Original Article

Diabetes self-care behaviours and clinical outcomes among Taiwanese patients with type 2 diabetes

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We examined the influences of patients' background characteristics on the frequency of performing five diabetes self-care behaviours that 185 Taiwanese outpatients reported. All patients had type 2 diabetes diagnosed for more than a year and attended an outpatient clinic at a large university hospital where they had received at least one dietitian-led individual nutrition education session and one nurse-led diabetes education session during the course of their care. Seventy nine percent of the patients regularly (defined as responses often or always on the questionnaire) took their medications and over half followed recommended meal plans and exercised, but fewer performed foot care (38%) or checked their blood glucose levels (20%) regularly. The associations between patients' demographics and disease-related characteristics and their performance of self-care behaviours were assessed with logistic regression. Although checking blood glucose levels and performing diabetes foot care were unrelated to any clinical outcome examined, patients who took their diabetes medications had lower hemoglobin A_{1c} levels and fewer chronic complications than those who did not. Furthermore, patients who followed a diabetes meal plan also had lower hemoglobin A_{1c} levels, and those who exercised regularly had healthier body mass indices (BMI) than those who did not.

Key Words: type 2 diabetes mellitus, Taiwan, self-care behaviours, patient education, clinical outcomes

INTRODUCTION

Diabetes is now a global pandemic, affecting an estimated 347 million people[1] and accounting for an estimated 12% of global health expenditures in 2010, or at least $376 billion US dollars.[2] Once considered a disease of the West, Asia now accounts for 60% of the world's population afflicted with diabetes.[3] In Taiwan, the increase in type 2 diabetes prevalence has been dramatic; from 5.79% in 2000 to 8.3% in 2007.[4] This rapid increase in the incidence and prevalence of type 2 diabetes across the globe makes it important to develop more effective prevention and treatment interventions to mitigate its burdens.[1] Diabetes self-care[5] and patient education[6] are two vital components of diabetes management that may reduce the risk of developing diabetes comorbidities and disease progression when they are implemented and adhered to. For example, self-care can reduce the risk or slow the progression of kidney failure,[7,8] retinopathy,[8,9] neuropathy,[8,10] and cardiovascular disease[8] while maintaining quality of life and improving life expectancy.[8,10-13]

Type 2 diabetes requires patients to undertake many complex actions to manage their illness, such as taking medications, preventive actions, and lifestyle changes that require the support of their families and caregivers. Self-care behaviours, such as maintaining a healthy diet, regular physical activity, self-monitoring of blood glucose, medication compliance, and foot care predict favourable disease outcomes.[8,12] Nevertheless, many individuals find it difficult to implement and integrate these self-care behaviours so compliance is low.[14] Taiwanese with type 2 diabetes have difficulties in adhering to self-care regimens, and unsatisfactory glycemic control with increased potential of diabetic complications may result.[15-17]

Diabetes and other chronic disease management programs are popular because they help achieve disease control and improve chronic disease outcomes, and yet little is known whether this is true in Asian populations.[2,18-20] Outpatient education for patients with type 2 diabetes has been in place for decades in Taiwan. However, to the authors' knowledge its effectiveness has not been evaluated and it is unknown if or how a Taiwanese individual's demographic, psychosocial, and disease characteristics

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affect adherence to self-care behaviours. This study's goal was to evaluate adherence to five diabetes self-care behaviours among outpatients with type 2 diabetes who received care in a large university hospital. We examined the effects of demographics, prior diabetes education, and disease-related background characteristics on the frequency of and adherence to these self-care behaviours on relevant clinical outcomes including body mass index (BMI), hemoglobin A_{1c}, and on the presence of acute or chronic diabetic complications.

METHODS

This cross-sectional, observational study was performed at the National Taiwan University Hospital in Taipei, Taiwan between March and July 2003. Patients were eligible if they had been diagnosed with type 2 diabetes for more than two years, had at least two measured hemoglobin A_{1c} levels from the year prior to enrollment, were at least 40 years old, and had received at least one dietitian-led and one nurse-led diabetes education session after diagnosis and prior to the study.

Data collection

One hundred eighty-five patients were eligible and consented to participate. After providing written informed consent, they completed the study questionnaire, which queried their sex, age, level of formal education, duration of diabetes, whether they were on an insulin regimen, and whether they had chronic or acute diabetes complications. They were also asked if they had received advice or recommendations from their health care providers on performing five diabetes self-care behaviors (e.g. taking medications, exercising, following a diabetes meal plan, checking blood glucose, and checking their feet). Each patient's height, weight, hemoglobin A_{1c} levels, and the number of visits to both nursing diabetes specialists and dietitians were abstracted from their medical records.

To assess the frequency of reported self-care behaviors, the authors developed a Diabetes Self-Care Behavior questionnaire (DSCB) that assessed the frequency with which patients performed the selected diabetes self-care behaviors, including how often individuals took prescription diabetes medications, exercised, followed a diabetic meal plan, checked their blood glucose levels, and performed foot checks. These were rated on a 5 point Likert scale. The DSCB was self-administered, unless a respondent required interviewer assistance. The mean time to completion was 20 minutes.

Statistical analysis

Descriptive statistics were calculated using SPSS version 13.0. The associations between patient demographics, disease characteristics, number of diabetes education sessions received, and the frequency in which they preformed recommended diabetes self-care behaviours were assessed using logistic regression. To construct dichotomous variables from the 5-point Likert scale, *often* and *always* were considered "*high adherence"* and *sometimes*, *seldom* and *never* were categorized as "*low adherence"*. The resulting odds ratios were adjusted for the effects of other background characteristics. Logistic regression was also used to determine if adhering to the five diabetes self-care behaviours examined predicted a BMI less than 27,[21] a hemoglobin A_{1c} less than 8.5 mg/dL, or the lack of acute or chronic diabetes complications. Statistical significance was determined if $p<0.05$.

The study was approved by the Human Investigation Review Committee of the National Taiwan University Hospital and Tufts Medical Center. Participants provided written informed consent prior to participation.

RESULTS

Patient demographic characteristics

The patients were predominantly men (54%) who had a high school or higher degree (62%) (Table 1). Their mean age was 65 years (SD=11, range: 40-90) with an average diabetes duration of 11 years (range: 2-41). Their mean BMI was 25 (SD=3.3, range: 15.7-35.6) and mean A_{1c} was 7.8% (SD=1.5%, range: 5-13%). Patients had attended a mean of 1.9 nurse-led diabetes sessions (SD=1.3, median=2.0) and a mean of 2.0 (SD=1.4, median=2.0) dietitian-led nutrition education sessions after being diagnosed with diabetes.

Table 1. Characteristics of 185 Taiwanese outpatients with type 2 diabetes responding to the diabetes self-care behaviour survey

Characteristic	n (%)
Sex	
Men	100 (54)
Women	85 (46)
Age, y	
≤65	92 (50)
>65	93 (50)
Formal education	
< High school	71 (38)
≥ High school	114 (62)
Duration of diabetes, years	
≤11	93 (50)
>11	92 (50)
Experienced acute complications†	
No	138 (75)
Yes	47 (25)
Experienced chronic complications‡	
No	101 (56)
Yes	80 (44)
Nurse-led diabetes education sessions	
One	72 (40)
More than one	109 (60)

†Acute complications: patients had experienced hypoglycemia or hyperosmolar hyperglycemic non-ketotic coma (HHNK).
‡Chronic complications: included retinopathy, neuropathy, nephropathy, amputation or diabetes related cardiovascular disease.

Self-care behaviour frequency

Some patients reported that they were advised to follow all five diabetes self-care behaviours by their health care providers while others were not (Table 2). They had been most frequently advised to take medications (96%), exercise (90%), and follow a diabetic meal plan (90%), whereas they were less likely to be advised to check their blood glucose levels (77%) or their feet (73%).

Patients did not rigorously adhere to all of the behaviours they were advised to follow. The most frequently performed self-care behaviour was taking medications

(79%), followed by exercise (58%), and adhering to a diabetic meal plan (55%), while they were least likely to perform diabetes foot care (38%) and regularly monitor their blood glucose levels (20%).

Patient characteristics and frequency of adherence

No single patient characteristic predicted adherence to all five self-care behaviours examined in this study, and only a few characteristics were significantly associated with adherence to at least one of the diabetes self-care behaviours (Table 3). Older (≥65 years) patients were more likely to exercise than younger (<65 years) patients (OR=4.00) and those who had received only one nurse-led diabetes education session were less likely to exercise than those who had attended more than one session (OR=0.41). Patients who were using insulin were more likely to regularly check their blood glucose levels than those who were not taking a medication (OR=2.41), but less likely to follow a diabetic meal plan (OR=0.36).

Clinical outcomes and frequency of adherence

We also examined whether frequency of adherence to the five self-care behaviours was associated with several clinical outcomes using logistic regression and odds ratios that were adjusted for age, sex, and education level (Table 4). Regular adherence to these self-care behaviours was a predictor of some beneficial clinical outcomes. For example, patients who frequently took their diabetes medi-

Table 2. Reported frequency of performing various diabetes self-care behaviours among 185 Taiwanese outpatients with type 2 diabetes advised to follow each behaviour

Component of diabetes self-care behaviours	Never/seldom /sometimes advised n (%)	Often/always advised n (%)	Total n (%)
Took medication	31 (17)	146 (79)	177 (96)
Exercised	60 (32)	107 (58)	167 (91)
Followed diabetes meal plan	65 (35)	101 (55)	166 (90)
Checked blood glucose	105 (57)	37 (20)	142 (77)
Checked feet	65 (35)	70 (38)	135 (73)

Table 3. Adjusted odds ratios relating prevalence of recommended self-care behaviours to characteristics of 185 Taiwanese outpatients with type 2 diabetes[†]

Variables	Odds ratios (95% confidence interval)				
	Took medication	Exercised	Followed diabetes meal plan	Checked blood glucose	Checked feet
Sex (men vs women)	1.06 (0.44, 2.57)	0.72 (0.35, 1.49)	0.44 (0.19, 1.01)	0.80 (0.39, 1.63)	0.77 (0.39, 1.53)
Age (≥65 y vs <65 y)	2.02 (0.88, 4.61)	4.00 (2.01, 7.90)[*]	1.60 (0.77, 3.32)	1.61 (0.83, 3.11)	1.31 (0.70, 2.45)
Education level (≤6 grades vs >6 grades)	1.21 (0.48, 3.09)	0.84 (0.40, 1.78)	0.48 (0.21, 1.10)	0.61 (0.29, 1.26)	0.49 (0.24, 1.01)
Duration of Diabetes (≥11 y vs <11 y)	0.82 (0.35, 1.92)	0.75 (0.37, 1.52)	1.23 (0.56, 2.69)	0.84 (0.42, 1.68)	1.42 (0.73, 2.76)
Diabetes Treatment (insulin vs no insulin)	1.04 (0.42, 2.55)	1.05 (0.49, 2.27)	0.36 (0.16, 0.82)[*]	2.41 (1.09, 5.32)[*]	0.84 (0.41, 1.73)
Nurse-led diabetes education sessions (1 vs >1)	1.72 (0.73, 4.07)	0.41 (0.21, 0.81)[*]	0.87 (0.43, 1.84)	1.01 (0.53, 1.95)	0.58 (0.31, 1.09)

[*]Significant results (p<0.05) are bolded and italicized. All data were adjusted by other background characteristics.
[†]Odds ratio was calculated from high frequency of practicing the behaviour (often + always) versus low frequency (never + seldom + sometimes) of recommended self-care behaviours.

Table 4. Odds ratios relating prevalence of various self-care behaviours on clinical outcomes of diabetes among outpatients with type 2 diabetes in Taiwan

Self-care behaviours	Odds ratios (95% confidence interval)			
	BMI	HbA1c	Acute complications of diabetes	Chronic complications
	Non-healthy (>27) vs healthy (≤27)	Poor (>8.5) vs good (≤ 8.5)	Yes vs no	Yes vs no
Took medications	0.97 (0.62, 1.53)	0.61 (0.39, 0.94)[*]	1.74 (1.06, 2.87)[*]	0.81 (0.55, 1.21)
Exercised	0.48 (0.23, 0.98)[*]	1.14 (0.57, 2.29)	1.21 (0.59, 1.37)	1.19 (0.63, 2.25)
Followed diabetes meal plan	1.39 (0.45, 4.33)	0.29 (0.10, 0.80)[*]	0.68 (0.23, 1.98)	0.25 (0.09, 0.68)[*]
Checked blood glucose	0.49 (0.18, 1.38)	1.93 (0.73, 5.08)	6.26 (2.18, 18.0)[*]	2.07 (0.86, 4.99)
Checked feet	0.91 (0.69, 1.21)	1.05 (0.80, 1.13)	1.09 (0.82, 1.45)	1.02 (0.80, 1.31)

[*]Significant results (p<0.05) are bolded and italicized. All data were adjusted by sex, age and education level.

cations (OR=1.74) and regularly checked their blood glucose levels (OR=6.26) were more likely to have acute diabetes complications than those who did not. However, those who took their medications regularly were less likely to have poor glycemic control (as measured by hemoglobin A_{1c} levels greater than 8.5% (OR=0.61)) and those who performed regular exercise were more likely to have a healthier BMI (OR=0.48). Also, patients who followed a diabetes meal plan were less likely to have undesirable hemoglobin A_{1c} levels (OR=0.29) and experienced fewer chronic diabetes complications (OR=0.25).

DISCUSSION

The goal of type 2 diabetes management is to maintain blood glucose levels within a near normal range using medications, diet, and other lifestyle modifications. Adherence to prescribed medications and dosing are important pharmacological interventions that maintain adequate glycemic control. In our study, patients reported high levels of medication compliance (79%), which was a sensitive predictor of good glycemic control.[22]

Other diabetes self-care behaviours are also important in management. Physical inactivity is a significant predictor of higher overall mortality in type 2 diabetes and metabolic parameters such as insulin sensitivity, glycemic control, and weight loss can be improved through increased levels of exercise.[2,23,24] Therefore it was gratifying to find that higher adherence to exercise regimens was associated with BMIs in a healthy range. However, in this study, exercise was not associated with glycemic control, perhaps because adherence to a prescribed eating plan and blood glucose monitoring did not accompany this behaviour.

Dietitians can play an important role in educating people with diabetes on proper self management. Following a meal plan for diabetes is another vital component of glycemic control. We found that following a diabetes meal plan was associated with better outcomes as measured by hemoglobin A_{1c} levels of less than 8.5% and fewer chronic diabetes complications. These results agree with a previously published trial of 154 patients that were randomized to either routine care or a dietitian-led intervention group, which found a decrease of hemoglobin A_{1c} levels in their poorly controlled intervention group (0.7%) when compared to the control group (0.2%) (p=0.034).[20] That study also found a 13.4 mg/dL reduction in mean fasting glucose in the intervention group and a 16.9 mg/dL increase in fasting glucose in the control group (p=0.007).[20]

Adherence to blood glucose monitoring was low among our patients. This may explain why there was no association between self monitoring of blood glucose and lower hemoglobin A_{1c} levels. Another study examining Caucasian and African Americans with diabetes found the rates of blood glucose monitoring to be much higher than in our study.[25] Poor adherence with self monitoring of blood glucose in our study may be because many Chinese patients have an aversion to blood loss.[26]

Improved foot care for patients with type 2 diabetes can prevent diabetic ulcer.[10] In our study foot care was not correlated with an improvement in the clinical outcomes studied, perhaps because the prevalence of foot ulcer was so low.

The association between reported frequency of both self monitoring of blood glucose and of medication use with an increased risk of experiencing acute complications of diabetes was unexpected, and may indicate reverse causation. That is, patients who had hypoglycemia, hyper osmolar hyperglycemic non-ketotic coma, orchronic complications were more likely to take their medications and check their blood glucose levels to avoid the recurrence of these events. Alternatively, the presence of complications may serve as a trigger that stimulated better adherence to treatment prescriptions and recommendations in hopes of prevention complication progression.

In our study, patients who attended more education sessions that emphasized exercising regularly and other lifestyle modifications had better adherence to diabetes self-care behaviours. This result supports the contention that patients need nutrition and diabetes education to promote the application of self-care recommendations. None of the demographic characteristics studied were good overall predictors of diabetes self-care behaviours. More research needs to be done on how best to teach diabetes self-care and which patients respond best to which strategies.

Conclusion

Taiwanese patients' adherence to five diabetes self-care behaviours (taking medications, following a meal plan, exercising, performing foot care, and self monitoring of blood glucose) varied dramatically depending upon the intervention modality. Following a meal plan for diabetes and taking prescribed medications were associated with better glycemic control and fewer complications, while regular exercise was associated with healthier BMIs. Since foot care and glucose monitoring were seldom performed it was not surprising that they were not associated with the clinical outcomes measured. The cause of low reported frequency of blood glucose monitoring, whether it is culturally unacceptable, or if patient instruction needs to be improved, or physicians do not adequately stress the importance of monitoring, requires further study.[27]

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AUTHOR DISCLOSURES

The authors have no conflict of interest to declare.

REFERENCES

1. Danaei G, Finucane MM, Lu Y, Singh GM, Cowan MJ, Paciorek CJ et al. National, regional, and global trends in fasting plasma glucose and diabetes prevalence since 1980: systematic analysis of health examination surveys and epidemiological studies with 370 country-years and 2·7 million participants. Lancet. 2011;378:31-40. doi: 10.1016/S0140-6736(11)60679-X.
2. Hu F. Globalization of Diabetes; the role of diet, lifestyle, and genes. Diabetes Care. 2011;34:1249-57. doi: 10.2337/dc11-0442.

3. Roglic G, Unwin N. Mortality attributable to diabetes: estimates for the year 2010. Diabetes Res Clin Pract. 2010; 87:15-9. doi: 10.1016/j.diabres.2009.10.006.
4. Lin C, Li C, Hsiao C, Liu C, Yang S, Lee C et al. Time trend analysis of the prevalence and incidence of diagnosed type 2 diabetes among adults in Taiwan from 2000 to 2007: a population-based study. BMC Public Health. 2013;13:318. doi: 10.1186/1471-2458-13-318.
5. Zhou Y, Liao L, Sun M, He G. Self-care practices of Chinese individuals with diabetes. Exp Ther Med. 2013;5: 1137-42. doi: 10.3892/etm.2013.945.
6. American Diabetes Association. Standards of medical care in diabetes-2011. Diabetes Care. 2011;34 Supplement 1: S11-61. doi: 10.2337/dc11-0174.
7. Thomas N, Bryar R, Makanjuola D. Development of a self-management package for people with diabetes at risk of chronic kidney disease (CKD). J Ren Care. 2008;34:151-8. doi: 10.1111/j.1755-6686.2008.00032.x.
8. Opara E, editor. Nutrition and diabetes pathophysiology and management. Boca Raton, FL: CRC Press; 2006.
9. Threatt J, Williamson J, Huynh K, Davis R. Ocular disease, knowledge and technology applications in patients with diabetes. Am J Med Sci. 2013;345:266-70. doi: 10.1097/ MAJ.0b013e31828aa6fb.
10. Chin Y, Huang T, Hsu B. Impact of action cues, self-efficacy and perceived barriers on daily food exam practice in type 2 diabetes mellitus patients with peripheralneuro-pathy. J Clin Nurs. 2013;22:61-8. doi: 10.1111/j.1365-2702. 2012.04291.x.
11. Glasgow R, Ruggiero L, Eakin E, Dryfoos J, Chobanian L. Quality of life and associated characteristics in a large national sample of adults with diabetes. Diabetes Care. 1997;20:562-7. doi: 10.2337/diacare.20.4.562.
12. Shrivastava S, Shrivastava P, Ramasamy J. Role of self-care in management of diabetes mellitus. J Diabetes Metab Disord. 2013;12:14. doi: 10.1186/2251-6581-12-14.
13. Fisher L, Chesla C, Bartz R, Gilliss C, Skaff M, Sabogal F et al. The family and type 2 diabetes: a framework for intervention. Diabetes Educ. 1998;24:599-607. doi: 10.1177/ 014572179802400504.
14. Mosnier-Pudar H, Hochberg G, Eschwege E, Halimi S, Virally M, Guillausseau P et al. How patients' attitudes and opinions influence self-care behaviours in type 2 diabetes. Insights from the French DIABASIS Survey. Diabetes Metab. 2010;36:476-83. doi: 10.1016/j.diabet.2010.08.004.
15. Chuang L, Tsai S, Huang B, Tai T, DIABCARE (Taiwan) Study Group. The current state of diabetes management in Taiwan. Diabetes Res Clin Pract. 2001;54 Suppl 1:S55-65. doi: 10.1016/S0168-8227(01)00310-2.
16. Lin C, Anderson R, Hagerty B, Lee B. Diabetes self-management experience: a focus group study of Taiwanese patients with type 2 diabetes. J Clin Nurs. 2008;17:34-42. doi: 10.1111/jocn.12724.
17. Nam S, Chesla C, Stotts N, Kroon L, Janson S. Barriers to diabetes management: patient and provider factors. Diabetes Res Clin Pract. 2011;93:1-9. doi: 10.1016/j.diabres.2011.02. 002.
18. Wagner E, Davis C, Schaefer J, Van Korff M, Austin B. A study of leading chronic disease management programs: are they consistent with the literature? Manag Care Q. 1999;7: 56-66.
19. Sidorov J, Shull R, Tomcavage J, Girolami S, Lawton N, Harris R. Does diabetes disease management save money and improve outcomes? A report of simultaneous short-term savings and quality improvement associated with a health maintenance organization-sponsored disease management program among patients fulfilling health employer data and information set criteria. Diabetes Care. 2002;25:684-9. doi: 10.2337/diacare.25.4.684.
20. Huang M, Hsu C, Wang H, Shin S. Prospective randomized controlled trial to evaluate effectiveness of registered dietitian–led diabetes management on glycemic and diet control in a primary care setting in Taiwan. Diabetes Care. 2010;33:233-9. doi: 10.2337/dc09-1092.
21. WHO Expert Consultation. Appropriate body-mass index for Asian populations and its implications for policy and intervention strategies. Lancet. 2004;363:157-63. doi: 10.10 16/S0140-6736(03)15268-3.
22. Al-Qazaz H, Sulaiman S, Hassali M, Shafie A, Sundram S, Al-Nuri R et al. Diabetes knowledge, medication adherence and glycemic control among patients with type 2 diabetes. Int J Clin Pharm. 2011;33:1028-35. doi: 10.1007/s11096-011-9582-2.
23. Dubé J, Allison K, Rousson V, Goodpaster B, Amati F. Exercise dose and insulin sensitivity: relevance for diabetes prevention. Med Sci Sports Exerc. 2012;44:793-9. doi: 10. 1249/MSS.0b013e31823f679f.
24. Sluik D, Buijsse B, Muckelbauer R, Kaaks R, Teucher B, Johnsen N et al. Physical activity and mortality in individuals with diabetes mellitus: a prospective study and meta-analysis. Arch Intern Med. 2012;172:1285-95. doi:10. 1001/archinternmed.2012.3130.
25. Trinacty C, Adams A, Soumerai S, Zhang F, Meigs J, Piette J et al. Racial differences in long-term self-monitoring practice among newly drug-treated diabetes patients in an HMO. J Gen Intern Med. 2007;22:1506-13. doi: 10.1007/s 11606-007-0339-5.
26. Womack M. The Anthropology of Health and Healing. First Edition ed. New York: AltaMira Press; 2010.
27. Christensen N, Steiner J, Whalen J, Pfister R. Contribution of medical nutrition therapy and diabetes self-management education to diabetes control as assessed by hemoglobin A1c. Diabetes Spectrum. 2000;13:72-5.

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台湾 2 型糖尿病患者自我照顾行为与临床结果

我们研究了 185 位台湾门诊病人的背景特征对五种糖尿病自我照顾行为表现频率的影响。所有受试者皆为到一所大学附属医院门诊就诊的被诊断为 2 型糖尿病一年以上的患者，并且他们在就诊过程中曾经在门诊接受过至少一次营养师主导的个体营养教育会议和一次护士主导的糖尿病教育会议。79%的受试者有规律服药（问卷调查回答为经常或总是），超过半数患者会遵守饮食和运动建议，但仅有少数患者做足部保健（38%）或自我血糖监测（20%）。采用逻辑回归方法分析患者的人口学和疾病相关特征与其自我照顾行为之间的相关性。虽然自我血糖监测和足部护理与临床结果并不相关，但按时服药的患者比不按时服药的患者有较低的糖化血色素值（A1C）和较少的慢性并发症。另外，遵循糖尿病饮食计划的患者也有较低的糖化血色素值，有规律运动者较未规律运动者有较健康的身体质量指数（BMI）。

关键词：2 型糖尿病、台湾、自我照顾行为、患者教育、临床结果