

Information Seeking Behavior among Diabetic Patients Attending Primary Healthcare in Western Saudi Arabia: A Cross-Sectional Two-Center Study

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ABSTRACT

Background: Saudi Arabia, unlike most western countries has relatively poor health education systems with very little material online being in native language. These predispose patients with diabetes to problems associated with treatment non-compliance that stems from poor health literacy.

Objectives: To investigate information seeking behavior among diabetic patients attending primary healthcare centers (PHCs) by evaluating the importance given by these patients to different types of diabetes-related medical information, sources they rely on and obstacles they face while seeking such information.

Methods: This cross-sectional study included 365 adult diabetic patients following-up at two PHCs in Jeddah, Saudi Arabia. A 5-part validated, semi-structured questionnaire was administered to assess: 1) demographic and clinical data; 2) importance of different types of diabetes-related information (13 items); 3) importance of different sources of information (16 items); 4) important obstacles while seeking information; and 5) participants' satisfaction about currently available information sources and frequency of internet utilization to seek medical information. Level of importance in parts 2, 3 and 4 was assessed using a 5-point Likert-type scale.

Results: The typical respondent was a young to middle-aged (18-50 years) married male, with middle to secondary school educational level, diagnosed 1 to 10 years ago for type II diabetes and treated by oral hypoglycemic agents (OHA) only. Assessment of information seeking behavior showed no remarkable importance to any of the types of information (mean \pm SD scores = 1.44 \pm 0.67 to 2.31 \pm 0.58); although "symptoms of hypoglycemia", "diabetes symptoms" and "proper

diet" were reported to be important motivations to seek information for 35.5%, 24.6%, and 23.5% of the patients, respectively. Treating doctors and ophthalmologists were ranked first and second important sources of information (score=4.02 and 3.39, respectively); while nurses ranked 12th (score=2.27). Problems in the doctor-patient relationship ranked the first important obstacle while seeking information (score=3.81). Majority of the patients declared being quite satisfied (55.3%) or very satisfied (7.1%) with their current possibilities of acquiring information about diabetes mellitus.

Conclusion: There is inadequate information seeking behavior among diabetic patients attending PHCs including marginal importance given to different types of diabetes-related information and quasi-dependency on physicians and on the quality of doctor-patient relationship to actively access medical information.


Keywords: Diabetes; Patient Education; Information Seeking; Doctor-Patient Relationship; Community Medicine.

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INTRODUCTION

Health awareness is a fundamental aspect of health care. It is not only an important entity in prevention of disease but also in the management of chronic diseases.¹ Such knowledge includes information on the disease and its progression, possible complications, medications and prognosis. Understanding these aspects of a chronic disease have shown to increase the

compliance to therapy, which subsequently confers a better prognosis.² Diabetes mellitus is a chronic metabolic disease that is compatible with a long life with appropriate lifestyle changes. Appropriate knowledge and medico social support plays a vital role in the management of diabetes and thus, the patient has a significant role in its management.

Self-care is highly necessary and demanding among diabetic patients and requires sound knowledge. Diabetic patients can acquire knowledge on the disease only if they can accept the truth that the condition lasts for life-long and vulnerable as it progresses. Healthcare professionals (HCPs) provide valuable suggestions to the patients regarding diabetes; such as basics of the condition, pathogenesis, signs and symptoms, at diagnosis and during the subsequent healthcare checkup visits.^{3,4} Moreover, diabetic patients should know their medications and how to self-administer the drugs, nutritional adjustments, carrying out blood glucose tests⁵ and how to discern hyperglycemic and hypoglycemic episodes⁶ as well as when to visit a doctor for diabetic consequences.⁷

Knowledge on the above aspects of diabetes mellitus helps to slow down the disease progression and delay its complications. However, acquiring knowledge on the disease and implementing it in day-to-day life remains a great challenge. Although there has been extensive research in this aspect, there are challenges in divulgence of the information to the patients. Reliable sources of information on diabetes not only help to demystify the disease but also provide ways to improve self-care, reduce anxiety and fear¹, promote better control of the disease and above all minimize the burden of diabetes on society, health systems and the economy.^{2,3} The most common and reliable source of information to a patient is HCPs.² However, regular visits to a doctor turn out to be expensive, which acts as an obstacle for the patient to access reliable and useful information. Community groups, rallies and symposia organized by governmental and non-governmental organizations can play significant role in educating the patients. In developed countries, fast growing internet/online platforms are being used to educate diabetics on their ailment, some of the patients read publications and articles to improve their health.^{8,9} Most of the latter sources may be cheap and of easy access; but on the other hand may be unreliable and constitute misconceptions.

In addition, availability of information sources must be coupled to appropriate information seeking behavior in order to effectively manage a chronic disease process.¹⁰

Information seeking behavior is described as the purposive and focused search of information motivated by the lack of knowledge on a particular subject.⁷ There is no much data on information seeking behaviors in the diabetic community. Patient's perception of the disease, motivating and demotivating factors, and the availability of resources are key factors in acquiring information on the knowledge of the disease.

Saudi Arabia, unlike most western countries has relatively poor health education systems with very little material online being in native language. These predispose patients with diabetes to problems associated with treatment non-compliance that stems from poor health literacy.² Management strategies targeting patient health should be improved for a condition that is progressively prevalent across the globe.⁶ There is paucity of data regarding health information seeking behavior in Saudi Arabia.² Studying the information seeking behavior of our populace will help us determine the state of diabetes health literacy, address the need for information among diabetics, discern the factors influencing patterns of information seeking behaviors and establish reliable resources to meet the information requirement of the Saudis.

The present study investigated information seeking behavior among diabetic patients attending primary healthcare centers (PHCs) in Jeddah. Types of diabetes-related information, information sources and obstacles to obtain information; as well as satisfaction about available opportunities for acquiring medical information were assessed.

METHODS

A multicenter cross-sectional study was conducted among diabetic patients following-up at Al Safa PHC and Briman PHC, Jeddah, Saudi Arabia. We included all adult (age>18 years) diabetic patients presenting between 10th to 31st October 2016 at the 4 following clinics: outpatient General Clinic; outpatient Geriatric Clinic; outpatient Diabetic Clinic and outpatient Diabetic Foot Clinic of the 2 participating PHCs. Objectives and procedure of the study were explained to the patients and consent was taken prior to interview. A validated semi-structured questionnaire was administered to consenting participants^{3,11} including 5 parts:

- 1) Demographic and diabetes-related clinical data;
- 2) Assessment of the needs for information about diabetes, by assessing the perceived level of importance of 13 successive information types related to diabetes, such as nature of the diseases, its symptoms, causes, and complication, etc.;
- 3) Assessment of the importance of potential sources of information, such as doctors, nurses, internet, leaflets, etc. (16 items);
- 4) Assessment of the important obstacles while seeking medical information among participants such as lack of time, lack of competent infrastructures, lack of medical or computer literacy, etc. (10 items);
- 5) Assessment of participants' satisfaction about current possibilities of acquiring information about diabetes (1 = not satisfied at all, 2 = a little satisfied, 3 = moderately satisfied, 4 = quite satisfied, and 5 = very satisfied); as well as the frequency of use of internet (every day, once per week, once per month, rarely in the year, and never).

Level of importance in parts 2, 3 and 4 was assessed using a 6-point Likert-type scale scored as: 0 = I don't know, 1 = not important at all, 2 = somewhat important, 3 = important, 4 = very important, 5 = most important. The questionnaire was translated into Arabic. The study was approved by the Medical Research and Studies Department, Directorate of Health Affairs, Ministry of Health (MOH), Jeddah.

Sample size (N=365) was calculated to detect a 95% confidence interval (CI) single proportion of 61.4% as the percentage of participants who consider a given item as the most important; e.g. "what is the proper diet for diabetes"³. Type I error was set at 0.05 for a 2-sided p-value; and statistical power was set at 0.80. Participants were recruited using convenience sampling until reaching the target sample size.

Data analysis was carried out using Statistical Package for Social Sciences version 21.0 for Windows (SPSS Inc., Chicago, IL, USA). Descriptive statistics were carried out to analyze demographic and clinical characteristics of the participants, as well as the pattern of answers to different questionnaire outcome data. Demographic and clinical data were presented as frequencies and percentages. Importance of different types of diabetes-related information (Part 2) was presented as a categorical variable using the percentage of responses in each

level (0= I don't know; 1=not important at all; to 5=most important) and displayed in bar charts. Importance of different information sources (part 3) and obstacles to information seeking (part 4) was presented as mean±SD importance score (range=1 to 5), after exclusion of participants who answered by "I don't know" (score=0). Results were depicted in bar charts. Perceived

importance of each information type (part 2) was correlated to demographic and clinical factors using Mann Whitney-U test for factors with binomial variables, and Kruskal-Wallis test for factors with multinomial variables. Results were presented as mean (range=1 to 5) with the corresponding statistical significance level. A p value of <0.05 was considered to reject the null hypothesis.

Table 1: Population demographic, socioeconomic and clinical characteristics

Parameter	Value	Frequency	Percentage
Gender	Male	208	57.0
	Female	157	43.0
Age (years)	18-40	106	29.0
	40-50	131	35.9
	50-60	79	21.6
	>60	49	13.4
Accommodation	Tenant (rental)	147	42.7
	Owner (proprietary)	197	57.3
Marital status	Single	40	11.0
	Married	283	77.5
	Divorced	19	5.2
	Widowed	23	6.3
Educational level	Illiterate	19	5.2
	Primary	64	17.5
	Intermediate	78	21.4
	Up to secondary	148	40.5
	University +	56	15.4
Income	<5,000	87	24.0
	5,000 – 10,000	154	42.4
	10,000 – 15,000	91	25.1
	>15,000	31	8.5
Diabetes type	Type I	81	22.4
	Type II	281	77.6
Disease duration (years)	< 1 year	34	9.3
	1-5 years	134	36.8
	5-10 years	109	29.9
	>10 years	87	23.9
Clinic type	Outpatient Diabetes clinic	214	59.0
	Outpatient diabetic foot clinic	7	1.9
	General clinic	121	33.3
	Geriatric clinic	21	5.8
Treatment	Diet alone	13	3.7
	Insulin	78	22.3
	OHA	239	68.3
	OHA + insulin	20	5.7
Sufficiently informed about diabetes	False	4	1.1
	True	356	98.9

HTN: hypertension; OHA: oral hypoglycemic agents;

RESULTS

We included 365 (N) diabetic patients from the 2 participating PHCs, who were pooled in 1 database. The typical respondent profile included a young to middle-aged (29.0% aged 18-40 and 35.9% aged 40-50 years), married (77.5%) male (57.0%), with middle to secondary school educational level (61.9%). Typical clinical profile included type II diabetes (77.6%) diagnosed 1 to 10 years ago (66.7%), presenting at the outpatient Diabetes Clinic (59.0%) or General Clinic (33.3%) and treated by oral hypoglycemic agents (OHA) only (68.3%). Almost all participants

(98.9%) affirmed being sufficiently informed about diabetes and not seeking information about diabetes (Table 1).

Analysis of the questionnaire reliability showed a Cronbach's alpha value = 0.865 for part 2 (information needs, 13 items), 0.737 for part 3 (sources of information, 16 items) and 0.581 for part 4 (obstacles to information, 10 items). Analysis of part 2 of the questionnaire showed that information types that were most frequently rated as "important" or "very important" to be sought were: symptoms of hypoglycemia (Info.11; rated as being important or very important by 35.5% participants); followed by

diabetes symptoms (Info.2; by 24.6%); proper diet for diabetic people (Info.5; by 23.5%); what is diabetes (Info.1; by 23.0%) and right exercise for diabetic patients (Info.6; by 21.9%). Information types that were least frequently regarded as "important" or "very important" were: new medications for diabetes and their side-effects (Info.7; 5.8%); what to do in case of other illness (Info.13; 5.5%); causes of diabetes (Info.3; 5.8%); when to start insulin (Info.8; 6.8%); and preventive measures against diabetic foot complications (Info.10; 9.3%). Only 1 participant rated as "most important" the information relating to what to do in case of other illness (Info.13); while no other information was rated likewise. (Figure 1)

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Figure 1: Importance of different types of diabetes-related information in motivating information seeking among diabetic patients

(Respondents answered the question: "how important do you consider the following factors/knowledge urging to seek information?"; answer categories were: 0=I do not know; 1=not important at all; 2= somewhat important; 3= important; 4=very important; 5=most important. Bars represent percentages of responses in each category, per type of information.)

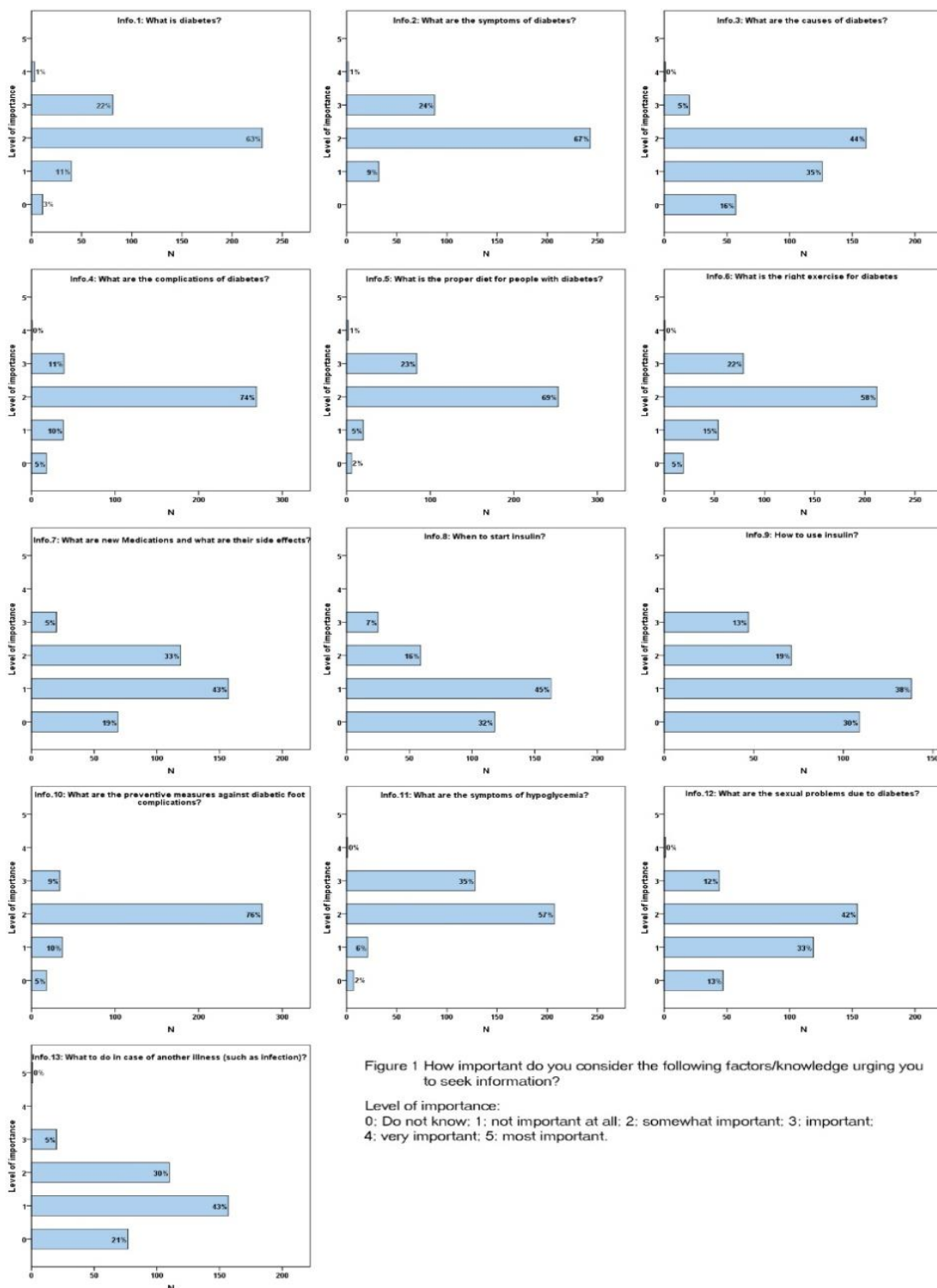


Figure 1 How important do you consider the following factors/knowledge urging you to seek information?
 Level of importance:
 0: Do not know; 1: not important at all; 2: somewhat important; 3: important; 4: very important; 5: most important.

Figure 2: Importance ranking of information sources used by diabetic patients.

(Respondents answered the question: "Which sources do you use to seek information about diabetes?". Bars represent mean±SD importance score for each potential information source (1=not important at all; 5=most important.)

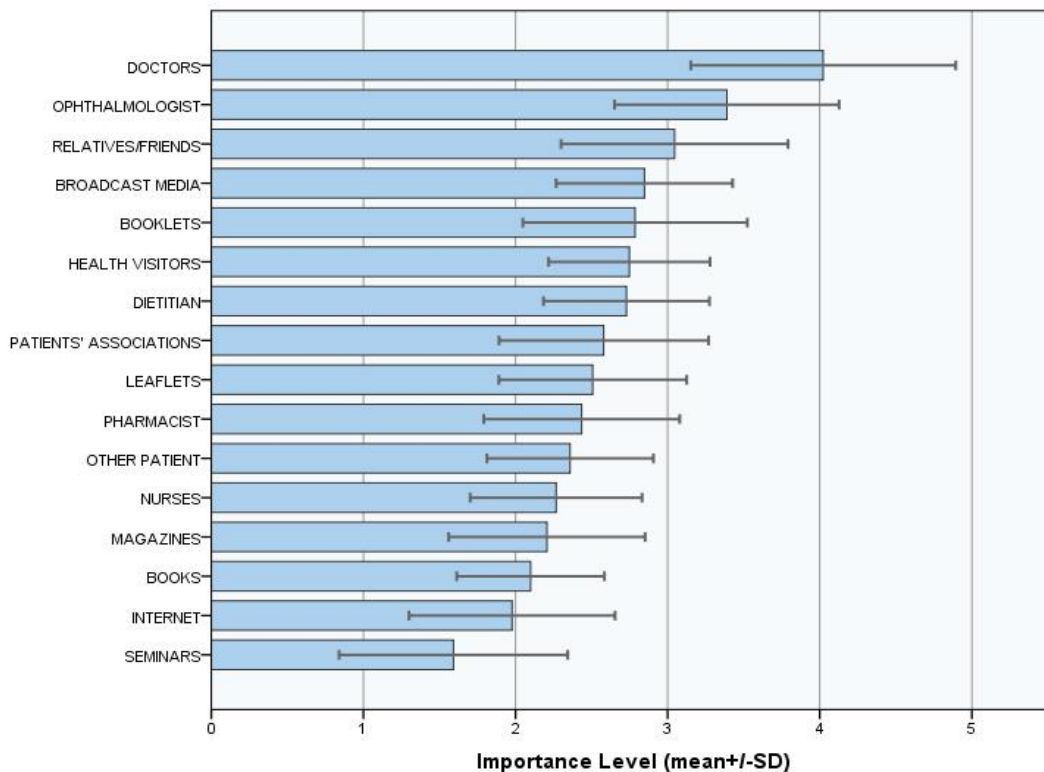
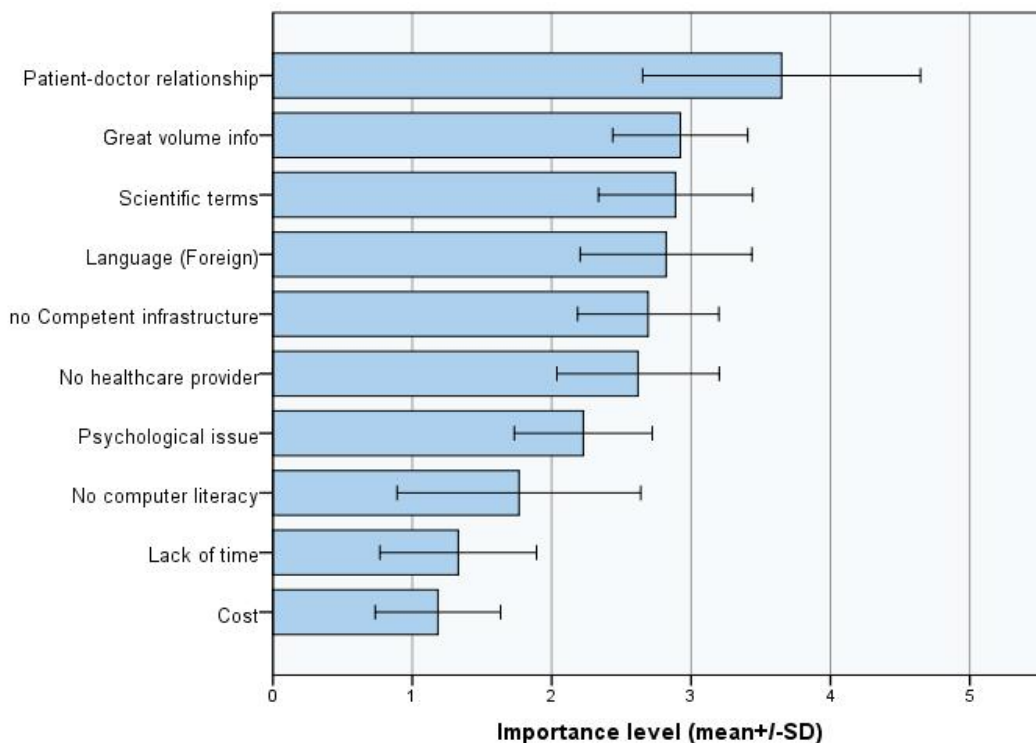


Figure 3: Importance ranking of obstacles to information seeking among diabetic patients

(Respondents answered the question: "How important are for you the following problems in seeking information about diabetes?". Bars represent mean±SD importance score for each potential obstacle (1=not important at all; 5=most important.)



Analysis of part 3 of the questionnaire related to sources of information showed that most participants regarded doctors as most important (38.1%), very important (32.9%) or important (26.6%) source of information about their disease (mean score=4.02). Other important sources were: Ophthalmologist, which was regarded as important, very important or most important in 92.9% cases (mean score=3.39); followed by friends and relatives (78.1%; mean score=3.05) and broadcast media (76.8%; mean score=2.85). Sources that were ranked least important were seminars for diabetics (mean score=1.59); followed by internet (mean score=1.98); and nurses were ranked 12th source of information by importance level (mean score=2.27). (Figure 2)

Assessment of obstacles to information seeking among diabetic patients showed that problems in the doctor-patient relationship were the most significant obstacle regarded as most important,

very important and important by 33.7%, 21.9% and 36.4% of the participants, respectively (mean score=3.81). Other important obstacles included: "great volume of unorganized information" and "poor understanding of scientific terms used", both scoring as 2.92; followed by "poor understanding of information available in foreign language" (mean score=2.85); "lack of healthcare providers" (2.61); and "lack of competent infrastructures" (2.54). On the other hand, cost, lack of time and lack of computer literacy were ranked as the least important obstacles to information seeking, with mean scores=0.85, 1.12 and 1.62. (Figure 3)

Majority of patients declared being quite satisfied (55.3%) or very satisfied (7.1%) with their current possibilities of acquiring information about diabetes mellitus; while no one declared being not satisfied at all. Majority of patients declared that they use internet at least once per month to seek information about diabetes. (Table 2)

Table 2: Satisfaction about current possibilities and frequency of internet usage to acquiring medical information among diabetic patients

Values	Frequency	Percentage
Satisfaction about current possibilities of acquiring information		
Not satisfied at all	0	0.0
A little satisfied	13	3.6
Moderately satisfied	124	34.0
Quite satisfied	202	55.3
Very satisfied	26	7.1
Frequency of usage of internet to seek for information related to diabetes		
Everyday	15	4.1
Once weekly	94	25.8
Once a month	149	40.8
Rarely	62	17.0
Never	45	12.3

No difference was observed between the 2 genders in rating the importance of the 13 types of information. Some significant differences were observed between different age categories, such as regarding symptoms and causes of diabetes and how to use insulin, where we observed greater importance among youngest participants (18-40 years) as compared with other age categories. Participants with highest educational level (university+) gave the highest scores in rating the importance of all 13 types of information; while illiterate participants gave the smallest scores for majority of the information types. Type I diabetes participants showed greater consideration for information related to right exercise for diabetes (info. 6), use of insulin (Info.8 & Info.9), as well as to preventive measures against diabetic foot complications (DFC), symptoms of hypoglycemia and sexual problems due to diabetes, by comparison to those with type II diabetes. Patients attending outpatient Diabetes Foot Clinic (ODFC) showed greater consideration regarding diabetes complications, the right exercise for diabetes, new medications, preventive measures against DFC, and what to do in case of another illness. Participants on insulin only showed greatest concern about 10 out of 13 information types, such as proper diet and exercise for people with diabetes, use of insulin, and symptoms of hypoglycemia. Mean scores and significance levels of each type of information in correlation with demographic and clinical factors are presented in Table 3.

DISCUSSION

This study investigated information-seeking behavior among diabetic patients attending PHCs. It focused on evaluating the importance given by the patients to different types of diabetes-related medical information, sources they rely on and obstacles while seeking information.

Demographic and clinical characteristics showed good representation of both genders; whereas a relative underrepresentation of geriatric category (>60 years; 13.4%) was observed. In addition, high socio-economic class (>15,000 SAR [US\$ 4,000] monthly income; 8.5%) was underrepresented; reflecting the actual discrepancies between individuals of different socio-economic classes in the utilization of primary health care.^{12,13} The 3 prominent findings in this study are: overall, assessment of information seeking behavior among diabetic patients showed no remarkable importance to the types of diabetes-related information, majority of the patients considered doctors as most important or very important source of medical information and doctor-patient relationship was a major obstacle to seek information among 92% of the participants

The first observation probably reflects lack of awareness among diabetic patients about the importance of different types of medical information and the necessity to seek information. Alnaif & Alghanim showed that only 20% of the patients with chronic health

Table 3: Factors correlated with information seeking behavior per information type

Factor	Category	Information type (mean score (1= not important at all; 5= most important))												
		Info.1	Info.2	Info.3	Info.4	Info.5	Info.6	Info.7	Info.8	Info.9	Info.10	Info.11	Info.12	Info.13
Gender	Male	2.14	2.20	1.69	2.01	2.22	2.11	1.58	1.44	1.62	2.00	2.33	1.79	1.57
	Female	2.12	2.13	1.61	2.00	2.16	2.04	1.48	1.46	1.71	1.99	2.29	1.76	1.49
Age category (years)	18-40	2.19	2.26*	1.79*	2.02	2.20	2.13	1.57	1.54	1.81*	2.01	2.43	1.78	1.56
	40-50	2.13	2.15	1.63	2.03	2.19	2.08	1.54	1.41	1.49	2.00	2.26	1.77	1.49
	50-60	2.17	2.22	1.58	2.05*	2.26	2.18*	1.53	1.37	1.52	2.00	2.28	1.80	1.59
	>60	1.93	1.92	1.56	1.83	2.06	1.77	1.46	1.37	1.79	1.91	2.21	1.69	1.52
Educational level	Illiterate	1.29	1.32	1.00	1.54	1.82	1.54	1.45	1.40	1.64	1.60	2.05	1.40	1.50
	Primary	1.92	1.95	1.34	1.81	1.98	1.88	1.33*	1.26	1.48	1.87	2.15	1.57	1.21
	Intermediate	1.92	2.03	1.39	1.94	2.17	2.03	1.44	1.30	1.39	1.97	2.12	1.56	1.38
	Up to secondary	2.25	2.27	1.77	2.05	2.21	2.08	1.59	1.46	1.69	2.04	2.41	1.81	1.62
	University +	2.57#	2.61#	2.13#	2.33#	2.50#	2.46#	1.76*	1.74*	2.03*	2.13#	2.55*	2.27#	1.86#
	<5,000	1.96	1.95	1.44	1.89	2.09	1.99	1.54	1.52	1.67	1.91	2.19	1.63	1.44
Income (SAR)	5,000 – 10,000	2.06	2.12	1.62	1.95	2.09	1.99	1.50	1.44	1.64	1.97	2.26	1.66	1.52
	10,000 – 15,000	2.27	2.31	1.71	2.04	2.25	2.11	1.41	1.26	1.52	2.06	2.40	1.85	1.54
	>15,000	2.55	2.55	2.21	2.42	2.68	2.60	2.00	1.77	1.95	2.10	2.55	2.41	1.81
	Type I	2.20	2.32	1.83	2.12	2.33	2.31#	1.58	2.07#	2.43#	2.12*	2.54#	2.04#	1.61
Diabetes type	Type II	2.11	2.11	1.62	1.98	2.15	2.01	1.53	1.19	1.31	1.95	2.23	1.69	1.51
	<1 year	2.03	2.12	1.69	2.00	2.09	1.97	1.63	1.35	1.46	1.84	2.24	1.68	1.54
	1-5 years	2.14	2.18	1.66	2.01	2.20	2.13	1.45	1.37	1.54	2.00	2.24	1.72	1.55
	5-10 years	2.19	2.17	1.65	2.02	2.19	2.09	1.58	1.36	1.47	2.01	2.37	1.73	1.55
Clinic type	>10 years	2.11	2.16	1.68	1.99	2.20	2.01	1.59	1.70*	2.04#	2.01	2.34	1.94	1.49
	ODC	2.21*	2.25	1.71	2.03	2.21	2.11	1.59	1.47	1.70	2.06	2.40*	1.80	1.54
	ODFC	2.00	1.86	2.00	2.33*	2.33	2.40*	2.00*	2.00	1.83	2.17#	2.29	2.00	3.00*
	General clinic	2.05	2.10*	1.59	2.00	2.19	2.08	1.47	1.39	1.53	1.92	2.19	1.74	1.47
Treatment	Geriatric clinic	1.79	1.81	1.38	1.71	1.95	1.56	1.13	1.18	1.62	1.65	1.95	1.63	1.27
	Diet alone	1.85	1.85	1.40	1.92	2.25	1.92	1.27	1.14	1.14	1.69	1.92	1.75	1.55
	Insulin	2.22*	2.33#	1.85*	2.11	2.32*	2.28*	1.62	2.06#	2.41#	2.14#	2.55#	2.03*	1.64
	OHA	2.15	2.16	1.64	2.00	2.16	2.05	1.54	1.17	1.21	1.99	2.26	1.71	1.52
	OHA + insulin	1.74	1.75	1.29	1.89	2.00	1.78	1.56	1.50	2.00	1.74	2.11	1.56	1.23

Results are presented as means; standard deviations were not presented to facilitate reading; statistical significance is calculated using nonparametric tests (Mann Whitney-U test for binomial variables including gender and diabetes types, and Kruskal-Wallis test for other multinomial variables); significance (* p<0.05; # p<0.001) is mentioned on the highest values; highest and lowest values are bolded; ODC: outpatient Diabetes Clinic; ODFC: outpatient Diabetic Foot Clinic.

problems were properly educated about their disease in Saudi Arabia. Authors also reported that PHCs staff contributed to the medical knowledge of >50% of the patients; although only one-third of the educative programs were led by PHCs. Authors highlighted the need to further improve patient education and knowledge in Saudi Arabia and emphasized the leading role of PHC providers in community-based actions.¹⁴

In comparison with the other types of medical information, symptoms of hypoglycemia was ranked as the most important to motivate information seeking behavior among diabetic patients, especially those on insulin. Hypoglycemia was reported in approximately 10% of treated type II diabetic patients, without apparent correlation with the level of glycemic control.¹⁵ However, it is more frequent in patients with chronic insulin therapy; but also observed in patients who are on conventional therapy.¹⁶ Geriatric patients are at increased risk of microvascular events and renal failure; and are also prone to severe forms of hypoglycemia.¹⁷⁻¹⁹ Therefore, patients should be aware of these complications, should be able to detect its symptoms and self-manage eventual episodes.

Proper diet and exercise for diabetes were amongst the most important concerns of interviewed diabetic patients, which is consistent with the findings of Kalantzi et al.³ The effect of exercise on diabetes resides in improving fat and glycemic metabolism, which enhances glucose uptake by skeletal muscle and results in effective reduction of hyperglycemia.²⁰ In type I diabetes, exercise type, intensity and duration have differential impact on glucose homeostasis.²¹

Information regarding new medications for diabetes and their side-effects; measure to take in case of other illness and preventive measures against DFC were less frequently rated as important. By contrast, Kalantzi et al. reported that information related to preventive measures against DFC was an important concern for diabetic patients, especially for those with long disease duration, poor glycemic control and those attending diabetic foot clinic.³

Regarding information sources, other studies' findings from Greece³ and Iran¹ were in line with our observations showing that physicians were the most important source of information for diabetic patients. In the Greek study, it was demonstrated that patients' perceptions towards different HCPs i.e. doctors versus nursing staff influenced the health information seeking tendencies with doctors being a preferred choice.³ Authors also reported that ophthalmologists ranked second most reliable source of information.³ The results of our study are in line with this study, which demonstrates that patients consider both general and specialist physicians involved in diabetes management as most trustworthy source of information. Surprisingly, nurses were regarded as one of the least important information sources in our study; which is fairly comparable to findings from the 2 previous studies.^{1,3} This negative perception constitutes an unfavorable condition for active information-seeking from nurses. Nursing staff should have an important place in patient education and could have a significant contribution in this field as they spend more time with the patients.²² Among other HCPs, nurses can provide timely information on the disease condition, progress, therapeutic focus (how to self-administer the drugs, nutritional adjustments, carrying out blood glucose tests⁵ and how to discern hyperglycemic and hypoglycemic episodes⁶ as well as when to visit a doctor) and lifestyle changes that helps in decreasing the disease

complications. Corrective and awareness measures should be taken to promote the role of nurses in diabetic patients' education and revalue their reliability as rich source of information.

Broadcast media including television and radio were amongst the important sources of information for diabetic patients. Comparably, Kalantzi et al. reported broadcast media as being the fourth most important information source for diabetic patients in Greece, especially in highly educated people;³ while Alnaif & Alghanim reported it to be the most important source among all patients attending PHCs in Saudi Arabia.¹⁴ Conversely, internet was unexpectedly a minor source of information for diabetic patients in our study as well as in other studies; however, it may encounter greater interest among young diabetic patients.^{1,3}

Perception of doctor-patient relationship as an obstacle may indicate dissatisfaction about the interpersonal dimension; it may also indicate that patients expect doctors to be more involved, and provide more information to educate them. A study by Alshammari et al., who explored patients' satisfaction in PHCs in Hail, Northern region of Saudi Arabia, supports this hypothesis. This study revealed that although interpersonal and communication dimensions had the highest satisfaction scores, respondents were less satisfied about the amount of time dedicated by doctors during the visit.¹³ Another study from Kuwait, reported that the majority of patients have judged the medical time dedicated in a PHC as being insufficient; and were unsatisfied with the quality of doctor-patient relationship.²³ The quality of doctor-patient relationship is a fundamental success factor for healthcare. A poor quality doctor-patient relationship was demonstrated to be a major cause of dissatisfaction and frustration among patients.²⁴ Besides acquiring updated knowledge on diabetes, care providers should receive trainings to improve their educational and communication skills. Most importantly, they should learn how to develop a proactive physician-patient relationship to detect and reduce the psychological and behavioral obstacles that may interfere with the appropriate transmission of the health message to their patients.^{25,26} However, several factors could also contribute in altering the education practice among physicians in PHCs, including unfavorable working and organizational conditions such as heavy workload, lack of time and insufficient staffing; in addition to factors related to the patients themselves.^{25,27}

Effective patient education in PHCs can only be achieved through implementation of an education-centered organizational culture; having as objectives to promote understanding of the disease among patients, increase awareness and knowledge about specific preventive measures and treatment-related issues. Roles should be harmoniously distributed between physicians and nurses, with further inclusion of social workers, dietitians, psychologists and specialist educators. Such measures may induce supplemental costs but have long-term clinical- and cost-effectiveness as in improving glycemic control and decreasing the incidence of diabetes complications.^{28,29} In addition, with regards to the nature of diabetes that requires daily monitoring and preventive measures, diabetic patients should be educated for self-management.³⁰

In conclusion, there is inadequate information seeking behavior among diabetic patients attending PHCs, including marginal importance given to different types of diabetes-related information and quasi-dependency on physicians and on the quality of doctor-patient relationship to actively access medical information.

The findings of this study reflect lack of awareness among diabetic patients about important medical information relevant to their disease and the necessity to seek such information.

There is imperative need to provide efficient trainings to PHCs physicians and nurses to improve their educational and communication skills. Physicians should be able to develop proactive physician-patient relationship, in order to detect and reduce the psychological and behavioral obstacles that may interfere with the appropriate transmission of the health message to their patients. Nurses' contribution in diabetic patient education within PHCs should be promoted and their reliability as information source should be revalued. Patients' learning expectations should be systematically assessed, oriented and managed in a team-organized work.

Effective patient education in PHCs can only be achieved through implementation of an education-centered organizational culture; having objectives to promote understanding of the disease, increase awareness about specific preventive measures and treatment-related issues to the patients..

Individual and group education programs should be implemented in all PHCs to enhance patients' information seeking behavior, provide them with reliable sources and learning materials and promote diabetes self-management.

Given the importance of diabetes in our region, all kind of media including television, radio and internet should be used to broadcast specifically- and professionally-designed educational programs at regional or national scale.

The issue of doctor-patient relationship deserves to be thoroughly investigated to determine related factors impeding active and efficient contribution of patients in the management of their disease and propose the appropriate solutions.

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