

Quality of Delivered Care for People with Type 2 Diabetes: A New Patient-Centred Model

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Abstract

Background: The quality of care from the perspective of people with Type 2 diabetes using a new model (CQMH) including three dimensions of quality in health care (Technical, Service and Customer Quality) was assessed.

Methods: A cross-sectional survey with a sample of 577 people with Type 2 diabetes was conducted. Measures were self-reported adherence to national guidelines for technical quality, the Netherlands Institute for Health Services Research questionnaire for service quality and the short form of the Patient Activation Measure for Customer Quality.

Results: There was a significant gap in technical quality between what diabetes care the patients reported receiving and what was recommended in the guideline, particularly for management and lifestyle aspects. For service quality, the lowest scores were for choice of care provider and accessibility of care. The mean Customer Quality score was 64.5 (meaning higher score indicating better quality). A positive relationship was demonstrated between higher technical, service and customer quality scores, and better diabetes control status as well as maintaining continuity of care. The average Quality Index was 70.0 of a 0-100 scale.

Conclusion: Customer Quality appears to be a useful third dimension in conceptualising quality in health care, particularly in the context of chronic disease, where good self-management can improve the outcomes of care. A high proportion of Queensland adults with Type 2 diabetes reported receiving suboptimal care in the majority aspects of provided care services as reflected in the overall Quality Index score indicating substantial room for quality improvement.

Keywords: *Quality in health care, Technical quality, Service quality, Customer quality, Type 2 diabetes*

Introduction

The commonly established dimensions of quality in health care are “technical quality” and “service quality”. Technical quality deals with the specific aspects of care of disease as reflected by care-related processes and/or care-related outcomes and indicates how well health systems handle the specific condition (1). Service quality reflects the relationship between customers, providers, and care processes which measures two aspects that people value: the way people are treated by the health system and the environment they are treated in (2). While evidence demonstrates

the influence of the health care customers on quality of health care (3-5), it seems that the vital role of health care customers and the important attributes that customers can add to quality content and outcome measures of care have been neglected.

Type 2 diabetes (T2D) is one of the most common chronic diseases, causing major burdens on the health systems due to its increasing prevalence, micro, and macro vascular complications (6), psychosocial effects on patients and diabetes related financial impact (7). Improving quality of care for T2D is not only important for diabetic patients but

also for health care policymakers, managers and providers. So, we have applied care for T2D as an example of a high priority common chronic disease in order to develop and demonstrate the usefulness of a model of quality in health care which encompasses a third dimension (Fig. 1), that we have basically referred to as Customer Quality. This new model as a model of Comprehensive Quality Measurement in Health care (CQMH) has close relevance in the context of chronic disease where it is widely recognised that self-management is a key component of good care. Self-management is highly dependent on characteristics of the customer.



Fig.1: The proposed model of Comprehensive Quality Measurement in Health care (CQMH)

Customer Quality refers to the attributes of patients or health care consumers that enable them to participate more effectively with health care delivery system in order to manage successfully their own conditions. In the direction of improve Customer Quality, consumers need to improve their capacity in three major areas: knowledge and skills (in disease specific and quality improvement areas), confidence in self-care and use of the health system.

Finally, a further application of this model is the potential for a single quality score, the "Quality Index", combining information on the three quality dimensions (Fig. 1). This Quality Index would provide an overall val-

ue for quality of delivered care when comparing care received in different systems.

The present study aimed to measure quality of delivered care as perceived by people with T2D. This study aimed to measure Customer Quality as a third dimension of quality along with technical and service quality, and consequently to derive an overall Quality Index through combining all three dimensions.

Materials and Methods

A cross-sectional survey of people with T2D was conducted in Australia in 2005/06. The study design, procedures and materials were approved by the Ethics Committee of the School of Population Health, University of Queensland. The eligible participants were Diabetes Australia-Queensland members (DAQ) over 25 yr old with T2D diagnosed at least one year prior to the study. The response rate from the 1500 mailed out questionnaires was 44.8%(672), decreasing to 38.5%(577) after excluding other types of diabetes and missing values. Non-respondents were a little younger ($P < 0.001$) than study participants but similar in gender ($P > 0.05$).

Technical Quality was measured as patient reported adherence to nationally accepted T2D clinical guidelines (8-10) using eleven clinical, lifestyle and management indicators (11). Service Quality was measured using local adaptations of The Netherlands Institute for Health Services Research validated questionnaire (12) based on the relative importance and actual performance for each service quality attribute.

There is no accepted measure of Customer Quality but for chronic disease, so we chose the 13-item Patient Activation Measure (PAM) questionnaire (13) because it measures attributes we believe are important in Customer Quality. It measures general aspects of patient knowledge, skills and confidence, and in addition is well validated and highly practical because of its brevity.

Principal Component Analysis (PCA) was used to calculate a single summary (Quality Index) by combining the three separate values of “Technical”, “Service” and “Customer Quality” for each individual with minimum loss of information (14). There was a pair wise correlation of 0.3 between each combination of the three dimensions of quality, which can be interpreted as meaning that about a third of the variability in quality of care being measured by the three-sets of questions are shared or similar and two-thirds are individual contribution. The PCA provided a logical combination of three variables with equal contribution (0.76, 0.72 and 0.72) of each dimension to component one, and explained 54% of variability across three separate variables. Uniform contribution of three dimensions suggests a simple score averaging with similar weighting to calculate one summary index instead of three separate variables.

Demographic and disease related information was obtained by using the self-reported questionnaire. Two types of outcome variables were used in this study. These were continuous variables: service, technical, and customer quality scores and quality index scores (each of these was referred on a 0-100 scale with high values indicating better quality), and participant-reported binary variables: diabetes complications, continuity of care and diabetes control status. For these, participants were asked to identify; any diabetes complications identified by their doctor or nurse; whether their usual pattern of care involved seeing the same care provider for diabetes management for at least the past 12 months, and their view of the overall status of their diabetes control over the past 12 months (poorly or well controlled).

All statistical analyses were conducted using SPSS 13.0 for Windows and P values ≤ 0.05 were considered statistically significant. Chi-squared and analysis of variance tests were used to investigate associations between categorical and continuous variables respective-

ly. General Linear Modelling were used for univariate and multivariate analysis.

Results

Around 15% of participants were younger than 65 yr; nearly half of them were female and obese and one quarter were studying or had completed tertiary level education. Almost two-thirds reported well controlled diabetes and 60% had diabetes for more than 5 yr. Most were not treated by specialists and maintained continuity of care for their diabetes management.

The overall results are shown in Table 1. For all three quality dimensions and the Quality Index, participants with well controlled diabetes and those who maintained continuity of diabetes care had significantly higher scores than participants with poorly controlled diabetes and those who did not report continuity of care, respectively. Younger participants had lower Service Quality and Quality Index scores than older participants. Participants who had studied or completed tertiary education had higher Customer Quality scores but not Technical and Service Quality scores than those who completed only primary and/or secondary level of education.

Overall Technical, Service and Customer quality scores as well as Quality Index scores (scaled from 0-100) were less than 75. There was no significant difference in the quality scores in terms of gender and diabetes complications.

As presented in Table 1, overall Technical, Service and Customer Quality scores as well as Quality Index scores were low. There were no significant differences in the Quality scores in terms of gender and diabetes complications.

The Technical Quality results demonstrated significant quality gaps in the management of T2D people particularly for lifestyle and management indicators. (Detailed information is presented else where (11)). Based on

adherence to the minimum standard, although nearly all subjects reported checking of HbA1c, blood lipids and blood pressure in the last 12 months, almost half of participants reported receiving neither medication nor self-management and physical activity review by care providers in the last 12 months. Service Quality scores were in general high for support of people with the same condi-

tion (support group), the quality of basic amenities, dignity and confidentiality and low for choice of care provider and accessibility of care. Mean scores for all aspects of Service Quality, except quality of basic amenities and timeliness, were significantly higher for well versus poor self-reported diabetes control status (Detailed information is presented elsewhere (12).

Table 1: Quality score and demographic and diabetes characteristics

Characteristics	Quality of delivered care for Type 2 diabetes							
	Technical Quality		Service Quality		Customer Quality		Quality Index	
	Mean (95% CI) ¹	<i>P</i>	Mean (95% CI)	<i>P</i>	Mean (95% CI)	<i>P</i>	Mean (95% CI)	<i>P</i>
Overall	58.8 (57.2, 60.7)		86.3 (85.2, 87.4)		64.5 (63.2, 65.8)		70.0 (69.0, 71.0)	
Sex								
Female	59.5 (56.9, 62.0)	0.57	86.7 (85.1, 88.4)	0.45	64.7 (62.8, 66.5)	0.82	70.5 (69.0, 71.9)	0.38
Male	58.4 (56.0, 60.9)		85.9 (84.3, 87.4)		64.4 (62.6, 66.1)		69.5 (68.1, 71.0)	
Age (yr)								
< 65	57.2 (54.6, 59.9)	0.12	83.9 (82.3, 85.6)	0.001	64.4 (62.4, 66.3)	0.91	68.5 (66.8, 70.2)	0.03
65-74	61.6 (58.4, 64.8)		88.4 (86.4, 90.4)		65.0 (62.6, 67.3)		71.7 (70.0, 73.5)	
≥ 75	58.8 (55.4, 62.3)		88.1 (85.9, 90.3)		64.3 (61.8, 66.9)		70.5 (68.6, 72.4)	
Tertiary Education								
No	59.0 (57.0, 61.0)	0.87	86.5 (85.2, 87.8)	0.45	63.8 (62.2, 65.3)	<0.001	69.9 (68.7, 71.1)	0.84
Yes	58.6 (55.2, 62.1)		85.5 (83.4, 87.7)		66.5 (64.0, 69.9)		70.1 (68.0, 72.2)	
Type 2 diabetes control status								
Poor	54.1 (51.2, 57.0)	<0.001	81.7 (79.9, 83.5)	< 0.001	58.1 (56.0, 60.1)	<0.001	64.7 (63.0, 66.3)	<0.001
Well	61.9 (59.7, 64.0)		89.0 (87.6, 90.4)		68.2 (66.6, 69.7)		73.0 (71.7, 74.2)	
Diabetes complication								
No	58.0 (55.7, 60.2)	0.15	86.9 (85.5, 88.3)	0.07	65.0 (63.3, 66.6)	0.41	70.0 (68.7, 71.3)	0.89
Yes	60.7 (57.7, 63.7)		84.7 (82.9, 86.6)		63.8 (61.6, 66.0)		69.8 (68.1, 71.6)	
Maintaining continuity of care								
No	48.2 (44.4, 52.0)	<0.001	80.6 (78.1, 83.1)	<0.001	59.1 (56.2, 61.9)	<0.001	62.5 (60.3, 64.7)	<0.001
Yes	62.1 (60.1, 64.0)		87.7 (86.4, 88.9)		65.9 (64.4, 67.4)		71.8 (70.7, 73.0)	

1. Confidence Intervals

Discussion

The participants in this study reported a significant gap between what diabetes care they received and what was recommended in the Australian guideline, and overall Service Quality, Customer Quality scores and, consequently, the Quality Index scores were all less than 75. We consider these low scores.

Evidence indicates that T2D management based on guidelines improves the short and long-term quality of life (15). These guidelines support care providers and people with diabetes to achieve well-integrated and high-quality care (16), reduce diabetes complications (17), achieve better clinical outcomes (18) and high level of patient satisfaction (8). Consistent with the other studies worldwide (9, 10, 17, 19, 20) in our study T2D care, according to patient reports, failed to meet the technical standard in many cases (11). The largest gap, related to lifestyle and management standards, suggests that a new way of improving such aspects of care need to be considered. The importance of multi-disciplinary care for diabetes has been repeatedly emphasised. We would stress also the importance of active engagement of the patient, the customer, in this, hence the argument for this as a new dimension in quality of care.

The concept of service quality is poorly developed in health care systems. Service quality requires that “the services should correspond to the customers’ expectations and satisfy their needs and requirements” (21). This is usually taken to mean the non-clinical aspects of health care including physical, managerial and organisational aspects. Service quality, by definition, should be assessed and judged directly by health care customers based on their experience of health care. In this study, customers reported non-satisfactory service quality (12), which could be due to several factors, such as unawareness of health care systems about the customers’ perspective, inadequate support of health

care providers to serve customers well (22), lack of control access of customers to clinical services, lack of knowledge over the condition, and the effect of health care providers’ performance and behaviours. Failings in one of those factors may influence overall service delivery and can affect customers’ perception and outcomes.

Quality improvement in health care systems requires effective engagement of informed and skilful customers, capable health care providers, and well organised systems for continuous quality improvement. The effective engagement in the management programs and follow up processes as well as efficient communication with care providers are associated with receiving recommended diabetes care (23), better glycemic control (24, 25) and fewer diabetes complications (26).

Despite the significant evidence of the benefits of good self-management in diabetes, patients’ willingness to be informed and involved in decision making (27, 28), and existing evidence of benefit of educational programs (4, 29) and educational interventions (30, 31); the results of this study revealed that a considerable proportion of people with T2D did not have required knowledge, skills and confidence for self-management as reflected in the Customer Quality scores. The capacity for improvement may be related to underlying education as suggested by significant association between educational attainment and Customer Quality scores (Table 1). Our results also demonstrated that people with diabetes who scored higher on Customer Quality were more likely to maintain continuity of care and, in turn, patients with continuity of care are more likely to visit their diabetes care providers with appropriate frequency (32). High-quality customers would remind the service providers of the services they need and will raise their concerns and ask questions. They would seek screening and monitoring tests when not pro-

vided at the right interval. They would be more likely to seek nutritionists' consultations about diet, meal preparation, and physical activity and they will be more likely to use the obtained information for self-management at home. Therefore, Customer Quality can facilitate the improvement of service and technical quality.

The Quality Index score would appear to be a useful tool for globally comparing overall health systems quality and is likely to be the type of measure of most use to policy makers. Measurement of all three dimensions is more informative in quality improvement as it provides clinicians, managers and policymakers with a more comprehensive perspective on the quality of health services and a better guide to quality improvement programs.

There is a significant evidence base (5, 23) indicating that high-quality (knowledgeable, skilful and confident) customers are fundamental to better T2D outcomes and probably for other chronic diseases (including pulmonary disorders, cardiovascular diseases, arthritis, and mental disorders) and possibly most preventive care. They may be of less importance in the management of acute illnesses and/or surgery. However, knowledge is certainly fundamental to informed consent that should underpin all but the emergent situations and skills and confidence are fundamental to the broader concept of informed decision-making. Arguably, therefore, the concepts inherent in Customer Quality probably apply more broadly in health care. Thus, further studies are needed to test the feasibility of the proposed model (particularly Customer Quality) to assess the quality of delivered care for other chronic diseases, preventive services, acute conditions, and non-urgent surgeries.

The key advantage of this study is using customer based report. It is amenable to large surveys independent of the practitioner and practice setting. Clinician surveys are dependent on the willingness and interest of the

clinician in participating. Medical audits are resource intensive and dependent on the quality of information recorded which can be highly variable. For example, medical record based studies have frequently reported high rates of missing or non-recorded data (33). There is very limited population wide administrative data in Australia but access to that information is still dependent on the doctors' willingness to participate. In addition, evidence supports validity and reliability of patients' perception for assessing the quality of care for chronic diseases (34) and its positive association with glycaemic control (23), actual health outcomes and objective measures of quality of care in T2D (35). The results of this study might be limited by recall bias, as for other self-reported studies, and the accuracy of patient reports is likely to be variable. In this study, non-respondent bias might be a concern, although non-responders were slightly younger ($P < 0.001$) than study participants without gender differences ($P > 0.05$). Another limitation can be low response rate (nearly 40%), which may reflect a range of factors, including the overall length of the questionnaire, the methods of contact and the understanding and interest of patients in participating. However, the most likely consequence of any selection bias that may have resulted from the low response rate is that the survey over represents patients with higher health literacy, more optimal care or more interest in self-care.

Participants in this study were drawn randomly among DA-Q members, who account for nearly half of expected T2D people in Queensland (36, 37). These members are supported by information and educational sessions. Therefore, participating patients may represent a more educated and motivated group of patients. However, it is unlikely that such a bias is under-estimating the general quality of services.

In conclusion, this study proposes a modification of the existing paradigm for measur-

ing quality in health care to include the dimension of Customer Quality, which refers to attributes of the health care user, who is expected to be a knowledgeable, skilful, and confident customer. Findings revealed substantial room for quality improvement on all three dimensions. It demonstrated a significant association between the measure of all three dimensions and self-reported diabetes control and continuity of care.

The present study has a number of implications for health care systems. Customers' perception can be measured using a relatively inexpensive, easy and quick method based on patient report and also can be useful for determining priorities for quality improvement programs. The proposed model (CQMH) in this study can be used as a comprehensive model to evaluate almost all aspects of health care quality as a baseline for quality improvement programs and to benchmark or compare several practices in term of a particular health care. This model and Customer Quality may be applicable to many chronic diseases and preventive care with modification of the technical quality section based on the target condition.

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