

Knowledge of Diabetes Mellitus Among Diabetic and Non-Diabetic Patients in Klinik Kesihatan Seremban

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Summary

The Malaysian Ministry of Health has undertaken various campaigns on healthy lifestyle and health promotion over the years. The impact of these campaigns has been mixed and not well documented. This cross-sectional study evaluated the knowledge level of patients with and without diabetes in a large urban polyclinic using a 41-item questionnaire. One hundred and forty-nine adults (83 with diabetes, 66 without diabetes) participated in this study. Patients with diabetes had higher overall knowledge scores than those without diabetes (81.8% vs 64.0%, $p < 0.001$). While the overall knowledge of patients without diabetes appeared to be acceptable, several areas of knowledge deficiency were identified in this group - areas that should be filled by the on-going health promotion activities.

Key Words: Diabetes mellitus, Knowledge, Primary health care

Introduction

Diabetes mellitus is a serious chronic, non-communicable disease that has reached epidemic proportions and is projected to become one of the world's main disablers and killers within the next twenty-five years. In the year 2000, it was estimated that the number of adults with diabetes mellitus worldwide was at least 171 million and will increase to at least 300 million by 2025¹. This "diabetes epidemic" will persist and the global prevalence is increasing due to population growth, aging, urbanisation, and increasing prevalence of obesity and physical inactivity. The prevalence of diabetes mellitus in Malaysia was reported to be only 0.65% in 1960, and it rose to 2-4% in the early 1980s; but by mid-1990s, the prevalence has increased to 8-12%². Therefore, diabetes mellitus is a serious growing public health concern with an enormous human and economic burden in Malaysia and worldwide.

Diabetic education helps to equip patients with self-care knowledge that includes nutritional management,

sedentary lifestyle changes and proper foot care. Such education, if integrated into the structured diabetic care in the primary care setting, results in improved patients' disease knowledge and self-care behaviour³. As diabetes mellitus is a chronic disease, adherence to appropriate self-care practices leads to improved glycaemic control⁴. Furthermore, Ranjini *et al*⁵ showed that more knowledgeable diabetic patients had better attitude towards the care of their own disease. Nevertheless, there were significant suboptimal care of diabetics exists in Malaysian primary care – only 38% of diabetics achieved good glycaemic control (HbA1c < 7.5%) in a large urban polyclinic⁶.

The objective of this study was to assess the general understanding of diabetes mellitus not only among the patients with diabetes but also among the patients who did not have diabetes. It is hoped that through this study, we are able to identify some areas of knowledge deficit on diabetes mellitus especially among the non-diabetic patients. Indirectly, this study will allow us to assess whether on-going public health promotion activity has reached the general community.

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Materials and Methods

Subjects and setting

This study is a cross-sectional study conducted in Klinik Kesihatan Seremban from 14th September 2004 to 15th September 2004. Klinik Kesihatan Seremban is a large polyclinic providing primary care to the urban residents in Seremban. The outpatient department sees about average 700 patients a day, of which 74 have diabetes. These patients are followed-up in a dedicated diabetic clinic in the same polyclinic setting. The subjects with diabetes in this study were identified by systematic sampling (1:2) of the patients in the diabetic clinic, while those without diabetes were obtained by using systematic sample (1:5) of general walk-in adults patients aged ≥ 18 years.

Questionnaire design

We adapted the diabetic knowledge questionnaire from that used by Wee *et al*⁷ and Tham *et al*⁸. Our 41-item self-administered questionnaire tested the respondents' knowledge on the following aspects (1) general aspects of diabetes (8 questions), (2) risk factors (4 questions), (3) symptoms and complications (12 questions), (4) treatment (13 questions), and (5) monitoring of diabetes (4 questions). Each item was a statement that required the respondents to answer; Yes, No, or Don't Know. The questionnaire was prepared in English and later translated into Bahasa Malaysia and Mandarin. The suitability and clarity of the questionnaire was assessed by a small pilot test.

Statistical analysis

Data were analysed using the Statistical Package for Social Studies, version 12. Each item of the knowledge questionnaire was awarded one point for correct response and zero point for wrong or uncertain responses. The overall scores (maximum point 41) and subscale scores (maximum points vary with number of items in the subscales) were converted to percentages. The chi-square test was used for comparison of categorical variables and Student's t-test for continuous data. Level of statistical significance was set at $p < 0.05$.

Results

Demographic data of respondents

One hundred and seventy-four eligible subjects answered the questionnaire but in 25 of them, the questionnaire was poorly completed and were not used

(actual response rate 85.6%). Of the 149 respondents, 83 had diabetes (mean age 53.3 years, range 21-72 years) and 66 did not (mean age 34.5 years, range 18-80 years). The diabetic register of Klinik Kesihatan Seremban for the year 2004 had 1007 patients with the following ethnic breakdown: Malay 24.6%, Chinese 29.9% and Indians 44.9%. The ethnic breakdown of the patients with diabetes in this study was similar to that of the diabetic register (χ^2 for Goodness of Fit test, $p > 0.05$). The patients with diabetes (when compared to those without) were older, more likely to be males, more likely to have a positive family history, more likely to be Indians and Chinese, less likely to have had tertiary education and more likely to be without any income (Table I).

Comparison of knowledge of diabetic and non-diabetic patients

The patients with diabetes in our study were statistically more knowledgeable than non-diabetic patients (overall and for all 5 subscales) (Table II). The overall knowledge score of patients with diabetes was 81.8% (SD=10.9, range 49-100%), while that of the other patients was 64.0% (SD=20.9, range 5-100%). Patients with diabetes scored somewhat poorer in the general knowledge subscale and risk factor subscale. The poorer performance in these two subscales was also observed among the patients without diabetes.

Patients with diabetes scored significantly better than the other patients for 27 out of 41 items in the knowledge questionnaire (Table III). Only one item was scored $< 50\%$ by the patients with diabetes (Question 6) but nine items were scored $< 50\%$ by the patient without diabetes (Questions 3, 5, 6, 10, 12, 15, 24, 27, 34).

The overall knowledge score significantly correlated with age of the respondents in patient without diabetes ($r=0.326$, $p=0.008$) but not in patients with diabetes ($p=-0.102$, $p=0.357$). The overall knowledge score was not statistically significantly different between gender, ethnicity, education and income for patients with diabetes. Among the other patients, the overall knowledge score was significantly higher among those with income more than RM1000 (mean scores 78.4 vs 59.9, $p=0.002$) and tertiary education (mean scores 78.4 vs 60.2, $p=0.003$). Having a family member with diabetes significantly improved the diabetic knowledge among the patients with diabetes only (diabetic patients: 83.4% vs 78.2%, $p=0.045$).

Table I: Demographic characteristics of respondents

Characteristics	Diabetic patients (n=83)	Non-Diabetic patients (n=66)	p value
Age, mean (years)	53.31	34.50	<0.001
Male, %	60.2%	39.4%	0.011
Family history of diabetes, %	69.9%	43.9%	0.003
Ethnicity			0.001
Malay	19 (22.9%)	34 (51.5%)	
Chinese	26 (31.3%)	8 (12.1%)	
Indian	37 (44.6%)	22 (33.3%)	
Others	1 (1.2%)	2 (3.0%)	
Education			0.001
Primary or none	30 (36.1%)	8 (12.1%)	
Secondary	46 (55.4%)	43 (65.2%)	
Tertiary	7 (8.4%)	15 (22.7%)	
Income			0.046
None	38 (45.8%)	18 (27.2%)	
<RM1000	25 (30.1%)	31 (47.0%)	
≥RM1000	20 (24.1%)	17 (25.8%)	

Table II: Comparison of the knowledge of diabetic and non-diabetic respondents: overall scores and subscale

Knowledge score	Diabetic patients (n=83)	Non-Diabetic patients (n=66)	p value
Overall	81.8 (79.4 to 84.2)	64.0 (58.9 to 69.1)	<0.001
Subscales			
General knowledge	71.2 (66.6 to 75.8)	59.1 (52.6 to 65.6)	0.003
Risk factors	69.6 (63.4 to 75.7)	49.2 (40.5 to 58.0)	<0.001
Symptoms and complications	85.3 (81.6 to 88.1)	64.8 (57.8 to 71.8)	<0.001
Treatment and management	86.9 (84.3 to 89.6)	67.6 (62.2 to 73.0)	<0.001
Monitoring	87.7 (83.4 to 91.9)	74.6 (68.0 to 81.2)	0.001

Table III: Comparison of the knowledge of diabetic and non-diabetic respondents: individual questions

Questionnaire item	Diabetic patients*	Non-diabetic patients*	P value
Section 1: General knowledge			
1. Diabetes is a condition of high blood sugar.	95.2	89.4	0.180
2. Diabetes is a condition of insufficient insulin.	79.5	68.2	0.115
3. Diabetes is a condition of the body not responding to insulin.	54.2	45.5	0.288
4. Diabetes is non-contagious.	71.1	63.6	0.334
5. Diabetes is not curable.	59.0	27.3	<0.001
6. Insulin is a hormone.	45.8	33.3	0.124
7. Insulin controls blood sugar.	79.5	74.2	0.446
8. Insulin is required for some diabetic patients.	85.5	71.2	0.032

Questionnaire item	Diabetic patients*	Non-diabetic patients*	P value
Section 2: Risk factors			
9. Family history of diabetes	75.9	66.7	0.213
10. Age above 40 year-old	79.5	47.0	<0.001
11. Obesity	72.3	54.5	0.025
12. Pregnancy	50.6	28.8	0.007
Section 3: Symptoms and complications			
13. Constant feeling of thirst	89.2	63.6	<0.001
14. Frequent urination	89.2	65.2	<0.001
15. Weight loss despite normal appetite	73.5	47.0	0.001
16. Blurred vision	89.2	68.2	0.002
17. Slow healing of cuts and wounds	86.7	87.9	0.837
18. Tiredness and weakness	94.0	83.3	0.037
19. Decaying limbs that require surgical removal	84.3	72.7	0.083
20. Eye problems	92.8	68.2	<0.001
21. Kidney problems	84.3	65.2	0.007
22. Heart attack	80.7	56.1	0.001
23. Loss of sensation in arms and legs	86.7	60.6	<0.001
24. Stroke	73.5	39.4	<0.001
Section 4: Treatment and management			
25. Insulin injections are available for the control of diabetes.	85.5	80.3	0.395
26. Tablets and capsules are available for the control of diabetes.	94.0	75.8	0.002
27. Diabetics should carry sweets when they are out.	54.2	28.8	0.002
28. Diabetics should exercise regularly.	97.6	84.8	0.005
29. Diabetics should have good weight control.	98.8	83.3	0.001
30. Diabetics should go for regular eye check-up.	96.4	65.2	<0.001
31. Diabetics should have low fat and high fibre diet.	96.4	78.8	0.001
32. Diabetics should care for toes and feet.	100	72.7	<0.001
33. Diabetics should not consume alcohol.	92.8	84.8	0.121
34. Diabetics should not consume fresh fruit freely.	60.2	30.3	<0.001
35. Diabetics should not smoke.	86.7	77.3	0.130
36. Diabetics should not wear tight shoes.	84.3	59.1	0.001
37. Diabetics should not skip meals especially when busy.	83.1	57.6	0.001
Section 5: Monitoring of diabetes mellitus			
38. Diabetics should test blood glucose level at home.	78.3	54.5	0.002
39. Diabetics should test urine glucose level at home.	79.5	65.2	0.049
40. Diabetics should attend diabetic counseling.	95.2	86.4	0.058
41. Diabetics should attend regular reviews doctors.	97.6	92.4	0.139

* proportion of patients giving correct response

Discussion

The knowledge scores of patients with diabetes in this study were found to be at the acceptable level: overall score was 81.9%. Only the general knowledge subscale and risk factors subscale scored below 75% (71.2% and 69.6% respectively). Although the overall knowledge score of the patients without diabetes appeared to be acceptable as well, 24.2% of them had knowledge score less than 50% and their score had higher variability than that of patients with diabetes.

Looking at the individual items of the questionnaire, the percentages of correct response for patients with diabetes were mostly above 50% with the exception of one item (Question 6: Insulin is a hormone). Nine questions were answered correctly by less than 50% of patients without diabetes (Q3, Q5, Q6, Q10, Q12, Q15, Q24, Q27, Q34). The failure to answer these questions may reflect not just poor knowledge but also substantial misconceptions, e.g. incurability of diabetes, use of sweets by diabetics, consumption of fresh fruits, etc. Nonetheless, patients without diabetes generally were able to identify the symptoms and complications of diabetes, although they were not well versed with the risk factors that may lead to diabetes (e.g. advancing age and pregnancy).

As expected, we found that higher education and higher income (possible interaction in these two factors) were associated with higher knowledge score. However, these are not impediment to the acquisition of diabetic knowledge, as shown in their lack of association with diabetic knowledge among the diabetic patients. One possible reason for not performing well in general knowledge section is lack of emphasis on explanation of basic pathogenesis of diabetes mellitus to the non-diabetic and diabetic patients. It is extremely crucial to accentuate the importance of the facts that diabetes mellitus is a non-curable but manageable disease at the time being. Misconception may cause the patients to be less

judicious in taking preventive action against diabetes mellitus and its complications. Therefore, there is necessary to stress on the pathogenesis of diabetes mellitus, risk factors, symptoms and complications as well as monitoring of diabetes mellitus in health promotion programmes in order to improve the overall awareness of the disastrous impact of 'diabetes epidemic' on the quality of life and its socio-economic burden.

Tham *et al*⁸ compared the knowledge of patients with and without diabetes in an emergency department and found that the knowledge was not statistically significantly different in these two groups (68.1% and 65.9% respectively). Our study in contrast showed that patients with diabetes outperformed significantly ($p < 0.01$) patients without diabetes, 81.8% versus 64.0%. One possible explanation was that many of our patients with diabetes were actually having some of the microvascular and macrovascular complications and received regular diabetic health education organised by the Klinik Kesihatan Seremban.

Conclusion

Knowledge on diabetes mellitus among patients with diabetes was significantly better than patients without diabetes in Klinik Kesihatan Seremban. Diabetic mellitus health education should put greater emphasis on prevention of diabetes mellitus among the healthy adults as well.

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