ORIGINAL ARTICLE

Patient Satisfaction with Doctor-Patient Interaction using SKIP-11 and Its Associated Factors among Type 2 Diabetics in Primary Care.

George Wong PK[1], Mohd Yusoff SH[1], Yaacob LH[1], Draman N[1]

[1]Department of Family Medicine, Universiti Sains Malaysia, Kubang Kerian, Malaysia.

ABSTRACT

INTRODUCTION: The quality of diabetes care is widely suboptimal, and most of the interventions depend on the active engagement and participation of patients. Understanding and determining patient related factors can help primary care providers pay more attention and give greater care to those patients. This will improve patient satisfaction, which further enhances compliance with or adherence to diabetic treatment. Therefore, this study aims to determine patient satisfaction with doctor-patient interaction and its associated factors among patients with type 2 diabetes mellitus. **MATERIALS AND METHODS:** This cross-sectional study was done among adults who had diabetes for at least six months. Participants were selected by systemic random sampling from the outpatient clinic of the University Hospital. Patient satisfaction with doctor-patient interaction was measured using 11- items with a three-domain version of the "Skala Kepuasan Interaksi Perubatan-11" questionnaire. The total scores ranged from 11 to 55, and those who scored 44 and above (>80%) were considered satisfied. **RESULTS:** A total of 417 patients were recruited in the study. 60% were satisfied with their doctor-patient interactions. Among the subtypes in the satisfied group, the domain of rapport had the highest percentage of satisfaction at 77.7%. HbA1c was found to be significant associated with patient satisfaction with doctor-patient interaction (95% CI: 0.81, 0.97; p = 0.008). **CONCLUSION:** 60% of the participants clearly illustrated positive feedback and were more satisfied with their doctor-patient interactions. HbA1c was found to be significantly associated with patient satisfaction concerning doctor-patient interaction.

Keywords
Patient satisfaction, Doctor-Patient Interaction, Type 2 Diabetes

Corresponding Author
Dr Siti Suhaila Mohd Yusoff
Department of Family Medicine,
School of Medical Sciences,
Health Campus, Universiti Sains Malaysia,
16150 Kubang Kerian, Kelantan, Malaysia
Tel: +60139330044
Email: drsuhaila@usm.my

Received: 12 August 2020; Accepted: 23 Feb 2021

Doi: https://doi.org/10.31436/imjm.v20i4

INTRODUCTION

Diabetes is a public health concern because of its chronic and debilitating effects. Its increasing incidence is often associated with the prevalence of patients with poor glycaemic control.[1] Therefore, it is crucial to study the factors that influence the glycaemic control of diabetic patients. Good diabetic control remains crucial for preventing further complications later in life.

Along with existing diabetic treatment regimes, psychosocial management, and lifestyle changes, improving the quality of care for patients has become an important focus of the healthcare organization and policy.[2] This can be achieved by addressing patient satisfaction, which is influenced by the patient, the physician and practice characteristics.[3] Recent literature on diabetes have increasingly focused on the quality of care and its measurement. However, the relationship between the quality of diabetes care and patient satisfaction is not well understood and requires further expansion and elaboration.[3]

Patients' satisfaction with their doctor-patient relationship is a key element in the efficiency and use of health services, and it can vary depending on patient characteristics.[4] Each patient has expectations when meeting a doctor, and the difference between these expectations and the care obtained represents the patient's perception of satisfaction.5 Satisfied patients described their doctors as showing genuine interest in their health problems, as being able to convey clear descriptions of diseases and future health consequences and as giving the patients ample opportunities to talk about their health and how diseases affect their everyday lives.[6]

In Malaysia, despite the country having very good pharmacological and non-pharmacological management for diabetic patients, most diabetic patients (up to 80%) still have poor glycaemic control.[7] The quality of diabetes care is widely suboptimal, and most of the interventions depend on the patients' active involvement and participation. Therefore, working with patient satisfaction may be an alternative mode

to improve diabetes care.[8] Diabetic care is complicated and is influenced by multiple factors such as culture, personal health choices and health and social policies.[9] Among the many contributing factors impacting diabetic care, the implementation of patients' decisions made by the health care provider is important as it can lead to improvement of patients' compliance toward the treatment and care of diabetes mellitus. Evaluation of the extent of patient satisfaction with primary care providers and health services are clinically relevant. Satisfied patients are more likely to comply with the treatment recommendation.[10] The present study was carried out because patients' views of the doctor-patient relationship are still not well established hence requiring further elaboration looking into the patient's factors.[3]

Associated factors mainly focused on patient related ideas, as most diabetic management still depends on the patients themselves. Understanding and determining patient related factors can help primary care providers pay more attention and give greater care to those patients. This will improve patient satisfaction, which will further enhance compliance or adherence to diabetic treatment thus, improve diabetic control. Therefore, this study aims to determine patient satisfaction with doctor-patient interactions and associated factors among type 2 diabetes mellitus (DM) patients in the outpatient clinic of the University Hospital.

MATERIALS AND METHODS

A cross-sectional study was conducted at the outpatient clinic University Hospital from April 2016 to July 2016 among type 2 diabetes mellitus (DM) patients aged more than 18 years. A sample size of 417 type 2 DM patients was calculated using single proportion formula. A systematic random sampling of 1:6 was done on every data collection day. The outpatient clinic had 14 consultation rooms with 12 medical officers and 2 family physician working at one time.

Once the participants finished consultations with their doctors, the researcher explained the nature of the study to the participants. If the participants agreed to take part, their written consent was gathered. First, the subjects filled in the case report form with their socioeconomic and medical status data. Then, they proceeded to complete the 'Skala Kepuasan Interaksi Perubatan-11' (SKIP-11) questionnaire to determine their patient satisfaction scores. The SKIP-11 was a self-administered questionnaire and usually requires 10-20 minutes to complete. Data regarding patients' medical status were gathered from patients' medical records. Recent HbA1c and fasting blood sugar levels (within six months of the study period) were taken from the hospital's online laboratory system. If none were available, blood tests were arranged within two weeks of data collection. Glycaemic control was divided into good glycaemic control (HbA1c <7%) and poor glycaemic control (HbA1c >7%).[11]

For data entry and analysis of the 417 participants, the Statistical Package for the Social Sciences, version 22 (SPSS Inc., Chicago, IL, USA) was used. Patient satisfaction was used as the dependent variable. It was subcategorised into 'satisfied' and 'unsatisfied', and the data were represented as proportions. The independent variables were socioeconomic background (age, gender, marital status, economic status, employment, level of education) and medical status (presence of comorbidity, diabetic complication, treatment modality, duration of diabetes and glycaemic control). Numerical variables were presented as mean (SD) or median (IQR) depending on the normality distribution of variables, with frequency (percentages) for categorical variables. Statistical analyses were conducted using simple and multiple logistic regressions to determine the associated factors for doctor-patient interaction among type 2 DM patients. Simple logistic regression was used to select preliminary variables regarding association with doctor-patient interaction. Variables with a p-value of less than 0.25 or any clinically relevant and important variable were included in the multiple logistic regression analysis. Multiple logistic regression was used to evaluate factors associated with doctor-patient interaction. The significant level was set at 0.05. This study was approved by the ethical committee of Universiti Sains Malaysia in January 2016.

Measurement tool

Skala Kepuasan Interaksi Perubatan (SKIP-11) questionnaire was used to determine the level of patient satisfaction with doctor-patient interaction. The questionnaire is a modification of the Malay version of MISS-21. SKIP-11 contains 11 items with three subscale (DR = distress relief, R = rapport, IO = interaction outcome). There are four items for subscale DR, four items for subscale R and three items for subscale IO. Cronbach's alpha was 0.513 for distress relief, 0.708 for rapport and 0.747 for interaction outcome. The overall Cronbach's alpha was 0.669.12 The questionnaire method had a good internal consistency, good construct reliability, convergent validity and discriminant validity. Therefore, for this study, SKIP-11 was considered acceptably valid, reliable, simple and more adapted to the studied community.[12]

The overall level of patient satisfaction in the questionnaire was determined by using a five-point Likert scale. Scores of one to five were assigned to the responses (Strongly Agree = 5, Agree=4, Uncertain=3, Disagree=2 and Strongly Disagree =1), with the higher score indicating more positive responses. The patient's subscale scores were added together, and the

mean subscale scores were determined.12 The outcome in this study was reported as categorical values which are either satisfied or unsatisfied, based on the overall items. The score for the total items is shown in Table I. The total scores ranged from 11 to 55, and those who scored 44 and above (> 80%) were believed to be satisfied with their doctor-patient interaction, while those with a total score of 43 or less were classified as unsatisfied.[12]

Table I: The satisfaction score for the total items and its subscale

	Items	Minimum Score	Maximum Score	Satisfaction cut off score (satisfied)
SKIP-11	11	11	55	≥44
Subscale				
Distress relief	4	4	20	≥16
Rapport	4	4	20	≥16
Interaction Outcome	3	3	15	≥12

Socio-demographic and clinical characteristic of the participants

The participants' characteristics were shown in Tables II and III. They were categorised based on socio-demographic and clinical characteristics. Most participants were male (n=217, 52.1%). The participants' ages ranged from 23 to 86 years old, with a mean age of 59.4 (SD±9.69). The majority of participants were married (n=362, 86.6%) and unemployed (n=250, 60%). More than half of the participants had low monthly incomes (n=274, 65.7%), and 59.2% (n=247) had completed secondary school. The details of the participants' socio-demographic characteristics are shown in Table II.

Participants' clinical characteristics are also shown in Table II. The mean duration of diabetes was 8.5 (IQR 6.9) years, while the minimum and maximum duration were 1 and 40 years, respectively. Most participants had two or more comorbidities (n=306, 73.4%). However, 95.9% of participants had received treatment with an oral agent, insulin therapy, or a combination of both. The majority were treated with oral agents only.

Based on the SKIP-11 questionnaires, 60% of the 417 participants were satisfied with their doctor-patient relationships (Figure 1). Among the subtypes in the satisfied group, the domain of rapport had the highest percentage of satisfaction at 77.7%. This was followed by the domains of distress relief (76.5%) and interaction outcome (48.4%) (Table III).

Table II: Socio-demographic and clinical characteristics of study participants (n= 417)

Characteristics/Variables	n	%
Age (years)	59.4[a]	9.69[a]
Gender		
Male	217	52.1
Female	200	47.9
Marital Status		
Unmarried/Widow	55	13.2
Married	362	86.8
Educational Level		
Never	9	2.2
Primary Education	63	15.1
Secondary Education	247	59.2
Tertiary/Institute	98	23.5
Occupation		
Unemployed	250	60.0
Employed	167	40.0
Monthly income		
<RM2000	274	65.7
RM2001-Rm6000	127	30.5
>RM6001	16	3.8
Duration of DM (years)	8.5[b]	6.9[b]
Comorbidities in DM		
Absent	27	6.5
1 comorbid	84	20.1
2 or more comorbidities	306	73.4
DM related Complication		
Absent	231	55.4
1 complication	122	29.3
2 complications	49	11.8
3 or more complications	15	3.5
Treatment Modality		
Lifestyle modification	17	4.1
Oral agent	237	56.8
Insulin therapy/insulin with oral agent	163	39.1
Glycemic control		
HbA1c (%)	8.4	2.13
FBS (mmol/L)	8.3	3.15

a: mean (SD
b: median (IQR)

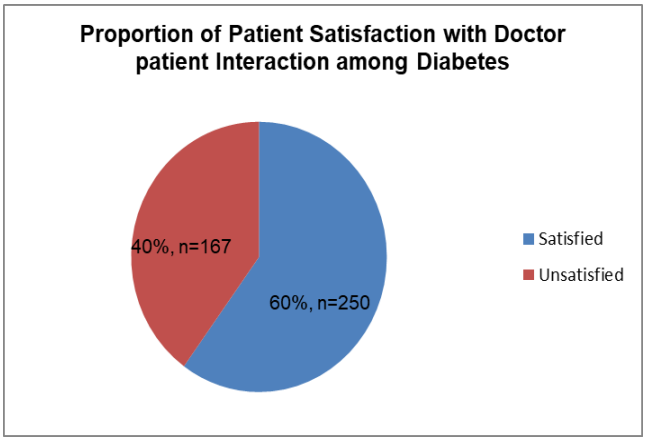

Figure 1. Proportion of patient satisfaction with 'Doctor-Patient Interaction' among diabetic patients

Table III: Proportion of patient satisfaction with doctor-patient interaction among type 2 diabetes according to the subscale of SKIP-11

		Patient satisfaction			
		Satisfied		Unsatisfied	
		n	%	n	%
Subscale					
	Distress relief	319	76.5	98	23.5
	Rapport	324	77.7	93	22.3
	Interaction outcome	202	48.4	215	51.6

Socio-demographic and clinical characteristic factors associated with patient satisfaction among participants by simple and multiple logistic regression

A simple logistic regression analysis identified all variables with P < 0.25 as shown in Table IV. These variables and all clinical important variables were included in multiple logistic regression analysis. HbA1c levels were found to be significantly associated with the doctor-patient relationship when other confounders were being controlled (95% CI 0.81, 0.97 p =0.008). The odds ratio for HbA1c was 0.88 (Table IV). Thus, the logistic regression model revealed for every 1% increase in HbA1c level, there was a 12% lower chance that the patient was satisfied with doctor-patient interactions.

DISCUSSION

This study was particularly concerned with patient satisfaction toward doctor-patient interaction because patient satisfaction is one of the most important indicators of medical care quality. Many associated factors have been tested, with some being found to have significant associations with doctor-patient interaction. In this study, HbA1c levels were found to be the most significant factor associated with patients' satisfaction with doctor-patient interactions.

Socio-demographic and clinical characteristics of the participants

In the present study, the participants ranged in age from 23 to 86 years old, with a mean age of 59.4 (9.69) years old. This was consistent with the mean age (59.7 years old) of diabetic patients in the National Diabetic Registry. There was generally a higher prevalence of DM in the older groups. 52.1% of the participants were male; this, however, was contrary to the national diabetes prevalence, in which there are more women (58.4%) than men (41.6%).

The duration of diabetes for participants in this study ranged from one to 40 years, with a mean of 8.48 years (95% Cl: 7.81, 9.15) and median of 6 years. The difference between the mean and median indicated that the data was not evenly distributed and was skewed to the left.

93.5% of participants had at least one comorbidity, but 73.4% of them had two or more comorbidities. Hypertension and dyslipidaemia were the most common comorbidities among this population. This result was parallel with findings from the National Diabetes Audit of 2009-2011. Macrovascular and microvascular complications of diabetes were assessed, but most of the participants did not suffer from any of these complications. The accuracy of the data on diabetes-related complications requires further work since the methodology heavily depended on the documentation quality of the participants' case notes.

The national rate of achieving HbA1c of less than 6.5% through treatment was 23.8% in 2012 and 14.9% in Kelantan, Malaysia.[13] Overall, the mean HbA1c in Kelantan was still high (8.9, 95 Cl: 8.8, 8.9). This study reported similar findings, with a mean HbA1c of 8.4 (2.13). Excessive sugar intake might be the contributing factor to the rising diabetes rate.[14] For instance, Diabcare Malaysia's 2008 study showed that poor adherence to diet, exercise and self-monitoring of blood sugar lead to deterioration of glycaemic control.[15]

Patient satisfaction with doctor-patient interaction and its subscale

The findings from this study revealed that 60% of participants were satisfied with their doctor-patient interactions. This was consistent with other studies evaluating patient satisfaction, in which 76.5%,[16] 63.3%[5] and 81%[17] were satisfied. The findings from this study were also consistent with work from Narayan et al.[8] which showed average patient satisfaction score ranged from 65-79 in the items studied. Even though this present research indicated greater patient satisfaction much like comparable studies, there were variants in the study population. Research from Abioye et al.[5] and Van Uden et al.[17] examined the general population attending primary care clinics, whereas Norhayati et al.[16] studied patients who were in moderate cardiovascular risk, and Narayan et al. specifically geared their research toward the diabetic population. Therefore, it could be postulated that the various medical illnesses in the population characteristics did not affect patient satisfaction toward doctor-patient interaction.

An observational study by Little et al. based on 865 subjects who attended a primary care clinic, concluded that communication and partnership, with a positive approach, is one out of five studied domains that influence patient satisfaction with doctor-patient interactions.[18] This strongly proved that good communication skills could improve doctor

Table IV: Associated socio-demographic and clinical characteristic factors with patient satisfaction among diabetes mellitus patients by simple and multiple logistic regression (n=417)

Variables	Patient Satisfaction		Crude OR[c] (95% CI)	Wald Stat[c] (df)	*P*- Value[c]
	Satisfied n (%)	Unsatisfied n (%)			
Age (years)	59.6 (9.4)[a]	59.0 (10.2.)[a]	1.01 (0.99, 1.03)	0.38 (1)	0.540
Gender					
Female	130 (52.0)	87 (52.1)	1.00		
Male	120 (48.0)	80 (47.9)	0.99 (0.67, 1.47)	0 (1)	0.540
Marital Status					
Unmarried/widow	30 (12.8)	23 (13.8)	1.00		
Married	218 (87.2)	144 (86.2)	0.92 (0.52, 1.63)	0.08 (1)	0.774
Educational Level					
Never	4 (1.6)	5 (3.0)	1.00		
Primary school	40 (16.0)	23 (13.8)	0.31 (0.17, 2.68)	0.31 (1)	0.581
Secondary school	153 (61.2)	94 (56.3)	1.39 (0.77, 2.83)	1.39 (1)	0.239
Tertiary/institute	53 (21.2)	45 (26.9)	1.79 (0.86, 2.22)	1.79 (1)	0.180
Occupation					
Unemployed	144 (57.6)	106 (63.5)	1.00		
Employed	106 (42.4)	61 (36.5)	0.78 (0.52, 1.17)	1.44 (1)	0.231
Monthly Income					
<Rm2000	162 (64.8)	112 (67.1)	1.00		
Rm2001- Rm6000	81 (32.4)	46 (27.5)	1.86 (0.67, 5.14)	1.43 (1)	0.232
>Rm6001	7 (2.8)	9 (5.4)	2.26 (0.79, 6.48)	2.32 (1)	0.128
Duration of DM	7.8 (6.5)[b]	9.5 (7.6)[b]	0.97 (0.94, 0.99)	6.06 (1)	0.014
DM Comorbidities					
Absent	19 (7.6)	8 (4.8)	1.00		
1 comorbid	49 (19.6)	35 (21.0)	1.62 (0.69, 3.81)	1.21 (1)	0.271
2 or more comorbid	306 (72.8)	124 (74.2)	0.95 (0.58, 1.56)	0.04 (1)	0.850
DM related Complication					
Absent	139 (55.6)	92 (55.1)	1.00	0.27 (1)	0.602
1 complication	72 (28.8)	50 (29.9)	1.32 (0.46, 3.71)	0.18 (1)	0.674
2 complications	31 (12.4)	18 (10.8)	1.26 (0.43, 3.69)	0.47 (1)	0.492
3 and more complication	8 (3.2)	7 (4.2)	1.51 (0.47, 4.85)		
Treatment Modality					
Lifestyle Modification	11 (4.4)	6 (3.6)	1.00		
Oral Agent	144 (57.6)	93 (55.7)	1.31 (0.46, 3.72)	0.26 (1)	0.609
Insulin Therapy/Insulin with Oral agent	95 (38.0)	68 (40.7)	1.11 (0.74, 1.66)	0.25 (1)	0.620
Glycemic Control					
HbA1c	8.2 (2.0)[a]	8.8 (2.3)[a]	0.88 (0.81, 0.97)[c] 0.88(0.81,0.97)[d]	6.93 (1)[d]	0.008[d]
FBS	8.2 (3.10)[a]	8.3 (3.23)[a]	0.99 (0.93, 1.05)	0.09 (1)	0.756
Duration of DM	7.8 (6.5)[b]	9.5 (7.6)[b]	0.97 (0.94, 0.99)	6.06 (1)	0.014
DM Comorbidities					
Absent	19 (7.6)	8 (4.8)	1.00		
1 comorbid	49 (19.6)	35 (21.0)	1.62 (0.69, 3.81)	1.21 (1)	0.271
2 or more comorbid	306 (72.8)	124 (74.2)	0.95 (0.58, 1.56)	0.04 (1)	0.850
DM related Complication					
Absent	139 (55.6)	92 (55.1)	1.00		
1 complication	72 (28.8)	50 (29.9)	1.32 (0.46, 3.71)	0.27 (1)	0.602
2 complications	31 (12.4)	18 (10.8)	1.26 (0.43, 3.69)	0.18 (1)	0.674
3 and more complication	8 (3.2)	7 (4.2)	1.51 (0.47, 4.85)	0.47 91)	0.492

[a] Mean (SD)
[b] Median (IQR)
[c] simple logistic regression
[d] multiple logistic regression, adjusted OR (95% CI)

-patient interaction and promote patient satisfaction, while poor communication can lead to poor treatment adherence and patient satisfaction.[19]

Among the subscales, the domain of 'rapport' had the highest percentage of satisfaction (77.7%). This was followed by the domains of 'distress relief' (76.5%) and 'interaction outcomes' (48.4%). This was in line with a similar study from Norhayati et al. which assessed patient satisfaction using SKIP-11 among patients with cardiovascular risk.[16] These patients were attended by the same doctors in the same outpatient clinic as in our study. The domain of 'rapport' was favourable among patients; this was most probably due to the good perception of participants toward doctors' levels of confidence, trust, empathy and courtesy. Information provided by doctors determines participants' distress relief. A good doctor will more enthusiastically counsel patients, thus promoting patient satisfaction. 'Interaction outcomes' displayed the least patient satisfaction among the domains. The cause of this less favourable finding could be patients' unreadiness and unwillingness to change their behaviour and comply with doctors' advice.[16] This was further supported by Bera's study of health education and risk reduction training programme, which revealed that even though patient satisfaction towards the counselling was very good (97%), only 69% of patients were willing to change their behaviours.[20]

Factors associated with patient satisfaction with doctor-patient interaction.

The present study was conducted to identify the underlying factors influencing diabetic patients' satisfaction. HbA1c levels were the only significant factors associated with patient satisfaction with doctor-patient interactions. This research found that higher HbA1c levels were associated with lower treatment satisfaction, and this result was in line with other studies.[19,21,22] In this research, mean HbA1c and FBS were 8.4% (2.13) and 8.3 mmol/L (3.15), respectively. Both perceived hyperglycaemia and HbA1c levels were independently, positively associated with treatment satisfaction.[22]

According to Ciechanowski et al., patients with poor adherence to treatment have worse diabetic control. There was a significant difference in HbA1c levels between those who rated their doctor-patient communication as good and those who did not; the study found that patients who rated doctor-patient communication as poor were significantly worse at adhering to glucose monitoring and treatment. However, this study might have been affected by patients' unfavourable responses to the questionnaire.[19] The variation in HbA1c can be explained by other factors as well. Those factors might include the natural history of the disease, with its expected deterioration of blood glucose control, as well as variations in diabetes care quality and outcomes at the patient, physician and clinic levels.[23] Patient age and intensification of pharmacotherapy were related to favourable changes in HbA1c.[24] These factors should be considered for improving HbA1c levels. Doctors should not have to fear the negative effects of an intensified treatment, treatment satisfaction and patient distress.

Counselling and treatment management from the primary care provider leads to better awareness of the importance of good glycaemic control thus, satisfying patient needs and expectations concerning their medical illnesses. The findings of this research were beneficial, as they point to the fact that physicians should carefully communicate with their patients about HbA1c levels. HbA1c of less than 7 mmol/L was determined as good glycaemic control because HbA1c levels less than 7.0% were associated with a significantly reduced risk of both microvascular and macrovascular complications.[25] Moreover, applying individualised glycaemic targets might additionally improve treatment satisfaction for individuals with less strict targets.[26]

The mean duration of diabetes in this study was 8.5 years (IQR 6.97). There was no significant association between satisfaction and disease duration. In a study by Hussein et al. patients who had had diabetes more than five years were more satisfied than those who had had the disease for less than five years.[27] Patients tend to be more accustomed to and more satisfied with the pre-existing services when they visit their primary care clinic more frequently and sustain continuity of care. This indicates that other associated factors should be considered in terms of promoting patient satisfaction with doctor-patient interactions.

In this study, 72.8% of participants with two and more chronic illnesses were satisfied with doctor-patient interaction. 82.5% (n=344) of the subjects were found to be hypertensive, and 78.9% (n=329) had dyslipidaemia. However, there was no significant association between the number of comorbidities and patient satisfaction. There was also a higher percentage of participants (55.6%) without complications, who were satisfied with doctor-patient interactions, compared to those who had complications. However, this was not significantly associated with patient satisfaction. This present study is in line Hussein et al. because treating doctors provide greater attention to patients with more complications and offer them a higher standard of care, thus increasing their satisfaction with the doctor-patient relationship. [27-28]

CONCLUSION

In this study, 60% of the participants were satisfied with their doctor-patient interactions based on SKIP-11. Older participants, males, those who were married, those who were unemployed, those from lower socioeconomic class and those who had completed secondary schooling were found to be more satisfied than other groups. In terms of medical status, participants with coexisting comorbidities, a longer duration of DM, those being treated for DM and those without DM related complications were also more satisfied with their doctor-patient interactions. 71.5% of the participants had not yet achieved good glycaemic control. HbA1C was found to be significantly associated with patients' satisfaction with doctor-patient interaction. It showed that for every 1% reduction in HbA1c levels, the likelihood of high patient satisfaction increased by 12% (95% CI 0.81, 0.97 $p < 0.05$).

Conflict of interest

No conflict of interest

FUNDING

This study was supported by USAINS Research Grant, Universiti Sains Malaysia

ACKNOWLEDGEMENTS

This study was supported by USAINS Research Grant, Universiti Sains Malaysia

REFERENCES

1. Caughey GE, Roughead EE, Vitry AI, McDermott RA, Shakib S, Gilbert AL. Comorbidity in the elderly with diabetes: Identification of areas of potential treatment conflicts. Diabetes research and clinical practice. 2010;87 (3):385-393
2. Gulliford MC, Naithani S, Morgan M. Continuity of care and intermediate outcomes of type 2 diabetes mellitus. Fam Pract. 2007;24(3):245-51.
3. Al Shahrani A, Baraja M. Patient Satisfaction and it's relation to diabetic control in a primary care setting. J Family Med Prim Care. 2014;3(1):5.
4. Arber S, McKinlay J, Adams A, Marceau L, Link C, O'Donnell A. Patient characteristics and inequalities in doctors' diagnostic and management strategies relating to CHD: a video-simulation experiment. Soc Sci Med. 2006;62(1):103-15.
5. Abioye Kuteyi EA, Bello IS, Olaleye TM, Ayeni IO, Amedi MI. Determinants of patient satisfaction with physician interaction: a cross-sectional survey at the Obafemi Awolowo University Health Centre, Ile-Ife, Nigeria. S Afr Fam Pract. 2010;52(6):557-62.
6. Platonova EA, Shewchuk RM. Patient assessment of primary care physician communication: segmentation approach. J Healthc Qual 2015;28(4):332-42.
7. M Mafauzy, Z Hussein, Chan SP. The Status of Diabetes Control in Malaysia: Results of DiabCare 2008. Med J Malaysia. 2008;66(3):175 - 81.
8 Narayan KV, Gregg EW, Fagot-Campagna A, Gary TL, Saaddine JB, Parker C, et al. Relationship between quality of diabetes care and patient satisfaction. J Natl Med Assoc. 2003;95(1):64.
9. Marrero DG, Ard J, Delamater AM, Peragallo-Dittko V, Mayer-Davis EJ, Nwankwo R, Fisher EB. Twenty-first-century behavioural medicine: a context for empowering clinicians and patients with diabetes. Diabetes Care. 2013;36(2), 463- 470.
10. Guldvog B. Can patient satisfaction improve health among patients with angina pectoris? International Journal for Quality in Health Care. 1999;11(3), 233-240.
11. Association AD. Standards of medical care in diabetes 2015 abridged for primary care providers. Clinical diabetes: a publication of the American Diabetes Association. 2015;33(2):97.
12. Abd Aziz A, Izyan Farhana Nordin N, Mohd Noor N, Bachok Na, Nor Ismalina Isa S. Psychometric properties of the 'Skala Kepuasan Interaksi Perubatan-11' to measure patient satisfaction with physician-patient interaction in Malaysia. Fam Pract. 2013;31(2):236-44.
13. Health Mo. National Health Morbidity Survey. Malaysia: Institute for Public Health. 2015:14-5.
14 Lustig RH, Schmidt LA, Brindis CD. Public health: the toxic truth about sugar. Nature. 2012;482(7383):27-9.
15 Mafauzy M, Hussein Z, Chan S. The status of diabetes control in Malaysia: results of DiabCare 2008. Med J Malaysia. 2011;66(3):175-81.
16. Norhayati MN, Masseni AA, Azlina I. Patient satisfaction with doctor-patient interaction and its association with modifiable cardiovascular risk factors among moderately-high risk patients in primary healthcare. PeerJ. 2017;5:e2983.
17. Van Uden C, Ament A, Hobma S, Zwietering P, Crebolder H. Patient satisfaction with out-of-hours primary care in the Netherlands. BMC health services research. 2005;5(1):6.
18. Little P, Everitt H, Williamson I, Warner G, Moore M, Gould C, et al. Observational study of effect of patient centredness and positive approach on outcomes of general practice consultations. BMJ. 2001;323(7318):908-11.

19. Ciechanowski PS, Katon WJ, Russo JE, Walker EA. The patient-provider relationship: attachment theory and adherence to treatment in diabetes. Am J Psychiatry. 2001;158(1):29-35.
20. Berra K. The effect of lifestyle interventions on quality of life and patient satisfaction with health and health care. Eur J Cardiovasc Nurs 2003;18(4):319-25.
21. Bener A, Al-Hamaq A, Yousafzai M, Abdul-Ghani M. Relationship between patient satisfactions with diabetes care and treatment. Niger J Clin Pract. 2014;17(2):218-25.
22 . Biderman A, Noff E, Harris SB, Friedman N, Levy A. Treatment satisfaction of diabetic patients: what are the contributing factors? J Fam Pract. 2009;26(2):102-8.
23. O'Connor PJ, Asche SE, Crain AL, Rush WA, Whitebird RR, Solberg LI, et al. Is patient readiness to change a predictor of improved glycemic control? Diabetes Care. 2004;27(10):2325-9.
24. O'Connor PJ, Rush WA, Solberg LI, Whitebird RR, Crain AL, Davidson G, et al. Peer reviewed: variation in quality of diabetes care at the levels of patient, physician, and clinic. Preventing chronic disease. 2008;5(1).
25. Imran SA, Rabasa-Lhoret R, Ross S. Targets for glycemic control. Can J Diabetes. 2013;37:S31-S4.
26. Ismail-Beigi F, Moghissi E, Tiktin M, Hirsch IB, Inzucchi SE, Genuth S. Individualizing glycemic targets in type 2 diabetes mellitus: implications of recent clinical trials. Ann Intern Med. 2011;154(8):554-9.
27 . Hussein H. Predictors of Patient Satisfaction Among Diabetic Population Attending Primary Health Care Centers at Dubai Health Authority. Quality in Primary Care. 2015.
28. Boels AM, Vos RC, Hermans TG, Zuithoff NP, Müller N, Khunti K, et al. What determines treatment satisfaction of patients with type 2 diabetes on insulin therapy? An observational study in eight European countries. BMJ. 2017;7(7):e016180.