Diabetes Control among Vietnamese Patients in Ho Chi Minh City: An Observational Cross-Sectional Study

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Abstract

The objective of this study was to assess the extent of diabetic control and its associated factors among Vietnamese patients with diabetes mellitus (DM). The study was conducted among 652 outpatients who were recruited at a public general hospital (People Hospital 115) and a private clinic (Medic Center) in Ho Chi Minh City, Vietnam. Median age of participants was 57 years from People Hospital 115, and 60 years for participants from Medic Center. Thirty-nine percent of patients at People Hospital 115 and 33% of patients at Medic Center had Hemoglobin A1c (HbA1c) greater than 8%. However, 55% and 45% of these patients from each facility reported they are in good control. There was a high percentage of missing data regarding possible complications at both sites. It was also observed a high proportion of patients with a discrepancy between perception and actual control of diabetic condition. Many of these patients showed less distress and had a high self-rating regarding their adherence to a lifestyle regimen. Furthermore, some of these patients were smokers and had a history of atherosclerotic disease. Overall, Vietnamese diabetic patients in this study exhibited poor plasma glucose control. Physician education designed to improve monitoring of glucose levels and diabetic complications, and patient education aimed at raising awareness about actual diabetic control are indicated in this population.

Key Words: Diabetes Mellitus; Glycemic Control; Disease Management; Chronic Disease; Primary Care

Introduction

Ischemic heart disease and cerebrovascular disease are the first and second leading causes of death worldwide among individuals 60 years or older.[1] Diabetes mellitus (DM) is a major risk factor for atherosclerotic disorders which lead to macro-angiopathies (ischemic heart and cerebrovascular diseases) and micro-angiopathies (retinopathy and nephropathy).[2] Globally, DM is increasing at an alarming rate. The International Diabetes Federation (IDF) predicts the prevalence of DM to increase from 5.1% (194 million people worldwide) in 2003 to 6.3% (333 million people worldwide) by 2025.[2] In response, the United Nations passed a landmark resolution in December 2006 on DM, recognizing the disease as a chronic, debilitating, and costly social burden.[3] Multidimensional efforts to fight DM are needed and more researches have begun to focus on the strategy to control DM by improving patient self-management.[4]

According to International Diabetes Federation (IDF), by 2025 the highest number of diabetic patients is expected to shift from Europe to South-East Asia.[2] The prevalence of DM is increased significantly in urban areas than in rural areas, reflecting the influence of lifestyle on the disease.[2, 5] The increase in DM with rapid industrialization will result in an increasing burden of diabetic complications and premature mortality, causing serious medical, economic, and political consequences. However, in almost all countries in South-East Asia, DM is not yet considered by policy makers to be a high-priority national problem.[2] Significant improvements in raising awareness, prevention, and early diagnosis of DM, as well as quality of care are needed.[6]

The Socialist Republic of Vietnam is located in South-East Asia. With recent economic development, especially in urban areas, the number of diabetic patients in the country is rapidly increasing. Results from a study conducted in 2001 indicated that the prevalence of DM was approximately 2.5 times higher (6.9%) than what was recorded 8 years ago (2.5%) in Ho Chi Minh City.[7] A cross-sectional survey also reported that the prevalence of overweight and obesity, defined as a body mass index of 23 or higher, was 33.6% for females and 31.6% for males in the city.[8] Surveys among children aged 6 to 11 indicated that the prevalence of obesity had increased from 12.2% in 1997 to 22.7% in the city in 2003.[9-10] Furthermore, a nutritional survey suggested that lipid intake was high in urban compared to rural areas among Vietnamese adults.[11] These reports highlight the need for an effective obesity prevention program during early childhood. Tackling the issue of over-nutrition during the early stages of economic change is important to prevent it from becoming an uncontrolled public health problem. Although some published epidemiologic studies have reported the prevalence of DM in Vietnam,[7,12] few have investigated the quality of disease management and the factors associated with diabetic control across the country.

Purpose of Study

The purpose of this study was to investigate: (a) characteristics of diabetic outpatients in the medical practices of an urban area in Vietnam, (b) factors associated with diabetic control among these patients, and (c) capacities of these patients to self-manage DM.

Methods

This cross-sectional study was conducted from December 17, 2007 to January 17, 2008 in Ho Chi Minh City, Vietnam. In August 2007, Vietnamese co-investigators met to discuss and revise survey procedures. A pilot survey was conducted in November 2007 to finalize the study protocol and rehearse survey procedures.

Study participants were diabetic outpatients who visited endocrinologists at a private clinic (Medic Center) and a public hospital (People Hospital 115) during the survey period. Four of the participating physicians were co-investigators in the present study and had completed a research training course jointly conducted by the University of Medicine and Pharmacy, Ho Chi Min City and the Department of Public Health of Fukushima Medical University.[13] Medic Center is affiliated with the Health Service Department of Ho Chi Minh City. People Hospital 115 is a public general hospital affiliated with the University of Medicine and Pharmacy, Ho Chi Min City. There are several differences between the survey sites. For instance, a single physician at Medic Center attends to all patients. As a result, patients are usually encouraged and more motivated to have all lab tests done. On the other hand, multiple physicians at People Hospital 115 attend the outpatient clinic. Given that the physicians tend to have different training backgrounds and therefore, their way of managing the patients may not be the same. Furthermore, patients attending People

Hospital 115 are on social health insurance programs and they may not have the financial resource to request lab tests during general check-up.

Every third diabetic patient coming in for examination was asked by an endocrinologist to participate in the study. The study was explained to all participants in detail, and those who agreed to participate were enrolled in the study and their basic medical information was copied from their files. General medical history collected included: date of birth, sex, anthropometries (height, weight, and waist circumference), family history (hypertension, DM, heart disease, cerebrovascular disease, renal disease, and malignant neoplasm), and health habits (tobacco smoking and alcohol consumption). Data specifically related to DM were also collected. These included previous visits, year of diagnosis, year medication was initiated, type of DM, glycemic measurements (fasting or casual blood glucose concentration [mg/dL], and HbA1c [%] measured within 6 months), type of DM treatment (diet alone, sulfonylurea, alpha-glucosidase inhibitors, biguanides, thiazolidine derivatives, phenylalanine derivatives, insulin, or other treatments), and the presence or absence of diabetic complications (diabetic retinopathy within the last 12 months, proteinuria, diabetic gangrene, and atherosclerotic disease). HbA1c is the most common indicator of long-term diabetic control, with less than 6.5% being recognized as good control and 8.0% or higher as poor control.

Information regarding hypertension in the study included measurements of systolic and diastolic blood pressure (mmHg), and medication for hypertension. Several international DM treatment guidelines recommend the maintenance of blood pressure below 130/80 mmHg. Lipid-related data included: total cholesterol (mg/dL; TC), high-density lipoprotein-cholesterol (mg/dL; HDL-C), low-density lipoprotein-cholesterol (mg/dL; LDL-C), triglyceride (mg/dL; TG), and medication for hyperlipidemia (taken within 6 months). LDL-C was estimated using the Friedwald equation [(TC) – (HDL-C) – (TG/5)].[14] For patients without cardiovascular complications, recommended management levels are: TC <200mg/dL, LDL-C <100 mg/dL, HDL-C ≥40 mg/dL, and TG <150 mg/dL according to American Diabetes Association recommendation.

Participants were interviewed about their perception of well-being, DM-related distress, evaluation of self-management, and perception of diabetic control.[15,16] The well-being measurement was composed of 5 statements: "I have felt cheerful and in good spirits"; "I have felt calm and relaxed"; "I have felt active and vigorous"; "I woke up feeling fresh and rested"; and "My daily life has been filled with things that interest me". Participants were asked to evaluate each statement on a scale from 0 to 5 (at no time=0, all of the time=5). A raw score was then calculated by summing the responses. In order to obtain a percentage score ranging from 0 to 100, the raw score was multiplied by 4. A percentage score of 0 represented the worst possible quality of life, whereas a score of 100 represented the best possible quality of life.

Distress related to DM was assessed by 4 statements: "I feel stressed because of my diabetes"; "I am constantly afraid of my diabetes getting worse"; "Coping with diabetes is more difficult than it used to be"; and "I feel burned out from having to cope with diabetes". Participants were asked to evaluate the statement on a scale from 1 to 4 (fully disagree=1, fully agree=4). Adherence to a lifestyle and medical regimen was assessed by 5 questions: "How successful have you been in following: (1) diet, (2) exercise, (3) medication, (4) keeping appointment, and (5) self-monitoring blood glucose recommendations given by your doctor or nurse for managing your diabetes?" Participants were asked to answer the questions on a scale from 1 to 4 (never=1, completely=4). Finally, perception of diabetic control was assessed by the question: "To what extent do you feel you control your diabetes?" Participants were asked to evaluate the statement on a scale from 1 to 4 (not at all=1, to a great extent=4).

In order to develop the Vietnamese questionnaire, the original English questionnaire was first validated and confirmed, and then translated into Vietnamese by the research team. The questionnaire was then back-translated into English by a native English speaker fluent in Vietnamese, and compared with the original in order to revise the Vietnamese version.

With regard to the perception of diabetic control, we defined "good perception" as those who answered 3 or 4 on a scale of 1 to 4. We then defined "discrepancy" as those participants who had "good perception" while their actual diabetic control was poor (HbA1c was 8.0% or higher). The collected information was then evaluated carefully, and the characteristics with and without discrepancy between good perception of diabetic control and actual diabetic control were analyzed among poorly controlled patients. Patients' data of these two groups were compared using logistic regression analysis adjusted to survey sites. All data were entered into a computer and analyzed using SPSS version 14 (SPSS Inc, Chicago, USA).

The Ethics Committee of Fukushima Medical University approved the research protocol and all patients provided their informed consent.

Results

A total of 658 diabetic patients (257 at People Hospital 115 and 401 at Medic Center) were invited to participate in the study. Of these, 652 patients (253 at People Hospital 115 and 399 at Medic Center) agreed to participate. At People Hospital 115, the median age of participants was 57 years (28-82) and 51.0 % of patients were male. At Medic Center, the median age was 60 years (24-92) and 22.3% of patients were male (Table 1). Median fasting plasma glucose concentration was 123.5 mg/dL (70-375) at People Hospital 115 and 131 mg/dL (49-441) at Medic Center. Median HbA1c was 7.5% (5.2-16.2) at People Hospital 115 and 7.3% (5.0-13.4) at Medic Center. There was a high percentage of missing or unknown data from both sites regarding DM complications among patients. At People Hospital 115, 44.6% of diabetic retinopathy data and 33.2% of diabetic nephropathy data was missing or unknown. At Medic Center, 34.8% of diabetic retinopathy data and 20.3% of diabetic nephropathy data were missing or unknown.

Table 2 shows the distribution of HbA1c values stratified according to the Diabetes Mellitus Treatment Guideline established by the Japanese Diabetes Association.[17] At both survey sites, the modal HbA1c was ≥8% (40.4% of patients at People Hospital 115 and 34.2% of patients at Medic Center). Patient well-being, self-management, and diabetic control profiles are shown in Table 3. The median score of perceived diabetes control was 3.0 (1.0-4.0) at both survey sites.

Table 4 shows the proportion of those with a good perception of diabetic control for each HbA1c range. Although we analyzed 652 participants, the sample size was reduced to 606 due to missing HbA1c measurements within the past 6 months. In the study, 54.7% of diabetic patients at People Hospital 115 and 44.9% at Medic Center had HbA1c at 8.0% or higher, but they also had a good perception of diabetic control.

We further examined the characteristics of patients who had a good perception of diabetic control even though their actual HbA1c was 8.0% or higher. Patients with a discrepancy between a good perception of diabetic control and actual diabetic control were more likely to be current smokers, and less likely to have a medical history of cardiovascular disease (Table 5-1). In addition, these patients showed significantly lower diabetes-related distress, higher general well-being, and higher adherence to a lifestyle regimen (Table5-2).

Discussion

Results of this cross-sectional survey revealed poor control of diabetes among Vietnamese diabetic patients. Data also indicated a high proportion of a discrepancy between perception and actual control of diabetic condition. Many patients showed perception of high level of general well-being, less DM-related distress, perceived ability for disease self-management.

Previous intervention studies have reported that intensive DM management may reduce atherosclerotic disorders .[18-21] Based on this evidence, diabetes management guidelines[17, 22] have been established which emphasize the importance of disease management with a target glycemic control level. However, study also showed there was a gap between actual control and the recommended glycemic control level.[23] In 1998, an international cooperative epidemiological study was conducted in order to evaluate the status of diabetes control in twelve Asian countries, including Vietnam.[24] The results demonstrated that overall mean HbA1c was 8.6±2.0% and that of Vietnam was 8.9±2.2%. Glycemic control status in Vietnam was ranked as poor among these countries. In the present study, however, mean HbA1c was 7.3% at Medic Center and 7.5% at People Hospital 115. It appears that these values are improvements compared to the previous study conducted a decade ago. It is possible that the recent introduction of new antidiabetic agents and insulin may contribute to the observed improvement.

Compared to an international cross-sectional survey aimed at assessing the relationship of patient self-reported factors,[16] DM-related distress was higher, while perception of diabetic control was lower, in our patient population. In addition, general well-being, lifestyle, and adherence to a medical regimen were higher in our patient population. These findings may indicate that Vietnamese patients have a tendency to report self-evaluation of adherence to a medical treatment because of lack of knowledge about their diabetic related symptoms or complications, which may result in poor disease control and high disease-

related distress. This may reflect on the fact that about half of the patients with poor diabetic control (HbA1c was 8.0 % or higher) actually had a good perception of diabetic control. Self-reported high adherence to a lifestyle regimen among patients with a discrepancy was significantly higher compared to those without a discrepancy. In addition, self-reported general well-being was higher while diabetes-related distress was lower among patients with a discrepancy when compared to patients without a discrepancy. It is possible that diabetic patients with a discrepancy assumed their disease was under control because they were not aware of their target blood glucose control levels, did not know their HbA1c level, or did not understand the clinical implications of test results.

Knowing one's HbA1c levels is usually associated with an accurate assessment of diabetic control.[25-26] In particular, DM is a disease where good communication between the doctor and patient is very important. Thus, it is necessary to improve physician communication skills to provide clinical information, including laboratory measurements, and help to enhance the understanding of such information to diabetic patients.[27] Some studies have introduced graphical representations of DM measurements [28] to enhance patient understanding, including log books[29] to help patients track their control status. These strategies may be effective methods which can be used to present clinical information to patients who have low health literacy and poor health education.[30]

Our findings also showed that patients without a discrepancy were more likely to have atherosclerotic disease compared to those with a discrepancy. It is possible that such patients became aware of the importance of treatment after developing complications. Previous studies have reported a similar association between history of cardiovascular disease and improved blood pressure control, which was explained by increased patient compliance, and/or a more aggressive treatment. [31-32] Taken together, these data support the need to improve patient awareness about their diabetic status to prevent developing complications.

At the start of our study, small group health education for diabetic patients had just initiated at People Hospital 115. Evaluation of such newly introduced programs is recommended for future studies. Likewise, implementation and evaluation of staff in-service programs aimed at improving communication skills is also recommended. Previous studies have stressed the importance of parental education in obesity prevention at an early age.[33-34] Given the fact that Vietnam (national, provincial, district, and commune) has a strictly structured vertical health care system, government recognition and development of national guidelines for the prevention of diabetes and related complications is critical.

Our study has several significant limitations which should be noted. The first is a selection bias. Patients who participated in our study were limited to those patients who visited the practices of our co-investigators in the two clinical sites. The significantly high proportion of females in our patient population at Medic Center may, for example, have resulted from the popularity of the female senior doctor directing the clinic. Therefore, a systematic sampling of diabetic patients in the area may reveal different results. Second, there was considerable data missing regarding diabetic complications due to unavailability of the data among patients at these two clinics. In order to prevent diabetic complications, it remains necessary to strengthen the assessment of the absence or presence and severity of all complications. Third, the validity and reliability of the Vietnamese questionnaire used could not be confirmed, although we did refer to the standard English questionnaires and, through a back-translation process, developed our final version. It remains necessary to confirm the validity and reliability of the Vietnamese questionnaire to improve the accuracy of the survey. Finally, some important factors, such as educational attainment, were not included. The inclusion of such factors in the analysis may produce different results.

In conclusion, this study reported characteristics of Vietnamese diabetic patients and revealed poor glycemic control. It further demonstrated the importance of improving diabetic control and routine checkups to prevent complications. A significant proportion of participants were not aware of their poor diabetic control status, suggesting the need to improve patient-doctor communication to help improve patients' knowledge and awareness about diabetic care.

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Table 1. Characteristics of Diabetic Patients

Variables	*Median (min, max)* or N (%)	
	People Hospital 115 N=253	Medic Center N=399
Age (years)	*57 (28, 82)*	*60 (24, 92)*
Sex (male)	129 (51.0)	89 (22.3)
Body mass index (BMI)	*24.2 (16.2, 39.2)*	*24.5 (15.4, 45.7)*
Metabolic syndrome (present)	92 (47.4)	209 (66.8)
Family histories (present)		
Hypertension	129 (51.0)	162 (40.6)
Diabetes mellitus	98 (38.7)	170 (42.6)
Heart disease	52 (20.6)	61 (15.3)
Cerebrovascular disease	45 (17.8)	55 (13.8)
Kidney disease	22 (8.7)	19 (4.8)
Malignant neoplasm	41 (16.2)	46 (11.5)
Alcohol consumption (daily)	42 (16.6)	27 (6.8)
Current smokers	40 (15.8)	23 (5.8)
Diabetes-related items		
First visit to the hospital	9 (3.6)	1 (0.3)
Duration of diabetes (years)	*5.0 (0, 38.0)*	*8.0 (1.0, 32.0)*
Duration of diabetic medication (years)	*4.0 (0, 38.0)*	*8.0 (1.0, 32.0)*
Types of diabetes		
Type 1 diabetes	2 (0.8)	0 (0.0)
Type 2 diabetes	251 (99.2)	396 (99.5)
Gestational diabetes	0 (0.0)	0 (0.0)
Others	0 (0.0)	2 (0.5)
Fasting plasma glucose concentration (mg/dL)	*123.5 (70, 375)*	*131 (49, 441)*
Hemoglobin A1c (%)	*7.5 (5.2, 16.2)*	*7.3 (5.0, 13.4)*
Treatment of diabetes mellitus		
Diet alone	5 (2.0)	2 (0.5)
Sulfonylurea	171 (67.6)	310 (77.7)
Alpha glucosidase inhibitor	4 (1.6)	0 (0.0)
Biguanides	185 (73.1)	313 (78.4)
Thiazolidine derivatives	13 (5.1)	98 (24.6)
Phenylalanine derivatives	1 (0.4)	3 (0.8)
Insulin	38 (15.0)	67 (16.8)
Diabetic complications (present)		
Diabetic retinopathy	14 (10.4)	157 (60.4)
Diabetic nephropathy	48 (28.4)	153 (48.1)
Diabetic gangrene	3 (1.2)	1 (0.3)
Other atherosclerotic complications (present)		
Cerebrovascular disease	10 (4.0)	5 (1.3)
Cardiovascular disease	15 (5.9)	168 (42.2)
Others	0 (0.0)	5 (1.3)
Hypertension related factors		
Antihypertensive medication (yes)	165 (65.2)	229 (57.4)
Systolic blood pressure (mmHg)	*138 (90, 201)*	*138 (94, 203)*
Diastolic blood pressure (mmHg)	*83 (50, 118)*	*83 (53, 113)*
Serum lipid profiles		
Lipid lowering medications (yes)	95 (37.5)	168 (42.1)
Total cholesterol (mg/dL)	*203 (119, 280)*	*186 (97, 399)*
HDL-cholesterol (mg/dL)	*48 (25, 109)*	*47 (16, 123)*
LDL-cholesterol (mg/dL)	*92 (32, 190)*	*109 (28, 276)*
Triglyceride (mg/dL)	*178 (39, 972)*	*167 (44, 571)*

Table 2. Distribution of Hemoglobin A1c among Vietnamese Diabetic Patients

Ranges of Hemoglobin A1c (%)[a]	N (%)	
	People Hospital 115 N=223	Medic Center N=383
5.7 or less	15 (6.7)	13 (3.3)
5.8-6.4	38 (17.0)	64 (16.7)
6.5-6.9	33 (14.8)	72 (18.8)
7.0-7.9	47 (21.1)	103 (26.9)
8.0 or higher	90 (40.4)	131 (34.2)

[a] Hemoglobin A1c was stratified according to the Diabetes Mellitus Treatment Guideline established by the Japan Diabetes Association.

Table 3. Patient Well-being, Adherence to Treatment, and Perception of Diabetic Control

	Median (min, max)	
	People Hospital 115 N=253	Medic center N=399
General well-being[a] (0 – 100)	*68 (4, 100)*	*72 (0, 100)*
Diabetes-related distress[b] (1 – 4)	*2.5 (1.0, 4.0)*	*2.0 (1.0, 4.0)*
Lifestyle regimen adherence[c] (1 – 4)	*3.5 (1.0, 4.0)*	*3.5 (1.5, 4.0)*
Medical regimen adherence[c] (1 – 4)	*4.0 (1.0, 4.0)*	*4.0 (2.0, 4.0)*
Perceived diabetic control[d] (1 – 4)	*3.0 (1.0, 4.0)*	*3.0 (1.0, 4.0)*

[a] General well-being ranges from 0 to 100.
[b] Diabetes-related distress ranges from 1 to 4.
[c] Lifestyle and adherence to medical regimen ranges from 1 to 4.
[d] Perception of diabetic control ranges from 1 to 4.

Table 4. Good Perception of Diabetic Control among Diabetic Patients

Ranges of Hemoglobin A1c (%)[b]	Good perception of diabetic control [N (%)][a]	
	People Hospital 115 N=222	Medic Center N=384
5.7 or less	12/15 (80.0)	10/13 (76.9)
5.8-6.4	37/42 (88.1)	67/81 (82.7)
6.5-6.9	28/35 (80.0)	47/68 (69.1)
7.0-7.9	32/44 (72.7)	66/95 (69.5)
8.0 or higher	47/86 (54.7)	57/127 (44.9)

[a] Good perception of diabetic control was considered a score of 3 or 4 on 4 point scales (Not at all=1, to a great extent=4).

[b] Hemoglobin A1c was stratified according to the Diabetes Mellitus Treatment Guideline established by the Japan Diabetes Association.

Table 5-1. Characteristics of Patients with or without a Discrepancy between Actual Diabetic Control and Good Perception of Diabetic Control Having HbA1c Levels of 8.0 % or Higher

Significant variables[a]	*Median (min, max)* or N (%)		
	Without Discrepancy	With Discrepancy	P value[b]
	N=111	N=109	
Current smokers	6 (5.4)	16 (14.7)	*
Other atherosclerotic complications (present)			
Cardiovascular disease	42 (38.2)	25 (22.9)	*

[a] Variables in Table 1 were analyzed and only those that are significant are shown here.
[b] Significance was determined using logistic regression analysis adjusted to survey sites.
* denotes $p < 0.05$

Table 5-2. Well-being and Adherence to Treatment of Patients with or without a Discrepancy between Actual Diabetic Control and Good Perception of Diabetic Control Having HbA1c Levels of 8.0 % or Higher

	Median (min, max)		
	Without Discrepancy N=109	With Discrepancy N=104	P value[d]
General well-being[a] (0 – 100)	*64 (4, 100)*	*76 (16, 100)*	**
Diabetes-related distress[b] (1 – 4)	*2.5 (1.0, 4.0)*	*1.75 (1.0, 4.0)*	**
Lifestyle regimen adherence[c] (1 – 4)	*3.0 (1.0, 4.0)*	*3.5 (2.0, 4.0)*	**
Medical regimen adherence[c] (1 – 4)	*4.0 (1.0, 4.0)*	*4.0 (3.0, 4.0)*	

[a] General well-being ranges from 0 to 100.
[b] Diabetes-related distress ranges from 1 to 4.
[c] Lifestyle and adherence to medical regimen ranges from 1 to 4.
[d] Significance was determined using logistic regression analysis adjusted to survey sites.
** denotes $p < 0.01$