The study of the perception of diabetes mellitus among the people of Petaling Jaya in Malaysia

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Abstract---Diabetes mellitus is a worldwide medical problem with lack of knowledge, high costs, and maximum cause of mortality. The assessment of knowledge is very important about diabetes mellitus and its causes, symptoms, complications, risk factors among the general population in Petaling Jaya due to gradual increase in diabetes and its complications among patients. Therefore, this study was conducted to analyze the perception of diabetes mellitus among the people residing in Petaling Jaya, Selangor, Malaysia. This is descriptive cross-sectional study which included 400 samples of various ages, sexes, ethnicities, income levels, education levels and family history of diabetic patients from ten policlinics in Petaling Jaya, Malaysia. A validated questionnaire with five elements was used for this study. The collected data from the respective respondents were analyzed through SPSS software. SPSS has been used to analyse the demographic profile of the respondents, as well as perform exploratory factor analysis and multiple regression analysis. The study's findings

indicated that general knowledge of diabetes mellitus, knowledge of risk factors of diabetes, knowledge of symptom of diabetes mellitus, knowledge of complications of diabetes mellitus are factors that significantly affect perception of diabetes mellitus among the people residing in Petaling Jaya, Selangor, Malaysia.

Introduction

Diabetes mellitus (DM) is best defined as a syndrome characterized by inappropriate fasting or postprandial hyperglycaemia, caused by absolute or relative insulin deficiency and its metabolic consequences, which include disturbed metabolism of protein and fat. Diabetes mellitus occurs when the usual constant of the merchandise of insulin secretion times insulin sensitivity, a parabolic function is insufficient to stop hyperglycaemia and its clinical consequences of polyuria, polydipsia and weight loss. By simultaneously considering insulin secretion and insulin action in any given individual, it becomes possible to account for the natural history of diabetes in that person (Ang *et al,* 2018, Mahmud *et al,* 2018)

The first type of diabetes mellitus (insulin-dependent) is an auto immune condition in which immune system is activated to destroy the cells of pancreas, that produce insulin. There is no cure for this, and it cannot be avoided. Thirst and urination are common symptoms, as are unexpected weight loss, weakness and exhaustion. Type-1 Diabetes Mellitus is more common in adults under the age of 30. The blood glucose test should be repeated numerous times during the day in this scenario. Because it usually starts in childhood, it's also known as Juvenile Diabetes Mellitus (JDM) (Chiang *et al.*2018).

Insulin-free diabetes mellitus (the second type) is generally occur when the body does not produce enough insulin. People are mostly affected after the age of 45. On the other side, Type-2 diabetes mellitus is caused by excess weight, family history, gestational diabetes, and polycystic ovarian syndrome. It's marked by high fasting and postprandial blood glucose levels, as well as Glycated Hemoglobin. Multiple factors, including genetic predisposition, contribute to the body's failure to adequately manage blood glucose levels (Patricia & Annette*,* 2019 Awodele, & Osuolale, 2015).

A fasting diet combined with regular exercise could considerably reduce the risk of death in diabetic patients. These ideas are still used today by doctors and diabetic educators when teaching their patients about lifestyle changes for the management of diabetes. (Cani *et al*, 2015, Patrik & Loreny, 2019).

Diabetes is a major public health concern in Malaysia, and thus the prevalence of type 2 diabetes (T2D) affecting individuals has escalated to 20.8% in adults which is around 2.8 million above the age of 30. The burden of managing diabetes falls on primary and tertiary health care providers operating in various settings

(Hussein *et al*, 2015). Most Type-2 DM patients don't have any symptoms until they experience a heart attack or renal failure. This quotation informed us about the unawareness of Malaysians with diabetes mellitus (Mustafa *et al.*, 2017, MOH 2020).

The diabetic disease is a chronic illness that requires continuous care either by the patient's or patient's heirs. Diabetic care in patients with diabetes mellitus is essential to avoid complications for patients such as hypoglycaemia, diabetic foot ulcers, and kidney failure (Balasubramaniam *et al.*, 2019). However, many patients do not practice proper and proper care. This is a problem in Petaling Jaya where the level of diabetic care knowledge among the patients is low. After all, the increase in diabetic mellitus is very alarming. Hence, a study was conducted in Petaling Jaya, which had a problem with the improvement of diabetes mellitus but had a low level of knowledge on diabetic care. Therefore, the aim of the study was to investigate the perception of diabetes mellitus among the general population of Petaling Jaya, Malaysia.

Methods
Study Design

This current research used cross sectional study with convenience sampling method design. Cross sectional epidemiological studies are commonly conducted to seek out the prevalence and also to some extent, association of things with the health included   problem. (Saleh, et al 2014). This study used a questionnaire to obtain data and information.

Sample Size

When selecting a survey method as a research strategy, selection of population should be done properly. For this study, 400 people with diabetes and non-diabetes from ten policlinics of Petaling Jaya were included as samples. The rule for selection of sample size must be in the range of 30 to 500 (Hair *et al.*2010).

Inclusion and exclusion criteria

Participants with diabetes mellitus and without diabetes mellitus were included in this study. Both local and foreigner aged 30 and above, who can speak in English were included in this study. People who felt discomfort and were unable to talk were excluded from this study.

Study survey instrument

A self-prepared structured questionnaire was distributed to the 400 participants for the purpose of data collection. The author had given permission and agreement to use this questionnaire. This questionnaire consists of 5 sections, namely, a) demographics, b) general knowledge of diabetes mellitus disease, c) knowledge of risk factors of diabetes disease, d) complications of diabetes mellitus disease and e) symptoms of diabetes diseases. The questionnaires were accompanied by a cover letter which explained the purpose of the study. The

questionnaire was consisting of 6 questions. The researcher taken verbal and written consent before starting his survey. A total of 30 questions have been administered in sections which were answered by the participants.

Data collection

This cross-sectional study was carried out in ten policlinics of Petaling Jaya, among diabetes and non-diabetes people between the ages of 30 to 59. The participants spent about 10-20 minutes to complete the questionnaire in its entirety. The participants signed a consent form that included information about the study's purpose, significance, and process.

Data Analysis

All statistical analyses were performed using SPSS (version 25). A frequency analysis has been conducted to analyse the demographic characteristics of the respondents as well as their general survey. Reliability analysis was conducted to determine the consistence of the data. the validity test was conducted by using Exploratory Factor Analysis (EFA). The purpose of performing EFA is to validate the appropriateness of the measurable items, namely the dependent and independent variables used in the study. Multiple regression analysis was conducted for the purpose of measuring the proximity of the relationships among variables.

Results

Reliability test was conducted towards all the retained items that made up the dependent and independent variables by using Cronbach's alpha which is the most common measure of internal consistency. Cronbach's alpha value 0.893 is presented in Table 1. The result of survey is acceptable. As, stated by Keith (2017), the Cronbach's Alpha value in between 0.6 to 0.7 is considered acceptable.

Table 1
Reliability Statistics

Cronbach's Alpha	N of Items
.893	30

The result of the respondent's demographic profiles is as per listed in Table 2. Out of 400 respondents involved in this research, majority around 61.8% (n=249) were male and 37.5% (n= 151) were female. Frequencies of the participants were 18.9%, 59.8%, 20.8%, for the age between 30-39, 40-49, 50-59 years respectively. According to the ethnicity, 45.4% (n=182) were Malay, 28.7 % (n=115) were Chinese, 12.3 % (n=49) were Indian and 13.2% (n=53) were other nationality. The level of education of the participants were 25.3% (n=102) Primary educated, 58.5 % (n=236) were secondary educated and 15.4% (n=62) were graduate. Among them, 39.2% (n= 158) of the participants' income was below RM 801-4000, 52.9% (n=213) participants' income was between 4,000 to 10,000 and 7.2% (n=29) participants' income was above 10,000. Additionally, 32.5% (n=131) of the

participants had a family history of diabetes and 66.7% (n=269) had no history of diabetes.

Table2
Demographic characteristics of the total participants (n=400)

Characteristics	Frequency	Percent
Gender,		
Male	249	61.8
Female	151	37.5
Diabetes	145	36.0
Non-diabetes patients	255	63.3
Age		
30-39	76	18.9
40-49	241	59.8
50-59	83	20.8
Ethnicity		
Malaysian	182	45.4
Chinese	115	28.7
Indian	49	12.3
other nationality	53	13.2
Education		
Primary	102	25.3
Secondary	236	58.5
Graduate	62	15.4
Income		
801- 4000 RM	158	39.2
4,000 to 10,000 RM	213	52.9
Above 10.000 RM	29	7.2
History of diabetes in family		
Yes	131	32.5
No	269	66.7

KMO assess the adequacy of sampling, it is suggested that KMO range from 0 to 1(Hair et al.2010). However, the results of KMO 0.880 which is considered suitable for conducting the EFA. As for Bartlett's Test of Sphericity, it provides a significant chi-square output at $p < 0.5$ for EFA to be suitably conducted. It also indicates that the matrix is not an identity matrix. The result of KMO and Bartlett's Test of Sphericity for this study is illustrated in Table 3.

Table 3
KMO and Bartlett's test of sampling adequacy

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.880
Bartlett's Test of Sphericity	Approx. Chi-Square	835.743
	Df	351
	Sig.	.000

Upon factor analysis performed, all the items were rearranged into 4 factors and items with factor loadings value below 0.4 were withdrawn from further analysis

Table 4
Rotated Component Matrix

	Component			
	1	2	3	4
Hereditary	.817			
Obesity	.741			
Nerve problem	.722			
Dry skin	.614			
Loss of sensation in arms and legs.	.712			
Pregnancy	.612			
Alcohol history	.602			
Kidney disease	.639			
Insulin is required in some DM patient	.736			
Infertility		.824		
Diabetic foot and fungal infection		.655		
Frequent micturition		.638		
Constant feeling of thrust		.652		
Anxiety		.729		
Family history of DM				
Eye problem			.854	
DM is not curable			.744	
High blood pressure			.764	
Insulin controls the blood sugar			.606	
Blurred vision				
DM is a chronic life-long condition				
Pre DM blood sugar 5.5- 6.9 mmol/L				.720
FBS 5.5-7 mmol/L & RBS 8-9.5 mmol/L				.743
Slow healing of wounds				.613
Weight loss				.712
Smoking history				.683
DM is a metabolic disease				.551

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Regression analysis

Regression analysis is another method commonly used in researches for the purpose of examining a linear relationship between variables. The regression equation is an equation that express the linear relationship between a dependent variable and one or more independent variables.

The variables include all the four independent variables against the dependent variable. The (R) correlation of the four independent variables which are general knowledge of diabetes mellitus, knowledge of risk factors of diabetes mellitus, knowledge of symptom of diabetes, knowledge of complications of diabetes mellitus that influence the dependent variable which is Perception of Diabetes Mellitus at R =.771. After the inter-correlation, R-Square is generated at R^2. = .722. The adjusted R^2 is 0.614. This result shows that 72.2% of the variance in the dependent variables is predictable from the independent variables. The amount of the six variables can endure explaining 72.2% of the variance.

Table 5
Model summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.771	.722	.614	.22327

Predictors: (Constant), Knowledge of DM 4 for analysis 1, Knowledge of RF 3 for analysis 1, Knowledge of CM   2 for analysis 1, Knowledge of SMT   1 for analysis 1

Regression analysis of ANOVA

ANOVA is another statistical technique to study the difference between two or more variables. The Statistic F Test is applied to test the equality of the variance to two and more variables. Based on Table 4, the F calculated value of 28.228 is significant at the 0.000 level which states the linear relationship between the dependent and independent variables. This means that Perception of Diabetes Mellitus is significantly represented by the four independent variables.

Table 6
ANOVA statistics

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	22.186	4	5.546	28.228	.000[b]
	Residual	77.612	395	.196		
	Total	99.798	399			

a. Dependent Variable: Perception of Diabetes Mellitus
b. Predictors: (Constant), Knowledge of DM 4 for analysis 1, Knowledge of RF 3 for analysis 1, Knowledge of CM   2 for analysis 1, Knowledge of SMT   1 for analysis 1

Regression analysis of coefficient

The result of regression is an equation that indicates the best prediction of a dependent variable from different independent variables. Regression analysis is used when independent variables are correlated with one another as well as with the dependent variables. The independent variables were general knowledge of diabetes mellitus, knowledge of risk factors of diabetes mellitus, knowledge of symptoms of diabetes and knowledge of complications of diabetes mellitus among general people in Petaling Jaya. In order to achieve the research objective, multiple regression method was used to test and to find out the relationship between the four independents variable. The overall model and the regression equation formula for this research are as per below:

$$Y = a + b1\ X1 + b2\ X2 + b3\ X3 + b4\ X4 + b4Xn\ldots\ldots$$

Table 7
Regression coefficient analysis

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	1.478	.022		66.664	.000
	Knowledge of Symptoms	.019	.022	-.038	-.855	.393
	Knowledge of Complications	.054	.022	-.107	-2.423	.006
	Knowledge of Risk Factors	.056	.022	.112	2.533	.012
	General Knowledge of DM	.222	.022	.443	9.995	.000

a. Dependent Variable: Perception of Diabetes Mellitus
Based on Table, the following regression equation can be formed.
Y= 1.478 + .019 (Knowledge of Symptoms) + .054 (Knowledge of Complications) + .056 (Knowledge of Risk Factors) + .222 (General Knowledge of DM).

All of the independent variables had significant p-value < 0.05. Hence, general knowledge of diabetes mellitus, knowledge of risk factors of diabetes, knowledge of symptom of diabetes mellitus, knowledge of complications of diabetes mellitus are factors that significantly affect Perception of Diabetes Mellitus at α = 0.05. There is a direct and positive relationship between these 4 variables. All the 4 variables are considered as significant predictors for Perception of Diabetes Mellitus.

Discussion

The study explored the knowledge of Diabetes Mellitus among the population of Petaling Jaya, Malaysia. The result shows there was a statistically difference in the mean knowledge of respondents with different age groups and ethnic origins. Around 400 questionnaires have been distributed to 10 policlinics in the Petaling Jaya. Based on the results on Table 2, it shows around 61.8 % of the respondents were male and 37.5% female. More male participants contributed in survey and gave their valuable answers for this survey.

Around 58.5 % of the respondents were secondary educated and 25.3% were primary educated people. Hence, majority of the respondents in this survey were well educated who can make decisions in terms of the diabetes mellitus. The foundation for evaluating one's ideas is education. Higher education standards ensure that people understand and respond to issues. The majority of the respondents in this study had the highest education under the secondary certificate. According to Hussein et al, (2015) stated that, Diabetes Mellitus affects over 1.2 million Malaysians today. Unfortunately, more than half of them are completely unaware that they have the disease.

Referring to Table 2, it shows that 18.9% of the participants were between the age of 30 to 39 years and 59.8% participants were between 40 to 49 years old. It can be concluded that there are still people who are unaware of the nature of diabetes mellitus. This is due to the lack of exposure to people with diabetes mellitus. Through knowledge of diabetes mellitus, the individual can avoid the risks and causes that may lead to diabetes mellitus before they occur. According to Zimmet *et. al* (2010), Wright & Bell (2013) indicated that, many factors such as genetic, social and environmental factors have been associated with the disease. These environmental factors include physical activity, drugs and toxic agents, obesity, viral infections and location. Environmental factors are believed to be influenced by genetic factors leading to Diabetes Mellitus. there are many other adverse effects of diabetes mellitus. Patrik & Loreny (2019), MOH (2020) stated that, Diabetes mellitus causes many complications, not only are people with diabetes twice as likely to develop heart disease, but they are also more likely to develop the disease at a younger age than those without diabetes. Symptoms of heart disease are often undetectable for diabetic patients, causing delays in diagnosing heart attacks and getting treatment early. Cholesterol plaque is a common cause, especially among diabetic patients with dyslipidaemia (abnormal amounts of fat or cholesterol in the blood), which causes clogged arteries that eventually lead to heart attacks or stroke.

In collecting data from the questionnaire form distributed, respondents were selected based on the research objective of choosing the population from ten policlinics of Petaling   Jaya. As a result of the selection, the results of the study were varied in terms of age, gender, race, educational level and socio-economic status. Although diabetes mellitus is a non-communicable disease, it is one of the health problems known as silent or silent killer stated by Mustafa *et al.*, (2017) Choudhury *et al* (2014). Therefore, this study was conducted on various ages, genders, races, educational levels and socioeconomic status as can be seen in the findings on Table 2.

Diabetic diet is one of the health education for diabetes mellitus which can be proved by the results of the study where 131 respondents of which 32.5% said yes, while only 269 respondents together 66.7% saying no. According to Hussein *et al,* (2015) suggested that a high level of knowledge can influence the health of an individual through the control and prevention gained from the knowledge demanded, as well as minimise the number of diabetes mellitus patients in Malaysia.

Besides that, there are still certain societies today that are unaware that diabetes mellitus can be fatal. In addition, there are many other adverse effects of diabetes mellitus. According to Ting (2019) and MOH (2020) stated that, Diabetes mellitus generates various problems that are bad, not only are persons with diabetes twice as likely to have heart disease, but they are also more likely to develop the condition at a younger age, Diabetic patients, symptoms of heart disease are frequently undetectable, causing delays in diagnosing heart attacks and receiving timely treatment. The most prevalent cause of a clogged artery in diabetic individuals with dyslipidaemia (total fats or aberrant cholesterol in the blood), which leads to a heart attack or stroke, is an abruptly ruptured cholesterol plaque.

The findings of this research have significant implications for Malaysian clinicians, healthcare workers, and policy makers. There are significant knowledge gaps on diabetes mellitus in our population, more so among those with lower socioeconomic group and those at-risk of developing diabetes mellitus such as individuals with Chronic kidney disease and/or hypertension. Hence, there is a need for a more targeted approach to increase the knowledge on diabetes among the at-risk group and those significantly associated with lower levels of diabetes knowledge.

Conclusion

In conclusion, this study from a representative sample in Petaling Jaya shows that people in Petaling Jaya have minimal understanding of diabetes. Diabetes education initiatives have the potential to make a significant difference in diabetes management. As we work to establish solutions to solve problems that often enhance people's lives, this gives us hope that health education can be an effective weapon. The most significant aspect in the prevention of diabetes is knowledge, but knowledge alone is insufficient; suitable lifestyle modifications and risk factor corrections are also critical The findings of this research revealed that the respondents' level of diabetes knowledge was fairly excellent. The majority of those polled believed diabetes could be cured, were unaware that problems may lead to diabetes, and were unaware that weight loss was an indication of diabetes. As a result, many measures should be made to further improve these specific deficient responses. In general, respondents had a good understanding of basic diabetes information.

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