ORIGINAL ARTICLE

Knowledge, Attitude, and Practice on Diabetes among Malay Villagers of Tanjung Tualang, Perak.

Ikmal Md Bakri[1], Balqis A Othman[1], Ashraf M. Abdullah[1], Sofiya M. Fauzi[1], Areef M.I Roslan[1], FRP Kinta Team*[1] and Osman Ali[2].

[1]MBBS Students, Faculty of Medicine, Royal College of Medicine Perak, Universiti Kuala Lumpur, Ipoh, Perak, Malaysia.
[2]Department of Community based, Faculty of Medicine, Royal College of Medicine Perak, Universiti Kuala Lumpur, Ipoh, Perak, Malaysia.

Corresponding Author
Prof. Dr Osman Ali
Department of Community based, Faculty of Medicine, Royal College of Medicine Perak, Universiti Kuala Lumpur, Ipoh, Perak, Malaysia.
Email: osmanali@unikl.edu.my.

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Abstract

Background: Diabetes is a chronic disease which is rapidly rising in incidence and prevalence worldwide. The issues of poor control of this disease have led to various complications or even death. Many factors have been shown to be associated with the incidence and long-term survivorship of the disease, however the intervention and treatment of the disease have not been successful in halting this pandemic. The study was done to determine the prevalence of diabetes among the residents in Kampung Batu 7 and Kampung Batu 8, Tanjung Tualang, Perak and the level of knowledge, attitude, and practice among diabetic patients there.

Methods: A cross sectional study was conducted in Kampung Batu 7 and Kampung Batu 8, Tanjung Tualang, Kinta District, Perak. A total of 253 Malay individuals aged 18 and above were selected for the study. A diabetic patient was defined as an individual who has been clinically diagnosed with diabetes before and/or those who are currently taking medication for diabetes. All respondents were asked to answer the questionnaire on knowledge concerning diabetes and its main symptoms. The diabetic patients were further asked about their attitude and practice in controlling the blood sugar levels and their awareness of the complications of the disease. The questionnaire consists of 10 questions on general knowledge about diabetes and its main symptoms; 8 questions on attitude towards diabetes control;, 8 questions about their practice of controlling diabetes; and 6 questions on their awareness of diabetes complications. All components were scored, and the medians were used to classify the level of KAP.

Results: Out of 187 respondents participated in the study (response rate of 74%), 64 (34.2%) were having diabetes mellitus. Men and women were equally affected, and participants aged 51 years old and above make up the highest fraction (51.1%). Based on analysis, 59.4% of the respondents had good knowledge on diabetes. Men and women were equally knowledgeable. 51.6% of diabetics had a poor attitude towards their diabetes and only 54.7% of the diabetics practiced a good diabetes care. In terms of awareness to diabetes complication, 73.4% had good awareness. Among diabetics, no significant association was found between their level of knowledge with attitude and practice. There was also no significant association found between knowledge, attitude, and practice of diabetes respondents with sociodemographic factors. However, diabetics aged 51 and above had a significantly more aware about diabetic complication as compared the younger age group.

Conclusion: The study showed that the prevalence of known diabetes in this area was about three times higher than the national average and affected mostly the senior age group. Only 60% of adult population here have good knowledge on diabetes. The knowledge, attitude, and practice on diabetes care among diabetics here were comparatively low. More efforts on health education and behavioral modifications by the health authorities and the empowerment of the community should be activated to fight against this pandemic.

Keywords: *Diabetes Mellitus, prevalence, KAP, diabetes complication, Malays, Perak.*

*FRP team members - Nur'Aqilah Hasnur, Azureen I. Hamran, Farzana A.M Zaini, Qistina N. Subri, Zamir K.A.M. Sazali, Syazana N. Halim, Aufa Mahlil, 'Arif M.A. Majid, Nabilah F. Ali, Shahmi M.I.A Aziz, Firzan M.M Firdaus, Zulaikha K. Anuar, Farhana N.A Alhamdu, A'thirah A. Ismail, Fikri M.A Elmi, Arees M.M Anwar, Imran F. Yuhaznel, Irfan K.E.K Nazeri, Khusyairi M. Hasbullah, Jazlina N.N Azhar, Amaani S.A Zawawi, Norsalsabila M. Baharudin, Adiliah N.A.A Rahman, Aisha N. Zainor, Haziqah W.A Halim, Puteri N.M Osman, Zafirah N.A Bakar, Farhan A. Kadir, Syahirah N. Yakop, Aida N.A.M Radzi, Zakiah N.I.M Nai, Syahirah FM. Samari, Syahira N.N.L Kaswadi.

Introduction

Diabetes is a chronic disease which is rapidly rising in the prevalence and incidence worldwide. About 422 million people worldwide have diabetes, the majority living in low-and middle-income countries, and 1.5 million deaths are directly attributed to diabetes each year [1]. The prevalence has been rising more rapidly in low- and middle-income countries compared to the high-income countries [1]. In Malaysia, based on the National Health and Morbidity Survey 2019, there are approximately 3.9 million Malaysians living with diabetes. The prevalence rate has risen from 13.4% in 2015 to 18.3% in 2019[2] (IPH, 2020). The high prevalence of overweight and obesity in the country, possibly responsible for the epidemic of this disease [3].

This metabolic disease is characterised by high blood sugar levels, which over time leads to serious damage to the heart, blood vessels, eyes, kidneys, and nerves. The complications include cardiovascular diseases, retinopathy, nephropathy, and neuropathy. A study in a hospital in Kelantan showed that diabetic nephropathy was the most common complication, followed by coronary heart disease and cerebrovascular disease [4]. With good glycemic control, the progression of complications may be delayed, and the life span of diabetics may be like those without the disease [5]. This suggests that prompt and proper management may modify the course of hyperglycaemia in diabetic patients.

There is lack of published KAP study on diabetes and its complication in Malaysia. A study in Penang showed that only 58.2% of the population studied were considered to have average and good knowledge about diabetes (9). The recent Malaysian Diabetes Index (MDI) study indicated that many Malaysians do not fully understand diabetes and its resultant health complications (10). More than half (52%) of respondents in the survey revealed that they do not know that diabetes cannot be cured and 51% think that diabetes is not difficult to manage. The similar finding also found elsewhere such as a study in the Rawal Institute of Health Sciences Islamabad using Michigan Diabetes Knowledge Test (MDKT) that showed 41.5% of diabetes patients had poor knowledge of diabetes and its control. It was the aim of this study to determine the level of knowledge, attitude, and practice of diabetes and its complication among Malay villagers in Tanjung Tualang, Perak.

Materials and methods

Tanjung Tualang is one of the major tin-mining towns in Malaysia around early 1900s. However, the mining ponds in the area are currently used for breeding the freshwater prawn and fish. One of tin dredge has been converted to a museum for tourism. The area was selected conveniently as a part of a community project for the field residential training of medical students from the Universiti Kuala Lumpur Royal College of Medicine (RCMP), Universiti Kuala Lumpur from 30th May to 12th June 2022.

A cross-sectional study was conducted among the population of Kampung Batu 7 and Kampung Batu 8, Tanjung Tualang. There were 96 houses total in that neighbourhood, with a total of 253 individuals over the age of 18 residing there and all were Malays. A minimum of 153 respondents was necessary to be a respondent in this study, based on an estimated 50% prevalence of persons with diabetes and 5% precision. However, all eligible people in the house aged 18 and above were selected as samples for the study. Known diabetes mellitus was defined as an individual who has been clinically diagnosed with diabetes before and/or those who are currently taking medication for diabetes. No blood tests were conducted.

All respondents were requested to answer the self-administered questionnaire on knowledge concerning diabetes and its main symptoms in Bahasa Malaysia and the diabetic patients were further asked about their attitude and practice in

controlling the blood sugar levels and their awareness of the complications of the disease. The questionnaires were self-created through discussion and references. The questionnaire consists of the sociodemographic status of respondents, 10 questions on general knowledge about diabetes and its main symptoms, 8 questions on attitude towards diabetes, 8 questions on treatment compliance and diabetes control and 6 questions on their awareness of diabetes complications. The questionnaires were validated (content validity) by the expert (supervisor of the project). For each question on knowledge, the correct answer will be given 1 mark whilst 0 for incorrect response (score between 0-10). For attitude, since Likert's scale was used, then the response was given 0 to 5 marks per question (score between 0-40 marks). Questions 2,4 and 5 were reversely scored. For practice questions the score was between 0-12 marks. For each question with yes-no option, 'yes' response will be scored 1 and 'no' response as 0. For question on missed medication, score was between 0-4 and frequency of exercise the score was between 0-3. For awareness questions, the score was between 0-12 marks. All components were scored, and the median was used as the cut-off point to classify the respondents into different levels based on their knowledge, attitudes, and practice scores because the data were not normally distributed. For the knowledge, a score of 9 and above is considered having good knowledge, good attitudes were the score of 29 and above, for good practice the score of 10 and above and for the awareness of complication a score of 5 and above was considered good.

Collected data were keyed in in Microsoft excel software and cleaned before analysing using SPSS (version 23). Profiles of samples and the prevalence of diabetes were analysed descriptively whilst for the association between knowledge, attitude, and practice of diabetic patients with sociodemographic variables, Chi-square test was used. P-value of less than 0.05 was considered statistically significant.

Ethical consideration

The community survey was approved by the Chairman of Kampung Batu 7 & 8 and the Dean of the Faculty of Medicine, RCMP. All respondents had to sign the consent form before answering the questionnaire.

Results

Profiles of the samples

There was a total of 253 people above 18 years old in the area. 187 respondents took part in this study (response rate of 73.9%). Those who did not respond were either reluctant to answer the survey or were not at home after 3 consecutive visits. 49.7% were males, 68.4% were married and 47.1% aged 51 years and above.

Prevalence of diabetes mellitus

Out of 187 respondents, 64 were known diabetes patients (34.2%). The prevalence of diabetes among males was 33.3% and females 35.1%. According to age group, 2.3% of diabetes found among respondents aged 18-30 years, 20% in 31-40 years, 48% in 41-50 years old and 51.1% in 51 years and above. Among the married respondents, the prevalence of diabetes was 78.1 %, divorced/widower 21.9% and single person 6.3%.

Out of 106 who did not know their diabetes status, 17 of them claimed that they were having symptom such as easily thirsty (6), always hungry (6) and frequent urinating (5). The diabetic status in this group was not determined since no blood test was conducted in this survey.

Knowledge on diabetes in sample population

Table 1 showed that more than 60% of respondents were able to correctly answer the question on knowledge of diabetes. More than 90% respondents knew about the cause of diabetes, the test of diabetes, delayed wound healing as the symptom and obesity as a risk factor of diabetes. However, after scoring, it was found that 59.4% of the respondents considered to have good knowledge about diabetes.

Attitude on diabetes among diabetes patients

Table 2 showed that 80% of diabetes patients will seek medical treatment when they have an injury. More than 80% believed that exercise could help them to improve their diabetes. Certain beliefs might be harmful to patients, such as taking a double dose of drugs when they missed it earlier (51.6%). About 23% of patients had believed that diabetes drugs (metformin) might cause kidney damage. 42.2% of patients believed that of traditional herbs are best for treating diabetes (29.7% had a strong belief). More than half (51.6%) of the respondents believed that they could not do much to stop the complications of diabetes. After scoring, 51.6% of patients had a poor attitude towards their diabetes.

Practice of diabetes among diabetic patients

Table 3 showed that 81.2% of patients did check their blood glucose regularly and 95.3% had a clinic follow-up every 6 months. More than 90% of patients comply with the medicine prescribed and the doctor's advice. However, 14% of them tend to forget to take medicine more than 2 times weekly and 62.5% forgot once a week. 87.5% claimed that they control the intake of food and drink and 78.1% of carbohydrate intake. In term of exercise, only 25% exercise regularly as prescribed. After scoring, 54.7% of the diabetic respondents showed good practice on diabetes.

Awareness on diabetic's complication among diabetes patients

Table 4 showed that the awareness of diabetes complication was quite high among diabetic patients. More than 80% of patients were aware about diabetes complications such as kidney diseases, vision disturbances, cardiovascular diseases and delayed wound healing. The effect on the immune system was not knowledgeable by half of the patients. After scoring, 73.4% of patients had good awareness towards the complications of diabetes.

Association between sociodemographic variables of diabetes patients with knowledge, attitude, practice, and complication awareness towards diabetes

No association was found between the age groups, gender, and marital status with the knowledge, attitude, and practice of control in diabetes patients in this study (Table 5). The only statistically significant association was found between age group and awareness on diabetic complications of which the patients aged 31 -40 years and 51 and above were significantly more aware of the complications of diabetes compared to the other age groups (p=0.033).

Association between knowledge, attitude, practice, and awareness towards diabetes

No association was found between knowledge on diabetes vs. their attitude in diabetes (P=0.135), knowledge vs. their practice (p=0.176), knowledge vs. awareness of the complications (p=0.127). No association also found between their attitude vs. practice (p=0.188), attitude vs. awareness of the complications (p=0.065) and practice vs. awareness of the complications (p=0.075).

Discussion

In this study, the prevalence of diabetes was 34.2%, and affecting mainly the old age group, with 51.1% in those aged 51 years old and older. 59.4% of the respondents seem to have good knowledge on diabetes. 51.6% of diabetic patients had a poor attitude towards their diabetes and only 54.7% of the diabetics practised a good diabetes care. Overall, 73.4% had good awareness on diabetic complications. No association was found between level of knowledge of patients with attitude and practice. The only significant association was found among diabetics aged 51 and above, who were more aware about diabetic complication as compared to the younger age group.

The prevalence of known diabetes (34.2%) is 3 times higher than the national average of 9.4% [2]. The prevalence of diabetes (total) will be much higher if the blood tests were conducted with participants who were currently non-diabetic. In NHMS 2019, the undiagnosed cases comprised of 8.9% of the population [2]. The high prevalence in this area probably due to the population demographic structure, sedentary lifestyles, and survivorship of the patients. Most of rural villages in Malaysia are inhabited by pensioners and old people, hence the non-communicable diseases are also high, including diabetes. Furthermore, with better treatments and health facilities, they live longer. Similar findings are also found in many rural areas in Malaysia and worldwide. In Malaysia, the prevalence of diabetes is approximately 17 percent higher in rural areas than urban areas [6]. In the USA, the crude prevalence rates of diabetes were 8.6% and higher among respondents living in rural areas compared with urban areas. The higher prevalence in rural areas were found to be significantly associated with many common risk factors including poverty, obesity, physical inactivity, poor diet, older age (age 45 and older), family history of diabetes and ethnicity [7][8].

Our study found that only 59.4% had good knowledge of diabetes. Despite the advances in communication technology such as the internet, smart phones and social media, the health knowledge seems not a priority in rural areas. This finding is similar to the findings from a study in Penang in which 58.2% were considered to have average and good knowledge about diabetes [9]. Malaysian Diabetes Index (MDI) study indicated that many Malaysians do not fully understand diabetes and its resultant health complications [10]. MDI study also found that more than half (52%) of respondents in the survey revealed that they do not know that diabetes cannot be cured, 51% think that diabetes is not difficult to manage and 37% with diabetes do not know what the abnormal blood sugar level readings are. The hospital-based study in the Rawal Institute of Health Sciences Islamabad using Michigan Diabetes Knowledge Test (MDKT) showed that 41.5% of diabetes patients had poor knowledge of diabetes which is comparable to a present study. However, in this study the poor knowledge significantly associated with the non-adherence to medical treatment, which is not found in the present study [11].

In terms of attitude towards diabetes control, most of patients have believe that they will be treatedt when they sustain a foot an injury on their feet and that regular exercise could help them to improve their diabetes control. However, some beliefs were negative and might harm them physically, such as taking a double dose of drugs when they missed it earlier (51.6%) and diabetes drugs (metformin) might cause kidney damage (23%), hence not taking it as prescribed. About 80% of patients occasionally miss a dose of their medication, so preemptive advice should be given at the time of prescribing and dispensing to improve patient compliance. It is a practise that if the patient forgets to take one or more doses, the next dose should be taken at the normal time and in the normal dose as prescribed [12][13]. The high percentage of diabetes patients in this study who believed they should take double doses when they missed a medication may endanger them if they practised it on a regular basis. The misconception that metformin might cause kidney damage leads to a poor compliance with this drug by patients. Metformin has been shown to not only help lower blood sugar in people with diabetes, but it also lowers the rate of death due to cardiovascular disease and helps people with diabetes lose excess weight and delay the aging process [14]. Severe side effects like lactic acidosis is very rare [14]. The misconception is probably rooted from random observations, family influence, and a strong connection with traditional practises [15].

A concerning belief in the society discovered in the study was the belief that traditional herbs were superior to modern medicine for treating diabetes (42.2% with 29.7% had strongly believing) as

compared to a modern medicine. A study in Tanzania has shown that 67.2% of patients who attended the diabetes care medical center reported using traditional medicines to manage their diabetes, including 58.6% who reported using both conventional medicines and traditional medicines. Some participants believed that combining conventional and traditional medicines improved the effectiveness of treatment. Traditional medicines were a choice of treatment in this population due to the high cost of conventional treatment and the easy availability and accessibility of traditional medicines [16]. In the current study, more than half (51.6%) also had a negative belief that there was nothing much they could do to stop the complication of diabetes. This belief may discouraged diabetes patients from seeking the preventive strategies to delay the occurrence of diabetes complications, especially the cardiovascular disease that may be fatal [17]. Overall, after scoring, 51.6% of the diabetic patients were considered to have a poor attitude towards their diabetic care. A study among diabetic patients in Ethiopia showed that two-thirds of the study participants (65.2%) had a good attitude level toward diabetic care however, less than half (48.8%) had a good practise on diabetes complications [18]. The difference in attitude level is probably due to the different sources of patients used for the study. The current study was using patients from the community, whilst the study in Ethiopia was using hospital-based patients.

Although most of diabetics checking their blood glucose levels on a regularly basis, attending a follow-up clinic every 6 months and complying with their diabetic medications, the lifestyle modification such as exercise and dietary control were still lacking. Dietary habits and sedentary lifestyle are the two major factors associated with a rapidly rising incidence of diabetes mellitus among the population in developing countries [19]. In type 2 diabetics, elevated HbA1c levels have been found strongly linked with the development of microvascular and macrovascular complications. It was also found also that improvement in the HbA1c level can be achieved through dietary management [20]. Awareness about diabetes complications and consequent improvement in dietary knowledge, attitude, and practises lead to better control of the disease. In the current study, only 43.8% of diabetic patients exercised once a week and 31.3% did not exercise at all. The overall score in practise was 54.7%. This finding is like previous studies where dietary practises and physical exercise recommendations were inadequately practised [19][20][21].

The study also discovered that the level of diabetes knowledge on did not significantly influence the attitude ($p=0.135$) and practise in diabetes care ($p=0.856$). Contrary to Rosenstock's Health Belief Model (1974), in which people's health beliefs depend upon their perception of susceptibility to disease. [22] (Arnold & Gorin, 1998). The level of knowledge also seemed to not influence the practise on diabetes care. This finding has also been observed in other populations. elsewhere [23][24]. It is possible that the intervention program set up in the community was ineffective in motivating diabetic patients to take positive measures to prevent the complications of the disease.

Most of the respondents were aware of the complications of diabetes (more than 80%) such as kidney diseases, vision disturbances, cardiovascular diseases, and delayed wound healing. After scoring, 73.4% of patients had good awareness of the complications of diabetes. MDI survey also found that more than 80% of respondent were aware of the complications such as leg amputation (95%), eye damage (93%), kidney damage (90%), and nerve damage (84%). However, only 75% of respondents were aware of the cardiovascular complications [10]. In this study, respondents aged 31-40 years and more than 51 years old had the highest awareness on diabetes (74.5%) compared to other age groups ($p=0.033$). Young people probably learned about the issues

from social media and educational institutions, whilst older people tend to know and be aware of the complications as they may already have the complications or seek advice from doctors. Gender and marital status did not influence the knowledge, practice, attitude, and awareness of complications of diabetes in this study. The finding is different from a study in Brazil that showed women had better knowledge regarding types of DM, normal blood glucose values, and the consequences of hyperglycemia [25]. A review on gender differences in care of diabetes also showed the existence of the differences. It was found that male diabetics were more adaptive and had a better attitude towards diabetes care as compared to females. It was proposed that targeted education for female diabetics is crucial because women have heavy responsibilities such as taking care of the family and doing housework which make it difficult for them to follow their own medication, exercise, care for their feet, check blood sugar and eating schedules [26]. The inconsistent findings were probably due to the small sample size and the design of the present study.

There were several limitations faced while carrying out this survey. Data collection was done through a self-administered questionnaire, which might have resulted in misinterpretation of some questions. Due to the limited number of respondents, the results of the study may be generalised to the population in this area but not to other population elsewhere. Future studies should include a much bigger sample, wider areas, different ethnic groups, and socioeconomic strata.

Conclusion

The study showed that the prevalence of known diabetes in this area was 3 times higher than the national average and affected mostly the senior population. Only about 60% of the adult population here has a good knowledge of diabetes. The knowledge, attitude, and practise on diabetes care among diabetics here were comparatively low. More efforts on education and behaviour modification by the health authorities, as well as community empowerment, should be mobilised to combat this pandemic in this area. More detailed KAP study involving a much wider area and population should be conducted to address the issue.

Table 1. Responses on knowledge questions among the sample population (n=187)

no	Knowledge on diabetes	Correct response		Incorrect response	
		No	%	no	%
1	Diabetes is a disease where your body produce a low amount of insulin, causing blood sugar level to increase.	173	92.5	14	7.5
2	Diabetes can be detected by using blood test	182	97.3	5	2.7
3	Increase frequency to urinate at night is one of the symptoms of diabetes	157	84.0	30	16.0
4	Often feeling thirsty is one of the symptoms of diabetes	156	83.4	31	16.6
5	Always feeling hungry is one of the symptoms of diabetes	121`	64.7	66	35.3
6	Low body weight is one of the symptoms of diabetes	134	71.7	53	28.3
7	Wound that takes longer to heal is one of the symptoms of diabetes	182	97.3	5	2.7
8	Obesity is one of the risk factors for diabetes	174	93.0	13	7.0
9	Urine test can be done to detect diabetes	126	67.4	61	32.6
10	Diabetic person has to practice low carbohydrate diet including sugar, fat and processed food	178	95.2	9	4.8

Table 2. Attitude towards diabetes control among diabetes patients (n=64)

no	Attitude towards diabetes control	Strongly disagree	disagree	neutral	agree	Strongly agree
		%	%	%	%	%
1	You will get a treatment at the clinic when you accidentally stepped on a nail and bled.	1.6	1.6	17.2	17.2	62.5
2*	If you forget to take your medications today, you will take them in double amount the next day	14.1	31.3	3.1	18.8	32.8
3	You believed that exercises could help to improve your diabetes	0	6.3	10.9	31.3	51.6
4*	Taking medications for diabetes (metformin) in long-term may causing kidney damage	20.3	14.1	42.2	12.5	10.9
5*	The uses of traditional herbs are better for treating diabetes rather than the medications prescribed by a doctor	14.1	17.2	26.6	12.5	29.7
6	When you feel numbness in your hands or legs, you will become worried and be more careful in taking your diet	1.6	9.4	10.9	28.1	50.0
7	You believed that the complications of diabetes will still going to affect you despite taking treatment.	18.8	10.9	18.8	12.5	39.1
8	You believed that your condition is critical when your vision is blurred.	1.6	10.9	12.5	20.3	54.7

* Reverse score: Strongly Disagree = 5; Disagree = 4; Neutral = 3; Agree = 2; Strongly Agree =1

Table 3. Practice of controlling diabetes (n=64)

no	Questions on practice of controlling diabetes	response	%
1	Do you check your blood glucose level regularly?	Yes	81.2
		No	18.8
2	Do you have follow-up treatments at nearby clinic done every 6 months?	Yes	95.3
		No	4.7
3	Do you comply taking medicines for diabetes?	Yes	92.2
		No	7.8
4	How often do you forget to take your diabetic medications?	4-5 times/week	3.1
		2-3 times/week	10.9
		once a week	62.5
		never missed	23.4
5	Do you comply to words and advises from your doctor	Yes	95.3
		No	4.7
6	Do you control your sugar intake in your food and beverages?	Yes	87.5
		No	12.5
7	Do you control your carbohydrate intake such as rice, noodle, flour, or others in your diet?	Yes	78.1
		No	21.9
8	How often do you exercise?	None	31.3
		Once a week	43.8
		3 times/week	25.0

*For each question 1-3 and 5-7, ‘yes’ response will be scored 1 and ‘no’ response as 0. For question 4, scores were between 0-4 and question 8 scores were between 0-3.

Table 4. Awareness towards diabetic complications among diabetic patients

no	Awareness towards diabetes complication	response	%
1	Diabetes can cause kidney diseases	Yes	90.6
		No	9.4
2	Diabetes can cause vision disturbances such as blurry of vision, cataract, and blindness	Yes	96.9
		No	3.1
3	Diabetes could not increase the risk of having heart disease	Yes	81.2
		No	18.8
4	Diabetes can cause neuropathic disease	Yes	84.4
		No	15.6
5	Diabetes will not weaken the body immune system	Yes	46.9
		No	53.1
6	Diabetes can cause longer time for wound healing	Yes	93.8
		No	6.3

Table 5. Association between sociodemographic variables of diabetes patients with knowledge, attitude, practice, and complication awareness towards diabetes care.

Sociodemographic factors	category	n	Knowledge on diabetes		Attitude towards control		Practice towards control		Awareness on complication	
			% poor	p	% poor	p	% poor	p	% poor	p
Age (years)	18-30	1	43.2	0.253	100	0.170	100	0.575	100	*0.033
	31-40	6	50.0		50.0		50.0		0.0	
	41-50	12	50.0		25.0		33.3		50.0	
	>51	45	24.0		57.8		46.7		22.2	
			40.9							
Gender	Male	31	39.8	0.235	41.9	0.135	48.4	0.067	19.4	0.10
	Female	33	35.5		60.6		42.4		33.3	
Marital status	Married	50	41.4	0.362	48.0	0.056	25.0	0.356	26.0	0.413
	Divorced/ Widower	10								
	Single	4	29.4		0.0		11.8		17.6	
			42.9		25.0		50.0		25.0	

*P<0.05 is significant

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