

Customer Quality and Type 2 Diabetes from the Patients' Perspective: A Cross-Sectional Study

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ABSTRACT

Background: Quality in health care can be seen as having three principal dimensions: service, technical and customer quality. This study aimed to measure Customer Quality in relation to self-management of Type 2 diabetes.

Methods: A cross-sectional survey of 577 Type 2 diabetes people was carried out in Australia. The 13-item Patient Activation Measure was used to evaluate Customer Quality based on self-reported knowledge, skills and confidence in four stages of self-management. All statistical analyses were conducted using SPSS 13.0.

Results: All participants achieved scores at the level of stage 1, but ten percent did not achieve score levels consistent with stage 2 and a further 16% did not reach the actual action stage. Seventy-four percent reported capacity for taking action for self-management and 38% reported the highest Customer Quality score and ability to change the action by changing health and environment. Participants with a higher education attainment, better diabetes control status and those who maintain continuity of care reported a higher Customer Quality score, reflecting higher capacity for self-management.

Conclusion: Specific capacity building programs for health care providers and people with Type 2 diabetes are needed to increase their knowledge and skills; and improve their confidence to self-management, to achieve improved quality of delivered care and better health outcomes.

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Introduction

Quality of health care has been described in two dimensions: service and technical quality¹. Technical quality refers to the degree to which the care delivered meets scientific and professional standards that are likely to optimize the benefits and minimize the risks. Service quality refers primarily to how the care received is perceived and is influenced by the physical, social, and cultural context.

These two dimensions do not fully encompass the dimensions of quality in health care because it ignores the central role of the customer (patient) in health care.

Evidence clearly shows that the health care customers influence the quality of health care directly and indirectly (by influencing service and technical aspects)²⁻⁴. Therefore, "Customer Quality" as a third essential dimension of

quality in health care has been added to the commonly accepted two dimensions⁵. For this dimension, the aims of quality improvement should be to improve the capacity of health care customers in three major areas knowledge, skill and confidence. By developing these attributes, patients will be better able to self-manage, to make the best use of health services and to engage in shared decision-making. Customer Quality may play a special role in the management of chronic diseases, such as type 2 diabetes⁶.

People with type 2 diabetes mellitus require complex care with day-to-day treatment monitoring and changes to treatment and major changes to lifestyle factors. Thus, high quality care for people with type 2 diabetes requires the development of knowledgeable, skilful, motivated and confident patients along with services that provide high service and technical quality.

Evidence shows that specific educational programs for care providers improves patients' engagement in their management and therapeutic decision-making³ and active involvement, in turn, resulted in better self-management⁴ and better control of their condition². Moreover, diabetic patients who had educational programs about self-management skills had fewer exacerbations and improved care outcomes⁷. To be actively involved patients need not only adequate knowledge and skills about type 2 diabetes and related health problems⁸ but also they need the additional support in the knowledge and skills required for decision making, planning and problem solving to enhance their self-management capability².

Consistent with the above discussed evidence, Norris et al.⁹ also demonstrated that quality related and managerial interventions, including quality improvement and problem solving education, were associated with statistically significant reduction of HbA1c values. In addition, there is increasing consensus about the association between patients' active contribution in their type 2 diabetes cares and successful diabetes management^{2,3,10}.

In this study, Customer Quality was measured in relation to self-management of type 2 diabetes.

Materials and Methods

A cross-sectional survey of people with type 2 diabetes was conducted in 2005 (February to December). The study population was sampled from membership lists of Diabetes Australia-Queensland. Diabetes Australia is the largest consumer organization for people with diabetes in Australia, in which membership is voluntary. Eligible participants were people aged 25 years and older with diagnosed type 2 diabetes at least one year prior to data collection. Participants who were incapable of completing the questionnaire or who were non-English speakers were excluded from the study. Potential participants were selected using random numbers from the membership register of Diabetes Australia-Queensland. Of 1500 mailed out questionnaires, 672 participants responded (44.8%). Exclusion applied to failure to complete the questionnaires (n=13), other types (n=36) and unknown type (n=20) of diabetes. Of the 603 remaining cases (40.2%), four subjects were excluded because of more than three Not Applicable (N/A) and 22 subjects because of more than three missing values leaving 577 (38.5%) people.

As there is no established method for measuring Customer Quality, the 13-item Patient Activation Measure (PAM), developed by Hibbard et al.⁸, was used as a well validated, reliable and practical instrument to assess Customer Quality from the participants' perspective⁶. This instrument measures attributes relevant to our definition of Customer Quality as four important stages of self-management: 1) believing the patients' role is important, 2) having the confidence and knowledge necessary to take action, 3) actually taking action to maintain and improve one's health, and 4) staying the course even under stress¹¹. Raw Customer Quality scores were calculated by adding up the responses to all 13 questions as follows: "Strongly Disagree = 1", "Disagree = 2", "Agree = 3", "Strongly Agree = 4". Any responses of "N/A" or "Missing Value" up to a maximum of 3 responses for

each person were interpolated to apply the average raw score for each missing or N/A item. Raw scores were transformed as indicated by Hibbard et al.¹¹ and related cut-off points¹² were used to identify Customer Quality score for each stage of self-management (Table 1).

Table 1: Customer Quality scores cut-off points for self-management

Self-management stage	Customer Quality scores
One	≤ 47.0
Two	47.1 to 55.1
Three	55.2 to 67.0
Four	≥ 67.1

The self-administered questionnaire sought demographic information, clinical history and accompanying diseases and medication. Participants were also asked to assess their own diabetes related health condition over the past

12 months as poor or well controlled, to identify seeing the same care provider for diabetes management for at least past 12 months and to indicate any complications related to their diabetes if doctor or nurse has ever told them. Self-reported height and weight were used to estimate Body Mass Index (kg/m²) based on the WHO (1998) classification¹³.

Chi-squared analysis compared respondents to non-respondents and the sample to a reference population, based on demographic characteristics. Chi-squared tests were also used to explore any association between categorical variables. All statistical analyses were conducted using SPSS 13.0. P values ≤0.05 were considered statistically significant. The study design, procedures and materials were approved by the Ethics Committee of the School of Population Health-University of Queensland.

Table 2: Self-reported characteristics of type 2 diabetic participants

Characteristics	Number	Percent
Age (yr)		
≤ 54	85	14.8
55-64	170	29.5
65-74	172	29.9
≥75	149	25.9
Gender		
Male	305	52.9
Female	272	47.1
BMI		
Normal (BMI ≤20-24.9 kg/m ²)	99	18.4
Over weight (BMI =25-29.9)	192	35.7
Obese (BMI ≥30)	247	45.9
Tertiary education		
Yes	155	27.1
No	417	72.9
Type 2 diabetes		
Well controlled diabetes	355	63.3
Disease for less than 5 years	216	40.4
Specialist is not the principal care provider	378	66.9
Maintaining continuity of care	436	79.4

Results

Of 577 type 2 diabetic participants, only 14.8% were younger than 55 years, over 50% were male, nearly half of them were obese and a quarter was studying or had completed tertiary level of education. Almost two thirds

reported well controlled type 2 diabetes and 40% had diabetes for less than five years. Mostly, respondents were treated by care providers other than specialists and met the same care provider for their diabetes management (Table 2).

The non-responders compared to the study sample did not differ significantly in terms of gender (males: 56.2 versus 52.9%) but they were more likely to be younger (age younger than 55 years: 26.7 vs. 14.8%). Almost 90% of participants suffered from hypertension and/or hyperlipidemia and 53% reported suffering from both conditions (Table 3). Approximately two-third had no complications, 6% had only micro-vascular complications (such as nephropathy, retinopathy and neuropathy), 16% only macro-vascular complications (such as myocardial infarction, ischemia and foot ulceration) and 12% had both.

As Table 4 demonstrates, the average self-reported Customer Quality score was 64.5. Based on the cut-off points that have been used by Hibbard et al.¹², overall 38% achieved the highest level of self-management and only 10%

stayed in the lowest stage. Although 26.2% did not reach the action stage, 74% reported taking action for self-management and around half of them (38%) were able to sustain it even under stress.

Participants with tertiary education were more likely to score higher on Customer Quality than participants who completed only primary and/or secondary level (Table 4). Compared to those reporting poorly controlled diabetes, participants with well-controlled diabetes were more likely to be actively involved in their self-management and more likely to achieve the highest stage of self-management (47% versus 21%). Participants who reported continuity with the same care provider for their diabetes management were also more likely to have higher Customer Quality score.

Table 3: Type 2 diabetes and self-reported co-morbidity and complications

Co-morbidity	Number	Percent
Yes	499	88.5
Hypertension only	102	18.1
No treatment	8	1.4
Under treatment	94	16.7
Hyperlipidemia only	97	17.2
No treatment	66	11.7
Under treatment	31	5.5
Both hypertension and hyperlipidemia	300	53.2
No treatment	12	2.1
Under treatment	288	51.1
Complications	Number	Percent
Yes	200	35.6
Micro-vascular only	35	6.3
Macro-vascular only	89	15.8
Both micro and macro-vascular	69	12.3
Other complications	7	1.2

For BMI, although the association is not statistically significant, compared to normal or overweight participants, more obese people scored at the stages one and two, less people took action for self-management and fewer reported capacity for staying the course under stress (34% versus 43%). People under 55 years old scored higher on Customer Quality and consequently were at the higher stages of self-management. There was no significant difference in self-management stages in terms

of gender, time since diabetes diagnosis and diabetes complications (Table 4).

Discussion

The key finding in the present study was that, using the PAM instrument, participants with higher education achievement, better diabetes control and maintaining continuity of care reported higher Customer Quality.

Overall, only a small number of participants in this study remained at the beliefs level

(Stage 1) and did not have enough knowledge and confidence to take action. The majority of participants (over 95%) believed in their unique role for self-management. This indicated that nearly all participants understand and believe the importance of their critical role in the management programs. About three quarters were able to take action and over half of these reported capacities to maintain action through a day-to-day self-management program. These proportions are slightly higher than average activation score in the UK study¹² for diabetes

patients (64.5% versus 59.2% for average activation score and 37.6% vs. 22.7% for the stage 4 of self-management). In contrast to the US¹¹ and UK¹² studies, we found no significant differences by gender or age, which may reflect their use of community samples for both studies. Consistent with the US¹¹ and UK¹² studies a small variation is shown in education attainment, with people achieving tertiary education more likely to be informed, confident and skilled to care for their own health.

Table 4: Mean Customer Quality score and proportion of self-management in terms of demographic and disease characteristics

Characteristics	Customer Quality Score (%)					P-value
	Mean	Stage1	Stage2	Stage3	Stage4	
Age (year)						0.30
≤ 54	67.0	11.8	12.9	24.7	50.6	
55-64	63.1	11.2	16.5	38.2	34.1	
65-74	65.0	7.6	16.9	37.8	37.8	
≥ 75	64.3	10.1	16.8	38.9	34.2	
Sex						0.31
Female	64.7	8.1	15.1	40.1	36.0	
Male	64.4	11.1	17.0	32.8	39.0	
BMI						0.09
≤ 24 kg/m ²	66.5	7.1	16.3	36.7	39.8	
25-29	65.6	8.3	15.5	33.7	42.5	
≥ 30	63.3	12.1	16.6	37.7	33.6	
Tertiary education						<0.001
No	63.8	9.1	16.8	41.2	32.9	
Yes	66.5	12.9	14.2	23.2	49.7	
Duration of diabetes (year)						0.94
< 5	64.7	7.4	19.0	34.7	38.9	
5-9	64.3	13.2	10.7	39.7	36.4	
≥ 10	64.9	10.1	16.2	35.4	38.4	
Diabetes control status						<0.001
Poor control	58.1	19.4	23.8	35.9	20.9	
Well Control	68.2	4.8	11.5	36.6	47.0	
Maintaining continuity of care						<0.001
No	59.1	18.6	18.6	42.5	20.4	
Yes	65.9	7.8	15.8	34.4	42.0	
Complications						0.41
No	65.0	8.0	15.8	39.1	37.1	
Yes	63.8	13.9	16.8	30.7	38.6	

It has been proposed that people with diabetes with higher activation scores may have improved outcomes due to better

communication with care providers and receiving recommended care close to the target levels¹⁴. Other studies also support that greater

involvement in their own management processes results in higher self-management capacity⁴ and satisfaction with care¹⁵. Consistent with this and the UK study¹², a highly significant association was found between self reported health status and Customer Quality score. In both studies people who felt healthier had higher knowledge, confidence and skills for self-management. The present study demonstrates that nearly half of participants with poorly controlled diabetes and 16% of those who reported well controlled diabetes could potentially benefit from interventions, such as special education programs targeting both them and their families to improve self-management capacity.

This study found that participants who reported continuity of care were more likely to have higher Customer Quality score and active involvement in their self-management. Fewer than eight percent of participants reporting continuity of care scored at the beliefs stage (Stage one). Other work has demonstrated that maintaining continuity of care is significantly associated with improved diabetes outcomes¹⁶, health related quality of life¹⁷, satisfaction with disease management¹⁸ and higher quality of delivered care¹⁹.

Patient reported data has both strengths and limitations. It is likely that some information will be less accurately reported than clinical notes were arguably other information might be more accurate or at least more complete. For example medical record based studies have frequently reported high rates of missing or non recorded data²⁰. However, the key advantage is that it is amenable to large-scale population surveys and importantly for some data measures the relevant attributes are the patients' perception of care. In addition, the finding that there is a positive association between patients' perceptions of the quality of care and actual health outcomes and objective measures of quality of care offers support to the validity of the patient based approach²¹. Hisler et al.¹⁴ also found that the assessment of self-management capability by patients with diabetes was significantly associated with their actual glycaemic control. Jacobi et al.²² more generally argued that patients' perception of

care is a valuable mean to assess the quality of care for chronic diseases.

The low response rate (around 40%) 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 are the members of the Diabetes Australia-Queensland and registration in this association is voluntary. These members are receiving information support and are participating in some educational sessions according to their health condition or willingness. Consequently, a proportion of people with type 2 diabetes are excluded from this study. Therefore, as indicated above, our participants may represent more educated and motivated group of people with type 2 diabetes.

The current study used the 13-item questionnaire rather than the 22-item one that was used in both US¹¹ and UK¹² studies. In both questionnaires activation score (Customer Quality score in this study) are rated from 0 to 100, both have been designed to assess the four stages of self-management capability and both are reported as valid, reliable and feasible questionnaires^{8, 11}. The 13-item questionnaire is highly attractive for primary care and mass survey settings because of its brevity. This version allows care providers to give individual's score or level of self-management and can inform a more personalized plan for capacity building and self-management.

Conclusion

Higher levels of Customer Quality reflecting higher knowledge, confidence and skills in diabetes self-care were associated with higher educational achievement, better continuity for diabetes management and better controlled diabetes. Capacity building programs should pay more attention to the patients with poorly controlled diabetes and patients with more than

one principal care provider to increase disease related knowledge and skills. Specific interventional education programs are needed for health care providers, patients and/or their families to increase their knowledge and skills to develop self-management capacity, better communication and promote patients' self-confidence in ability to self-care to change and maintain lifestyle. This combined approach is likely to improve the quality of delivered care and self-management; and result in improved health outcomes.

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Conflict of interest statement

The authors declare that they have no conflicts of interest.

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