UNIVERSITI PUTRA MALAYSIA

FACTORS ASSOCIATED WITH ADEQUATE HEALTH LITERACY AMONG TYPE 2 DIABETES MELLITUS PATIENTS ATTENDING RURAL GOVERNMENT HEALTH CLINICS IN KUALA SELANGOR, MALAYSIA

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FPSK(m) 2019 26

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Thesis Submitted to the School of Graduate Studies, Universiti Putra Malaysia, in Fulfillment of the Requirements for the Degree of Master of Science

September 2018

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Abstract of thesis presented to the Senate of Universiti Putra Malaysia in fulfilment of the requirement for the degree of Master of Science

FACTORS ASSOCIATED WITH ADEQUATE HEALTH LITERACY AMONG TYPE 2 DIABETES MELLITUS PATIENTS ATTENDING RURAL GOVERNMENT HEALTH CLINICS IN KUALA SELANGOR, MALAYSIA

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September 2018

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Introduction: Diabetic patients with adequate health literacy are known to have better control of the disease. However, the level of health literacy and the determinants associated with it among rural populations is still questionable in Malaysia. The study aims to determine the level of health literacy with regards to Type 2 Diabetes Mellitus (T2DM) and the factors associated to it among patients attending rural government health clinics in the district of Kuala Selangor.

Objectives: To determine the factors associated with the level of health literacy among T2DM patients attending Tanjung Karang and Sungai Tengi Kanan rural government health clinics in the district of Kuala Selangor

Methodology: A cross-sectional study using a self-administered questionnaire was conducted with a total of 223 respondents with T2DM. The respondents were selected using systematic random sampling. A validated questionnaire was used and it consisted of socio-demographic, current medical history of T2DM, Michigan Diabetes Knowledge Test (MDKT), MY-TOFHLA, adherence to treatment, Summary of Diabetic Self Care Activity (SDSCA), Diabetic Quality of Life (DQoL), and International Physical Activity Questionnaire (IPAQ). IBM Statistical Package for Social Science (SPSS) Version 23.0 was used to analyse all collected data. The descriptive results were presented as median and interquartile (IQR) and frequency (%). Chi-square test was used to analyse the relationships between dependent and independent variables. For continuous covariates, simple logistic regression was used to determine the relationship with the dependent variable. The predictors were then analysed using multiple logistic regression.

Results: The response rate was 86.9%. A total of 85% of the respondents had adequate health literacy. Level Of Education, Household Income, Diabetes Duration, Diabetes Knowledge, SDSCA Exercise, Blood Glucose Testing and Foot Care, and all DQOL domains were significantly associated with the level of health literacy (p <0.05). The odds of having adequate HL is higher among those with Secondary/Tertiary Education [AOR = 5.990, 95% CI (1.301, 22.577), p = 0.022] and household income RM1000 and above [AOR = 4.836, 95% CI (1.152, 20.306), p = 0.031]. The odds of having better exercise score in SDSCA increased by 1.6 times with the increase in 0.5 level of adequate HL [AOR = 1.459, 95% CI (1.101, 2.472), p = 0.015]. Patients are more likely to have increased in score of foot care in SDSCA by 1.4 times with the increase in 0.3 level of adequate HL [AOR = 1.424, 95% CI (1.070, 1.894), p = 0.015].

Conclusion: The prevalence of adequate HL was high among the T2DM patients attending Tanjung Karang and Sungai Tengi Kanan rural government health clinics in the district of Kuala Selangor have adequate HL. The predictors of adequate health literacy are Level Of Education, Household Income and Summary of Diabetic Self Care Activity (SDSCA).

Keywords: Health literacy, factors associated, type 2 diabetes mellitus, rural

Abstrak tesis yang dikemukakan kepada Senat Universiti Putra Malaysia sebagai memenuhi keperluan untuk ijazah Master Sains

FAKTOR - FAKTOR YANG MEMPENGARUHI LITERASI KESIHATAN DI KALANGAN PESAKIT DIABETES MELLITUS JENIS DUA YANG MENGHADIRI KLINIK KESIHATAN KERAJAAN DI KAWASAN LUAR BADAN DI KUALA SELANGOR, MALAYSIA

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Pengenalan: Pesakit kencing manis dengan literasi kesihatan yang memuaskan diketahui mempunyai kawalan kesihatan yang lebih baik. Walau bagaimanapun, tahap literasi kesihatan dan faktor yang mempengaruhinya di kalangan populasi luar bandara masih dipersoal di Malaysia. Kajian ini bertujuan untuk mengetahui tahap kesihatan yang berkaitan dengan Diabetes Mellitus Jenis Dua (DMJ2) dan faktor-faktor yang mempengaruhinya di kalangan pesakit yang menghadiri klinik keshiatan kerajaan di kawasan luar bandar di daerah Kuala Selangor.

Tujuan: Untuk mengetahui faktor-faktor yang mempengaruhi tahap literai kesihatan di kalangan pesakit Diabetes Mellitus Jenis Dua (DMJ2) yang menghadiri klinik kesihatan kerajaan di Tanjung Karang dan Sungai Tengi Kanan di daerah Kuala Selangor.

Kaedah kajian: Satu kajian keratan rentas menggunakan borang soal selidik yang ditadbir sendiri telah dijalankan ke atas 223 responden Diabetes Mellitus Jenis Dua (DMJ2). Responden telah dipilih secara rawak sistematik. Borang soal selidik yang disahkan telah digunakan dan ia terdiri daripada sosio-demografi, Sejarah Pesakit Diabetes, Pengetahuan Tentang Diabetes (MDKT), Literasi Kesihatan (MY-TOFHLA), Pematuhan Rawatan, Aktiviti Penjagaan Diri Pesakit Diabetes (SDSCA), Ukuran Kualiti Hidup Pesakit Diabetes (DQOL) dan Soal Selidik Aktiviti Fizikal Antarabangsa (IPAQ). Pakej Statistik untuk Sains Sosial IBM (SPSS) Versi 23.0 telah digunakan untuk menganalisis semua data yang dikumpul. Keputusan deskriptif telah dibentangkan sebagai median dan antara kuartil (IQR) dan kekerapan (%). Ujian Chi-Square telah digunakan untuk menganalisis hubungan antara pembolehubah. Untuk

kovariats yang berterusan, regresi logistik ringkas digunakan untuk menentukan hubungan dengan pembolehubah. Faktor peramal kemudiannya dianalisis mengunakan regresi logistic berganda.

Hasil kajian: Kadar tindak balas adalah 86.9%. Seramai 85% daripada responden mempunyai literasi kesihatan yang memuaskan. Tahap Pendidikan, Pendapatan Isi Rumah, Tempoh Diabetes, Pengetahuan Tentang Diabetes, SDSCA Senaman, Ujian Glukosa Darah dan Penjagaan Kaki, dan semua domain DQOL mempunyai pengaruh terhadap tahap literasi kesihatan ($p < 0.05$). Kebarangkalian mempunyai tahap literasi yang memuaskan adalah lebih tinggi di kalangan mereka yang berpendidikan Menengah/Tinggi [NOT = 5.990, 95% SK (1.301, 22.577), $p = 0.022$] dan mereka yang mempunyai pendapatan isi rumah RM1000 dan ke atas [NOT = 4,836, 95% SK (1.152, 20.306), $p = 0.031$]. Kemungkinan mempunyai skor senaman yang lebih baik dalam SDSCA meningkat sebanyak 1.6 kali dengan peningkatan dalam tahap literasi kesihatan memuaskan sebanyak 0.5 [NOT = 1.459, 95% SK (1.101, 2.472), $p = 0.015$]. Pesakit lebih cenderung untuk mendapat skor penjagaan kaki yang baik di SDSCA sebanyak 1.4 kali dengan peningkatan dalam tahap literasi kesihatan memuaskan sebanyak 0.3 [NOT = 1.424, 95% SK (1.070, 1.894), $p = 0.015$].

Konklusi: Prevalens pesakit yang mempunyai tahap literasi kesihatan yang memuaskan adalah tinggi di kalangan pesakit yang menghadiri klinik kesihatan kerajaan di kawasan luar bandar Tanjung Karang dan Sungai Tengi Kanan di daerah Kuala Selangor. Peramal bagi tahap literasi kesihatan yang mencukupi adalah Tahap Pendidikan, Pendapatan Isi Rumah, Aktiviti Penjagaan Diri Pesakit Diabetes Serta Ukuran Kualiti Hidup Pesakit Diabetes.

Keywords: Literasi kesihatan, faktor yang mempengaruhi, Diabetes Mellitus Jenis Dua, luar bandar

ACKNOWLEDGEMENT

I would like to thank my supervisor, Assoc. Prof. Dr. Suriani Ismail, my co-supervisor, Assoc. Prof. Dr. Rosliza Abd Manaf, my parents and my friends for their never ending support and motivation that had helped me went through this experience, Alhamdulillah.

This thesis was submitted to the Senate of Universiti Putra Malaysia and has been accepted as fulfilment of the requirement for the degree of Master of Science, The members of the Supervisory Committee were as follows:

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LIST OF ABBREVIATIONS

AMA	American Medical Association
AOR	Adjusted Odd Ratios
BMI	Body Mass Index
CI	Confidence Interval
COR	Crude Odd Ratios
CPG	Clinical Practice Guideline
DM	Diabetes Mellitus
DQoL	Diabetic Quality of Life
HALS	Health Activities Literacy Scale
HbA1c	Haemoglobin A1c
HC	Health Clinic
HL	Health Literacy
IEC	International Expert Committee
IOM	Institute of Medicine
IPAQ	International Physical Activity Questionnaire
IQR	Interquartile Range
JKNS	Jabatan Kesihatan Negeri Selangor
MDKT	Michigan Diabetes Knowledge Test
MOH	Ministry of Health
MOWFCD	Ministry of Women, Family and Community Development
MREC	Medical Research Ethics Committee
MY-TOHFLA	Malay – Test of Functional Health Literacy in Adults
NDRR	National Diabetes Registry Report

NHMS	National Health and Morbidity Survey
NIDDM	Non-Insulin Dependent Diabetes Mellitus
NMRR	National Medical Research Register
PA	Physical Activity
PKD	Pejabat Kesihatan Daerah
REALM	Rapid Estimate of Adult Literacy in Medicine
REALM-R	Rapid Estimate of Adult Literacy in Medicine –Revised
REALM-SF	Rapid Estimate of Adult Literacy in Medicine –Short Form
SD	Standard Deviation
SDSCA	Summary of Diabetes Self-Care Activity
SPSS	Statistical Package for Social Sciences
S-TOFHLA	Short- Test of Functional Health Literacy in Adults
T2DM	Type 2 Diabetes Mellitus
TOFHLA	Test of Functional Health Literacy in Adults
UPM	Universiti Putra Malaysia
USA	United States of America
WHO	World Health Organization

CHAPTER 1

INTRODUCTION

1.1 Background

Health literacy (HL) has been a widely used term to circumscribe a broad range of ideology and definitions. The most common definition used is defined the Institute of Medicine as "the degree to which individuals have the capacity to obtain, process and understand basic health information and services needed to make appropriate health decisions". (IOM, 2004). The World Health Organization (WHO) defined HL as the cognitive and social skills, which determine the motivation and ability of individuals to gain accessibility to understand and use the information in ways, which promote and maintain good health (WHO, 1998). Sorensen on the other hand defined HL as the degrees to which individuals have the capacity to read and comprehend health-related print material, identify and interpret information presented in graphical format (charts, graphs, tables), and perform arithmetic operations in order to make appropriate health and care decisions (Sorenson *et al*, 2012). As these definitions suggest, health literacy is a broad concept including more than individual levels of intelligence, but rather a specific skillset that involves a variety of methods to communicate and interpret health information with unique demands, depending upon the person and their setting.

The exchange of complex health information among patients, providers, health organizations and the public is often described as health literacy. A low level of HL is common and associated with processes of healthcare and important health outcomes. For many patients, lack of literacy skills is a major obstacle to effective health care communication and as a result low literacy has been shown to be independently associated with poor health (Schillinger *et al*, 2002). Patients with low HL skills were found to require greater medical care than those with marginal literacy skills, were more likely to report their health as poor and were more likely to have been hospitalized in the previous year than people with higher literacy levels (Baker *et al*, 1996). Low HL people are prone to have higher risk of death and poor health outcomes. For example, non-adherence of HIV regimen was found to be higher among those with lower HL as compared to those with adequate HL (Baker *et al*, 2008; Osborn *et al*, 2010). Studies shown that, HL is associated with self-efficacy. Patients with adequate HL level have efficacy in prescribing acquired medications as compared to those with lower HL level (Wolf *et al*, 2007). Apart from that, the odds of having long term illness such as heart failure in more likely among those with lower HL (Sentel and Halpin, 2006).

In 2010, it was estimated that there were 285 million adults worldwide with diabetes, with projections that this will increase to nearly 440 million people by 2030 (Shaw *et al*, 2010). Despite innovative scientific discoveries to advance our understanding of the pathology of diabetes mellitus and to develop novel approaches to therapy, the

burden of diabetes continues to escalate and treatment often remains substandard (Saaddine *et al*, 2006). The National Diabetes Registry Report 2009-2012 stated that diabetes is a chronic, often debilitating and sometimes fatal disease, in which the body either cannot produce insulin or cannot properly use the insulin it produces (MOH, 2013). Type 2 Diabetes Mellitus (T2DM) occurs when the body cannot properly use the insulin that is released (called insulin insensitivity) or does not make enough insulin. As a result, sugar builds up in the blood instead of being used as energy. About 90% of people with diabetes have T2DM (Colberg *et al*, 2010). T2DM more often develops in adults, but children can be affected. Depending on the severity of T2DM, it may be managed through physical activity and meal planning, or may also require medications and/or insulin to control blood sugar more effectively.

T2DM has become one of the major causes of mortality and exponentially rising from time to time. It has also been known to change life experiences, altered self-esteem, challenged present existence and increased uncertainty about the future (Chew *et al*, 2015). Optimal management of T2DM requires collaboration between multidisciplinary healthcare providers and patients to encourage effective self-care in many tasks including adherence and manipulation of complex medication schedules, executing detailed dietary recommendations, promoting physical activity and participation in preventative care strategies (Funnell *et al*, 2010). In diabetes, HL is related to diabetes knowledge, self-efficacy and self-care behaviours and glycemic control (Cavanaugh, 2011). HL plays an important role as the ability to have self-management behaviours and improve diabetic related health outcomes among patients with T2DM. HL is found to have relationship with the rate of diabetic complications while improving the level of HL has been shown to improve glycemic control (Schillinger *et al*, 2002). HL levels also affect the ability to read the labels on the medication boxes. T2DM patients with inadequate HL level have trouble to understand nor bother to read the labelling on their medications thus this will affect their medication compliance (Schillinger *et al*, 2003).

1.2 Problem Statement

T2DM also known as non-insulin dependent diabetes mellitus (NIDDM) is an adult onset and in approximately 90%-95% of the population (Minhat *et al*, 2014). The world prevalence of diabetes among adults in 2010 was 6.4% affecting 285 million adults and was stated to be increased to 7.7% and affecting 439 million adults by 2030 (Shaw *et al*, 2010). The prevalence of T2DM in Malaysia has been increasing over the year. In 2011, 31.0% of increase in the prevalence has been recorded comparing to the percentage of in 2006, which was 11.6% to 15.2% in 2011 (MOH, 2012). Adequate HL is an important part of being active in one's own health care. HL is necessary for the use and acquisition of health-related information.

Diabetes ranks as on of the top two causes of blindness, renal failure, and lower-limb amputation (Gambert & Pinkstaff, 2006). The relationship between literacy and chronic illnesses such as T2DM is complex. One of the reasons of diabetes complications is due to poor glycemic control and poor glycemic control is associated

with poor HL (Schillinger *et al*, 2002). Inadequate HL is a particular problem for T2DM. HL impacts health knowledge, access to health services and several socioeconomic factors such as income level, occupation, education, housing, and access to medical care (Schillinger *et al*, 2002).

According to NHMS IV (MOH, 2015), the urban population [7.8% (95% CI: 6.6, 9.3)] reported significantly higher frequency of adequate health literacy compared to the rural population [2.3% (95% CI: 1.7, 3.1)]. However, NHMS IV only reported the frequency of HL in general. In Malaysia, several studies have been done to assess the level of HL, though study that explores the determinants of HL level, particularly among T2DM patients in rural settings in Malaysia is still scarce. By determining the factors that affect the level of HL among T2DM patients in rural settings, it will contribute a baseline that better informs of diabetes treatment and preventions with regards to the level of HL to lower the risk of diabetic complications, especially among those in rural populations. Thus, this study aims to determine the factors associated to adequate HL among T2DM patients attending rural government health clinics in the district of Kuala Selangor.

1.3 Significance of Study

Over the years the prevalence of T2DM has been increasing and it has become one of the causal of increasing morbidity and mortality. In NHMS 2006, it was reported in the prevalence of diabetes shot up to 20% in Tanjung Karang compared to 6.5% in 1990 and 4% in 1984 (MOH, 2008). With the increasing prevalence of diabetes in rural areas as such in Tanjung Karang and Sungai Tengi Kanan, it is vital to seek the influence of the level of HL towards the inflation of diabetes and its associated factors among the T2DM patients. Rural populations are generally of older age, lack of knowledge and education, more likely to report their health status as poor and lack of access into health care services (IOM, 2005). Hence, they are more likely to have limited HL. Thus, being in rural settings, Tanjung Karang and Sungai Tengi Kanan government health clinics are good fit to conduct this study.

This study aims to identify the association between the level of HL and the independent variables [socio-demographic and socioeconomic factors, current medical history (diabetes duration and type of treatment) of T2DM, knowledge on T2DM, adherence to treatment of T2DM, Summary of Diabetic Self Care Activities (SDSCA), Diabetic Quality of Life (DQoL), the International Physical Activity Questionnaire (IPAQ), glycemic control (HbA1c) and Body Mass Index (BMI) among T2DM patients attending Tanjung Karang and Sungai Tengi Kanan government health clinics in the district of Kuala Selangor. By identifying the factors associated with HL among T2DM patients, it is hoped that a better approach can be applied through modification of the factors identified in delivering the T2DM management. Thus, the findings that will be obtained at the end of the study are to be understood and hope to be the contribution to the advancement of this issue and may lead to a better diabetic management outcome.

1.4 Research Questions

i. What is the level of HL among T2DM patients attending Tanjung Karang and Sungai Tengi Kanan government health clinics in the district of Kuala Selangor?
ii. What are the factors associated with the level of HL among T2DM patients attending Tanjung Karang and Sungai Tengi Kanan government health clinics in the district of Kuala Selangor?
iii. What are the predictors of the level of HL among T2DM patients attending Tanjung Karang and Sungai Tengi Kanan government health clinics in the district of Kuala Selangor?

1.5 Objectives

1.5.1 General objective

i. To determine the level of HL with regard to T2DM and factors associated with the level of HL among T2DM patients attending Tanjung Karang and Sungai Tengi Kanan government health clinics in the district of Kuala Selangor

1.5.2 Specific Objective

iv. To identify the level of HL among T2DM patients attending Tanjung Karang and Sungai Tengi Kanan government health clinics in the district of Kuala Selangor

i. To describe characteritics of T2DM patients attending Tanjung Karang and Sungai Tengi Kanan government health clinics in the district of Kuala Selangor and the;

   a. Socio-demographic and socioeconomic factors
   b. Current medical history of T2DM
   c. Knowledge on T2DM
   d. Adherence to treatment of T2DM
   e. Summary of Diabetic Self Care Activities (SDSCA)
   f. Diabetic Quality of Life (DQoL)
   g. International Physical Activity Questionnaire
   h. Glycemic control (HbA1c)
   i. Body Mass Index (BMI)

v. To determine the association between the level of HL among T2DM patients attending Tanjung Karang and Sungai Tengi Kanan government health clinics in the district of Kuala Selangor and the;

j. Socio-demographic and socioeconomic factors
k. Current medical history of T2DM
l. Knowledge on T2DM
m. Adherence to treatment of T2DM
n. Summary of Diabetic Self Care Activities (SDSCA)
o. Diabetic Quality of Life (DQoL)
p. International Physical Activity Questionnaire
q. Glycemic control (HbA1c)
r. Body Mass Index (BMI)

vi. To determine the predictors of the level of HL among T2DM patients attending Tanjung Karang and Sungai Tengi Kanan government health clinics in the district of Kuala Selangor

1.6 Research Hypotheses

There is a significant association between the level of HL among T2DM patients attending Tanjung Karang and Sungai Tengi Kanan government health clinics in the district of Kuala Selangor and the;

a. Socio-demographic and socioeconomic factors
b. Current medical history of T2DM
c. Knowledge on T2DM
d. Adherence to treatment of T2DM
e. Summary of Diabetic Self Care Activities (SDSCA)
f. Diabetic Quality of Life (DQoL)
g. International Physical Activity Questionnaire
h. Glycemic control (HbA1c)
i. Body Mass Index (BMI)

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BIODATA OF STUDENT

Named Noor Amanina binti Shaharudin, born on 13 July 1991 and an only child. Has been a nomad for her entire life, lived around East to West of Malaysia, jumped from one school to another and have plenty of friends from different states. An independent wanderer, loud, eccentric and responsible in nature. Have the best parents in the world and playful cat sisters. Pursued her degree in Biomedical Science in Management and Science University (MSU). Worked as a Study Coordinator in UiTM Selayang campus before furthering her Masters Science in Public Health in Universiti Putra Malaysia (UPM). Live live to the fullest and always rely on Allah S.W.T.

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