

Research Article

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An Overview of Confidence in Diabetes Self-Management among Diabetics in the State of Qatar



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Abstract

Background: Diabetes complications are preventable given a supportive environment. Managing diabetes daily requires confidence which can be effectively done with effective support system. The information and health services received by diabetics are vital to empowerment as it enables them to make correct choices for better outcomes. The aims of this study were to examine patients' confidence in self-managing diabetes and its relationship to the level of information and available diabetes related services received in the State of Qatar.

Methods: The study was conducted among 300 diabetic patients through face-to-face interviews using a semi-structured questionnaire between February and May 2015 at healthcare facilities of Hamad Medical Corporation in Qatar. Patient consent to participate was sought. Survey responses were analyzed using frequencies, percentages, Chi-squared and Fisher's exact tests at 5% level of significance.

Results: About 54% of patients reported to have had Type 2 and 31% had Type 1 diabetes. Approximately 32% were treated for complications. Diabetic patients were more likely to gain confidence in managing their diabetes the more frequent they were in contact with hospital specialist consultant ($P=.02$), foot specialist ($P=.03$), eye specialist ($P=.03$) and diabetes coordinator ($P < 0.000$), when provided with diabetes plan ($P < .000$), and having a contact number to call for any diabetes-related concern ($P = .005$). Healthcare services available to the patients were a significant help for diabetic patients in coping and confidently managing their diabetes.

Conclusion: Better patient-provider collaboration and healthcare system's provision of medical services were substantially useful to diabetics in developing higher confidence to self-manage diabetes.

Keywords: Diabetes self-management; Diabetes; Qatar; Patient-Provider collaboration; Diabetic patient survey; Self-managing diabetes; Diabetes knowledge; Diabetes health services

Abbreviations: T1D: Type 1 Diabetes; T2D: Type 2 Diabetes; MOPH: Ministry of Public Health; NHS: National Health Strategy; NDS: National Diabetes Strategy; NHANES: National Health and Nutrition Examination Survey; HMC: Hamad Medical Corporation; PHCC: Primary Healthcare Corporation; BMI: Body Mass Index

Introduction

Diabetes is a health challenge as it has tremendous impact on the population's quality of life and well-being. Diabetes complications and its comorbidities contribute to increased death rates. NHS reported that 7% of mortalities in Qatar were caused by diabetes and related complications [1]. National survey conducted in 2012 among Qataris found that the prevalence of diabetes among adult population was 16.7% in both sexes. Proportion of overweight individuals was at 70.1%, hypertensive individuals were 33% while obesity was at 41.4% [2]. This high incidence of diabetes precipitated from the rapid socio-economic development in the country which led to low physical activity, unhealthy food choices and obesity.

Qatar's average yearly healthcare expenditure on diabetes treatment and its complications was estimated at QR1.8bn and

projected to increase to QR 4.9bn by 2035, with a corresponding rise in the number of diabetics to 299,000 at same year [3]. If the diabetes menace is left uncontrolled, it would adversely impact not only the country's economic progress but also the individual's quality of life. Through the National Diabetes Strategy (NDS), which is a component of Qatar's National Health Strategy (NHS), it targets to decrease the incidence and complications of diabetes by raising public awareness through health promotion approaches, education and counselling [4].

Serious complications of diabetes are preventable if people with diabetes understand their disease and participate in managing their own care [5,6]. It is imperative to focus prevention efforts in combating diabetes which involve both patients' and healthcare providers. Accordingly, the individual level knowledge

about the diseases will be more valuable if supplemented by readily available effective and affordable healthcare services [4]. Many studies emphasized effective strategies in improving diabetes care such as patient education and support, provider role through multidisciplinary teams, and telemedicine [7]. Moreover, supportive services such as nutrition counselling, health education, family and workplace engagement are essential in empowering patients to manage their diabetes [8].

An overview of Qatar’s healthcare support facilities and professionals shows that the country has 302 healthcare centers/clinics, 61 diagnostic facilities and 251 pharmacies, as of 2014 [9]. The inpatient services in Qatar are provided by 13 hospitals (consisting of 8 public hospitals of Hamad Medical Corporation (HMC) and 5 private facilities) while the outpatient services are catered by the Primary Healthcare Corporation (PHCC), other government-operated health centers and private clinics in the country [9]. Various endocrinology and diabetes clinics were opened in the entire country to provide comprehensive and interdisciplinary care to both children and adult diabetic patients. In terms of healthcare manpower, the rate of physicians in Qatar is 3.1 per 1000 population, 5.8 nurses per 1000 population, 0.09 pharmacists per 1000 population, 0.7 dentists per 1000 population and 3.6 per 1000 population for other healthcare providers [10].

The Supreme Council of Health (now Ministry of Public Health) commissioned a survey in 2015 through the YouGov UK (a market research organization) to understand the diabetes situation in Qatar and to improve the awareness and education of both the patients and general population about diabetes. The current study presents the results obtained from this survey about the perceptions of diabetic patients who sought medical care at the local hospitals and healthcare facilities in Qatar. The study primarily aimed to gauge the level of diabetes-related support diabetic patients received from the healthcare providers and determine the former’s confidence in managing their disease. The study presents the characteristics of the diabetic patients, their knowledge of diabetes-related factors, and their perception on the diabetes related services in the State of Qatar. This study supports the Qatar National Health Strategy (NHS) and National Diabetes Strategy (NDS) in preventing complications, monitoring and educating patients and the general public about diabetes, related factors, and preventive approaches [4].

Methods

The data in this report was sourced from the survey conducted among diabetic patients attending their appointments

Table 1: Characteristics of study respondents.

Characteristics	n (%)
N	300
Age	
16-24 years	20 (6.7)
25-34 years	72 (24.0)

at the outpatient clinics of Hamad Medical Corporation (HMC). HMC is a major public non-profit healthcare provider composed of nine tertiary hospitals and various clinics offering about 90% of acute services in the State of Qatar [11]. Through purposive sampling, a quota of 300 patients were selected and approached by the trained surveyors in the waiting areas or walk-in rooms of pediatric and adult diabetes clinics, women’s clinic, foot clinic and renal center. Sample quota was categorized based on the population characteristics in Qatar [12]. The 20-30-minute survey was carried out using a pre-tested and validated English and Arabic translated semi-structured questionnaire during the clinics’ regular working hours in February and May of 2015. Inclusion criteria for recruitment were Qatar residents (Qatari and Non-Qatari nationals), both sexes, at least 16 years with diabetes. On the other hand, visitors and non-resident of Qatar, less than 16 years old and without diabetes were excluded from the study. Patient participation in the survey was on voluntary basis, with informed consent obtained prior to survey and patients were assured of data confidentiality. Parental consent was sought for patient respondents below 18 years old. The study was approved by the Supreme Council of Health, Doha, Qatar.

Questions included were related to patients’ characteristics, knowledge about diabetes-related factors, associated complications and diabetes service level support received from health facilities, health providers, and other local diabetes support groups. The patients’ perception of diabetes and related factors were evaluated by Likert scale questions using a 5-point scale (nothing, very little, some, enough, and a lot) at 95% confidence interval. Frequencies, percentages, Chi-squared and Fisher’s exact tests were used to present and analyze the data. Data processing and analyses were carried out using the SPSS Software version 22.0 (IBM Corporation, Chicago, IL, USA) at 5% level of significance.

Results

Respondents’ characteristics

The respondents’ profile were characterized in terms of patients’ age, gender, nationality group and marital status. Among the 300 respondents, the highest percentage was in the age group 35-54 years (n=123, 41%) and least among 16-24 years (n=20, 6.7%). Proportion of males (n=166, 55.3%) were slightly higher than females (n=134, 44.7). Highest percentage of participants were Arab expatriates (n=110, 36.7%) and least among Westerners (n=10, 3.3%). Majority of the respondents were married with children (n=240, 80%) while widowed or divorced (13, 4.3%) were least represented (Table 1).

35-54 years	123 (41.0)
55-64 years	58 (19.3)
65 years and above	27 (9.0)
Gender	
Male	166 (55.3)
Female	134 (44.7)
Nationality Group	
Qatari nationals	88 (29.3)
Arab expatriates	110 (36.7)
Asian	92 (30.7)
Westerner	10 (3.3)
Marital Status	
Single	29 (9.7)
Married with children	240 (80.0)
Married without children	18 (6.0)
Widowed/ divorced	13 (4.3)

Diabetes types and diagnosis related factors

Table 2 presents respondents' characteristics by type and diagnosis of diabetes. More than half of the respondents (53.7%) self-reported having Type 2 Diabetes (T2D); 31% have had Type 1 Diabetes (T1D); and the rest have not specified their type of diabetes or were not aware of the type. The median duration of diabetes (all types) among sample was 60 months which indicated that half of the patients surveyed had diabetes duration above and below 60 months. Approximately 32% of respondents stated that they were treated for diabetes-related complications such

as high cholesterol (39%), vision problems (33%), hypertension (30%) and foot problems (25%) as among the most common. Most of the respondents were diagnosed at primary care clinics (41.7%). Regarding the health information received at the time of diagnosis, approximately 44% acknowledged that they received the right amount of diabetes-related information. Almost half of the respondents (49.3%) received diabetes-related brochures at the time of diagnosis and majority of them were either satisfied (63.5%) or extremely satisfied (27%) with the information contained in it. Majority of the respondents (78.3%) were fully advised regarding the different types of diabetes tests.

Table 2: Respondents' characteristics by diabetes types and diagnosis related factors.

	n (%)
N	300
Diabetes Type	
T1D	93 (31.0)
T2DM	161 (53.7)
Others/ unspecified	46 (15.3)
Duration of diabetes	
Months [Median(IQR)]	60 (24, 144)
Treated with Complications	
Yes	97 (32.3)
No	203 (67.7)
Diabetes-Related Complications*	
High cholesterol	117 (39.0)
Vision problems	99 (33.0)
High blood pressure	90 (30.0)
Foot problems	75 (25.0)
Kidney problems	24 (8.0)
Dental bleeding	21 (7.0)

Osteoporosis	18 (6.0)
Heart problems	12 (4.0)
Location of Diagnosis	
Screening bus	6 (2.0)
Primary care	125 (41.7)
Diabetes clinic	39 (13.0)
Emergency room	51 (17.0)
Women's hospital	23 (7.7)
Professional test following a self-test	38 (12.7)
Other	18 (6.0)
Level of Information at First Time of Diagnosis	
Too little information	113 (37.7)
Received right amount of information	133 (44.3)
Received too much information	32 (10.7)
Don't know/ can't remember	22 (7.3)
Brochures on Diabetes at Time of Diagnosis	
Yes	(49.3)148
No	146 (48.7)
Don't know	6 (2.0)
Satisfied with Brochures	
Extremely dissatisfied	3 (2.1)
Dissatisfied	-
Neither satisfied/ dissatisfied	11 (7.4)
Satisfied	94 (63.5)
Extremely satisfied	40 (27.0)
Fully Advised on all of Diabetes Tests	
Yes	235 (78.3)
No	46 (15.3)
Don't know/ can't remember	19 (6.3)

Treatment planning

Table 3 shows patients' behaviour as regards follow-up visits and treatment planning. More than half of the diabetics (57%) had four or more visits for their disease-related check-ups in past 12 months. Majority of patients received diabetes-related guidance from a physician (89.7%) while more than half received valuable advice and support from the nurses (69.3%). Among the 56% who have at least worked with the health professionals for goal setting, a lower percentage of 22.3% did goal setting with the health professionals in every visit while 33.7% sometimes or to some extent did treatment planning during their visit with healthcare team. Less than half of patients reported that they received sufficient advice from the clinic staff regarding diet (34.3%) and

physical activity (42.7%) while others did receive but not enough or not at all. About 57% of patients affirmed that they were provided with a copy of diabetes plan during their last visit and according to 95% of these respondents, the plan usually included next appointment time and date. It can be noted that over 64% of the patients felt confident or very confident in managing their diabetes themselves as a result of their diabetes follow up visits during the past 12 months. Most of the respondents stated that they underwent diabetes relevant tests such as body mass index (BMI) (79.3%), blood pressure (78%), cholesterol (69.3%), HbA1c (68%) and others during the past 12 months. Approximately 62% acknowledged that the results of these tests were fully explained to them.

Table 3: Follow up Visits & Treatment Planning.

	n (%)
Diabetes follow up visits in the past 12 months	
Once	26 (8.7)
Twice	39 (13.0)

Three times	42 (14.0)
Four times or more	171 (57.0)
Received advice and guidance in relation to diabetes	
Doctor	269 (89.7)
Nurse	5 (1.7)
Support groups	2 (0.70)
Friends	2 (0.70)
Family	9 (3.0)
Dietician	6 (2.0)
Personal trainer	2 (0.70)
Others	3 (1.0)
Nobody	2 (0.70)
Value of advice and support provided by nurse	
Yes	208 (69.3)
No	57 (19.0)
Worked with the health professionals to set goals about the best way to manage diabetes	
Yes, completely each time I visit them	67 (22.3)
Yes, to some extent-sometimes at visit	101 (33.7)
No, but I would have liked to	77 (25.7)
Received advice to change diet that could help manage diabetes	
Yes, definitely	103 (34.3)
Yes, to some extent but not enough	(27.3) 82
No, but I would have liked help/advice	56 (18.7)
Received advice on physical activity from clinic staff	
Yes, definitely	128 (42.7)
Yes, to some extent but not enough	63 (21.0)
No, but I would have liked help/advice	42 (14.0)
Thinking back to your last visit, were you given a copy of your diabetes plan?	
Yes	172 (57.3)
No	119 (39.7)
Diabetes plan includes any of the following:	
Your next appointment time and place	164 (95.3)
Name of contact person	71 (41.3)
Info. on managing diabetes between appointments	56 (32.6)
Personal goal and targets about diabetes	43 (25.0)
Advice on your diet and what foods to eat	67 (38.9)
Advice on physical activity	51 (29.6)
Your results of the diabetes tests	92 (53.5)
A plan for medicines & lifestyle	91 (52.9)
Your health information & diabetes status	45 (26.7)
Confidence in managing diabetes due to the health check-up in past 12 months	
Very confident	60 (20.0)
Confident	134 (44.7)
Not sure	77 (25.7)
Fairly unconfident	20 (6.7)

Very unconfident	9 (3.0)
In the last 12 months, have you undergone any of the following diabetes related tests? (Yes/No)	
Weight/ Body Mass Index (BMI)	238 (79.3)
Blood Pressure	234 (78.0)
Cholesterol	208 (69.3)
HbA1c (long term blood glucose test)	204 (68.0)
Blood test for kidney function	158 (52.7)
Urine test	220 (73.3)
Foot examination	140 (46.7)
Eye screening	161 (53.7)
Don't know/ can't remember	8 (2.7)
Were the results of these tests fully explained to you? (B14)	
Yes, and I understood them clearly	181 (61.9)
Yes, But I did not really understand them	26 (8.9)
No, I didn't need them to be	41 (14.2)
No, not at all	22 (7.5)
Don't know/ can't remember	22 (7.5)

Diabetes knowledge

Patients' understanding of the different diabetes dimensions and related factors were evaluated by Likert scale questions, responses of which were shown in Table 4. Majority of respondents indicated that they have at least "some" or "enough" knowledge about most of the factors influencing diabetes. More than half

indicated that they have been "enough" or "a lot" informed about the importance of having a regular visit with the doctor or nurse (65.3%). However, more than half had no idea about the effect or relation of drinking alcohol (58%) and smoking (53.3%) to diabetes while a greater proportion of them had no (33%) or very little knowledge (14.7%) about the adverse effects of taking medications.

Table 4: Respondents' extent of understanding on diabetes-related factors.

	Nothing	% (CI%)	Very little	% (CI%)	Some	% (CI%)	Enough	% (CI%)	A lot	% (CI%)
The effects of being ill: ex. Having flu	29.7	(24.8, 35.1)	16.7	(12.9, 21.3)	29.7	(24.8, 35.1)	16.7	(12.9, 21.3)	7.2	(4.9, 10.8)
Maintaining weight	17	(13.2, 21.7)	16.3	(12.6, 20.9)	25.3	(20.7, 30.5)	28.3	(23.5, 33.6)	13.1	(9.7, 17.3)
Blood glucose drops too low	5.7	(3.6, 8.9)	21.7	(17.4, 26.7)	31.7	(26.7, 37.1)	25	(20.4, 30.2)	16	(12.3, 20.6)
Regular check-ups with doctor/ nurse	4	(2.3, 6.7)	8.7	(6.0, 12.4)	22	(17.7, 27.0)	37	(31.7, 42.7)	28.3	(23.5, 33.7)
Cholesterol levels	20	(15.9, 24.9)	17.3	(13.5, 22.0)	27	(22.3, 32.3)	28	(23.2, 33.3)	7.7	(5.2, 11.2)
Blood pressure	19.7	(15.6, 24.5)	17.7	(13.8, 22.4)	29.7	(24.8, 35.0)	24.7	(20.1, 29.8)	8.3	(5.7, 12.0)
Checking and looking after eyes	18	(14.1, 22.7)	12.7	(9.4, 16.9)	28.7	(23.8, 34.0)	19.3	(15.3, 24.2)	21.3	(17.1, 26.3)
Checking and looking after feet	21.3	(17.1, 26.3)	18.7	(14.7, 23.5)	26.3	(21.7, 31.6)	22	(17.7, 27.0)	11.7	(8.5, 15.8)
Drinking alcohol	58	(52.3, 63.4)	6	(3.8, 9.3)	9.7	(6.8, 13.5)	11.3	(8.2, 15.4)	15	(11.4, 19.5)
Smoking	53.3	(47.7, 58.9)	4	(2.3, 6.8)	17.7	(13.8, 22.4)	11	(7.9, 15.0)	14	(10.5, 18.4)
Stress	10.3	(7.4, 14.3)	22.7	(18.3, 27.7)	36	(30.8, 41.6)	18.7	(14.7, 23.5)	12.3	(9.1, 16.5)
Tiredness	9.3	(6.5, 13.1)	19.3	(15.3, 24.2)	24.2	(19.2, 28.3)	23.7	(19.2, 28.3)	11	(7.9, 15.0)
Adverse effects taking medication	33	(27.9, 38.5)	14.7	(11.1, 19.1)	23.3	(18.9, 28.4)	17	(13.2, 21.7)	12	(8.8, 16.2)
Severe complications left untreated	8	(5.4, 11.6)	15.3	(11.7, 19.8)	31.1	(26.0, 36.4)	22.3	(17.9, 27.4)	23.3	(18.9, 28.4)

Respondents' level of confidence in diabetes self-management and local support received

The patients' confidence in managing their diabetes was correlated with some of the related services and support they received within the country. Table 5 emphasizes the significant role of support provided by the healthcare providers to the patients' level of confidence in managing their diabetes. More than half of the participants have sufficient contact with the doctor (78%) and nurse (58%) at local clinics. It was more likely for patients to be more confident in self-managing their diabetes care the more frequent they get in contact with the hospital specialist consultant (P=.02), foot specialist (P=.03), eye specialist ((P=.03) and diabetes coordinator (P<.000). These healthcare providers were perceived by the diabetics as the most significant providers of diabetic care as their contact with them were substantially

helpful in gaining confidence to manage their disease. Moreover, patients who were given a copy of their diabetes plan during their last check-up (P<0.000) and having a contact number to call for any diabetes-related concern (P=0.005) were more likely to be confident in managing their disease (Table 6). The diabetes plan provided patients' next appointment time and date, the contact person, information on managing diabetes between appointments, personal goals and targets about diabetes, advice on diets and physical activity, results of diabetes tests, a plan for medicines and lifestyle and other health information and diabetes status. Only a quarter of the patients were given or knew the hotline number to contact in cases of diabetes-related queries. Patients found it very essential that they have available channels of communicating their concerns and receiving diabetes information that would support in better self-managing their disease.

Table 5: Relation between Patient's Level of Confidence in Diabetes Self-Management and Extent of Contact with Health Professionals.

Health Professionals	Extent of Contact with Health Professionals					P-value*
	Too little n (%)	A little n (%)	Right amount n (%)	A lot n (%)	Too much n (%)	
Doctor at local clinic	41 (14)	25 (8)	88 (29)	63 (21)	83 (28)	0.19
Nurse at local clinic	85 (28)	40 (13)	98 (33)	53 (18)	24 (8)	0.39
Specialist consultant at hospital	122 (41)	54 (18)	90 (30)	16 (5)	18 (6)	.02*
Specialist nurse at hospital	156 (52)	68 (23)	49 (16)	14 (5)	13 (4)	0.21
Foot specialist	127 (42)	60 (20)	74 (25)	21 (7)	18 (6)	.03*
Eye specialist	89 (30)	67 (22)	73 (24)	30 (10)	41 (14)	.03*
Dietician	135 (45)	65 (22)	67 (22)	19 (6)	14 (5)	0.8
Diabetes Coordinator	192 (64)	29 (10)	67 (22)	2 (1)	10 (3)	<.000*

Table 6: Relation between patients' level of confidence in diabetes self-management and diabetes-related services/support received.

Diabetes-related Services & Support Received	n (%)	P-value
Fully advised on all of the diabetes tests that patients required to have	235 (78)	0.47
Given a copy of your diabetes plan during patient's last check-up	172 (57)	<.000*
Provided with brochures on diabetes at the time of diagnosis	148 (49)	0.15
Contact number to call for any diabetes-related concern	76 (25.3)	.005*

Information and communication support

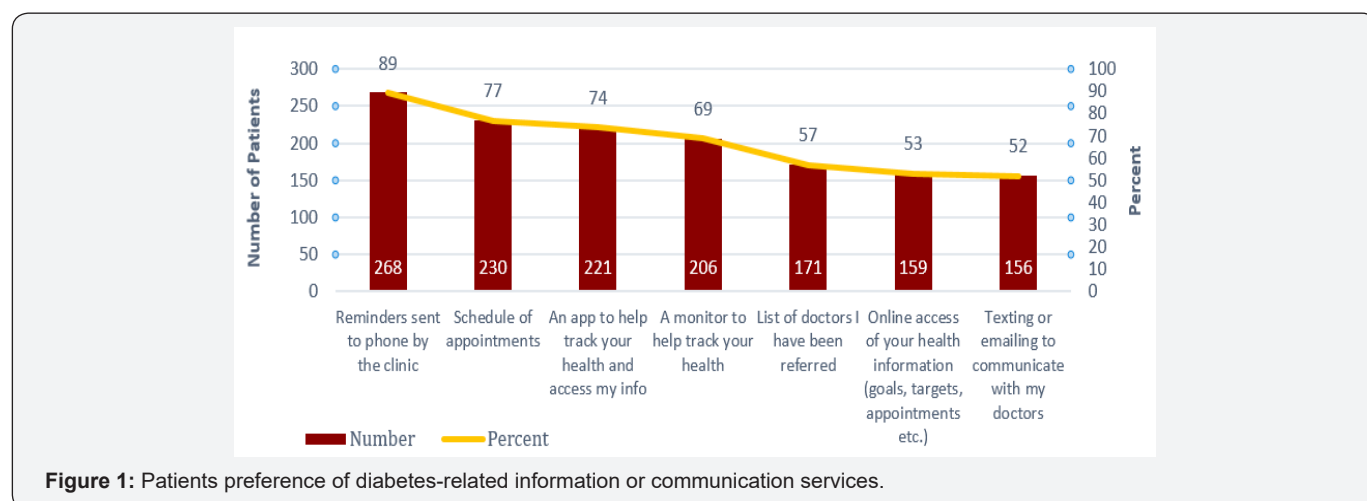


Figure 1: Patients preference of diabetes-related information or communication services.

Respondents were asked of their preference for diabetes-related information and communication services that they wished to receive in the future to provide them with better service. Patients mostly preferred SMS reminders sent to patient's phone by the clinic (89%), their schedule of appointments (77%), an app to help track health and access health information (74%), a monitor to help track own health (69%), and list of doctors that patients have been referred to (57%) as among the top 5 responses (Figure 1). Patients found these forms of communication as particularly useful because they were more likely to develop self-efficacy after gaining knowledge about their health conditions, diabetes treatment plans and access to healthcare services. When patients understand the burden of their disease, they are motivated more to actively participate in managing their own care with the healthcare professionals.

Discussion

This study provided an overview of the diabetes-related services and information received by the patients from the healthcare professionals and Qatar's healthcare facilities in developing their confidence to self-manage their disease. A third of the respondents surveyed were treated for the diabetes-related complications due to all types of diabetes. According to the National Health and Nutrition Examination Survey (NHANES), 1999–2004 (USA), the prevalence of diabetes complications among diabetics were mainly due to retinopathy (18.9%), foot problems (22.9%) and kidney disease (27.8%) [13]. In a Saudi review article, the prevalence of retinopathy was found to be 31% while neuropathy and foot disease was alarmingly high (82%) along with kidney disease was identified as an important complication of diabetes [14]. At least half of the patients received adequate information during the first time of diagnosis while a significant proportion (45%) reported that the level of information they received during this encounter was either too little or cannot be remembered. Moreover, almost half of the patients (49%) received brochures from the healthcare facility at the time of diagnosis, and about 90% of them were happy with the contents. These findings provide a valuable information to this study because patient satisfaction in most healthcare services predicts the quality of care and the management required from the health providers [15].

Most of the patients received additional examination and testing relating to their diabetes diagnosis which includes body mass index (BMI), blood pressure, urine testing, cholesterol & HbA1c etc. About 62% of the patients confirmed that these results were effectively explained to them. After 12 months of diabetes checkups, at least 67% of patients felt confident in managing their disease appropriately. This was attributed to the valuable support provided by the health practitioners, and the health care services made available to the patients. In terms of patient-provider relationship, majority of patients received guidance from their doctors. As expected, most patients cited doctors as their primary source of knowledge about their disease.

The extent of patient-provider communication and treatment planning significantly correlated with increased confidence of di-

abetics to self-manage their diabetes. In terms of communication, found that the respondents were fairly able to work with healthcare professionals in setting goals on the best ways to manage their diabetes. These factors are important since it is evident that lack or insufficient communication between provider and patient with diabetes could lead to poor compliance among patients [16,17].

Furthermore, the patients who less frequently receive information about diabetes are also less likely to manage their disease themselves [18]. In the present study, patients who underwent proper checkups in past 12 months, were provided a copy of their diabetes plan, had a contact number to call for any diabetes-related concern, had more frequent contact with the health professionals were confident about diabetes self-management. Also, the majority of them were satisfied with the contents of the brochures provided to them at the time of diagnosis. While participants understood well regarding the importance of relationship with healthcare providers, family members and other people with diabetes as a support, the greater proportion of them were not aware of any local diabetes advocacy group. In another study the participants also considered patient-provider collaboration, positive attitude among them, having a support person in their lives, and participation in group educational activities as essential components of an effective diabetes self-management strategy [19].

Studies reveal that patients are more likely to develop confidence after gaining knowledge of their own health conditions, treatment plans and health care access. Confidence motivates and empowers patients to communicate with health providers, express their concerns and preferences [20,21]. Patients understanding of the burden of their disease is important in developing preventive strategies and bringing patients to collaboratively manage care with the health professionals. Collaborative relationship between the health care providers and patients brings effective diabetes care through achieving improved outcomes and a higher level of satisfaction [22].

Most patients preferred reminders sent to patient's phone by the clinic (89%) as a way of communicating diabetes-related information. This information provides our healthcare providers and policy makers evidence on the best ways to reach and help diabetic patients in accessing information to better manage their disease. Enhancing patient-provider communication and shared decision making have been shown to result in greater patient satisfaction, adherence to treatment plans, and improved health outcomes. Collecting patient experience information and timely provision of relevant information to patients builds their capacity to actively manage their own care through behavioral change and adherence to treatment plan [23,24]. A greater percentage of the respondents had at least some understanding about their diagnosis and disease such as their glucose levels, cholesterol levels, blood pressure and things such as maintaining weight, having regular check-ups, checking their feet, and other related factors etc. On the other hand, more than half had nothing or very

little understanding about selected factors such as alcohol use, smoking, and medicine side effects. Although our findings may not be comparable due to the differences in the instruments used, a study conducted in the UAE showed low levels of overall awareness on diabetes based on a questionnaire covering definition, causes, symptoms and complications; however, a relatively higher awareness of general symptoms and complications was found among participants [25]. A previous study conducted in Qatar demonstrates that the levels of knowledge, attitude, and practice among adult Arab T2D patients were poor as compared to Qatari patients, although the latter group still needs patient-focused education on diabetes and its management [23,26]. This highlights that awareness and knowledge of diabetes and its complications can help both the patients and the providers in achieving favorable therapeutic goals. Lastly, outcomes of this study reflect the need for an improved disease-specific information giving, collaborative decision-making and goal-setting such that patients embrace the behavior changes needed to improve outcomes and will gain the confidence (self-efficacy) to make the most of life regardless of their chronic condition.

Conclusion

This study highlights various facets of diabetic patients' characteristics, behaviors and understanding of diabetes-related factors influencing self-management of diabetes. Results of the study emphasizes the importance of healthcare information and services received by the patients such as diabetes planning and messaging which significantly contributed to their level of confidence in managing diabetes. Outcome of the study suggests increased patient engagement in diabetes goal setting in partnership with the healthcare professionals to augment their knowledge and develop their confidence in self-managing diabetes. Patients require further education and counselling about risks factors such as smoking, alcohol use and adverse effects of medicines require further education and counselling. Patients were found to be generally satisfied about the level of information and support they received from the healthcare system. Given the burden of diabetes entails a profound need for strong collaboration between patient and healthcare providers for patients to confidently manage their disease. It would be more valuable to further expand diabetes related programs in the country through innovative approaches such as using social media, diabetes hotline number, and health campaigns and events to address diabetes-related concerns.

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