-management measures**

- Diabetes Knowledge Questionnaire (DKQ-24) has 24 items on general diabetes knowledge, and total score ranges from 0 to 24. Higher score means higher diabetes knowledge.\textsuperscript{18} DKQ-24 total score ≥80% was taken as ‘good’ diabetes knowledge.

- Medical Prescription Knowledge Questionnaire (MPKQ) has 3 items on patients’ knowledge of their oral glucose-lowering medications (medication name, dosage and dosing interval). Correct answers to all items indicates ‘strong’ knowledge (‘weak’ otherwise).\textsuperscript{19}

- Diabetes Self-Efficacy (DSE) scale has 8 items on patient’s confidence to perform self-management behaviours including diet, exercise, and problem solving. Total score ranges from 1 to 10. Higher score means higher diabetes self-efficacy.\textsuperscript{20} DSE total score ≥7 was taken as ‘good’ diabetes self-efficacy.

- Summary of Diabetes Self-Care Activities (SDSCA) has 12 items on the frequency of self-management behaviours over the last 7 days.\textsuperscript{21} In this study ‘good’ diabetes self-management was defined as 3 or more behaviours out of diet, exercise, foot care, and taking medications on 4 or more days per week.

- An item from the General Practice Assessment Questionnaire (GPAQ) was used to measure continuity of care, asking patients how often they saw their usual general practitioner.\textsuperscript{22} This item has a 6-point response scale ranging from ‘never’ to ‘always’, with higher scores indicating better continuity of care. ‘Good’ continuity was taken as ‘Always’, ‘Almost always’, or ‘A lot of the time’.

- Appropriate treatment intensification (TI) by the GP was an increase in the number of medications and/or daily dosage in response to high blood glucose levels HbA1c ≥7 or fasting blood glucose ≥130 mg/dl, 7.2 mmol/l.\textsuperscript{12}

- Patient-Doctor Communication Scale has 8 5-point Likert items measuring patients’ perception of GP communication skills, and total score ranges from 8 to 40. Higher score means better communication. ‘Good’ communication was defined as a total score of ≥32 (an average score per item of ≥4).

- Patient Satisfaction with Diabetes Care has 11 five-point Likert items measuring patients’ satisfaction with diabetes care (primary care), and total score ranges from 11 to 55. Higher score means better satisfaction. ‘Good’ satisfaction was defined as a total score of ≥44 (an average score per item of ≥4).

Demographic characteristics collected included age, gender, marital status, level of education, and occupation. Marital status was dichotomised as ‘with partner’ (including married and unmarried but cohabiting) and ‘without partner’ (including divorced, widow/widower, and single). Levels of education were measured and recoded into 5 categories for analysis. Patients were asked about their occupation as an open question and it was coded as ‘with or without paid employment’.

Clinical characteristics included cholesterol level, duration of diabetes in years from interviews, body mass index (BMI) from medical records, comorbidities and complications from interviews, medical prescription from medical records, and depression. BMI was classified as ‘normal weight’ (20-24.9 kg/m\textsuperscript{2}), ‘overweight’ (25-29.9 kg/m\textsuperscript{2}), and ‘obesity’ (≥30 kg/m\textsuperscript{2}).\textsuperscript{14} Medical prescription was a dichotomous variable: monotherapy (one oral glucose lowering medication) and combination therapy (two or more oral glucose lowering medications). Depression was measured with the Beck Depression Inventory (BDI).\textsuperscript{13} The BDI has 21 items reflecting depression symptoms. Each item has four statements arranged in increasing severity (example statements: I do not feel sad, I feel blue or sad, I am blue or sad all the time and I can’t snap out of it, and I am so sad or unhappy that I can’t stand it) with a response scale was from 0 to 3 (total score 0-63). BDI was classified into five categories (none to minimal depression 0-10; mild to moderate depression 10-18; moderate to severe depression 19-29; and severe depression 30-63).

**Samples size and selection**

Assuming a correlation between self-management and quality of care of 0.1, an intra-cluster correlation of 0.1 [recognising that outcomes of patients at the same practice may not be independent, given that they consult the same GP(s)] and 20% loss to follow-up at six months, a sample of 405 patients would enable a difference as small as 0.2 (e.g. 0.25 vs. 0.05) to be detected between the correlations of HbA1c/self-management and HbA1c/quality of care with approximately 75% power at the 5% level of significance.\textsuperscript{24,25}

Given the time and financial constraints of the study, it was decided that 80% of patients would be selected using a consecutive sample (all eligible patients attending an appointment would be approached, whilst the researcher was present in the practice). A random sample of patients on the lists of the practices was also taken to evaluate selection bias (the remaining 20% of the final sample). It was ensured that at least one patient per GP was selected. In the main analysis of all patients, any differences between the two samples would be adjusted statistically.

**Procedures**

YM provided information about the study to medical directors and clinical managers in every practice before recruitment of patients. Potential participants were adults (≥ 40 years old), with a diagnosis of Type 2 diabetes in the medical record, with a current prescription of oral glucose lowering medications, and no insulin prescription. Written informed consent was obtained at recruitment with approval of the Ethics Committee of Research on Human Beings at the University of Manchester (ref 09121) and from the IMSS Local Health Research Committee N° 101 (R-2009-101-12).

YM and a trained research assistant (who had experience from previous research projects) approached patients when they
were attending consultations with general practitioners. After eligibility was confirmed, written informed consent was obtained. At recruitment, patients were asked to attend a blood test within a week at the local hospital to measure HbA1c and cholesterol. After the blood test, YM arranged a home visit to assess self-management and quality of care within a week and obtain demographic and clinical characteristics. It was expected that on average, patients would have low levels of education; therefore, face to face interviews were used to collect data from patients.

Statistical analysis

Baseline data describing the patient sample were summarised using descriptive statistics. The prevalence of current ‘good’, self-management practice and receipt of ‘acceptable’ quality of care within the sample was determined; using published thresholds where available.

The analyses of the relationships between self-management and quality of care were undertaken – using simple linear or logistic regression as appropriate – on the assumption that the former is predicted by the latter.\(^7\) Self-management measures were, therefore, treated as the dependent variable. For associations between self-management measures, we assumed that knowledge ‘determined’ levels of self-efficacy, which, in turn, ‘influenced’ self-care behaviour. For quality, we assumed that continuity affected patient-doctor communication, which, in turn, influenced the doctors’ decision to intensify treatment or not. All three of these factors were thought to impact on patient satisfaction. In this analysis, diabetes knowledge, self-efficacy and patient satisfaction were analysed as continuous variables. Medical prescription knowledge, self-management behaviours, and treatment intensification were analysed using the previously described thresholds. Continuity of care was analysed in four categories: ‘always’, ‘almost always’, ‘a lot of time’, and ‘some of the time or less’. Patient-doctor communication was classified as ‘good’ indicating that patient-doctor communication happened (‘always’ or ‘almost always’). Patient-doctor communication was dichotomised for analytical purposes, due to its extremely skewed distribution. The dichotomy compared patients with a total score of 40 (the maximum possible) with patients scoring <40.

For linear models, bootstrap estimates of error variance were calculated for significance tests (using 10,000 samples) due to the skew that was evident in the distribution of continuous variables. For all models, regression coefficients or odds ratios (and 95% confidence intervals) are reported: the exception being when skew that was evident in the distribution. The dichotomy compared patients with a total score of 40 (the maximum possible) with patients scoring <40.

Quality of care

Only 25% of patients with high FBG levels received treatment intensification, whilst the vast majority under recommended FBG levels continued with the same medical prescription (93%). In total, general practitioners appropriately prescribed medical treatment, based on patients’ glycaemic control, in just over half of the sample (58%). Eighty-seven percent of patients self-reported being seen by their usual GP ‘a lot of the time’, ‘almost always’ or ‘always’. One hundred and forty two patients (69%) reported good communication with their GPs (scoring ≥4 in the patients were prescribed more than one oral glucose lowering medication (68%). The mean cholesterol level was 5.3 mmol/l (SD 0.9; range 3.1 to 8.4). The mean level of HbA1c was 7.9% (SD 2.1; range 4 to 16.5).

Self-management

Summary descriptive data on levels of self-management and quality of care are presented in Table 1.

The mean score on the Diabetes Knowledge Questionnaire was 15.8 (SD 3.6, range 0 to 23) and 25% of patients scored ≥80% correct answers on this questionnaire. Thirty two percent of patients were classified as having ‘strong’ knowledge of their prescription medication. The mean score on the Diabetes Self-Efficacy Scale was 7.0 (SD 1.7; range 2 to 10) and 55% of patients scored ≥7 on this scale. Over half of the participants (57%) reported performing 3 or 4 self-care behaviours on 4 or more days per week.

CONSORT diagram

Figure 2 shows a CONSORT diagram outlining recruitment. There were 270 patients who agreed to participate in the study and who had laboratory and interviews done. The final sample was 205 patients because patients were excluded (mainly for incomplete data from medical records to enable evaluation of treatment intensification) or were lost at follow-up (10%). The average patient age was 60.8 years (SD 10.3; range 40 to 88); 62% of the sample was female, 75% had a partner, 67% had at best primary school education and 72% were not in paid employment. Patients reported having been diagnosed with diabetes for a median of 8 years (inter-quartile range 4 to 14; range 1 to 35). Eighty-eight percent of patients were either overweight (48%) or obese (40%), 68% reported being hypertensive and 54% currently had depression (as assessed by the BDI). More than two-thirds of
the Patient-Doctor Communication Scale), but only 34 patients (17%) were satisfied with their diabetes care (scoring ≥4 in the Patient Satisfaction with Diabetes Care scale).

**Relationships between measures of self-management and quality of care**

The analysis showed that diabetes knowledge (DKQ-24) and prescription knowledge (MPKQ) were associated (OR 1.19, 95% CI 1.08 to 1.32, P <0.01). Knowledge did not ‘determine’ levels of self-efficacy (DSE) and it was not associated with self-care behaviours (SDSCA). Self-care behaviours were ‘influenced’ by self-efficacy (OR 1.51, 95% CI 1.26 to 1.81, P <0.01). For quality, patients who reported being seen by their usual GP ‘always’ (CoC) were more likely to report ‘good’ patient-doctor communication (Chi2 = 11.03, P <0.05). Continuity of care was not associated with treatment intensification (TI).

Table 2 shows that quality of care was rarely predictive of patient self-management: only patient-doctor communication was associated with diabetes self-efficacy (β 0.70, P <0.01). Higher scores on the self-efficacy scale were associated with patients reporting ‘good’ patient-doctor communication.

Self-management and quality of care were also analysed in their relationship with demographic and clinical characteristics of the sample [data available from YM].

Diabetes knowledge was significantly higher in younger patients, those with higher education, and those under

**Table 1. Descriptive data of self-management and quality of care.**

<table>
<thead>
<tr>
<th>Measure</th>
<th>Descriptive data</th>
<th>Threshold data</th>
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</thead>
<tbody>
<tr>
<td><strong>Self-management</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DKQ-24</td>
<td>Mean = 15.8 (SD 3.6)</td>
<td>Good diabetes knowledge: 25%</td>
</tr>
<tr>
<td>MPKQ</td>
<td>Mean = 7.0 (SD 1.7)</td>
<td>Strong knowledge: 32%</td>
</tr>
<tr>
<td>DSE</td>
<td>Mean = 7.0 (SD 1.7)</td>
<td>High self-efficacy: 55%</td>
</tr>
<tr>
<td>SDSCA</td>
<td>Self-care behaviours ≥4 days/week:</td>
<td>Good self-management behaviours</td>
</tr>
<tr>
<td></td>
<td>0: 1%</td>
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<tr>
<td></td>
<td>1: 13%</td>
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<td></td>
<td>2: 29%</td>
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<td></td>
<td>3: 37%</td>
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<td>4: 20%</td>
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<tr>
<td><strong>Quality of care</strong></td>
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<tr>
<td>CoC</td>
<td>Frequency seen by usual GP:</td>
<td>Good relational continuity: 87%</td>
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<td></td>
<td>Some of the time or less: 13%</td>
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<td></td>
<td>A lot of time: 17%</td>
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<td></td>
<td>Almost always: 29%</td>
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<td></td>
<td>Always: 40%</td>
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<tr>
<td><strong>Communication</strong></td>
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<tr>
<td>TI</td>
<td>Mean = 33.1 (SD 8.7)</td>
<td>Good communication: 69%</td>
</tr>
<tr>
<td><strong>Satisfaction</strong></td>
<td>Mean = 37.2 (SD 7.1)</td>
<td>Good satisfaction: 17%</td>
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</tbody>
</table>

| SD = standard deviation |

**Table 2. Relationships between self-management and quality of care.**

<table>
<thead>
<tr>
<th>Measure</th>
<th>DKQ-24</th>
<th>MPKQ</th>
<th>DSE</th>
<th>SDSCA</th>
<th>CoC</th>
<th>Commun</th>
<th>TI</th>
</tr>
</thead>
<tbody>
<tr>
<td>DKQ-24</td>
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</tr>
<tr>
<td>MPKQ</td>
<td>OR 1.19*</td>
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<td></td>
<td>(1.08 to 1.32)</td>
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<tr>
<td>DSE</td>
<td>β -0.001</td>
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<tr>
<td></td>
<td>(-0.07 to 0.06)</td>
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<tr>
<td>SDSCA</td>
<td>OR 1.06</td>
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<td></td>
<td>(0.98 to 1.14)</td>
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<tr>
<td>CoC</td>
<td>F 1.34 [3, 196]</td>
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<tr>
<td>Commun</td>
<td>β 0.21</td>
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<tr>
<td></td>
<td>(-0.81 to 1.31)</td>
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<tr>
<td>TI</td>
<td>β -0.26</td>
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<td></td>
<td>(-1.23 to 0.71)</td>
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<tr>
<td>Satisfaction</td>
<td>β -0.02</td>
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<td>(-0.09 to 0.05)</td>
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| β = unstandardized regression coefficients including percentile bootstrap confidence intervals in parentheses; OR = odds ratio with confidence intervals in parentheses; significant associations are indicated in bold typeface= * P-value <0.05, † P-value <0.01; figures in square brackets represent degrees of freedom for F and Chi-squared tests (omnibus tests comparing all levels of CoC). |
combination therapy. ‘Strong’ knowledge about medical prescription was associated with having higher levels of education. Patients were significantly more likely to perform self-management behaviours if they had higher education or lower levels of depression. Diabetes self-efficacy was significantly higher in patients with higher levels of education, higher cholesterol levels, less comorbidity, and less depression.

Overweight patients were more likely to be seen by their usual GP; obese patients, however, were not, compared to patients of normal weight. There were some characteristics that showed a weak relationship with quality of care. Patients were more likely to report being seen more frequently by their usual GP if they did not have a partner. General practitioners intensified treatment in patients with higher levels of cholesterol and, independently, with depression. Higher satisfaction with diabetes care was reported by overweight and obese patients.

Discussion

Summary of the results

This observational study evaluated baseline levels of self-management and quality of care in patients with type 2 diabetes in Mexico, and explored the relationships between self-management and quality of care. Half of the patients had good diabetes knowledge (more than 16 correct answers out of 24), high level of diabetes self-efficacy (score>7 on a 10 point scale), and performed three or four self-care behaviours on at least 4 days per week. In terms of quality of care, one quarter of patients with high FBG levels received treatment intensification, while good levels of continuity of care were perceived by nearly 90% (according to subjective patient assessment) of patients respectively. Nearly 70% of patients perceived good patient-doctor communication, but less than 20% were satisfied with diabetes care.

There were significant relationships between different self-management measures, and between different quality of care measures, but self-management and quality of care was not generally associated across the patient sample.

The results in the context of the published literature

There is currently very limited data on the relationship between self-management and quality of care. Baseline HbA1c levels suggested that clinical guideline recommended levels of glycaemic control were not ordinarily present at baseline in most patients, reinforcing previous studies that have reported average HbA1c levels of 7.3% to 8.8% in Mexican or Mexican American samples. Findings relating to diabetes and medical prescription knowledge and diabetes self-efficacy were similar to results from previous studies in Mexican or Mexican American patients with diabetes. One study reported a relationship between a proxy measure of self-care behaviours and process measures of quality of care (receipt of HbA1c test, eye examination, and nephropathy screening). Patients who rated their diabetes self-management more highly had more HbA1c tests, more eye examinations, and more nephropathy screening.

The findings of this study showed that a higher educational level was related to better diabetes knowledge, more self-management behaviours, and higher self-efficacy. It is possible that patients with higher educational level have more resources (i.e. information, time, or finances) to engage in self-management, which was the conclusion of a recent review. Younger patients also had better diabetes knowledge and this has been reported previously. Depression was also associated with less self-management behaviour, confirming published studies.

Strengths and weaknesses

There are several limitations in the study. Half of the participants were not included in the analysis because they did not agree to participate, did not attend blood test, or were lost to follow-up. It is possible that non-participants might have had different self-management and quality of care characteristics, but lacking data on non-respondents, we could not analyse their characteristics. Some non-participants reported that they did not have time to attend blood tests and interviews, and these patients may be less keen on performing self-management and attending medical appointments. Mean blood glucose (163.1 mg/dl, SD 69) was lower than mean blood glucose of previously diagnosed patients (196.2 mg/dl, SD 98) in a large population-based nationwide survey. Self-care behaviours were measured with a self-report scale; this approach might have overestimated the actual performance of self-care behaviours, especially when measured via interview. Interpersonal quality of care was measured with questionnaires that were developed and tested in similar population. Although, the questionnaires have been demonstrated to be valid and reliable, the data have not been published. The descriptive data analyses applied reasonable though arbitrary thresholds to assess the appropriateness of current self-management and quality of care, and the data should be considered illustrative only.

The intended sample was 80% consecutive patients and 20% random patients but the final sample was 87% and 13%. Nevertheless, sample selection was adjusted statistically. The final sample size (n=205) allowed us to detect a correlation between self-management and quality of care at 0.3, with approximately 70% power at the 5% level of significance. Cross sectional designs limit the interpretation of results because it is not possible to determine direction of relationships. For example, this study found relationships between diabetes self-efficacy and patient-doctor communication but it cannot be assumed that patients report better self-efficacy as a consequence of having ‘good’ patient-doctor communication or vice versa.

Implications for policy, practice, and research

The associations between measures of self-management and quality of care were modest. Patients who were achieving high levels of one aspect of care were not necessarily receiving high levels of the other. This (a) indicates that different factors are likely to be driving each aspect of care (b) highlights the importance of measuring their relative importance. The percentage of patients meeting combinations of thresholds for self-management and quality of care were low. There were 7 (3%) patients meeting thresholds for self-management and 17 (8%) for quality of care. There was just one patient meeting both thresholds for self-management and quality of care.

This paper shows multiple aspects of self-management (knowledge, self-efficacy, and behaviour) and quality of care (continuity of care, treatment intensification, patient-doctor communication, and patient satisfaction with diabetes care) which need to be considered in future research. Measuring multiple
aspects of both self-management and quality of care would strengthen future research methodologically (i.e. when considering the evaluation of complex interventions like the CCM).

The authors of this paper will explore the relative importance of quality of care and self-management to diabetes control in a longitudinal cohort study. The results would be useful in helping health care organisations target quality improvement interventions to maximise their impact in the Mexican health care context. For example, quality improvement interventions might address multiple aspects of both self-management and quality of care including the aspects described in this paper.

ETHICAL APPROVAL(S)

Ethical approvals were from the Ethics Committee of Research on Human Beings at the University of Manchester (ref 09121) and from the IMSS Local Health Research Committee N° 101 (R-2009-101-12).

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CONFLICT OF INTEREST

The authors declare no conflict of interest.

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