

## Understanding Towards Diabetes Mellitus among Rural Adult Community in Malaysia

*H.S. Minhat and T.R. Hamedon*

Department of Community Health, Faculty of Medicine and Health Sciences,  
Universiti Putra Malaysia, 43400 Serdang, Selangor, Malaysia

**Abstract:** iabetes mellitus (DM) has shown an increasing trend globally and a growing burden of DM in Malaysia. This study aimed to explore the understanding of the rural adult community in Malaysia on DM. A cross-sectional study was conducted involving adult residents aged 18 years old and above, living in two separate villages in the district of Kuala Pilah, Negeri Sembilan. A pre-tested questionnaire was used for data collection using a face-to-face interview to ensure the accuracy and to avoid incompleteness of information given. Respondents' understanding on DM was reflected by their knowledge, which was measured using a 3-point likert scale questionnaire consisted of 13 items. A total of 234 respondents consented for the study with mean age of  $45.54 \pm 17.61$  years old. Majority were 45 years old and younger (56.8%), females (59.0%), had higher education level (76.9%), had individual monthly income of RM1500 and less (79.5%) and were not suffering from diabetes mellitus (81.2%). The median score for knowledge related to diabetes mellitus was 20.00 (IQR = 7), with 58.1% had a poor score below the median value. Only diabetic status was significantly determining understanding of the respondents on diabetes mellitus. The findings of the study indicated that majority of the rural community adult involved in the study had a remarkably low knowledge related to diabetes mellitus which was significantly related to their diabetic status. The existing health promotion programs could possibly limited among those already suffered from diabetes, which indicate the needs for a more extensive community-based education in order to reduce the prevalence of diabetes in the community.

**Key words:** Understanding • Knowledge • Diabetes Mellitus • Rural • Adult

### INTRODUCTION

Diabetes mellitus (DM) is a group of metabolic diseases characterized by hyperglycemia resulting from defect in insulin secretion, insulin action, or both. There are 3 types of DM, namely Type 1, 2 and gestational DM. Type 2 DM (T2DM) also known as non-insulin dependent diabetes mellitus (NIDDM) is an adult onset and in approximately 90-95% of the population, it is related to insulin resistance and have relatively deficient insulin in the body.

In many parts of the world, there has been an emerging in the prevalence of non-communicable disease which includes increase in the prevalence of DM. The world prevalence of diabetes among adults in 2010 was 6.4% affecting 285 million adults and will increase to 7.7% and 439 million adults by 2030 [1]. The prevalence of diabetes in Malaysia has been increasing

over the last three decades and this rate is accelerating. The prevalence of diabetes mellitus among Malaysians aged 30 years of age has increased by more than two fold over a 20-year period [2]. A study conducted by Wan Nazaimoon *et al.* [2] on the prevalence of DM in Malaysia recorded an overall diabetes prevalence of 22.6%, almost a two fold increase from 11.6% reported in 2006. This has increased to 14.9% in 2006 [3]. The prevalence of DM among adults more than 18 years old had increased from 11.6% (2006) to 15.2% (2011) [4]. The prevalence of DM is high among Indians (19.9%) followed by Malays (11.9%) and Chinese (11.4%). There was an increasing trend of diabetes prevalence with age; from 2.0% in 18 to 19 years old group, to a prevalence ranging between 20.8% and 26.2% among 60 to 64 years old. Three states in Malaysia named Negeri Sembilan, Melaka and Penang had highest prevalence of diabetes at 15.3%, 15.2% and 14.9% respectively [5].

**Corresponding Author:** Halimatus Sakdiah Minhat, Department of Community Health,  
Faculty of Medicine & Health Sciences, Universiti Putra Malaysia, 43400 Serdang,  
Selangor, Malaysia. Tel: +60-12-3438175, Fax: +60-3-89450151.

Patient with DM experiences chronic hyperglycemia associated with long term damage, dysfunction and failure of different organs especially to the eyes, kidneys, heart and blood vessels [1]. Knowledge about DM is crucial to reduce the incidence and morbidity associated with DM [6, 7]. This also will improve the compliance among diabetics patient, thus influencing diabetics outcomes [8]. Knowledge remains a vital prerequisite to good compliance with medical therapy [9]. According to Fadia and Mervat [10], knowledge and attitude are the first steps in formulating a preventive programs for Insulin dependent diabetes mellitus (IDDM). Inaccurate and inadequate information and education related to diabetes associated with potentially harmful results in the care of diabetic patients.

Negeri Sembilan is a state in Peninsular Malaysia that was found to have the highest prevalence of diabetes in Malaysia (15.3%) [5]. The increase in prevalence of DM might attribute to low knowledge of DM among general population [3]. The level of knowledge surveys among community is important for early detection of disease, identifying areas of weakness for further intervention as well as increasing public awareness [5, 6]. No formal research addressing the level of knowledge in Negeri Sembilan has been published despite it being the state with highest diabetes prevalence in Malaysia. This study aimed is to evaluate the understanding related to diabetes mellitus among rural adult community in Malaysia which will help to identifying areas of weakness and misconception about DM.

## MATERIALS AND METHODS

The study was conducted in two separate villages located in the district of Kuala Pilah, namely Kampung Sungai Dua Besar and Kampung Kuala Sungai Dua. A cross-sectional study was carried out involving the adult residents of both villages, aged 18 years and above. The total estimated number of adults in both villages was 450. However, only 234 respondents involved in the study with a response rate of 52.0%. Data was collected between 29<sup>th</sup> August 2013 and 13<sup>th</sup> September 2013. A guided self-administered questionnaire was used for data collection. The first part was on the socio-demographic information and the diabetic status of the respondents. Meanwhile, the second part of the questionnaire was on the knowledge related to diabetes, consisting of 13 items, measured using a 3-point likert scale, 0 = unsure, 1 = Yes and 2 = No. The questionnaire was pre-tested among adult residents of another village with almost similar background. Information sheet was distributed together was given to respondent or upon

request. Permission from the leader of each village was gained prior to data collection. The data were analysed using Statistical Package for Social Sciences (SPSS) version 19.0. The median value for knowledge was used to decide on a cut-off point to categorize the data into poor and good understanding related to diabetes mellitus. Chi-square test was used to assess the association between different parameters. Data were re-categorized for the purposes of inferential and multivariate analyses. Multiple logistic regression analysis was carried out to determine the predicting factors for knowledge. The level of significance was set at 0.05.

## RESULTS

**Characteristic of Respondents:** Table 1 shows the distribution of the respondents involved in this study. Mean age of the respondents was  $45.54 \pm 17.61$ . Majority of the respondents were female (59.0%), had diabetes (81.2%), younger age group, aged 45 years old and younger (56.8%), received higher education level of at least secondary education (76.9%), lower individually monthly income of RM 1500 and less (71.8%), were not diagnosed with DM (81.2%) and had poor knowledge or understanding related to diabetes (58.1%)

Table 1: Characteristics of respondents (n=234)

Factor	Frequency (n)	Percentage (%)
Age (mean = $45.54 \pm 17.61$ )		
= 45	131	56.8
> 45	101	43.2
Gender		
Male	96	41
Female	138	59
Education level		
Lower	54	23.1
Higher	180	76.9
Monthly income (RM)		
= 1500	186	79.5
> 1500	48	20.5
Diabetic status		
Yes	44	18.8
No	190	81.2
Knowledge on DM		
Median (20.00, IQR=7)		
Poor (= 20)	136	58.1
Good (> 20)	98	41.9

Table 2: Factors associated with understanding on DM (n=234)

Factors	Knowledge	
	Statistical test	p
Age	t = 2.193	0.029
Gender	$\chi^2 = 1.045$	0.307
Education level	$\chi^2 = 0.502$	0.479
Monthly income	$\chi^2 = 0.476$	0.490
Diabetic status	$\chi^2 = 8.167$	0.004

Table 3: Predictive model for understanding on DM among respondents (n=234)

	B	SE	Wald	OR	95% CI for OR	p
Constant	-0.927	0.418	4.912	0.396		0.027
Age	0.526	0.352	2.233	1.692	0.849 – 3.371	0.135
Gender	0.25	0.281	0.796	1.285	0.741 – 2.227	0.372
Education level	0.723	0.41	3.108	2.061	0.922 – 4.605	0.078
Monthly income	0.253	0.359	0.498	1.288	0.638 – 2.602	0.48
Diabetic status	-1.023	0.43	5.677	0.359	0.155 – 0.834	0.017

Nagelkerke R2 0.082

**Contributing Factors Towards Understanding of Respondents on DM:** Table 2 is showing the factors associated with the understanding of the respondents on DM. The findings showed that age ( $t=2.193$ ,  $p<0.05$ ) and diabetic ( $\chi^2=8.167$ ,  $p<0.05$ ) status of the respondents significantly associated with their understanding or knowledge on DM.

**Predicting Factors for Understanding on DM:** Table 3 shows that diabetic status is the only significant predicting factor for understanding or knowledge related to DM. Those who had DM are 3.6 (OR=0.359; 95% CI= 0.155-0.834) more likely to have better understanding on DM compared to otherwise respectively. However, the Nagelkerke R Square shows that only 8.2% of the variation in the understanding related to DM is explained by this logistic model.

## DISCUSSION AND CONCLUSION

Management of diabetes is complex, multi-faceted and can be very challenging. One of the barriers to good diabetes control is lack of knowledge about optimal diabetes control goals and associated self-care activities [11]. Better knowledge of diabetes has been associated with greater likelihood to perform self-care activities (e.g. following a diabetes diet, blood glucose self-measurement and regular exercise) [12], fewer perceived barriers to blood glucose monitoring [13] and better medication adherence and glycaemic control [14]. Similarly, greater understanding of diabetes medications has been associated with better glycaemic control [15].

Knowledge and awareness on the possible consequences of diabetes is vital. Findings from this study revealed that there is a poor level of understanding related to DM among the rural community in Kuala Pilah, Negeri sembilan, Malaysia. The findings from this study showed a poor level of knowledge or understanding related to DM which somehow could be related to the small involvement of diabetic patients in the study. However, education on the risk of DM should not be limited among those already suffers from DM. The poor

level of knowledge and understanding related to DM had been reported in many studies all over the world. A national population-based survey conducted among Mongolian revealed similar results with poor knowledge reported among them [16]. Similarly, limited level of knowledge was also reported among the people of Cameroon in a qualitative survey on knowledge, attitude and behavior related to diabetes and its related factors [17].

Considering that the respondents in this study were all Malay, the findings is comparable to a study conducted by Salmiah and Kamaruzaman [18], they had revealed that, most of Malaysian Malay diabetic patients are lacking understanding of diabetes and management of diabetes, nature of diabetes, awareness of having diabetes, diabetic education, knowledge of diabetes, duration of illness, patients' understanding of diabetes, physical effects of treatment, severity of symptoms and disease. Patients believed that they needed to integrate many treatment requirements such as diet, medications, blood glucose monitoring and exercise into their daily routine [18]. According to Salmiah and Kamaruzaman [18], education and knowledge related to diabetes that influenced understanding of the disease were also reasons for non-adherence to treatment regimen.

Various factors could possibly contribute to the poor understanding and knowledge of the community on diabetes mellitus. It could be related to the individual factors or the ineffectiveness of the health promotion programmes conducted by the relevant authorities. Among the factors that were found to have significant association with the understanding level on DM in this study were age and diabetic status. However, only diabetic status was the significant predicting factor towards their understanding. A study conducted by Unyime *et al.* [19] on the determinants of diabetes knowledge among Nigerian diabetics reported that, their poor knowledge was significantly related to their age, level of education, satisfaction with education received, employment status and household wealth. Their poor knowledge was partly related to the widespread traditional beliefs about the condition.

Similarly, Bruce and colleagues [20] found that greater education, attendance at diabetes education programs and visits to dieticians were independently associated with greater diabetes knowledge in a large sample of Australian patients with Type 2 diabetes.

Patient's factors such as misconceptions about the disease and medication, feeling well despite being diagnose with diabetes and questioning the necessity of continuing treatment were among factors previously reported in other studies associated with poor control of diabetes [21], which indirectly reflecting the poor understanding related to the importance in controlling the blood sugar. According to Atif and Naila [21], the patient's beliefs on traditional healers and alternative drugs like homeopathic medicines also play an importance role in the poor of adherence to diabetes treatment. In another study conducted by Baghianimoghadam and Afkhami-Ardekani [22] reported that the face-to-face and group teaching health education intervention performed in their study had remarkably improved the quality of life of diabetic patients.

Overall, the findings from this study revealed a poor knowledge and understanding related to diabetes among the respondents involved, which is likely related to the small involvement of diabetic patients in the study and the fact that, diabetic education conducted in the health centers only for diabetic patients. Ideally, a more comprehensive population should be targeted especially those of higher risks as part of the primary prevention in the DM prevention programmes. The diabetic educators should also be well-trained to ensure an effective delivery of information and the programmes. Exploration on the barriers in participating in such programmes is necessary to ensure its reachability to the targeted population. Consideration should also be given to the evaluation of the existing diabetic education programmes.

#### ACKNOWLEDGEMENT

I would like to sincerely thank the year 4 medical students, Universiti Putra Malaysia (UPM) especially Mohd Taufik Azfar Mohd and Mohd Iszuan Ismail for their contribution during the analysis of the data and preparation of the manuscript and also those who were involved in the data collection.

#### REFERENCES

1. Shaw, J.E., R.A. Sicree and P.Z. Zimmet, 2010. Global estimates of the prevalence of diabetes for 2010 and 2030. *Diabetes Res Clin Pract*, 87(1): 4-14
2. Wan Nazaimoon, W.M., S.H. Md Isa, W.B. Wan Mohamad, A.S. Khir, N.A. Kamaruddin, I.M. Kamarul, N. Mustafa, I.S. Ismail, O. Ali and B.A.K. Khalid, 2013. Prevalence of diabetes in Malaysia and usefulness of HbA1c as a diagnostic criterion. *Diabet. Med.* DOI: 10.1111/dme.12161
3. Letchuman, G.R., W.M. Wan Nazaimoon, W.B. Wan Mohamad, L.R. Chandran, G.H. Tee, H. Jamaiah, M.R. Isa, H. Zanariah, I. Fatanah and Y. Ahmad Faudzi, 2010. Prevalence of diabetes in Malaysia National Health Morbidity Survey III 2006. *Med J. Malaysia*, 65(3):180-6.
4. Tahir, A. and S. Nor Ani, 2013. NCDs in Malaysia-A Rising Trend. Conference on Non-Communicable Diseases (NCDs): 26-27 March; Kuala Lumpur. <http://www.slideshare.net/appfromlab/nsm-ncd2013-symposium-1-ncd-in-malaysia-a-rising-trend>. [Accessed May 6 2014].
5. Rugayah, B., 2014. Diabetes Epidemic in Malaysia [http://mydiabetologists.com/public/English/PatientSite/DiabetesGeneral/DiagnosingDiabetes/Diabetes\\_Epidemic\\_in\\_Malaysia.htm](http://mydiabetologists.com/public/English/PatientSite/DiabetesGeneral/DiagnosingDiabetes/Diabetes_Epidemic_in_Malaysia.htm). [Accessed May 6 2014]
6. Baradaran, H. and K. Jones, 2004. Assessing the knowledge, attitude and understanding of type 2 diabetes amongst ethnic groups in Glasgow, Scotland. *Practical Diabetes International*, 21(4): 143-148.
7. Binhemd, T.A., 1992. Diabetes mellitus: knowledge, attitude, practice and their relation to diabetes control in female diabetics. *Ann Saudi Med.*, 12(3):247-251.
8. Kheir, N., W. Greer, A. Yousif, H. Al Geed and R. Al Okkah, 2011. Knowledge, attitude and practices of Qatari patients with type 2 diabetes mellitus. *Int J. Pharm Pract.*, 19(3): 185-91.
9. Farmer, A., A.L. Kinmonth and S. Sutton, 2006. Measuring beliefs about taking hypoglycaemic medication among people with Type 2 diabetes. *Diabet Med.*, 23: 265-270
10. Fadia, Y.A.M. and M. Mohamed Ali El-Sayed, 2012. Health Education Intervention Improves Knowledge, Attitude and Practices of Mothers of Insulin Dependent Diabetes Mellitus. *World Applied Sciences Journal*, 17(11): 1398-1404.
11. Eva, K.F., X. Jing, R. Gwyn, P.F. Robert and L.L. Ecosse, 2013. Factors Associated with Knowledge of Diabetes in Patients with Type 2 Diabetes Using the Diabetes Knowledge Test Validated with Rasch Analysis. *PLOS One*. DOI: 10.1371/journal.pone.0080593.

12. Persell, S.D., N.L. Keating, M.B. Landrum, B.E. Landon, J.Z. Ayanian, C. Borbas C and E. Guadagnoli, 2004. Relationship of diabetes-specific knowledge to self-management activities, ambulatory preventive care and metabolic outcomes. *Preventive Medicine*, 39: 746-752.
13. Murata, G.H., J.H. Shah, K.D. Adam, C.S. Wendel, S.U. Bokhari, P.A. Solvas, R.M. Hoffman and W.C. Duckworth, 2003. Factors affecting diabetes knowledge in Type 2 diabetic veterans. *Diabetologia*, 46: 1170-1178.
14. Al-Qazaz, H.K., S.A. Sulaiman, M.A. Hassali, A.A. Shafie, S. Sundram, R. Al-Nuri and F. Saleem, 2011. Diabetes knowledge, medication adherence and glycemic control among patients with type 2 diabetes. *International Journal of Clinical Pharmacy*, 33: 1028-1035. doi: 10.1007/s11096-011-9582-2
15. McPherson, M.L., S.W. Smith, A. Powers and I.H. Zuckerman, 2008. Association between diabetes patients' knowledge about medications and their blood glucose control. *Res Social Adm Pharm.*, 4: 37-45.
16. Alessandro, R.D., O. Dugee, D.C. Maximilian, C.B. Ib, E. Palam, O. Janchiv and W.M. Dan, 2013. Exploring knowledge, attitudes and practices related to diabetes in Mongolia: a national population-based survey. *BMC Public Health*, 13: 236.
17. Kiawi, E., R. Edwards, J. Shu, N. Unwin, R. Kamadjeu and J.C. Mbanya, 2006. Knowledge, attitudes and behavior relating to diabetes and its main risk factors among urban residents in Cameroon: A qualitative survey. *Ethn Dis.*, 16(2): 503-9.
18. Salmiah, M.A. and J. Kamaruzaman, 2009. Barriers to Optimal Control of Type 2 Diabetes in Malaysian Malay Patients. *Global Journal of Health Science*, 1(2).
19. Jasper, U.S., B.G. Ogundunmade, M.C. Opara, O. Akinrolie, E.B. Pyiki and A. Umar, 2014. Determinants of diabetes knowledge in a cohort of Nigerian diabetics. *Journal of Diabetes & Metabolic Disorders*, 13: 39
20. Bruce, D.G., W.A. Davis, C.A. Cull CA and T.M.E. Davis, 2003. Diabetes education and knowledge in patients with type 2 diabetes from the community The Fremantle Diabetes Study. *Journal of Diabetes and Its Complications*, 17: 82-89.
21. Atif, S.H. and N. Shaikh, 2010. Barriers and myths to initiate insulin therapy for type 2 diabetes mellitus at primary health care centers of Hyderabad district. *World Applied Sciences Journal*, 8(1): 66-72.
22. Baghianimoghadam M.H. and A.A. Mohammad, 2008. Effect of Education on Improvement of Quality of Life by SF-20 in Type 2 Diabetic Patients. *Middle-East Journal of Scientific Research*, 3(2): 67-72.