

# Assessing Patients' Understanding, Provider's Participatory Decision-Making, and Communication among Type 2 Diabetic Patients and Their Impact on Diabetes Self-Management in Qatar's Primary Healthcare Centers

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## Article Information

Received date: Oct 01, 2016

Accepted date: Oct 12, 2016

Published date: Oct 15, 2016

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**Keywords** Diabetes Mellitus; Self care; Primary health care; Decision making

## Abstract

**Introduction:** Diabetes mellitus is a chronic illness that requires comprehensive evidence-based care. With many evidence arising about the importance of engaging the patient in self-management, we sought to analyze the situation in the state of Qatar, which has one of the highest diabetes prevalence rates in the region; to improve patients' final health outcomes.

**Methods:** A structured questionnaire was administered to type II diabetic patients (n=513), aged 35-86 years from both sexes. The participants were a convenience sample of patients attending the diabetic clinics of two primary health care centers. The primary independent variables were: patient understanding of diabetes, provider's Participatory Decision-Making (PDM) style, and Communication (PCOM). Moreover, we aimed to assess the effect these variables had on the primary outcome, which is diabetes self-management. Associations between two or more qualitative variables were analyzed using chi-square test, with a continuity correction factor when appropriate. The unpaired 't' and Mann-Whitney U tests were also utilized, with a calculation of the Cronbach's alpha.

**Results:** Using ANOVA models, each of the primary independent variables was shown to be a significant predictor of diabetes self-management (P<0.001). However, after implementing multivariate regression, only the patient understanding variable was strongly associated with diabetes self-management. Finally, there was no significant correlation between PDM style, PCOM, patient understanding, or self-diabetes management on one hand and age or gender on the other.

**Conclusion:** The study demonstrates that if diabetics understood their disease, they would have a better chance at self-management; despite the importance of provider participatory decision-making and communication in enhancing that understanding.

## Introduction

Diabetes mellitus is a chronic and progressive disease that requires continuous as well as comprehensive medical services. Despite being a considerable part of diabetic care, diabetes self-management, including Self-Monitoring of Blood Glucose (SMBG) and making healthy food and lifestyle choices, is complex and demanding [1].

People with diabetes are responsible for most day-to-day decisions related to the management of their disease, making self-directed health care a large part of diabetes management. Historically, the management of diabetes was primarily the responsibility of providers. More recently, however, patient-centered care and comprehensive team approaches have gained attention, with endocrine clinics providing care through a multidisciplinary team that includes a diabetes educator [2]. In fact, many studies, such as the Regimen adherence questionnaire and the Johnson, *et al.* 24-h recall interview, have revealed that Diabetes Self-Management Education (DSME) is a critical element of care in order to improve patient outcomes [3].

Similarly, research has revealed that patient involvement in the decision-making process is associated with better understanding of care. In addition to that, participation in decision-making

helps amplify patient understanding of diabetes self-management and thus self-care practices. More importantly, patient understanding of diabetes self-care is vital to promoting evidence-based self-care practices [4]. Kaplan and colleagues first studied the practice of participatory decision-making among providers and their patients during clinical encounters in 1995 [5]. They discovered that involving patients in participatory decisions by offering treatment options, allowed physicians to stimulate in them a sense of ownership for their medical care.

Also, patients who receive information and guidance from their physicians are more likely to understand their health problems and treatment options, adhere to treatment plans, and adjust their compliance behaviors [6,7].

Moreover, findings from research consistently affirm that enhancing patient-physician communication and participatory decision-making are powerful tools for greater patient satisfaction and adherence to treatment plans. Furthermore, diabetics who discuss their treatment goals and management strategies with their providers tend to have better clinical outcomes than those who do not [8,9]. Therefore, a shift in provider-patient relations from directive to collaborative, with a joint definition of problems, treatment targets, and management options has been constantly supported by chronic disease experts [10,11]. Other studies also reported that patients' evaluations of their physicians' communication and participatory decision-making style are strongly associated with their diabetes control and is influential on patients' self-management [12] which may lead to improved health outcomes.

With little research on the subject in the Middle East, the present study was undertaken to analyze the current situation in the state of Qatar. Furthermore, we aimed to describe patient self-management and participatory decision-making among type II diabetic patients attending the diabetic clinics at primary health care centers and assess their association /relation to the age and gender as well as assess the impact of the aforementioned on the self-management of diabetes. Thus, clarifying these areas will help health care providers best utilize resources to improve communication, patient self-care behaviors, and ultimately health care outcomes.

## Methods

This is a prospective descriptive study, in which a sample (N=513) of type II diabetic patients from different nationalities, aged 35-86 years from both sexes, were recruited using a convenient sampling technique. These patients attended the diabetic clinics of two primary health care centers during the study period of six months. We administered a structured questionnaire through a series of interviews, where we asked about socio-demographic characteristics, understanding of diabetes, self-management behaviors, utilization of medical services, and provider communication. While our study measures relied on self-reporting, we implemented a valid tool used in previous studies.

Regarding the analysis, we measured self-management in an overall manner as well as separately in five different domains (medications, regular exercise, following a diet, checking the blood sugar, and checking feet for wound or sores). Then, we assessed the level of understanding of diabetes care overall as well as in each of the aforementioned domains. Finally, the level of patient involvement

in decision-making (provider participatory decision-making style- PDM style) as well as provider communication- PCOM was evaluated. For patient self-management and understanding, a scoring system ranging from 1 to 4 was implemented, where a higher score meant greater adherence and understanding respectively. A similar system was employed for PDM style and PCOM, ranging however from 1-3, where a greater score signified better participation and communication respectively.

The Institutional Review Board at Hamad Medical Corporation approved this study, where participation was voluntary after eliciting informed consent.

For statistical analyses, we used the SPSS 20.0 (SPSS Inc. Chicago, IL). Bivariate and multivariate linear regression analyses were conducted to examine the association of PDM style, PCOM, and respondents' understanding of diabetes care as overall predictors of self-management. To assess the relative predictive power of each of the three principal independent variables, their standardized  $\beta$  coefficients were compared in models that combined the two provider variables (PDM and PCOM) and then added patient understanding to this combined model. The regression models also adjusted for age, ethnicity, gender, and duration of diabetes. Using exploratory analysis, we found no evidence of heteroscedasticity, substantive multicollinearity, or overly influential outliers in any of the models. A two-sided P value <0.05 was considered to be statistically significant.

## Results

For the 513 enrolled participants, age ranged from 35 to 86 years, with a mean age of  $56.07 \pm 10.01$  years. There were 56.6% females, 43.4% males; 72.5% Arabs and 27.5% non-Arabs. Table 3 depicts the participants' baseline demographics as well as other characteristics.

The primary outcome measure assessed was the overall self-management scale, as described above. The self-management scale was designed to reflect how well patients feel able to manage aspects of their diabetes care and has been found to be a valid reflection of patients' own involvement with their care. We measured patients' evaluation of provider participatory decision making with a 5-item scale (Provider Participatory Decision-making Style [PDM style];  $\alpha = 0.73$ ), rating of providers' communication with a 4-item scale (Provider Communication [PCOM];  $\alpha = 0.55$ ), understanding of diabetes self-care with a 5-item scale ( $\alpha = 0.93$ ), and patients' completion of diabetes self-care activities (self-management) in 5 domains ( $\alpha = 0.51$ ). The items that were used to measure the patient's evaluation of provider participatory decision-making style were adopted from a valid survey conducted by Kaplan *et al* [13,5]. In addition to that, the points utilized to evaluate the providers' communication were adapted from a validated survey conducted by Piette *et al* [7]. Similarly, the items used in the assessment of the understanding of diabetes self-care and diabetes self-care practices were espoused from a scale developed and validated by Heisler and associates [13].

In secondary analyses, the scale for overall understanding of diabetes care was also used as a dependent variable. Respondents were asked to indicate how well they understood how to care for their feet, how to take medications, how to make appropriate food choices, how and when to test blood sugar, how to exercise appropriately, how to manage symptoms of low blood sugar, and what their blood glucose target values should be.

**Table 1:** Association between evaluations of Provider Participatory Decision – Making style (PDM style), Provider Communication (PCOM) and Patients’ understanding of diabetes care with patients’ reported diabetes self-management <sup>d</sup>, Qatar 2012.

| Predictors                             | Overall self management                                |         |   |         |   |         |
|--|--|---------|---|---------|---|---------|
|  | Model 1 <sup>a</sup><br>(Model R <sup>2</sup> = 0.12 ) |         | Model 2 <sup>b</sup><br>(Model R <sup>2</sup> = 0.10) |         | Model 3 <sup>b</sup><br>(Model R <sup>2</sup> =0.15 ) |         |
|  | Beta   | P value | Beta  | P value | Beta  | P value |
| PDM style                              | 0.27   | <0.001  | —   | —       | —   | —       |
| PCOM                                   | —  | —       | TRUE  | —       | —   | —       |
| Overall understanding of diabetes care | —  | —       | —   | —       | 0.35  | <0.001  |

<sup>d</sup>Adjusted for age, gender, ethnicity, current employment status and duration of diabetes.

<sup>a</sup>Main independent variable = PDM Style (Provider participatory decision - making style).

<sup>b</sup>Main independent variable = PCOM (Provider communication).

<sup>c</sup>Main independent variable = Overall understanding of diabetes care.

To understand the influence of provider styles (PDM and PCOM) and patient understanding on self-management, we examined three primary independent variables: physician decision-making style, provider communication, and overall patient understanding.

### Relationship of Participatory Decision-Making (PDM) as well as patient understanding variables and patient self-management

PDM style was observed as a significant predictor of overall self-management in multiple linear regression models that did not include provider communication or patient understanding (Model 1,  $\beta = 0.27$ ,  $P < 0.001$ , model  $R^2 = 0.12$ , Table 1). Results derived from ANOVA models associating the separate domains of diabetes self-management and PDM style was significantly associated with blood glucose monitoring, good diabetes diet, medication compliance and exercise ( $P < 0.001$ ).

Provider communication was significantly but inversely associated with overall self-management ( $\beta = -0.18$ ,  $P < 0.001$ , model  $R^2 = 0.15$ , Model 2, Table 1). Furthermore, the ANOVA models revealed that the PCOM was significantly and inversely associated with good diabetes diet ( $P < 0.001$ ) and blood glucose monitoring ( $P = 0.001$ ); whereas, medication compliance ( $P = 0.053$ ) and exercise ( $P = 0.469$ ) were not significantly associated. On the other hand, overall understanding was highly predictive of overall self-management (Table 1, Model 3,  $\beta = 0.35$ ,  $P < 0.001$ ).

### Relative predictive power of PDM style, PCOM, and understanding for self-management in combined multivariate linear regression models

When we combined PDM style and PCOM in the same model using multivariate linear regression (Table 2), PDM style remained highly significant (standardized  $\beta = 0.24$ ,  $P < 0.001$ ), but provider communication was no longer significantly associated with diabetes self-management (standardized  $\beta = -0.08$ ,  $P = 0.10$ ). Furthermore, when patient understanding was added to this model, the unique ability of PDM style in predicting diabetes self-management weakened substantially (standardized  $\beta = 0.12$ ,  $P = 0.028$ ). Patient understanding was strongly and independently associated with diabetes self-management (standardized  $\beta = 0.29$ ,  $R^2 = 0.17$ ;  $P < 0.001$ ) in this model.

**Table 2:** Association between evaluations of provider Participatory Decision-Making style (PDM), provider communication (PCOM), and patients’ understanding of diabetes care with patients’ reported diabetes self-management, after adjustment <sup>d</sup>, Qatar 2012.

| Predictors                             | Model A <sup>a</sup><br>(R <sup>2</sup> =0.14) |         | Model B <sup>b</sup><br>(R <sup>2</sup> =0.17) |         |
|--|--|---------|--|---------|
|  | Beta   | P value | Beta   | P value |
| PDM style                              | 0.24   | <0.001  | 0.12   | 0.028   |
| PCOM                                   | -0.08  | 0.099   | -0.009   | 0.858   |
| Overall understanding of diabetes care | -----  | -----   | 0.289  | <0.001  |

<sup>d</sup>Adjusted for age, gender, ethnicity, current employment status, and duration of diabetes

<sup>a</sup>Independent variables = PCOM and PDM style

<sup>b</sup>Independent variables = PCOM, PDM style, and overall understanding of diabetes care.

### Relationship between PDM style, PCOM, patient understanding, and diabetes self-management on one hand and age, gender and ethnicity on the other

After utilizing Pearson correlation to examine the relationship between age and diabetes self-management, no significant correlation was noted between PDM style, PCOM, patient understanding, and diabetes self-management and age. No statistically significant association was noted between the aforementioned study variables and gender. The mean PCOM was observed to be significantly higher among males than females ( $P = 0.025$ ). In addition to that, the mean PDM style and diabetes self-management were significantly higher among non-Arabs ( $P < 0.01$ ), however; while mean understanding was seen to be significantly higher among the Arab ethnicity ( $P = 0.003$ ).

### Discussion

In order to improve health outcomes in diabetes, patients need to undertake and maintain a variety of self-care practices, including following a diet, engaging in regular exercise, taking medications, monitoring blood glucose levels, and caring for their feet. These and other skilled behaviors to promote health and prevent complications are often called “self-management” [14].

In addition to that, analyses of effective models of care for diabetes and other chronic diseases suggest that the design of practice plays an important role in their success [15]. This is what previous research as well as our own reaffirmed, that the healthcare provider’s participatory decision-making and communication styles affect patients’ diabetes self-management, and hence patients’ outcomes. Thus, it is clear the importance of re-aligning the practice of individual physician’s as well entire healthcare organization and systems, to incorporate participatory decision-making and communication styles that will aid patient’s understanding of disease and ultimately maximize patients’ diabetes self-management. However, this notion is not without obstacles and barriers, as the healthcare system globally is stressing under financial and bureaucratic constraints that are undermining efficient improvement of patient care.

An unexpected result was the higher level of self-diabetes management among non-Arab ethnicities ( $P < 0.01$ ), but a higher mean understanding was observed among Arab ethnicity ( $P = 0.003$ ). Response bias by either group could explain the aforementioned results.

**Table 3:** Socio-demographic and other characteristics of the participants according to gender, Qatar 2012.

| Characteristics                                     | Male<br>N (%) | Female<br>N (%) | Total<br>N (%) |
|---|---------------|-----------------|----------------|
| <b>Age (in years)</b><br>Mean ± SD                  | 56.17 ± 10.66 | 56.11 ± 9.57    | 0.951          |
| <b>Age (in years)</b>                               |               |                 | 0.257          |
| < 40  | 14 (6.4)      | 18 (6.3)        |                |
| 40-50   | 57 (26.0)     | 57 (19.9)       |                |
| >60   | 148 (67.6)    | 211 (73.8)      |                |
| <b>Duration of Diabetes (years)</b><br>Mean ± SD    | 10.17 ± 7.11  | 10.31 ± 6.68    | 0.823          |
| <b>Nationality</b>                                  |               |                 | <0.0001        |
| Arab  | 127 (58.3)    | 239 (84.2)      |                |
| Non-Arab  | 91 (41.7)     | 45 (15.8)       |                |
| <b>Marital Status</b>                               |               |                 | <0.0001        |
| Single  | 2 (0.9)       | 8 (2.9)         |                |
| Married   | 210 (96.3)    | 214 (76.7)      |                |
| Divorce/Widow                                       | 6 (2.8)       | 57 (20.4)       |                |
| <b>Occupation</b>                                   |               |                 | <0.0001        |
| Working   | 139 (64.1)    | 46 (16.1)       |                |
| Unemployed  | 13 (6.0)      | 34 (11.9)       |                |
| Homemaker   | 16 (7.4)      | 189 (66.3)      |                |
| In school   | 4 (1.8)       | 6 (2.1)         |                |
| Retired   | 42 (18.4)     | 4 (1.4)         |                |
| Others  | 3 (1.4)       | 6 (2.1)         |                |
| <b>Blood sugar test</b>                             |               |                 | <0.0001        |
| Yes   | 67 (31.0)     | 28 (9.9)        |                |
| No  | 149 (69.0)    | 255 (90.1)      |                |
| <b>Keep a record of blood sugar test results</b>    |               |                 | 0.265          |
| Yes   | 114 (75.5)    | 169 (67.9)      |                |
| No  | 13 (8.6)      | 29 (11.6)       |                |
| Only unusual values                                 | 24 (15.9)     | 51 (20.5)       |                |
| <b>Patient Self management</b>                      | 2.98 ± 0.34   | 2.97 ± 0.32     | 0.618          |
| <b>Provider participatory decision making style</b> | 1.21 ± 0.38   | 1.17 ± 0.34     | 0.212          |
| <b>Provider Communication</b>                       | 2.48 ± 0.37   | 2.41 ± 0.36     | 0.025          |
| <b>Patient understanding</b>                        | 3.33 ± 0.52   | 3.32 ± 0.55     | 0.909          |

Our study, like any descriptive study, is limited by the lack of a comparison group; which would have further validated the inferences we have drawn. It is a cross-sectional study, thus the causal relationships between the independent variables and study outcomes could not be determined. Furthermore, the small number of participants was also a setback for the results, as a larger number would have given more power. Moreover, the participants' self-reports of self-care are vulnerable to biases such as social desirability, such as the tendency to give self-reports that are self-deceptive (highly desirable but honestly held), and impression management (the conscious tendency to give highly desirable self-reports) [16,17]. However, conducting this study was unprecedented in the State of Qatar or the region and we hope the results will pave the way to more research, preferably longitudinal studies that establish a firm causal relation, in an effort to optimize the quality of care that diabetic patients receive in their primary care centers.

**Table 4:** Socio-demographic and other characteristics of the participants according to nationality, Qatar 2012.

| Characteristics                                     | Arab<br>N (%) | Non-Arab<br>N (%) | P-value |
|---|---------------|-------------------|---------|
| <b>Age (in years)</b><br>Mean ± SD                  | 57.85 ± 10.11 | 51.70 ± 8.21      | <0.0001 |
| <b>Age (in years)</b>                               |               |                   | <0.0001 |
| < 40  | 22 (6.0)      | 9 (6.5)           |         |
| 40-50   | 57 (15.4)     | 57 (41.3)         |         |
| >60   | 290 (78.6)    | 72 (52.2)         |         |
| <b>Duration of Diabetes (years)</b><br>Mean ± SD    | 10.86 ± 7.11  | 8.44 ± 5.78       | <0.0001 |
| <b>Gender</b>                                       |               |                   | <0.0001 |
| Male  | 127 (34.7)    | 91 (66.9)         |         |
| Female  | 239 (65.3)    | 45 (33.1)         |         |
| <b>Marital Status</b>                               |               |                   | 0.001   |
| Single  | 9 (2.5)       | 0 (0)             |         |
| Married   | 297 (81.8)    | 131 (95.6)        |         |
| Divorce/Widow                                       | 57 (15.7)     | 6 (4.4)           |         |
| <b>Occupation</b>                                   |               |                   | <0.0001 |
| Working   | 94 (25.6)     | 18 (13.1)         |         |
| Unemployed  | 29 (7.9)      | 26 (19.0)         |         |
| Homemaker   | 178 (48.5)    | 0 (0)             |         |
| In school   | 10 (2.7)      | 0 (0)             |         |
| Retired   | 47 (12.8)     | 0 (0)             |         |
| Others  | 9 (2.5)       |                   |         |
| <b>Blood sugar test</b>                             |               |                   | <0.0001 |
| Yes   | 51 (13.9)     | 44 (32.6)         |         |
| No  | 315 (86.1)    | 91 (67.4)         |         |
| <b>Keep a record of blood sugar test results</b>    |               |                   | 0.001   |
| Single  | 9 (2.5)       | 0 (0)             |         |
| Married   | 297 (81.8)    | 131 (95.6)        |         |
| Divorce/Widow                                       | 57 (15.7)     | 6 (4.4)           |         |
| <b>Patient Self-management</b>                      | 2.62 ± 0.81   | 3.27 ± 0.59       | 0.003   |
| <b>Provider participatory decision-making style</b> | 1.17 ± 0.34   | 1.26 ± 0.39       | 0.006   |
| <b>Provider Communication</b>                       | 2.43 ± 0.36   | 2.46 ± 0.37       | 0.454   |
| <b>Patient understanding</b>                        | 3.35 ± 0.54   | 3.22 ± 0.47       | 0.003   |

The results of this study support that of its predecessors that patients' involvement in management of their disease is crucial to buy them in, especially with long-term illnesses such as diabetes. Thus, there is a role here for physicians as well as patients to make this endeavor thrive, through mutual collaboration and understanding. Special emphasis is made on the role of physicians to reach out to patients at the beginning of the chronic care process and throughout while focusing on patient empowerment through better knowledge and understanding of the disease process in their bodies.

### Conclusion

The study demonstrates that if diabetics understood their disease, they would have a better chance at self-management; despite the importance of provider participatory decision-making and communication in enhancing that understanding.

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