ASSOCIATION OF FAMILY DOCTOR CONCEPT'S IMPLEMENTATION ON DOCTOR-PATIENT INTERACTION, PERCEIVED QUALITY OF CARE AND GLYCAEMIC CONTROL AMONG TYPE 2 DIABETES MELLITUS PATIENTS IN PRIMARY HEALTH CLINICS IN KELANTAN

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By

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LIST OF ABBREVIATIONS

Adj. OR	Adjusted Odds Ratio
CCM	Chronic Care Model
CI	Confidence interval
CPG	Clinical Practice Guideline
DM	Diabetes Mellitus
FDC	Family Doctor Concept
FMS	Family Medicine Specialist
HbA1c	Glycated haemoglobin A1c
ICC	Intra-Class Correlation
lm	Linear model
lmer	Linear mixed model
PACIC-M	Patient Assessment of Chronic Illness Care-Malay Questionnaire
PHC	Primary Health Care
PS	Power and sample size calculation
SD	Standard Deviation
SKIP-11	Skala Kepuasan Interaksi Perubatan-11 Questionnaire
SPSS	Statistical Package for The Social Science
T2DM	Type 2 Diabetes Mellitus
UK	United Kingdom
VIF	Variance Inflation Factor
VPC	Variance Partition Coefficient
USM	University Sains Malaysia
WHO	World Health Organization

LIST OF SYMBOLS

>	More than
<	Less than
=	Equal to
≥	More than and equal to
≤	Less than and equal to
α	Alpha (type I error)
β	Beta (type II error)
%	Percentage
p	p-value

HUBUNGKAIT PELAKSANAAN KONSEP DOKTOR KELUARGA TERHADAP INTERAKSI DOKTOR-PESAKIT, PERSEPSI KUALITI RAWATAN DAN KAWALAN GLISEMIA DALAM KALANGAN PESAKIT DIABETES MELLITUS JENIS 2 DI KLINIK KESIHATAN PRIMER DI KELANTAN

ABSTRAK

Latar belakang: Kawalan glisemia dalam kalangan pesakit Diabetes Mellitus Jenis 2 adalah masih rendah walaupun pelbagai strategi telah diambil untuk meningkatkannya. Pelaksanaan Konsep Doktor Keluarga dalam menyediakan perkhidmatan kesihatan 'Satu Kelurga Satu Doktor' dijangka dapat meningkatkan kepuasan pesakit terhadap interaksi doktor-pesakit, kualiti rawatan dan hasil rawatan dalam kalangan pesakit Diabetes Mellitus Jenis 2.

Objektif: Objektif kajian ini adalah untuk membandingkan tahap kepuasan interaksi doktor-pesakit, persepsi kualiti rawatan dan min HbA1c diantara pesakit Diabetes Mellitus Jenis 2 yang menerima rawatan di klinik yang menjalankan Konsep Doktor Keluarga dan klinik yang tidak menjalankan Konsep Doktor Keluarga, untuk menentukan faktor-faktor berkaitan dengan kawalan glisemia yang baik dalam kalangan pesakit Diabetes Mellitus Jenis 2 yang menerima rawatan di klinik yang menjalankan Konsep Doktor Keluarga, dan untuk mengkaji hubungkait diantara min HbA1c dengan interaksi doktor-pesakit dan persepsi kualiti rawatan dalam kalangan pesakit yang menerima rawatan di klinik yang menjalankan Konsep Doktor Keluarga dan klinik yang tidak menjalankan Konsep Doktor Keluarga, dengan mengambilkira ciri-ciri peringkat pesakit, ciri-ciri peringkat klinik dan pesakit yang bersarang dalam klinik.

Kaedah: Satu kajian hirisan lintang telah dijalankan di klinik kesihatan primer dikesemua sepuluh daerah di Kelantan bermula Februari sehingga Mei 2019 melalui kaedah temu ramah menggunakan soal selidik Skala Kepuasan Interaksi Perubatan-11 (SKIP-11) yang telah divalidasi, soal selidik *Patient Assessment of Chronic Illness Care (PACIC-M)* (Versi Bahasa Melayu) dan senarai semak proforma. Ujian khi kuasa dua digunakan bagi menentukan perbezaan kepuasan interaksi doktor-pesakit diantara pesakit yang menghadiri kedua-dua jenis klinik, manakala analisa t bebas digunakan untuk menentukan perbezaan persepsi kualiti rawatan dan min HbA1c. Regresi logistic berganda digunakan untuk menentukan faktor-faktor berkaitan dengan kawalan glisemia yang baik dalam kalangan pesakit Diabetes Mellitus Jenis 2 yang menerima rawatan di klinik yang menjalankan Konsep Doktor Keluarga. Analisa regresi pelbagai peringkat dan regresi linear berganda digunakan untuk mengkaji hubungkait diantara min HbA1c dengan interaksi doktor-pesakit dan persepsi kualiti rawatan di kalangan pesakit.

Keputusan: Sejumlah 20 klinik kesihatan primer terlibat. Seramai 785 pesakit telah direkrut dengan kadar respon sebanyak 99.0%, dan data dari 772 pesakit telah dianalisa. Para hadirin di klinik yang menjalankan Konsep Doktor Keluarga mempunyai perkadaran kepuasan interaksi doktor-pesakit yang lebih tinggi berbanding para hadirin di klinik yang tidak menjalankan Konsep Doktor Keluarga (40.1% vs. 33.7%, p= 0.070). Tiada perbezaan bagi persepsi kualiti rawatan diantara para hadirin di kedua-dua klinik (p=0.806). Pesakit Diabetes Mellitus Jenis 2 yang menghadiri klinik yang menjalankan Konsep Doktor Keluarga mempunyai min HbA1c yang lebih rendah berbanding pesakit yang menghadiri klinik yang tidak menjalankan Konsep Doktor Keluarga (p=0.046). Regresi logistic berganda mendapati

lelaki (Adj. OR 2.56; 95% CI: 1.49,4.42; p=0.001) dan bujang/duda (Adj. OR 2.35; 95% CI: 1.32,4.18; p=0.004) berkait dengan peningkatan kebarangkalian terhadap kawalan glisemia yang baik. Peningkatan durasi diabetes (Adj. OR 0.93; 95% CI: 0.88,0.99; p=0.017), peningkatan purata pesakit Diabetes Mellitus Jenis 2 yang menghadiri klinik setiap hari (Adj. OR 0.96; 95% CI: 0.93,0.99; p=0.007), dan peningkatan skor domain PACIC-M 'susulan/koordinasi' (Adj. OR 0.70; 95% CI: 0.51 ,0.95; p=0.021) adalah berkait dengan kebarangkalian yang rendah dalam kawalan glisemia yang baik dalam kalangan pesakit Diabetes Mellitus Jenis 2 yang menerima rawatan di klinik yang menjalankan Konsep Doktor Keluarga.

Analisa regresi pelbagai peringkat mendapati 2% variasi min HbA1c disumbangkan oleh perbezaan peringkat klinik. Kebolehubahan min HbA1c yang boleh diterangkan dari kombinasi kepuasan interaksi doktor-pesakit dan persepsi kualiti rawatan adalah sebanyak 14.2%. Peningkatan satu unit skor SKIP-11 menurunkan 0.08 unit HbA1c (Adj. β: -0.08; 95% CI: -0.11,-0.06; p<0.001), peningkatan satu unit skor PACIC-M meningkatkan 0.46 unit HbA1c (Adj. β: 0.46 ; 95% CI: 0.14,0.77; p<0.005), dan jenis klinik tidak mempunyai hubungan yang signifikan terhadap min HbA1c (Adj. β -0.48; 95% CI: -1.09,0.13; p=0.120).

Kesimpulan: Pengukuhan Konsep Doktor Keluarga dalam penjagaan kesihatan primer melalui penambahbaikan kepuasan interaksi doktor-pesakit dan penjagaan kesihatan yang diselaraskan dengan lebih baik, adalah perlu bagi meningkatkan kawalan glisemia yang baik dalam kalangan pesakit Diabetes Mellitus Jenis 2 di Kelantan.

KATA KUNCI:

Konsep Doktor Keluarga, Penjagaan Kesihatan Primer, Interaksi Doktor-Pesakit, Persepsi Kualiti Rawatan, Kawalan Glisemia, Diabetes Mellitus Jenis 2

ASSOCIATION OF FAMILY-DOCTOR CONCEPT'S IMPLEMENTATION ON DOCTOR-PATIENT INTERACTION, PERCEIVED QUALITY OF CARE AND GLYCAEMIC CONTROL AMONG TYPE 2 DIABETES MELLITUS PATIENTS IN PRIMARY HEALTH CLINICS IN KELANTAN

ABSTRACT

Background: Glycaemic control among patients with Type 2 Diabetes Mellitus (T2DM) was still low despite various strategies taken to improve it. The implementation of Family Doctor Concept (FDC) in providing 'One Family One Doctor' healthcare service was expected to escalate the improvement in the patient's satisfaction towards doctor-patient interaction, quality of care, and outcome among T2DM patients.

Objectives: The objectives of this study were to compare the satisfaction level of doctor-patient interaction, perceived quality of care and mean HbA1c between T2DM patients who attended FDC and non-FDC clinics in Kelantan, to determine the factors associated with good glycaemic control among T2DM patients attended FDC clinics in Kelantan, and to examine the relationship between mean HbA1c with doctor-patient interaction and the patient's perceived quality of care in FDC and non-FDC clinics in Kelantan, accounting for patient-level characteristics, clinic-level characteristics and nesting of patients within clinics.

Methodology: A cross-sectional study was conducted at primary health clinics throughout ten districts in Kelantan from February until May 2019 using the validated interview-guided *Skala Kepuasan Interaksi Perubatan-11* (SKIP-11) questionnaire, the Patient Assessment of Chronic Illness Care (PACIC-M) questionnaire (Malay

version) and proforma checklist. Chi-square test used to determine the difference in doctor-patient interaction satisfaction between patients attended both type of clinics, meanwhile independent t-test used to determine the difference in perceived quality of care and mean HbA1c. Multiple logistic regression used to determine the factors associated with good glycaemic control among FDC clinic's attendees. Linear multilevel regression and multiple linear regression analysis were used to explore the relationship between mean HbA1c with doctor-patient interaction and the patient's perceived quality of care.

Result: Twenty primary health clinics involved. A total of 785 participants were recruited with response rate of 99.0%, and data from 772 participants were analysed . The FDC clinics attendees have higher proportion of doctor-patient interaction satisfaction compared to non-FDC attendees (40.1% vs. 33.7%, p= 0.070). The was no difference in perceived quality of care between both type of clinics attendees (p=0.806). T2DM patients attended FDC clinics has lower mean HbA1c as compared to non-FDC clinics attendees (p=0.046).

Multiple logistic regression found that male (Adj. OR 2.56; 95% CI: 1.49,4.42; p=0.001) and single/widower (Adj. OR 2.35; 95% CI: 1.32,4.18; p=0.004) associated with higher odd for good glycaemic control. An increase in duration of diabetes (Adj. OR 0.93; 95% CI: 0.88,0.99; p=0.017), higher average T2DM patients attended clinic per day (Adj. OR 0.96; 95% CI: 0.93,0.99; p=0.007), and higher PACIC-M domain 'follow-up/coordination' (Adj. OR 0.70; 95% CI: 0.51,0.95; p=0.021) were associated with reduce odd for good glycaemic control among FDC clinics attendees.

The multilevel analysis found that 2% of the variation in mean HbA1c was contributed by the clinic-level differences. The variability in mean HbA1c that could be explained by the combined doctor-patient interaction satisfaction and perceived quality of care was 14.2%. A one-unit increase in SKIP-11 score has 0.08 unit lower HbA1c (Adj. β: -0.08; 95% CI: -0.11,-0.06; p<0.001), a one-unit increase in PACIC-M score would has 0.46 unit higher HbA1c (Adj. β: 0.46 ; 95% CI: 0.14,0.77; p<0.005), and the type of clinic has no significant relationship towards mean HbA1c (Adj. β -0.48; 95% CI: -1.09,0.13; p=0.120).

Conclusion: The strengthening of FDC in primary health care through improvement in doctor-patient interaction satisfaction and better coordinated care are essential to escalate good glycaemic control among T2DM patients in Kelantan.

KEYWORDS:

Family Doctor Concept, Primary health care, Doctor-Patient Interaction, Perceived Quality of Care, Glycaemic Control, Type 2 Diabetes Mellitus

CHAPTER 1

INTRODUCTION

1.1 Epidemiology of Type 2 Diabetes Mellitus

Type 2 Diabetes Mellitus (T2DM) is a known non-communicable disease which was prevalent in Malaysia and increasing worldwide (Hussein *et al.*, 2015; MOH, 2015; Magliano *et al.*, 2019). This metabolic disorder manifested by chronic hyperglycaemic state and other metabolic derangements caused major health issues together with social and economic impacts. The direct and indirect economic impacts include increasing medical costs, loss of productivity and increasing premature mortality. Apart from that, person and families with diabetes were at risk of catastrophic personal health expenditure due to higher out-of-pocket payments and loss of family income due to disability and premature mortality.

Globally, the diabetes prevalence in 2019 was estimated to be 463 million people, representing 9.3% of the global adult population age 20-79 years old. The prevalence is expected to rise to 10.2% (578 million) by 2030, and further rise to 10.9% (700 million) by 2045 (Saeedi *et al.*, 2019). The rising trend was attributed to ageing, a rapid increase in urbanisation and obesogenic environment (Nanditha *et al.*, 2016). China, India and United States of America were the countries with the highest number of people living with diabetes in 2019 and expected to remain the top of the list in the year 2030 (Saeedi *et al.*, 2019).

The World Health Organization (WHO) had estimated that South-East Asia has the largest number of people with diabetes, with an increase in prevalence from 4.1% in

1980 to 8.6% in 2014 (WHO, 2016). Nevertheless, according to Saeedi *et al.* (2019), the world-age standardised prevalence of diabetes among ages 20-79 years in South East Asia was higher than expected, which was 11.3% (87.6 million people) in the year 2019 and estimated to rise to 12.2% (115 million people) by the year 2030. Our neighbouring country, Singapore, also faced a growing prevalence of diabetes from 9% in 1998 to 12.3% in 2013 (Ong, 2017).

In Malaysia, the Malaysian National Health & Morbidity Survey (NHMS) reported an increase in the prevalence of diabetes among adults above the age of 18 from 14.9% to 17.5% in 2006 and 2015 respectively (Ministry of Health Malaysia, 2015). The prevalence was projected to rise to 21.6% by the year 2020 (Feisul Idzwan Mustapha, 2013). The increasing prevalence of diabetes leads to challenges among healthcare providers in managing people with Type 2 diabetes, improving their quality of life, and maintaining the optimum glycaemic control to prevent further diabetes complications. Following the international recommendations, these challenges need to be addressed in line with the World Health Organization Non-Communicable Disease Global Action Plan 2013-2020 to reduce the impact of diabetes and one of the key strategies is to strengthen the health system response to diabetes, particularly at the primary-care level (WHO, 2016).

1.2 Primary Health Care and initiation of Family Doctor Concept in Malaysia

The WHO defines the Primary Health Care (PHC) as a whole-of-society approach to health and well-being centred on the needs and preferences of individuals, families, and communities (WHO, 2019). It is an integral part of a country's health system, whereby it is the first level of contact for individuals, families and communities which

enables health care to be delivered as close as possible to where people live and work. PHC prevents and treats infectious and non-communicable diseases. Whereas, primary care is the subset under PHC that refers to a concept of family doctor services delivered to individual patients attended the PHC, and this differentiates the healthcare service from the secondary and tertiary services in the hospital (Howell, 2010; Ramli *et al.*, 2019). Primary care is known as Family Medicine in certain countries such as North America, Canada, and Malaysia, whereas some countries such as the United Kingdom and Australia recognise it as General Practice (Ramli *et al*., 2019).

The central to primary care is the doctor-patient relationship by which the interaction occurs with one another appropriately, and with others in the community and the health care delivery system (Figure 1.1). It is indeed a challenge that faces by health care clinicians and non-clinicians, policymakers, and administrators on how to foster and maintain such doctor-patient relationships in a complex, integrated PHC delivery system (Donaldson *et al.*, 1996).

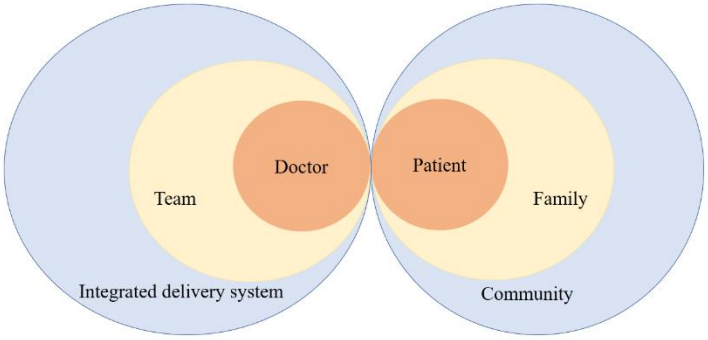

Figure 1.1: The interdependence of the constituents of primary care showing the centrality of the patient-clinician relationship (Donaldson *et al.*, 1996)

The PHC system needs to be robust to embrace the challenging management of diabetes and other diseases throughout the life course. National Health and Morbidity Survey 2015 reported that 80.0% of patients with T2DM sought treatment in government health care facilities (56.0% in public health clinics and 24.0% in public hospitals) (IPH, 2015b). The increasing number of patients is expected as government health care facilities are affordable and reachable to most of the Malaysian populations.

As part of reorienting the health systems, Malaysia initiated the Family Doctor Concept in the year 2013 to provide comprehensive services, strengthen its PHC and improve the universal health coverage (Jaafar *et al.*, 2018). FDC offers a proactive approach to capture and register all members in a specified population, identify the risk factors and disease burden, and to provide personalised care to the populations (MOH, 2016). The implementation of FDC was to improve the continuity, comprehensiveness and coordination of care by introducing the concept of 'One Family One Doctor' or 'One Family One Primary Healthcare Team' led by a Family Doctor' to look after a designated population covered by the clinic operational area (Jaafar *et al.*, 2018).

Starting from the year 2015, Kelantan State Health Department has adopted the implementation of FDC. In the year 2018, a total of 33 from 85 primary health clinics in Kelantan has been gazette as FDC-implemented clinics, and the remaining health clinics (non-FDC clinics) are still functioning as per current practice. It is a restructuring of primary health services; its infrastructure and equipment, healthcare personnel, clinic's floor set-up, clinic's physical space and scheduled appointment; to ensure patients and population are taken care by specific PHC Team (PHCT) according

to “zone” (Jaafar *et al.*, 2018). The population under the clinic’s operational area were grouped into smaller and specific cluster named “zones” which demarcated by specific streets or river. Each zone consists of 3000 to 15000 population and assigned to specific PHCT team under FDC-implemented clinics. In average, the team per zone comprised of 1-3 medical officers, 2-4 nurses, 1-3 community health nurses, 1-2 medical assistant (Jaafar *et al.*, 2018). Meanwhile, speciality services such as the Family Medicine Specialist (FMS), pharmacist, dietician, physiotherapist therapist, occupational therapist, radiology, and laboratory services are being shared across all zones. Patients regardless of life-course, including maternal, paediatrics, teenagers, adult, or geriatric were seen by the same set of PHCT each time they seek treatment at the FDC-implemented clinics, and this is called personalised care.

As for non-FDC clinics, it follows the current PHC practice, which has no dedicated team and no specific geographical zoning. The current practice requires patients with chronic illness, antenatal and other acute diseases to be managed separately, and no personalised care involved. To date, there were no resident FMS, fewer numbers of medical officers and a limited number of diabetes educators (Mustapha *et al.*, 2014; Nordin *et al.*, 2020). Other specialities such as physiotherapist and dietician were also shared across the district. Nonetheless, the availability of equipment such as the fundus camera and x-ray machine were limited at the non-FDC clinics. However, patients with poor glycaemic control who are being treated at non-FDC clinics would be given appointments to be seen by the visiting FMS and other specialities when needed, as decided by the treating medical officer at the non-FDC clinics. Patients also need to be mobilised to the nearest FDC clinics in the district to undergo fundus camera or x-ray examination as required.

1.3 Glycaemic control among Type 2 Diabetes Mellitus

The importance of maintaining a strict and good glycaemic control among T2DM in the prevention of further diabetes complications has been established (Patel *et al.*, 2008; Chew *et al.*, 2010; Blonde *et al.*, 2017; Elsharkawy *et al.*, 2018; Yozgatli *et al.*, 2018). However, a study showed that glycaemic control among 40-60% of people with T2DM was still suboptimal whereby current management failed to maintain the targeted blood glucose level, thus increased the risk of serious diabetes complications (Blonde *et al.*, 2017). It is well established that the best method of choice for monitoring glycaemic control in diabetes is by using glycated haemoglobin (HbA1c) that indicate the average blood glucose reading over the past three months (O'Connor *et al.*, 2006). One of the advantages of using HbA1c is that people with T2DM do not require to be in a fasting state, and ideally, this should be measured twice a year (WHO, 2016). According to the latest Malaysian Clinical Practices Guidelines (CPG) for Type 2 Diabetes Mellitus, the targeted glycaemic control is ≤ 6.5% (MOH, 2015).

The Malaysia National Diabetes Registry reported that among people with T2DM audited in 2012, the mean HbA1c was 8.1%, which only 23.8% patients in primary care clinics and 12.7% in tertiary care hospitals achieved the glycaemic target (Feisul Idzwan Mustapha, 2013). Data from Kelantan State Health Department (2018) however, showed an increased proportion of patients achieving HbA1c≤6..5%, from 17.9% in 2015 to 23.1% in 2017 (Figure 1.2). Nevertheless, the proportion was still far from the targeted key performance indices (KPI) that aim 30% of T2DM patients attended primary health care shall achieve targeted HbA1c (IPH, 2015a).

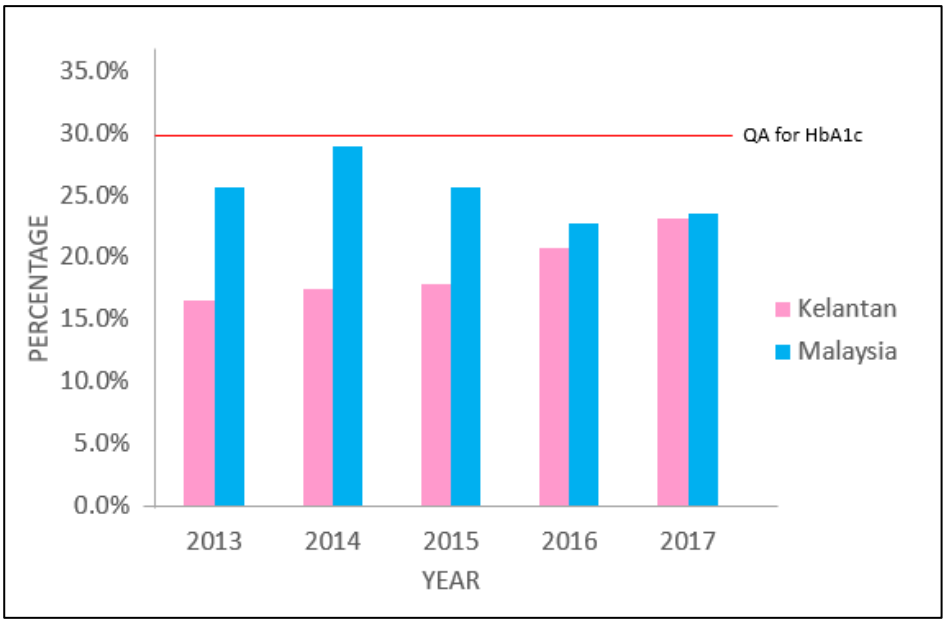

Figure 1.2: Comparison in the proportion of HbA1c ≤ 6.5% for Kelantan and Malaysia (2013-2017) (Kelantan State Health Department, 2018)

To achieve the desired diabetes outcome and targeted glycaemic control, comprehensive care involving coordinated multidisciplinary plan need to be implemented as emphasised by evidence-based Chronic Care Model (CCM) (Taggart *et al.*, 2011; Frei *et al.*, 2014; Kuznetsov *et al.*, 2015; Jaafar *et al.*, 2018). The CCM consists of six dimensions including healthcare organisation, delivery system design, clinical information system, patient self-management support, decision support and use of community resource. The PHC in Malaysia is at the utmost effort to strengthen diabetes management in accordance with CCM and the effectiveness of CCM delivered by the primary health care can be measured by the assessment of the perceived quality of care received by diabetes patients (Abdul-Razak *et al.*, 2018).

1.4 Problem statement

The increasing prevalence of diabetes is expected to increase the attendance of patients with T2DM at public primary health care facilities because of its affordability and accessibility. The capability and quality of care provided by the primary health clinics to cater the increasing number of patients are at stake as currently, the proportion of diabetes patients with good glycaemic control was still low compared to other countries. Studies had shown that glycaemic control among 40-60% T2DM patients in lower and higher-income countries was still suboptimal (Blonde *et al.*, 2017) and not all facilities able to provide comprehensive diabetes management as suggested by the CCM.

Ideally, good quality of management is needed to improve the diabetes outcome among T2DM, especially the achievement of targeted glycaemic control. Comprehensive management for diabetes patients following CCM, a good doctor-patient relationship, and the higher perceived quality of treatment received by the patients, are the essentials to improve the patient's glycaemic control. Excellent management is centred by good doctor-patient interaction which in turn would lead to increase patient's participation in their diabetes management plan. This will lead to better perception towards diabetes care and subsequently improved the glycaemic control. The implementation of Family Doctor Concept in Malaysia was expected to increase the satisfaction of doctor-patient interaction and improve the quality of CCM for diabetes management by providing 'One Family One Doctor' concept.

However, due to increasing prevalence in T2DM and expected increasing number of attendances to the primary health clinics, the desired good glycaemic control among

patients could be difficult to achieve. A higher number of patients attended clinics per day would reduce the doctor-patient interaction satisfaction due to reduced time spent for consultation and rapport, and subsequently lowered the patient's perception towards the quality of care that has been provided. The implementation of FDC was expected to increase the doctor-patient satisfaction and increase the perception of the quality of care provided as patients will be seen by the similar doctor and similar health care team throughout the follow-up at the health clinics. However, to the best of our knowledge, there are still scarce local evidence to demonstrate the effects of FDC's implementation towards doctor-patient interaction, perceived quality of care and glycaemic control among diabetes patients in Malaysia, particularly in Kelantan populations. The proportion of T2DM patients in Kelantan that able to achieve targeted glycaemic control are still below par, and the number of health clinics gazetted to implement the FDC is increasing, despite the lack of evidence on the effects of the implementation towards the improvement of glycaemic control among T2DM patients.

Thus, the evidence is needed to ascertain the doctor-patient interaction satisfaction, the perceived quality of care received by T2DM patients and the status of glycaemic control among T2DM patients in Kelantan. These form of patient-reported measures is very valuable for health practitioner and policymaker in making decision, related to improving health care for chronic illness such as T2DM (Miller *et al.*, 2015).

1.5 Justification of the study

Majority of T2DM patients are being treated at government primary health clinics and a comprehensive diabetes management is indeed a crucial aspect in managing patients

with T2DM. Thus, patient's experience while receiving care at primary health clinic is considered essential in optimizing the treatment received. The patient's perspective on doctor-patient interaction and perceived quality of care is important to improve the delivery of diabetes care in the primary health clinics, and subsequently increase patient's participation in the management plan. Thus, improvement on the glycaemic control can be escalate. As the Kelantan State Health Department is increasing the number of gazetted FDC clinics per year, it is crucial to demonstrate the effects of FDC's implementation in improving the glycaemic control among T2DM patients. Hence, following this research, the gap in PHC services in term of doctor-patient interaction satisfaction and quality of care received by diabetes patients can be identified. In addition, the information from this study may provide guidance to the policy makers to strengthen the primary health care service delivery.

1.6 Research questions

1. Is there any difference in satisfaction level of doctor-patient interaction, perceived quality of care and mean HbA1c between T2DM patients who attended FDC and non-FDC clinics in Kelantan?
2. What are the factors associated with good glycaemic control among T2DM patients attended FDC clinics in Kelantan?
3. Does mean HbA1c relate with doctor-patient interaction and perceived quality of care among T2DM patients who attended FDC and non-FDC clinics when accounted for patient-level characteristics, clinic-level characteristics, and nesting of patients within clinics?

1.7 Objectives

1.7.1 General objective

To explore the association of FDC's implementation–on the satisfaction of doctor-patient interaction, the patient's perceived quality of care and glycaemic control among Type 2 Diabetes Mellitus in health clinics in Kelantan

1.7.2 Specific objectives

1. To compare the satisfaction level of doctor-patient interaction, perceived quality of care and mean HbA1c between T2DM patients who attended FDC and non-FDC clinics in Kelantan.

2. To determine the factors associated with good glycaemic control among T2DM patients attended FDC clinics in Kelantan.

3. To examine the relationship between mean HbA1c with doctor-patient interaction and the patient's perceived quality of care in FDC and non-FDC clinics in Kelantan, accounting for patient-level characteristics, clinic-level characteristics, and nesting of patients within clinics.

1.8 Null hypothesis

1. There is no difference in satisfaction level of doctor-patient interaction, perceived quality of care and mean HbA1c between T2DM patients who attend FDC and non-FDC clinics.

2. There is no association between patient's characteristics, clinic's characteristics, doctor-patient interaction, and perceived quality of care among T2DM patients who attended FDC clinics towards glycaemic control.

3. There is no relationship between mean HbA1c with the satisfaction of doctor-patient interaction and perceived quality of care among T2DM patients who attend FDC and non-FDC, when accounted for patient's characteristics, clinic's characteristics, and nesting of patients within health clinics.

CHAPTER 2

LITERATURE REVIEW

Literature search on the satisfaction of doctor-patient interaction, perceived quality of care, glycaemic control and family-doctor concept was done using PubMed, Science Direct, EBSCOhost and SpringerLink databases. Various search strategies have been applied, such as a combination of terms and use of connectors (AND, OR NOT). Studies published from 2010-2020 were included. Keywords used were "Type 2 Diabetes Mellitus", "Glycaemic Control", "Primary Health Care", "Family Doctor Concept", "Perceived Quality of Care" and "Doctor-Patient interaction".

2.1 Family-Doctor Concept (FDC) and diabetes management

The Family Doctor Concept (FDC) is a model for delivery of Primary Health Care (PHC) services and has been initiated in Malaysia in the year 2013 to strengthen the PHC services provided to the community. The model is built with aim to provide comprehensive health services throughout the life-course by implementing 'One Family One Doctor' concept (Jaafar *et al.*, 2018). The concept of FDC was generally matched most of the key concepts of a family physician, such as the first contact for care, continuous, comprehensive, coordinated, and orientated to patients (patient-centred). Some believed that a family doctor is a regular doctor attending the whole family and having a close relationship with them, almost like a 'family member' (Mercer *et al.*, 2011). Patients who have visited same and regular family-doctor were more likely to feel being enabled and to experience patient-centred care in consultations thus improve their clinical outcome (Mercer *et al.*, 2011; Lam *et al.*,

2014; Shortell *et al.*, 2017). Moreover, treatment received by the same doctor, particularly if the doctor had a speciality in diabetes, ensured a better quality of care in terms of process measures such as HbA1c and cholesterol level (De Berardis *et al.*, 2004).

In Kelantan, all FDC clinics have at least one resident FMS that provide comprehensive, coordinated, continuous, evidence-based, preventive, and patient-centred health care services to each patient and their family (Ramli *et al*., 2019). All medical staffs at a primary health clinic in Kelantan were bound to follow the standard Clinical Practice Guidelines (CPG) published by the Malaysian Ministry of Health to guide the management of T2DM. The Non-Communicable Disease unit of Kelantan State Health Department has conducted a series of training for medical officers and paramedics to increase competency in managing diabetes as per CPG protocol. Meanwhile, all diabetes patient is provided with a pocket-size individual diabetes record book as their record-keeping. The book can be used to notify other medical personnel when patients admitted to the hospital or seek treatment at other healthcare facilities apart from government public health clinics. The respective clinic responsible for registering the diabetes patients also has one copy of the diabetes record book, and it must be used by respective medical personal to document the patients' progress, clinical examination, and laboratory results during each clinic visit. Hence, all related clinical examination, laboratory results, x-ray findings or fundus camera findings are documented in the diabetes record book.

Jaafar *et al.* (2018) has conducted a study in two selected health clinics and reported the initial findings from the pilot implementation of FDC in Malaysia. The study had found improvement in the proportion of good glycaemic control from 31.0% to 41.7%,

and 7.6% to 22.7% for each respective health clinics. The main challenges in the management of T2DM in primary health clinic are higher turnover rate for doctors at an average of every two yearly, lack of Family Medicine Specialist, lack of equipment and the higher number of patients per day. The FDC clinics do have the resident FMS and other speciality services (physiotherapist, dietician, radiology, and laboratory), and equipped with adequate modalities, as compared to non-FDC clinics which had no resident FMS, no other specialities and not properly equipped. The range of various health specialists is required to care and treat diabetes patients (WHO, 2016). In order to overcome these challenges, nurses were trained to be qualified diabetes educators who could assist in managing T2DM patients in health clinics, mainly for health education and self-management support. Moreover, nurses have a lower turnover rate and able to take care of the PHCT for longer duration as compared to doctors. All primary health clinics do have qualified diabetes educators, even though the numbers slightly differ between FDC and non-FDC implemented clinics.

2.2 Satisfaction on doctor-patient interaction among Type 2 Diabetes Mellitus

Patients satisfaction is defined as a patient's feeling about the treating doctor (Abd Aziz *et al.*, 2013), and it is one of the predictors of health outcome. The doctor-patient interaction was about effective two-way communication that is necessary to be used in all clinical activities, skill and expertise (Abioye Kuteyi *et al.*, 2010). Despite that, the doctor-patient interaction is the central part in PHC and can be used to predict the patient's adherence to treatment (Meakin & Weinman, 2002; Alazri & Neal, 2003; Abioye Kuteyi *et al.*, 2010), as satisfied patients are more likely to comply with treatment (Norhayati, Masseni & Azlina, 2017). The relationship between doctor-

patient has changed from paternalism in which doctors decides for the patient's best interest, towards patient-centred in which decision was made in partnership (Igel & Lerner, 2016). Good communication skills are insufficiently thought in medical training, and this could affect the patients' satisfaction and their health outcome because the patient would give more trust towards doctors only if a doctor has good communication skills (Abioye Kuteyi *et al.*, 2010; Jalil *et al.*, 2017). Patient's confidence in the doctor and good interpersonal skills are essential to enhance information gathering, correct the misunderstanding and increase patient's participation in the treatment decision. Nonetheless, a good rapport can be enhanced when the similar doctor and team attending the same patients, causing higher satisfaction of doctor-patient interaction, and thus able to increase patient's compliance to treatment and better continuity of care (Abd Aziz *et al.*, 2013; Nasir, Ariffin & Yasin, 2018). According to Jalil *et al.* (2017) patients with no formal education were more satisfied with doctor-patient interaction compared to educated counterpart and this was in agreement with other studies (Nasir, Ariffin & Yasin, 2018).

The patient's satisfaction surveys are important tools for healthcare providers to identify the gap in service from the patient's perspective. The example of a tool to measure doctor-patient satisfaction was the Medical Interview Satisfaction Scale (MISS). It was initially developed in the USA to determine satisfaction with individual consultation. This initial version consists of a 26-item questionnaire in three domains, namely cognitive, affective, and behavioural. However, due to lack of validity and high intercorrelations between domains, the second version of MISS named MISS-29

was develop consisted of 29-items in four domains namely distress relief (DR), communication comfort (CC), rapport (R) and compliance intent (IO).

Meanwhile, MISS-21 questionnaire was designed to study the doctor-patient communication satisfaction among the United Kingdom's population, which consists of 21-items in four domains (Meakin & Weinman, 2002). For the use of Malaysian population, a validated Malay version of MISS-21 questionnaire was produced by Abd Aziz *et al.* (2013) from School of Medical Sciences, Universiti Sains Malaysia. The confirmatory factor analysis (CFA) has confirmed the translated and validated MISS-21 questionnaire with 11-items constructed in three domains has good internal consistency and good construct reliability. The domains include rapport (R), distress relief (DR), and interaction outcome (IO), and the questionnaire was named as *Skala Kepuasan Interaksi Perubatan-11* (SKIP-11). It was an acceptable tool to assess the doctor-patient interaction satisfaction from patient's perspective as it was valid and simple.

The implementation of FDC with the key concept of 'One Family One Doctor' would foster a good doctor-patient relationship as patient and their family are followed-up and treated by the same doctor (Jaafar *et al.*, 2018). Despite that, its implementation was expected to reduce consultation time further as patients were managed by the same doctor (and team) who already known and understand the patient's social issues such as their working nature and the living condition (Jaafar *et al.*, 2018; Nordin *et al.*, 2020). A good and effective consultation would further reduce the waiting time for the next patients to be seen by the doctors and thus, further increase the patient's satisfaction and increase the likelihood to be compliance to further scheduled follow-up (Meakin & Weinman, 2002; Jalil *et al.*, 2017).

A study in Gombak conducted at two government primary health clinics revealed the overall mean (SD) SKIP-11 score of 42.1 (2.87). The domain rapport showed a highest mean score of [15.81(1.41)], followed by distress relief [15.75 (1.36)] and interaction outcome [10.52 (1.63)] (Nasir, Ariffin & Yasin, 2018). At the time of study conducted, the clinics involved were practising services as per usual practice without the implementation of FDC yet. Meanwhile, another local study conducted at the primary outpatient clinic of a tertiary hospital in Kelantan revealed 78 (76.5%) out of 104 respondents were satisfied with the doctor-patient interaction with the mean (SD) of overall SKIP-11 score of 47.6 (4.40). The highest scored domain was rapport [17.9 (1.80)], followed by distress relief [17.5 (1.72)], and interaction outcome [12.2 (2.04)] (Norhayati, Masseni & Azlina, 2017). However, this study was conducted among moderately high-risk cardiovascular risk patients. The difference in the study setting among previous studies conducted might influence the result of doctor-patient satisfaction. Furthermore, the FDC concept was not implemented in the hospital setting because the majority of people with T2DM are seeking treatment in public primary health clinics (59.3%) as compared to the public hospital (20.0%) (Y. M. F. Lim *et al.*, 2019).

A study by Alazri & Neal (2003) was conducted among two types of general practitioner in Leeds, whereby practice A cover 12200 diabetes patients as compared to practice B that provided care for 6300 patients. Practice A was holding regular diabetes clinics, and Practice B did not hold a diabetes clinic. The measure of patient's satisfaction was assessed using the General Practice Assessment Survey Questionnaire which consists of 52 items including 32 items measured for patient's satisfaction in nine domains, including access, receptionists, continuity of care, technical care,

communication, interpersonal care, trust, doctor's knowledge about the patient, and practice nursing. The study found no differences in satisfaction between the two types of practice (Alazri & Neal, 2003).

2.3 Perceived quality of care among Type 2 Diabetes Mellitus

People with T2DM requires a coordinated, comprehensive, and multidisciplinary team approach in the management of diabetes due to the chronicity of disease, risk of developing diabetes complications and negative effects on the patient's quality of life. Hence, management of T2DM by using a chronic care model (CCM) has been established around the world as it was associated with enhanced in the quality of care and improvement in diabetes outcome through a coordinated multidisciplinary approach (Taggart *et al.*, 2011; Frei *et al.*, 2014; Kuznetsov *et al.*, 2015; Jaafar *et al.*, 2018). CCM is a model that recommends a proactive and planned care approach to deliver a high-quality and patient-centred chronic illness care to the population which is widely used in the primary care settings (Glasgow *et al.*, 2005; Abdul-Razak *et al.*, 2018). The CCM consists of six dimensions including healthcare organisation, delivery system design, clinical information system, patient self-management support, decision support and use of community resource. All six dimensions are crucial to be adopted successfully to optimise the health outcome. The effectiveness of CCM delivered by the PHC team can be measured through the patient's perceived quality of care (Thomas, Iyer & Collins, 2014; Ramli *et al.*, 2016).

The Malaysian PHC is at an utmost effort to strengthen diabetes care following the CCM (Abdul-Razak *et al.*, 2018) and the implementation of FDC is expected to strengthen this diabetes management through the concept of 'One Family One Doctor'

(Jaafar *et al.*, 2018). Hence, assessment of the perceived quality of care from the patient's perspective is important to improve the healthcare delivery process and hence improved the diabetes outcome (Glasgow *et al.*, 2005; Thomas, Iyer & Collins, 2014; Ramli *et al.*, 2016; Shortell *et al.*, 2017). Some studies found that higher perceived quality of care was contributed by a good self-management support from health care providers, which results in an improvement in patient-reported outcomes (Thomas, Iyer & Collins, 2014; Aung *et al.*, 2016; Shortell *et al.*, 2017).

The Patient Assessment of Chronic Illness Care (PACIC) questionnaire is a valid and competent tool that is widely used in many studies involving diabetes patients, in assessing whether the quality of care received by the patients is congruent with the elements in the CCM and related to the provision of collaborative care (Taggart *et al.*, 2011; G. M. Ku & Kegels, 2014; Aung *et al.*, 2016; Arditi, Iglesias & Peytremann-Bridevaux, 2018). According to Ku & Kegels (2014) a higher overall PACIC score was associated with good adherence to medication and resulting good diabetes outcome.

The original PACIC has been translated and validated in the Malay language to suit the Malaysian context. The study was conducted among T2DM patients from five public primary care clinics, and the final questionnaire was named as PACIC-M questionnaire (Abdul-Razak *et al.*, 2018). The questionnaire consisted of 19 items and three domains namely i) goal setting/tailoring and problem-solving/contextual, ii) follow-up/coordination, and iii) patient activation and delivery system design/ decision support.

A local study on 'Evaluation of the Enhanced Primary Health Care interventions in public health clinics' (EnPHC-Eva) was conducted in 40 primary health clinics in Selangor and Johor whereby the baseline data was collected in 2017. One of the outcomes from the study was the assessment of patient experience on self-management support, measured using the modified 11-items PACIC questionnaire to suit the study requirement. The study found the domain patient activation was lowest scored with a mean (SD) of 2.1 (1.1), and the highest scored domain was delivery system design/decision support, 2.9 (0.9). Higher PACIC score was observed when health providers able to explain things in ways that were easy to understand and knew about patients living condition (M. T. Lim *et al.*, 2019). The study findings demonstrated the importance of good communication between doctor-patient that would reflect in a better perceived quality of care from the patient's perspective. Additionally, a study in Texas found that patients with lower education level reported better chronic illness care as compared to patients with higher education level (Noël *et al.*, 2014).

The FDC clinics are expected to perform better than non-FDC clinics because of the higher number of staffs and better equipped. A cross-sectional study has been conducted in Philippines to assess chronic illness care among people with diabetes consulting the family physician-led tertiary hospital-based out-patient clinic versus local government health unit-based health centres (G. M. Ku & Kegels, 2014). The study had high response rate of 95.0% with majority (64%) of the respondent was from hospital-based out-patient clinic. The study found that diabetes patient who gets treated in a facility with regular doctors in government health centre scored higher PACIC score as compared to patients who seek treatment at a facility with specialist trained in Family Medicine in tertiary hospital (G. M. Ku & Kegels, 2014). The respondents from

the local government health unit-based health centres who were managed by regular doctors might have low expectations and less knowledgeable to have such expectations from their health services, thus their higher PACIC ratings. Apart from that, higher PACIC score for follow-up and coordination among respondents from the local government health unit-based health centres may be enhanced by the home visits done by the large cadre of community-based health workers.

Moreover, a systematic review by Arditi, Iglesias & Peytremann-Bridevaux (2018) revealed that integrated care did not produce higher PACIC score. The review that includes 34 studies involving 25942 patients from 13 countries found that the variability in PACIC score was influenced by the place of the study conducted either in Asia or other continents rather than the healthcare system delivery itself.

A study in Korea revealed a higher score in the perception of coordinated function and personalised care when a clinic was designated as family medicine clinic and patients recognised the specialist in the clinic as registered FMS (Kim *et al.*, 2016). Meanwhile, a study in Taiwan found that diabetes patient who enrolled in pay-for-performance (P4P) programme scored higher PACIC in all domains as compared to patients who did not enrol in the P4P programme (Chiu *et al.*, 2016). The main feature of P4P was the financial incentives to strengthen diabetes management following the practice guidelines such as allowing more testing (HbA1c and cholesterol level) and had a regular follow-up. A total of 1458 participant including 1037 from P4P and 421 from non-P4P, were enrolled in this study.

2.4 Glycaemic control among Type 2 Diabetes Mellitus

Glycaemic control is the most important predictor for diabetes-related complications and deaths (Ngoyo, 2017; Tekalegn *et al.*, 2018). It is best measured used HbA1c level and can be interpreted by mean HbA1c and/or categorical as good vs poor glycaemic control. The proportion of good glycaemic control remains low, despite the availability of national policies and programmes, including the availability of clinical practice guidelines, detailing every treatment recommendations to strengthen diabetes care (Tharek *et al.*, 2018). The latest Malaysian Clinical Practice Guideline (5^{th} edition) of Diabetes Mellitus published in December 2015 stated that the targeted glycaemic control measured by HbA1c should be ≤ 6.5%. However, it must be tailored individually (MOH, 2015). This target is essential for those newly diagnosed, younger age, no other cardiovascular diseases and low risk of hypoglycaemia. Meanwhile, the HbA1c target for T2DM with comorbidities such as coronary artery diseases, heart failure, renal failure; shorter life expectancy and high risk of hypoglycaemia shall be aimed at 7.1-8.0% (MOH, 2015). Despite that, the WHO defined 'uncontrolled diabetes' when a diabetes patient on treatment has HbA1c > 6.5% (Mahmood, Daud & Ismail, 2016).

Studies around the world have been using different test and cut-off point to categorise glycaemic control either good or poor. Few studies used fasting blood glucose measurement rather than HbA1c to define diabetes control due to limited resource in their setting. A study in Shanan Gibe Hospital at Southwest Ethiopia found 70 (40.8%) out of 174 people with T2DM able to achieve the American Diabetes Association recommended of fasting blood glucose range 80-130 mg/dL (Yigazu & Desse, 2017). There was no diabetes management guideline used in that hospital setting at the time

of study conducted. Meanwhile, a study conducted in Saudi Arabia involving 1111 people with T2DM found that the proportion of good glycaemic control characterised by HbA1c < 7% was 263 (24.1%) (Alramadan *et al.*, 2018). A study in Singapore involving 688 patients revealed mean (SD) HbA1c of 7.6 (1.35) with 22.8% had optimal HbA1c level of 6.5-7.0% and 12.2% had ideal HbA1c level of 4.5-6.5% (Quah *et al.*, 2013).

Local studies showed the proportion of good glycaemic control ranges from 13.5% in Selangor (Tharek *et al.*, 2018), 32% in Johor Bharu (Mahmood, Daud & Ismail, 2016) to 33.6% in Negeri Sembilan (WH *et al.*, 2016), with all of the studies used HbA1c < 6.5% as good glycaemic control. A study with a high proportion of comorbidities among the participant used higher HbA1c value to categorise into good and poor glycaemic control (Sazlina *et al.*, 2015).

The HbA1c value can be interpreted as a numerical value without categorisation into good or poor glycaemic control. Data from the Malaysian National Diabetes Registry showed a mean HbA1c of 8.1% among people with T2DM audited in 2012. Some local studies in Malaysia showed lower mean HbA1c among the study participants; 7.6% (Abdullah *et al.*, 2019), 7.8% (Mahmood, Daud & Ismail, 2016), 7.99% (Tharek *et al.*, 2018). Meanwhile, a study in Riyadh and Brazil showed higher mean HbA1c compared to Malaysia with an HbA1c of 8.7% in both countries (Al Shahrani & Baraja, 2014; Lima *et al.*, 2016). Our neighbouring country, Singapore, has lower mean HbA1c as compared to Malaysia, with HbA1c of 7.6% (Quah *et al.*, 2013).

Reduction of HbA1c is important among people with T2DM as it does associate with 25% reduction in microvascular complications mainly retinopathy and nephropathy