Medication Adherence and Self-Management Practices among Type 2 Diabetes Mellitus Patients in Jeli District, Kelantan, Malaysia

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Abstract

This study was carried out to investigate the level of medication adherence and diabetic knowledge among type 2 diabetes mellitus patients in Jeli District, Kelantan, Malaysia. This cross-sectional study was done from February to July 2019 by giving a questionnaire to 150 type 2 diabetes mellitus patients aged 40-80 years in three primary health cares in Jeli District, Kelantan, Malaysia. The quantitative descriptive method was used in this study. The findings of this study revealed that knowledge was significantly related to poor adherence. When sex, record of diabetes, and education were accounted for, patients with low diabetic knowledge had an odds ratio of 4.53 for poor adherence compared to those with high knowledge (adjusted 95% CI = 1.92–10.69; p-value = 0.001). To achieve the goal of regulating diabetes management in primary health care, a clinical supervision program should be implemented to improve staff competence in diabetes management and to empower patients through self-management.

Keywords: medication adherence, self-management practices, type 2 diabetes mellitus

Introduction

The World Health Organization (WHO) states that health is a stage or state in which a person has perfect mental, physical, and social well-being and is not just free from disease or helplessness.[1] Personal health is a valuable asset, but many are unaware of it until they are infected. Many also do not realize that improper living habits can contribute to harmful diseases. One of most feared diseases in the community is diabetes mellitus (DM).[2] It is not a new disease for the public, and it threatens humans through high blood glucose levels. If the increase in blood glucose levels persists over a long period, several sensitive cells, tissues, and organs will suffer damage due to the toxic effects caused by glucose, and the damage will be permanent.[2] According to the WHO, "Poor adherence to long-term therapies severely compromises the effectiveness of treatment," making this a critical issue in population health both from the perspective of quality of life and health economics.[3]

According to the 2019 National Health and Morbidity Survey (NHMS), 3.9 million Malaysians aged 18 years and above have diabetes; 9.4% are aware of the disease, but 8.9% are unaware they have it.[4] It also states that

among diabetic patients receiving treatment at primary health care, 25.7% stated that they had insulin resistance, but 85.6% said they had taken oral anti-diabetic medications in the last two weeks.[4] This report also shows that 88% of patients practice a diabetic diet after consultation with health staff to control blood sugar and lose weight. In comparison, 75.4% of patients have undergone weight-loss exercise and are more physically active. Diabetic patients who received regular treatment at the Malaysian Ministry of Health (MOH) primary health care (PHC), hospital, private clinic, and private hospital are approximately 68.2%, 15%, 12.1%, and 2.8%, respectively. Furthermore, approximately 0.4% of people with diabetes (PWD) purchase their medications from a private pharmacy, while 0.2% take traditional medicine to treat their diabetes.[4]

Globally, about 1.8 million people have not been diagnosed, have never undergone a health screening, and did not realize the presence of DM.[5] This diabetic disease gives the patient many complications, including diabetic foot ulcer (DFU). If this condition is not treated, it will injure the wound and spread to the upper leg. Eventually, the amputation should be performed to save the healthy

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feet.[3] Most cases of amputation and leg ulcers can be avoided with early treatment and proper foot care. Diabetic neuropathy and other diabetic conditions cause leg complications in patients with diabetes. The main aim of this study was to determine the level of knowledge and the medication adherence of PWD, primarily type 2 diabetes mellitus (T2DM) patients, in Jeli District, Kelantan, Malaysia.

Method

This cross-sectional study was conducted from February to July 2019 in Jeli District, Kelantan, Malaysia, using the quantitative method. There were 1,402 T2DM patients registered in three PHCs of Jeli District. The sample size was calculated using the Krejcie and Morgan formulas.[6,7] Based on the calculation, the sample size was 150 (95% confidence interval (CI) and a 5% error margin). The samples were randomly selected using the patient registration system available at PHC.

The data was collected by distributing a questionnaire following the instrument used by Aminde, *et al.*,[8] to 150 T2DM patients at three PHCs of Jeli District. The questionnaires consisted of two parts; part A covered participants' characteristics such as sex, age, ethnicity, education, employment status, and monthly income; while part B asked about the objective of the study and level of knowledge regarding DM. Each PHC was allotted four weeks for selecting and collecting patients, and data collection at three PHCs was completed in 12 weeks. The process of distributing the questionnaires and retrieving the survey forms took three months due to the distance between the PHCs involved.

Results

Table 1 shows the breakdown of participants by demographic variables. For sex, 63 (42%) were male, while 87 (58%) were female. The ethnicity data showed all T2DM patients in the study area were Malays because

Table 1. Diabetes Mellitus Patients' Demographic Data

Variable	Category	n	%	Median	IQR
Age				53.00	18
HbA1c				8.20	3.9
Duration of DM				5.00	6
Sex	Male	63	42.0		
	Female	87	58.0		
Ethnicity	Malay	150	100		
	Non-Malay	0	0.0		
Education	Uneducated	8	5.3		
	Primary	43	28.7		
	Secondary	92	61.3		
	Tertiary	7	4.7		
Employment status	Unemployed	89	59.3		
	Employed	61	40.7		
Monthly income	<1,000 MYR	5	3.3		
	1,000-3,000 MYR	46	30.7		
	3,000-4,000 MYR	92	61.3		
	>4,000 MYR	7	4.7		
Number of medication	1	67	44.7		
	2	83	55.3		
Family records of DM	Yes	67	44.7		
	No	83	55.3		
Receiving DM education	No	66	44.0		
	Yes	84	56.0		

Notes: DM = Diabetes Mellitus, MYR = Malaysian Ringgit, IQR = Interquartile Range

Table 2. Adherence and Knowledge Score Type 2 Diabetes Mellitus Patients

Variable	Category	n	%	Median	IQR
Knowledge score				58.33	33.33
Adherence score				50.00	50.00
Knowledge	Good	112	74.7		
	Poor	38	25.3		
Medication adherence	Good	112	74.7		
	Poor	38	25.3		

Note: IQR = Interquartile Range

most residents of Jeli District were Malays. Most T2DM patients in this study attained secondary education (61.3%) and only 4.7% attained tertiary education. A total of 46 participants had a monthly income in the middle range. While, the remaining 92 participants had the high monthly income group.

Table 2 displays the results of the medication adherence and knowledge score of T2DM patients in this study. Most T2DM patients in Jeli District had good knowledge and medication adherence. The knowledge score showed a median score of 58.33 and an inter-quartile range (IQR) of 33.33, while the adherence score showed a median of 50.00 and an IQR of 50.00. Most participants in this study had good knowledge and medication adherence (74.7%).

Based on Table 3, there was a significant association between poor knowledge and medication adherence (Crude OR 3.51, 95% CI: 1.58–7.78, p-value = 0.002), while remaining variables were insignificant. In the

multivariate analysis (Table 4), first, all variables were selected for the selection process and applied forward logistic regression (LR), backward LR, and manual methods to determine a parsimonious model for the study. The final model consisted of the record of DM education, sex, and knowledge. Knowledge had a significant association with poor adherence. When sex and record of DM education were controlled, patients with poor knowledge had an odds ratio of 4.53 for poor adherence compared to patients with good knowledge (adj 95% CI = 1.92–10.69), p-value = 0.001). When sex and knowledge were controlled, patients with no record of DM education had a 2.40 chance of poor adherence compared to patients who received DM education (adj 95% CI = 1.04–5.57), p-value = 0.041). However, sex has no significant association with poor adherence, even when knowledge and record of receiving DM education were controlled.

Table 3. Factors Associated with Poor Medication Adherence Using Simple Logistic Regression (n = 150)

Variable	Category	Crude Odd Ratio	95% CI	p-value
Age		0.973	0.938–1.010	0.155
HbA1c		0.947	0.809–1.109	0.498
Duration of DM		0.961	0.880–1.049	0.374
Sex	Male	1.340	0.639–2.810	0.438
	Female	1		
Education	Uneducated	1		
	Primary	0.505	0.102–2.493	0.402
	Secondary	0.556	0.123–2.508	0.445
	Tertiary	0.667	0.076–5.878	0.715
Employment status	Unemployed	1		
	Employed	1.924	0.915–4.048	0.085
Monthly income	<1,000 MYR	1.667	0.147–18.874	0.680
	1,000–3,000 MYR	0.786	0.133–4.633	0.790
	3,000–4,000 MYR	0.833	0.151–4.591	0.834
	>4,000 MYR	1		
Number of medication	1	1.157	0.553–2.421	0.698
	2	1		
Family records of DM	Yes	0.713	0.870–0.414	1.830
	No	1		
Receiving DM education	No	1.594	0.761–3.340	0.217
	Yes	1		
Knowledge	Good	1		
	Poor	3.508	1.582–7.778	0.002

Notes: DM = Diabetes Mellitus, MYR = Malaysian Ringgit, CI = Confidence Interval

Table 4. Factors Associated with Poor Adherence Using Multiple Logistic Regression (n = 150)

Variable	Category	Adjusted OR	95% CI	p-value
Receiving DM education	No	2.401	1.035–5.571	0.041
	Yes	1		
Sex	Male	1.947	0.860–4.408	0.110
	Female	1		
Knowledge	Good	1		
	Poor	4.534	1.923–10.691	0.001

Notes: DM = Diabetes Mellitus, OR = Odd Ratio CI = Confidence Interval

Discussion

Diabetes care practices among T2DM patients in Jeli District remained satisfactory. Most participants in this study practiced diabetes care. Nevertheless, some did not know the correct way to practice because their knowledge was still limited in their basic understanding of diabetes. The results of this study revealed that patients with no record of receiving DM education (poor knowledge) would practice poor medication adherence. The last question for participants' level of knowledge related to whether DM patients could get information on diabetes care showed a significant difference in participants, with 84 participants saying "Yes" and 66 participants saying "No." Based on the analysis, participants still do not understand their diabetic care. A previous study stated that the record of receiving diabetic education has a significant association with poor adherence.[9]

The knowledge level of T2DM patients in this study was moderate, and many people still did not care about DM. This indifference to society is alarming, as it indirectly increases the number of patients with DM.[10] This condition is very concerning as people will take it lightly, not knowing the risk of DM. In addition, there are many other adverse effects of DM. A study by Leon and Maddox stated that DM caused many bad complications. The diabetic patients have not only twice the risk of heart disease, but also more likely to develop the disease at a younger age than those who do not have diabetes.[11] Diabetic patients' symptoms of heart disease are frequently undetectable, resulting in delays in diagnosing a heart attack and receiving timely treatment. Sudden cholesterol plaque breaking is the most common cause among diabetic patients with dyslipidemia (total fats or abnormal cholesterol in the blood), which causes a clogged artery that eventually causes a heart attack or stroke.[11]

Diabetes is a condition that lasts for a long time, and it is now considered one of the most severe threats and deaths to people's health in the 21st century.[12,13] Various campaigns have been organized to increase public awareness of DM. The drive and seminars are aimed at helping the community get the latest information on DM so that it can be prevented.[14] It fully supports the saying that prevention is better than cure. Therefore, awareness of the patient's attitude and responsibility is fundamental to ensuring that the information delivery objectives are met.[15] Knowledge of diabetes medication adherence is essential for PWD as it can control and prevent the disease from spreading and becoming more serious. Another study shows that greater adherence to the frequency of HbA1c testing advised in the guidelines was related to better glycemic management and a decreased risk of developing chronic kidney disease. These results may give valuable data to support the use of clinical recommendations to improve patient outcomes in T2DM patients.[16]

Various ways and recommendations can be made to address the problem of inadequate knowledge of DM in the population. Some practical suggestions are provided for elevating the knowledge level about DM. Comprehensive lectures or health education on DM can be held among all community groups. The lectures should also be applied to adolescents who do not have the opportunity to learn. The MOH must produce a total of pamphlets or promotional books related to DM and shall issue them from time to time. This pamphlet or leaflet is distributed to all sections, from the hospital outpatient department to the primary health care and the rural clinic.

Conclusion

Knowledge has a significant association with poor adherence. If T2DM patients have no history of receiving DM education, it can influence their medication adherence. Even though T2DM patients in this study have already practiced diabetes care, the number of DM patients can still increase if they do not practice it right. From the above discussion, it can be said that medication adherence is essential for people with DM; however, many groups still do not even care about DM. It is possible to start the clinical supervision program so that Malaysian people are aware of the value of DM information. This issue will be able to be avoided, which will indirectly lower the number of individuals to suffer from DM.

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