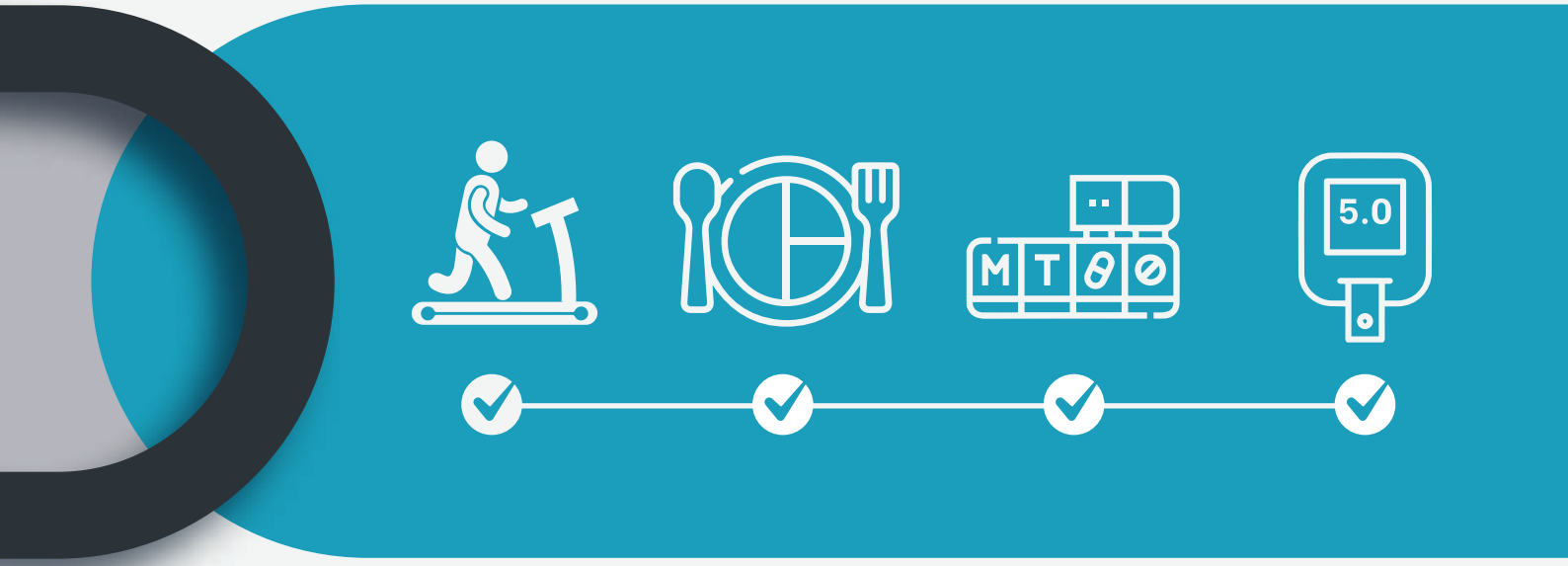
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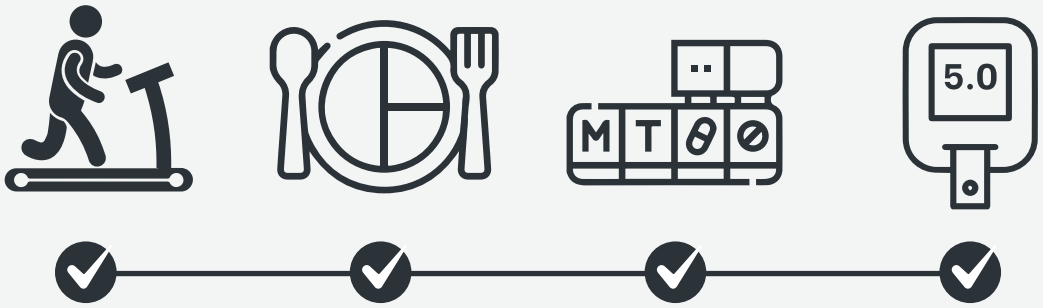
TECHNICAL
REPORT

THE DIABETES BEHAVIOURAL DIAGNOSIS INSTRUMENT (DBDI):

Development Of An Instrument In Enhancing Healthy Lifestyles Among Type 2 Diabetes Mellitus (T2DM) Patients



THE DIABETES BEHAVIOURAL DIAGNOSIS INSTRUMENT (DBDI)



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Development Of An Instrument In Enhancing Healthy Lifestyles Among Type 2 Diabetes Mellitus (T2DM) Patients

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Development Of An Instrument In Enhancing Healthy Lifestyles Among Type 2 Diabetes Mellitus (T2DM) Patients

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TECHNICAL REPORT

PRINCIPAL INVESTIGATOR

Rosnani binti Kassim	*Institute for Health Behavioural Research*

CO - INVESTIGATOR

Albeny Anak Joslyn Panting	*Institute for Health Behavioural Research*
Nadia binti Amirudin	*Institute for Health Behavioural Research*
Siti Nurhanim Mohamed Aimanan	*Institute for Health Behavioural Research*
Norbaidurah Ithnain	*Institute for Health Behavioural Research*

DBDI Research Officer Team

Tengku Puteri Nadiah Tengku Baharudin Shah	*Institute for Health Behavioural Research*
Nurul Nadhirah Nasir	*Institute for Health Behavioural Research*
Nur Izzati Mohammed Nadzri	*Institute for Health Behavioural Research*

DBDI Research Officer Team

Dr Feisul Idzwan bin Mustapha	*Non-Communicable Disease Section*
Dr Nazrila Hairizan binti Nasir	*Family Health Development Division*
Dr. Manimaran A/L Krishnan	*Institute For Health Behavioural Research*
Dr. Mohammad Zabri Johari	*Institute For Health Behavioural Research*
Dr. Yong Sy Liang	*Hospital Tuanku Ampuan Rahimah, Klang*
Safruddin Sahalan	*Hospital Tuanku Ampuan Rahimah, Klang*
Dr. Mohd Azahadi Omar	*Biostatistic Sector & Respiratory Data*
Dr. Nor Azilah Abu Bakar	*Medical Development Division*
Hafizah Abdul Khanan	*Allied Health Sciences Division*
Muhammad Muzzamil Ishak	*Health Education Division*

EXPERTS (QUALITATIVE STUDY)

Prof Tong Seng Fah	*Qualitative Research Association of Malaysia*
Prof Dr Khatijah Lim Abdullah	*Qualitative Research Association of Malaysia*
Assoc Prof Dr Irene Tan	*Qualitative Research Association of Malaysia*
Dr. Irmi Zarina Ismail	*Qualitative Research Association of Malaysia*

EXPERTS (QUANTITATIVE STUDY)

Dr. Shazli Ezzat Ghazali	*Universiti Kebangsaan Malaysia*
Dr. Ponnusamy Subramaniam	*Universiti Kebangsaan Malaysia*
Dr. Yong Sy Liang	*Hospital Tuanku Ampuan Rahimah, Klang*
Syahidatun Mardhiah Baharin	*Hospital Tuanku Ampuan Rahimah, Klang*
Bahyah binti Mat	*Hospital Tuanku Ampuan Rahimah, Klang*
Anita binti Mohamad	*Hospital Tuanku Ampuan Rahimah, Klang*
Safruddin Sahalan	*Hospital Tuanku Ampuan Rahimah, Klang*
Joseph Anak Lukong	*Selangor State Health Department*
Norani bt Mohd Sarawani	*Sekolah Kebangsaan USJ 12*
Dr.Thavamaran Kanesan	*Proofreading by A UK PhD*

DATA COLLECTORS

Rosnani binti Kassim	*Institute for Health Behavioural Research*
Albeny Joslyn Panting	*Institute for Health Behavioural Research*
Nadia Amirudin	*Institute for Health Behavioural Research*
Siti Nurhanim Mohamed Aimanan	*Institute for Health Behavioural Research*
Norbaidurah Ithnain	*Institute for Health Behavioural Research*
Tengku Puteri Nadiah Tengku Baharudin Shah	*Institute for Health Behavioural Research*
Nurul Nadhirah Nasir	*Institute for Health Behavioural Research*
Nur Izzati Mohammed Nadzri	*Institute for Health Behavioural Research*
Muhammad Rafiudin Habib	*Institute for Health Behavioural Research*
NurSyafiza Zahari	*Institute for Health Behavioural Research*
Ain Aqiela Azamuddin	*Institute for Health Behavioural Research*
Khairul Amar Musa	*Institute for Health Behavioural Research*
Nur Liyana Mohd Razali	*Institute for Health Behavioural Research*
Nur Fariha Atira Abdul Rahman	*Institute for Health Behavioural Research*
Noor Atiqah Rahman Mostafa	*Institute for Health Behavioural Research*
Farah Aleah Zainul Rijal	*Institute for Health Behavioural Research*
Nurul Hidayah Jamalluddin	*Institute for Health Behavioural Research*
Siti Nur Nabilah Mohd Yunus	*Institute for Health Behavioural Research*
Nurul Izzati Muhamad Lizan	*Institute for Health Behavioural Research*
Nurul Hasmida Azmi	*Institute for Health Behavioural Research*
Safruddin Sahalan	*Hospital Tuanku Ampuan Rahimah, Klang*
Siti Hajar Suhari	*Hospital Tuanku Ampuan Rahimah, Klang*

Reviewers

Dr Manimaran Krishnan	*Institute for Health Behavioural Research*
Dr Saiful Adli bin Suhaimi	*Institute for Health Behavioural Research*

DEDICATION

This study is devoted by the research team to the accomplishment of our objective(s). We anticipate that the findings of this study will assist healthcare providers in improving current flow and patients in improving their quality of life.

FOREWORD BY
THE DIRECTOR OF IHBR



We are immensely grateful for the opportunity to deliver this technical report as an official publication of the Institute for Health Behavioural Research (IHBR). Congratulations to the highly devoted team members for their dedication and commitment from the inception until the publication of this research. Their continuous efforts and hard work made this research and report possible. The ultimate goal of this study is to develop an instrument that can assess behavioural domains in an effort to improve the current practices in diabetes treatment, especially among T2DM patients. This report provides an in-depth explanation of the development process of an instrument via a study that involved both qualitative and quantitative methods.

Dr. Manimaran Krishnan
Director of Institute for Health Behavioural Research

ACKNOWLEDGEMENT

First and foremost, praises and thanks to the Almighty God, for His blessings throughout the preparation and completion of the technical report “The Diabetes Behavioural Diagnosis Instrument (DBDI): Development of Instrument in Enhancing Healthy Lifestyle among Type 2 Diabetes Mellitus (T2DM) Patients”.

The research team would like to extend our utmost appreciation to the Director General of Health for the permission to publish this report. Special thanks to Dr. Manimaran Krishnan, the Director of the Institute for Health Behavioural Research, for his vision and support that culminated in this report.

This report was also greatly assisted by the many bodies and individuals, including all the health authorities and patients who participated in this study. Their contributions are highly acknowledged and appreciated.

Last but not least, our deepest thanks to all the research team members for their effort and determination in producing this report. This is the result of all the hard work and challenges throughout the preparation and completion of this report.

May God bless you all.

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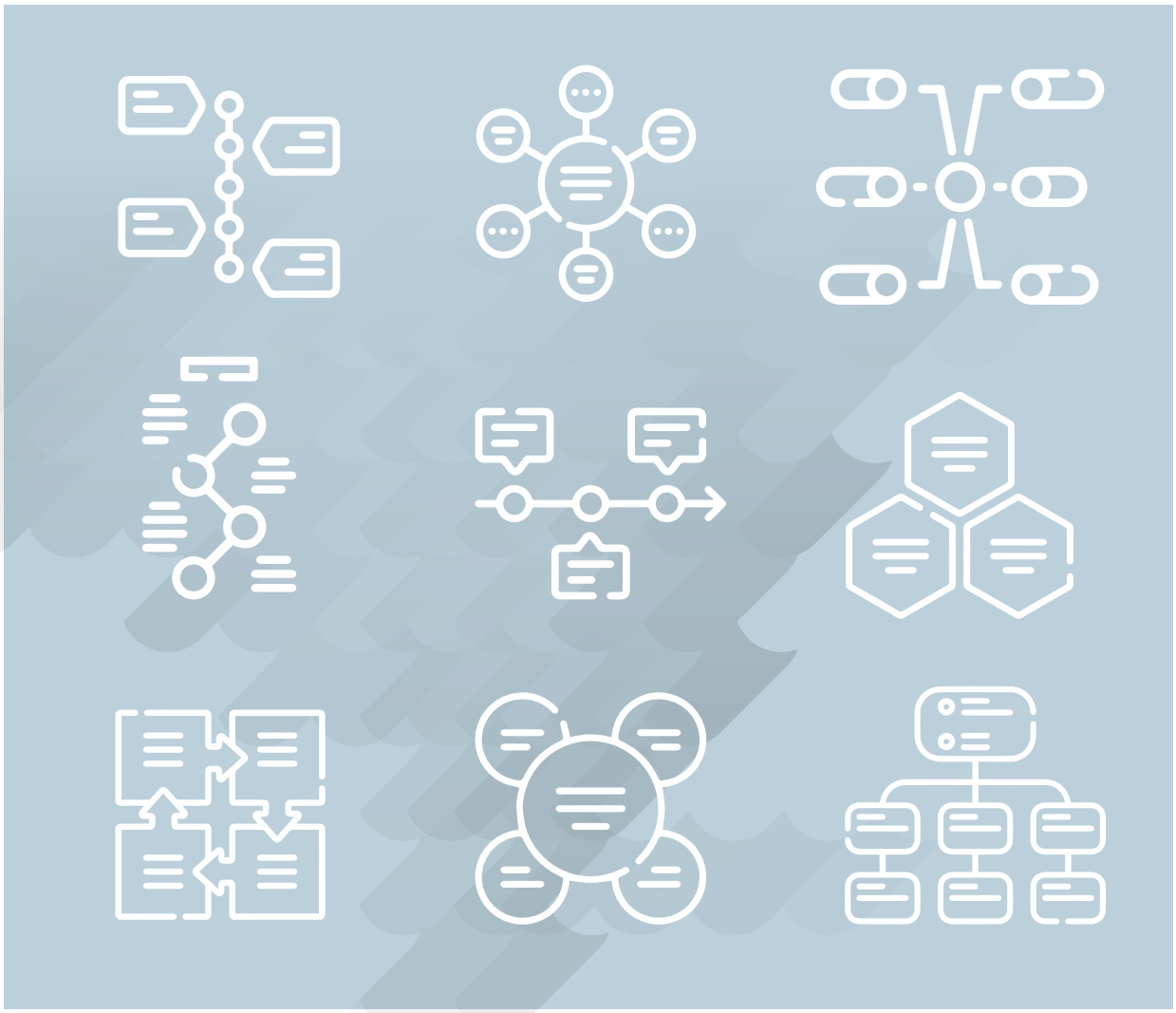
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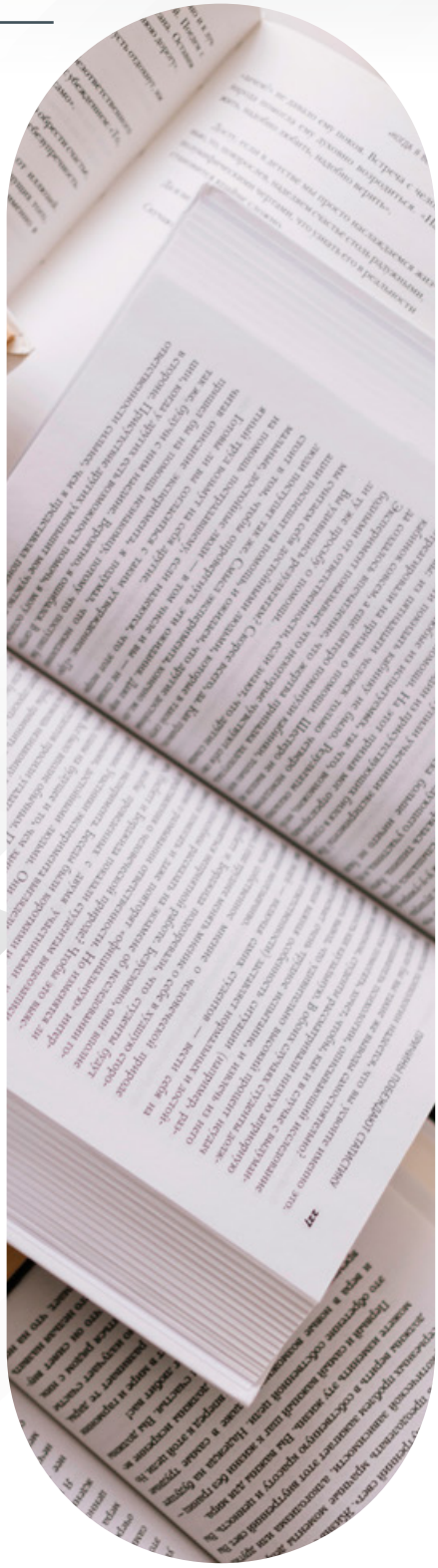
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LIST OF ABBREVIATIONS

Acronym	Description
T2DM	Type 2 Diabetes Mellitus
WHO	World Health Organization
NHMS	National Health and Morbidity Survey
NGO	Non-Governmental Organisation
MOH	Ministry of Health
CPG	Clinical Practice Guideline
DBDI	Diabetes Behavioural Diagnosis Instrument
DSMQ	Diabetes Self-Management Questionnaire
GM	Glucose management
SDSCA	Diabetes Self-Care Activities Measure
heiQ	The Health Education Impact Questionnaire
IDI	In-Depth Interview
FGD	Focus Group Discussion
HCP	Healthcare Provider
SMBG	Self-Monitoring Blood Glucose
BP	Blood Pressure
HbA1c	Haemoglobin A1c
FMS	Family Medical Specialist
MTAC	Medication Therapy Adherence Clinic
MNT	Medical Nutrition Therapy
DM	Diabetes Mellitus
DE	Diabetic Educator
TCM	Traditional and Complementary Medicine
TCA	To Come Again
CBT	Cognitive Behavioural Therapy
QR code	Quick Response code
EFA	Exploratory Factor Analysis
CFA	Confirmatory Factor Analysis
CVI	Content Validity Index
I-CVI	Item Level Content Validity Index
S-CVI	Scale Level Content Validity Index
NMMR	National Medical Research Registry
BMI	Body Mass Index
SD	Standard Deviation



EXECUTIVE SUMMARY

This project was fully funded by the Ministry of Health Malaysia (MOH) (NMRR-19-862-46635). Ethical clearance was obtained from the MOH Malaysia [(KKM/ NIHSEC/P19-1453(7)]. It was completed within two years.

This report aims to provide an overview of the process involved in developing the tool for evaluating the self-management of T2DM patients in the form of a questionnaire. The study was divided into two phases: 1. Exploring the domains involved in the self-management of T2DM patients and 2. Developing the items as indicators to measure T2DM patients' cognitive, affective, and skills concerning diabetes care to be included in the final tool, i.e. Diabetes Behavioural Diagnosis Instrument (DBDI).

This report is meant to enlighten policymakers, stakeholders, funding agencies, and all who are invested or interested in this topic. We hope that the dissemination of this report can contribute towards the development of effective health interventions and behaviour modification for self-care among T2DM patients to improve their quality of life.

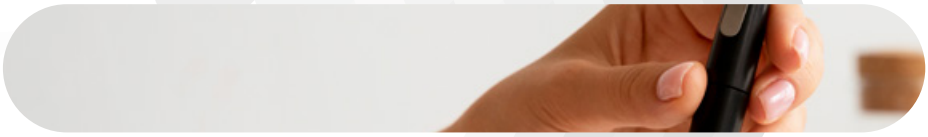
More importantly, this instrument can be incorporated into the clinical practice guidelines as a standard behavioural diagnosis for Type 2 DM patients to be used by the Diabetic Resource Centre in primary healthcare and hospital settings for effective personalised health behavioural interventions.



INTRODUCTION

Diabetes mellitus (DM) is a serious chronic disease that occurs when the pancreas does not produce sufficient insulin or when the body fails to use the insulin that is produced effectively (WHO, 2016). DM is one of the world's most serious public health problems and it causes a significant burden on both public health and socioeconomic development (Akhtar et al., 2022). Malaysia recorded the highest prevalence of DM in the Western Pacific region and one of the highest in the world, with an estimated annual cost of 600 million US dollars (Ganasegaran et al., 2020; Ganasegaran et al., 2021). Between 2011 and 2019, the prevalence of diabetes increased by 68.3%, rising from 11.2% to 18.3% (IPH, 2019). According to a Malaysian national survey report in 2019, as many as 3.6 million adults had diabetes, with another 3.7 million cases likely to be undiagnosed (The Star News, 2019). By 2025, DM is expected to affect 7 million Malaysian adults aged 18 and older with a prevalence of 31.3%, posing a significant public health risk (Institute for Public Health [IPH], 2020). The increasing trend of DM prevalence can be attributed to various factors, including aging population, urbanisation, obesity, and physical inactivity (Ho et al., 2014).

Diabetes patients require ongoing medical care, patient education, self-management, and consistent access to support systems (American Diabetes Association [ADA], 2013). According to WHO (2016), to reduce the prevalence of DM and improve the quality of life (QOL), multidisciplinary involvement of various government agencies, healthcare providers (HCPs), civil societies, non-governmental organisations (NGOs), food producers, and manufacturers is imperative. Lifestyle or behavioural changes are forefronts of the disease management of DM (Marchesini et al., 2010; Tuomilehto et al., 2001). A study conducted by Gillespie and Lenz (2011) revealed that abstaining from smoking, maintaining a healthy body weight, performing regular physical activity, following healthy eating habits, and consuming a moderate amount of alcohol can potentially prevent 90% of T2DM, 80% of coronary artery disease, and 70% of all strokes. Despite so, behaviour modification is frequently the main hindrance in the uptake and maintenance of these healthy lifestyle behaviours. In this regard, patient education is imperative as individualised education has been shown to promote behaviour change (Burke et al., 2014). Therefore, to customise suitable patient education, behavioural diagnosis in determining the aspects of behavioural determinants that require intervention is vital.







REVIEW OF LITERATURE

The Diabetes Behavioural Diagnosis Instrument (DBDI) is based on a variety of behavioural theories, including the Health Belief Model (Janz et al., 1984), Social Cognitive Theory (Bandura, 1986), Theory of Planned Behaviour (Ajzen, 1991), and Self-Regulation Theory (Carver & Scheler, 1998). The main domains of these theories revolve around behavioural changes in diabetic patient management, i.e. motivators, inhibitors/facilitators, intentions, and triggers. The interactions between these behavioural domains can be seen in the patient-centred approach or patient empowerment in diabetic patient management, all of which suggest that the patient is at the centre of the behaviour change process. In other words, the patient must implement diabetes self-care and thus be amenable to proposed changes. More importantly, the patient must be internally motivated to change (Peyrot & Rubin, 2007).

The authors conceptualised each domain based on the review of behavioural theories (Peyrot & Rubin, 2007). The first domain, i.e. motivators, includes factors that predispose one to action, such as perceived need, perceived benefits of treatment, outcome expectancies, rewards, incentives, as well as cues to action. Secondly, inhibitors or facilitators refer to barriers to or resources for actions whereby barriers can be both the absence of prerequisites to action (i.e., funds, skills, or support) or the presence of an obstacle. Next, intentions are the proximal causes of behaviour change. Individuals must have an intention to change and be willing to change before they can work towards a specific goal. Fourth, triggers are events that propel a person from a predisposed-to-action state to an action state. Finally, all these four theoretical domains were incorporated into the development and validation of the DBDI to measure the psychosocial domains of DM patients. In summary, Figure 2 depicts the theoretical framework of these four behavioural domains.

In the literature, various behavioural domains in research instruments/tools have been reported in relevant studies. Table 1 summarises the relevant scientific evidence with an emphasis on the importance of identifying information, motivation, and behavioural factors related to diabetes self-care. One of the most important aspects of good diabetes management is the access to information. Next, motivation is defined as factors that influence one to act or cues for one to change behaviours. Self-motivation and socio-motivation are two types of motivation. In addition, another behavioural characteristic discovered in this study is the individual's compliance with diabetes self-care.

Table 2 summarises a number of instruments used in T2DM patients. Based on previous research on diabetic self-care tools such as Schmitt et al. 2013 (Diabetes Self-Management Questionnaire [DSMQ]), Bujang et al. 2016 (Summary of Diabetes Self-Care Activities [SDSCA]), and Osborne et al. 2007 (The Health Education Impact Questionnaire [heiQ]), at least 12 domains were explored when developing the DBDI.

Most local and global studies on diabetes management are currently focused on domains such as medication, diabetes self-monitoring, exercise, diet, and physical activity. However, the assessment and monitoring of behaviour modification among DM patients require the use of a standardised and comprehensive instrument that not only measures clinical biomarkers but also other psychosocial indicators such as cognitive, attitude, and diabetic care skills (Fishbein et al., 2008). The assessment of different influences on the desired patient's behaviour (either impede or facilitate the behaviour), including the consideration of individual, social, environmental, and medical regimen factors, is defined as behaviour diagnosis (Bartlett, 1982).

In this study, we developed the Diabetes Behavioural Diagnosis Instrument (DBDI) that can be used in a Malaysian setting to provide a reliable and valid assessment of the cognitive, affective, and psychosocial domains of T2DM patients. This validated instrument may help HCPs to evaluate and monitor their patients' health. The availability of validated instruments for the behaviour diagnosis of T2DM patients can facilitate HCPs to better monitor patients' behaviour and implement the necessary interventions to improve diabetes control (Hackett et al., 2018).

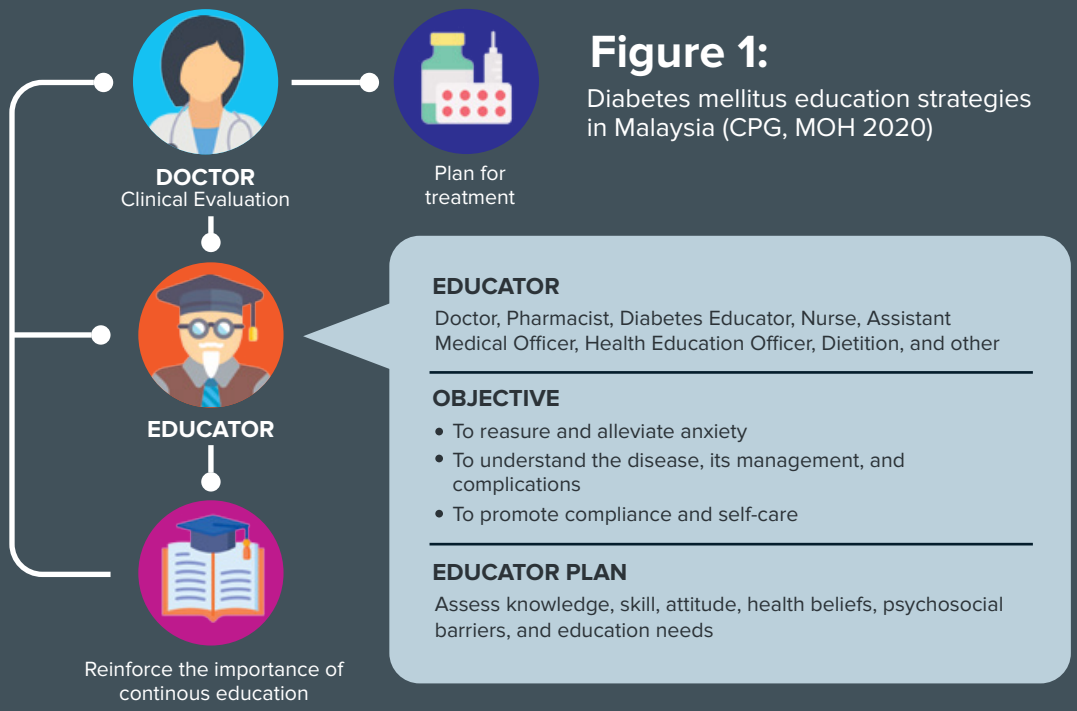


Figure 1:
Diabetes mellitus education strategies in Malaysia (CPG, MOH 2020)

2.2 | Theoretical Framework

The development of DBDI was based on several behavioural theories such as Health Belief Model (Janz et al., 1984); Social Cognitive Theory (Bandura, 1986); Theory of Planned Behaviour (Ajzen, 1991), and Self-Regulation Theory (Carver & Scheler, 1998). All these theories revolve around the effects of behaviour changes on diabetic patient management and can be categorised into four main domains, namely motivators, inhibitors/facilitators, intentions, and triggers. Theoretically, the interactions between these behavioural domains can be seen in the patient-centred approach or patient empowerment in diabetic patient management. Fundamentally, the patient is regarded as the centre of the behaviour change process whereby the patient must implement diabetes self-care and be amenable to the proposed changes. More importantly, the patient must be internally motivated to change (Peyrot & Rubin, 2007).

In a review of behavioural theories (Peyrot & Rubin, 2007), the authors conceptually defined each domain. Firstly, motivators include factors that predispose one to action, such as perceived need, perceived benefits of treatment, outcome expectations, rewards/ incentives, and cues to action. Secondly, inhibitors/ facilitators refer to barriers to or resources for action. Barriers can be the absence of prerequisites to action (i.e. resources such as funds, skills, or support) or the presence of an obstacle.

Thirdly, intentions are the proximal causes of behaviour change. In short, individuals must have the intention to change, be ready to change in the present and have a particular goal that they can work towards. Lastly, triggers are events that can shift a person from being predisposed to action into the action state. Together, these four theoretical domains were embedded in the development and validation of DBDI with the ultimate aim of measuring these psychosocial domains in T2DM patients. Figure 2 shows the theoretical framework of these four behavioural domains.

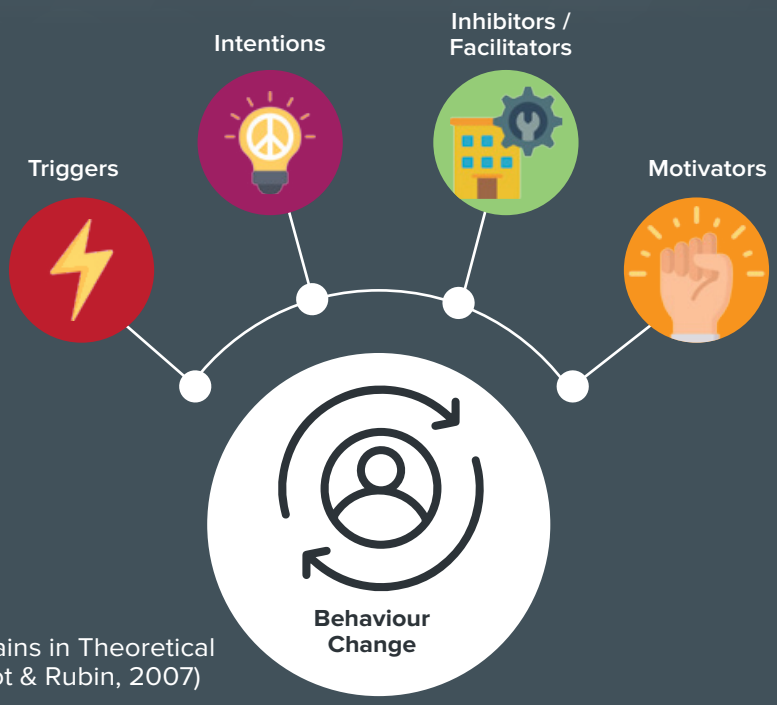


Figure 2 :
Behavioural Domains in Theoretical Framework (Peyrot & Rubin, 2007)

2.3 | Non-compliance and Other Factors Associated with Diabetes Self-Care Management

This study applied a scoping review technique to review previous literature with regard to behavioural diagnosis and behavioural modifications among T2DM patients in Malaysia and other countries. The objective of the scoping review was to identify and analyse the various behavioural domains used in the research instrument/tools in the relevant studies. The following keywords were used in the scoping review: diabetic patient, behavioural diagnosis, behavioural modifications, patient behaviour, patient assessment, and psychometric assessment. Publications between 2000 and 2019 were included in the search.

The summary findings of the scoping review are tabulated in Table 1. It provides an overview of the scientific evidence surrounding the importance of identifying information, motivation, and behavioural factors related to diabetes self-care. Information was one of the most important aspects of good diabetes management. Similarly, factors that influence one to action and cues to behaviour change can be theoretically defined as motivation. Motivation can be categorised as self-motivation or socio-motivation. Lastly, compliance with diabetes self-care is one of the additional behavioural characteristics discovered in this study.

Table 1:

Summary of Gaps/ Non-Compliance in Previous Literatures

DOMAIN	Gaps / Non-compliance	Attribute factors	Literature(s)

INFORMATION	• Unaware of characteristic of Diabetes by higher glucose level
	• Unaware regarding normal level of blood glucose
	• Lack of knowledge on insulin level in their type of Diabetes
	• Patient misunderstood insulin as harmful
	• Misunderstood that Diabetes can be cured
	• Misunderstood that Diabetes can be cured by bitter food
	• Patient considered fast food as healthy food
		• Financial condition
		• Communication between HCP (regular follow up)
		• Barriers with HCP
		  ✓ Information providing approaches
		  ✓ Lack of consultation time (due to patient load)
		  ✓ Lack of knowledge among HCP
		• Lack of facility in clinic (no proper established process)
		• Existence of alternative medication (Ayurveda, spiritual healers and Homeopathy)
		• Socio demographic factors
		  ✓ Population area (rural / urban area)
		  ✓ Age
		  ✓ Gender
		  ✓ Race
		  ✓ Profession
		  ✓ Level of education
		  ✓ Family history
		  ✓ Duration of Diabetes
			Duke et al. (2018); Karimy et al. (2018); Kueh & Kuan (2018); Nagar et al. (2018); Rahaman et al. (2017); Solanki et al. (2017); Islam et al. (2016); Nazir et al. (2016); Istepanian (2015); Mohammadi et al. (2015); Shrestha et al. (2015); Ahmad et al. (2014); Burke et al. (2014); Rathod et al. (2014); Lalazaryan & Zare-Farashbandi (2014); Saleh et al. (2012a); Upadhyay et al. (2012); Bains & Egede (2011); Wu et al. (2011); Mukhopadhyay et al. (2010)

MOTIVATION	**Social Motivation**		
	• Accessibility to facility • Frequent follow up • Waiting time for appointment • Doctors' limited time • Companionship in physical activity	• Relationship with Health Care Providers (HCP) • From family members • Tangible support (Financial/ Instrumental)	*Neblett et al. (2019); Rashid et al. (2018); Karimy et al. (2018); Al Hamid et al. (2017); Gao et al. (2013)*
	Self-Motivation		

	• Positive attitude towards
	  ✓ Dietary modification, regular exercise, medication and SMBG control
	  ✓ Importance of family awareness
	  ✓ Prevention of obesity
		• Experienced symptom themselves or observe in fellow patients
		• Socio demographic
		  ✓ Level of education
		  ✓ Gender
		  ✓ Duration of disease
			Gautam et al. (2015); Zareban et al. (2014); Al-Maskari et al. (2013); Hawal et al. (2012); Saleh et al. (2012b); Ardena et al. (2010); Mukhopadhyay et al. (2010)

	• Negative attitude towards
	  ✓ Having Diabetes
	  ✓ Dietary modification & exercise
	  ✓ Measure to detect early complications of Diabetic (periodic eye examination, BP monitoring and Hypoglycaemia)
		• Lack of education programme
		• Regular self-monitoring
		• Ignorance
		• High level confidence
		• Unsatisfied with the treatment
		• Felt irritated after taking medicines being ill, being lazy, or had a preference of tablets over injection	

DOMAIN	Gaps / Non-compliance	Attribute factors	Literature(s)
MOTIVATION	**Self-Motivation**		
	Perception on Diabetes	Poor perspective on Diabetes selfcare Negative perception in usefulness of life Different races showed various perceptions Misbelieved by elderly on certain guideline factors for diabetes treatment in opposition to the recommended guidelines	*Elmira et al. (2018); Solanki et al. (2017)*
	Coping with stress	Lack of knowledge on handling stress method Culture Chinese less expressive Visit psychiatrist as shameful Severe disability (need help with daily task) No significant association between self-care management and depression	*Mikhael et al. (2019); Radzi et.al (2019); Wu et al. (2011)*
BEHAVIOUR	Diet / metabolism intake	Culture in yogya (sweet food), Iraq (food preparation) Social & family gathering Refuse food given consider impolite Social habits such as eating out and home-prepared foods affected diet intake	*O'Connor et al. (2020); Mikhael et al. (2019); Neblett et al. (2019); Al Hamid et al. (2017); Primanda et al.*
	SMBG Difficulty affording diabetes equipment (Glucometer test strip)	Could not afford a glucometer Test strips were claimed to be expensive	*Herkert et al. (2019); Papo et al. (2019); Mukhopadhyay et al. (2010)*
	Medication Medicine compliance with free medicine Insulin underutilized	Forgetfulness Concern for adverse effects Religious practices Financial constraint	*Persaud et al. (2020); Herkert et al. (2019)*
	Medication Medicine compliance with free medicine Insulin underutilized	Forgetfulness Concern for adverse effects Religious practices Financial constraint	*Persaud et al. (2020); Herkert et al. (2019)*
	Physical activity	Gender Occupational status Social lifestyle Environmental factor Physical limitation Time constraint (busy lifestyle) Accessibility to exercise facility	*Alshayban & Joseph (2020); Mikhael et al. (2019); Price et al. (2018); Al-Aboudi et al. (2016); Al-Maskari et al. (2013)*

DOMAIN	Gaps / Non-compliance	Attribute factors	Literature(s)
BEHAVIOUR	Follow-up with HCP (Appointment)	Negative attitude towards HCP (physicians) Busy schedule Fear of complication and environmental factors Traveling Lack of trust	*Mikhael et al. (2019)*
	Lifestyle	Socio demographic Level of education Gender Marital status (social support) Duration of disease Geographic factor- weather, dangerous sectional violence (war) Society lifestyle-female mostly stay at home	*Mikhael et al. (2019); Al-Aboudi et al. (2016); Kohli et al. (2015); Al-Maskari et al. (2013); Saleh et al. (2012a)*
	Relationship between HCP-Patient	Sub optimal knowledge of guideline Time and facility constraint Focus on acute management rather than preventive care Competing care demand Delay in clinical	*Mukhopadhyay et al. (2010)*

2.4 | Summary of Previous Instruments of Self-Care Behaviour Among T2DM Patients

Table 2 below summarises several instruments that have been used among T2DM patients internationally and locally. Based on previous literature on diabetic self-care tools, i.e. Schmitt et al 2013 (Diabetes Self-Management Questionnaire [DSMQ]); Bujang et al 2016 (Summary of Diabetes Self-Care Activities [SDSCA]) and Osborne et al. 2007 (The Health Education Impact Questionnaire [heiQ]), at least 12 domains should be explored in the development of DBDI. Currently, most published countries pertaining to DM patient management are focused on domains such as medication, diabetes self-monitoring, exercise, diet, and physical activity. However, the assessment and monitoring of behaviour modification among DM patients require a more standardised and comprehensive instrument that measures not only clinical biomarkers but also other psychosocial indicators such as cognitive, attitude, and skills regarding diabetic care (Fishbein et al., 2008).

Behaviour diagnosis is defined as the assessment of various influences on the desired patient's behaviour. The influences can be individual, social, environmental, or medical regimen factors that may either impede or facilitate certain behaviours (Bartlett, 1982). Behavioural diagnosis plays a crucial role in healthcare as it allows a comprehensive identification and analysis of various factors that cast a direct impact on a patient's behaviour, either in a positive or negative manner. It also serves as a fundamental process to understand the complex interplay of variables that influence the desired patient behaviours. Via behavioural diagnosis, healthcare professionals can gain valuable insights into the multifaceted aspects that contribute to patient behaviours so that targeted interventions and strategies aimed at promoting positive behaviours and improving patient outcomes can be put in place.

Therefore, this study proposed the development of DBDI, an instrument that can be used in the Malaysian setting to provide a reliable and valid assessment pertaining to the cognitive, affective, and psychosocial domains of T2DM patients. Such an instrument can assist HCPs in evaluating and monitoring patients' health. By encompassing comprehensive assessments of cognitive, affective, and psychosocial domains, this instrument represents a reliable and valid means of evaluating and understanding the behaviours exhibited by T2DM patients. Furthermore, it can be used to identify key areas in which patients may require additional support, either in the form of cognitive strategies for self-management, support for emotional wellbeing, and ways to address other psychosocial factors that impact diabetes control. The availability of a validated instrument to diagnose behaviour among T2DM will allow HCPs to monitor patients' behaviour and customise their interventions to enhance diabetes control (Hackett et al., 2018).

Armed with a comprehensive understanding of patients' cognitive, affective, and psychosocial profiles, HCPs can customise strategies that address specific needs and challenges faced by individuals with diabetes. Such a targeted approach can improve the effectiveness of interventions, ultimately enhancing patient outcomes and overall health. We believe that this instrument has the potential to positively impact diabetes management among DM patients and contribute to improved patient health outcomes in the Malaysian healthcare setting.

Table 2:

Summary of Instrument of Self-Care Behaviour among T2DM Patients

Researcher (year of study)	Name of Instrument	Domain Measurement	No of Item	Scale Measurement	Reliability	Strengths/ Limitation
International						
Schmitt et al. (2013)	Diabetes Self-Management Questionnaire (DSMQ)	4 main domains • Glucose management (GM) • Dietary control • Physical activity • Health-care use (over the last 8 weeks)	16	4-point Likert scale	Internal consistency: Cronbach's α: overall 0.84, GM-0.77, DC – 0.77, PA – 0.76 & HU – 0.60	• DSMQ as preferable tool when analysing behavioural problems related to reduced glycaemic control • Origin version in German and translated to English
Huang and Hung (2007)	Self-Care Behaviour Scale	• Exercise • Diet • Medication • SMBG • Self-care of feet • Prevention of high and low blood glucose	26	5-point Likert scale	Internal consistency: Cronbach's α: overall 0.92	
Toobert DJ; Hampson SE; Glasgow RE (2000)	Diabetes Self-Care Activities Measure (SDSCA). 1993 and revised in 2000	5 main domains • General diet • Specific Diet • Exercise • Blood-Glucose Testing • Foot Care • Smoking (during the previous week/7 days)	11	7-point Likert scale	Internal consistency: Cronbach's α: overall 0.84, GM-0.77, DC – 0.77, PA – 0.76 & HU – 0.60	• Practical tool with 11 items only and commonly used • The revised SDSCA has been validated many times in various language • A poor association with the level of glycaemic control

Researcher (year of study)	Name of Instrument	Domain Measurement	No of Item	Scale Measurement	Reliability	Strengths/ Limitation
Malaysia						
Bujang et al. (2016)	Validation of the Summary of Diabetes Self-Care Activities (SDSCA) In Malay Language for Malaysian Adults	5 main domains • General diet • Specific Diet • Exercise • Blood-Glucose Testing • Foot Care • Smoking (during the previous week/7 days)	11	Scoring (During 7 Days, 0 - 7 days)	Internal consistency: Cronbach's α: between 0.651 and 0.905	• Practical tool with 11 items only and commonly used • This study did not conduct test-retest reliability • However, there was no major weakness because the SDSCA has been proven as a stable instrument with strong reliability and validity
Ang et al. (2018)	Diabetes Self-Management Questionnaire (DSMQ) in Malay M-DSMQ	4 main domains • Glucose management (GM) • Dietary control • Physical activity • Health-care use (over the last 8 weeks)	16	4-point Likert scale	Internal consistency: Cronbach's α: 0.91	

2.5 | Objective

The main objective of this study is to develop and validate an instrument that can measure behavioural domains with regard to diabetes care among T2DM patients.

2.5.1 | Specific Objective

The specific objectives of this study include:

1. To explore and synthesise all the literature related to behavioural domains among T2DM patients.
2. To develop items that can be used as indicators to measure the knowledge, motivation, and behaviours concerning diabetes care among T2DM patients.
3. To validate the tool, i.e. Diabetes Behavioural Diagnosis Instrument (DBDI) to assess T2DM patients' knowledge, motivation, and behaviours in the management of T2DM patients.

METHODOLOGY

3.1 | Study Design

There are three stages in this study, namely 1) Preliminary conceptual decisions including the selection of a conceptual model that included a review of existing behavioural diagnosis instruments and possible items through In-Depth Interviews (IDI) and Focus Group Discussion (FGD) to guide the development process; 2) Assessment of comprehensibility followed by item revision (content validity & face validity; and 3) Instrument validation (pre-test & pilot study).

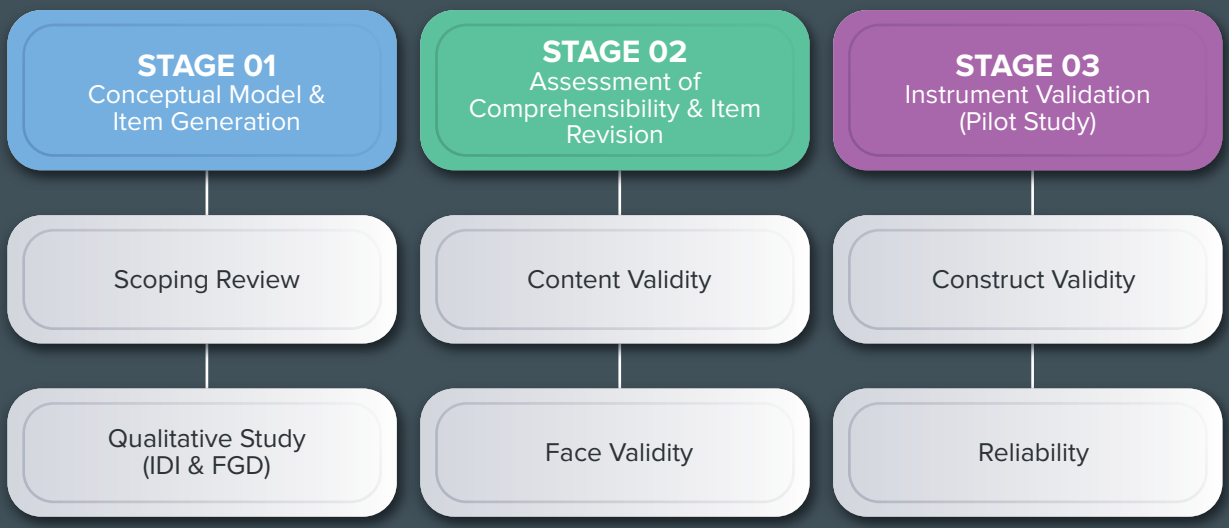


Figure 3 :
Stage in Development of DBDI

3.1.1 | Stage 1: Conceptual Model & Item Generation

3.1.1.1 Scoping Review

A scoping review was conducted to review previous literature on behavioural diagnosis and behavioural modifications among T2DM in Malaysia and other countries. This was done to guide the IDI and FGD. The scoping review aimed to identify and analyse the various behavioural domains in the research instrument/tools published in the relevant studies. The keywords applied in the literature search included: diabetic patient, behavioural diagnosis, behavioural modifications, patient behaviour, patient assessment, and psychometric assessment. Only studies published between 2000 and 2019 were included in the scoping review.

3.1.1.2 Qualitative Study (IDI and FGD)

A qualitative study was then conducted using IDI among T2DM patients. In addition, an FGD was also conducted among HCPs. The main objective of conducting IDI and FGD was to obtain qualitative data for the generation and development of the domains and items to be included in DBDI.

a Data Collection Procedures

The study was carried out in two healthcare facilities: Hospital Tengku Ampuan Rahimah (HTAR) and Meru Health Clinic (Klinik Kesihatan Meru), both located in Selangor. These two facilities were considered in terms of size, capacity, locality, and area. Informed consent was obtained from the patients before the interview. They were informed that the interview sessions would be audio-recorded and his/her privacy would be assured. The interviews were conducted with one facilitator and one note-taker in a private room. Each session lasted 45 to 60 minutes. The qualitative data collection process is summarised in Figure 4 below.

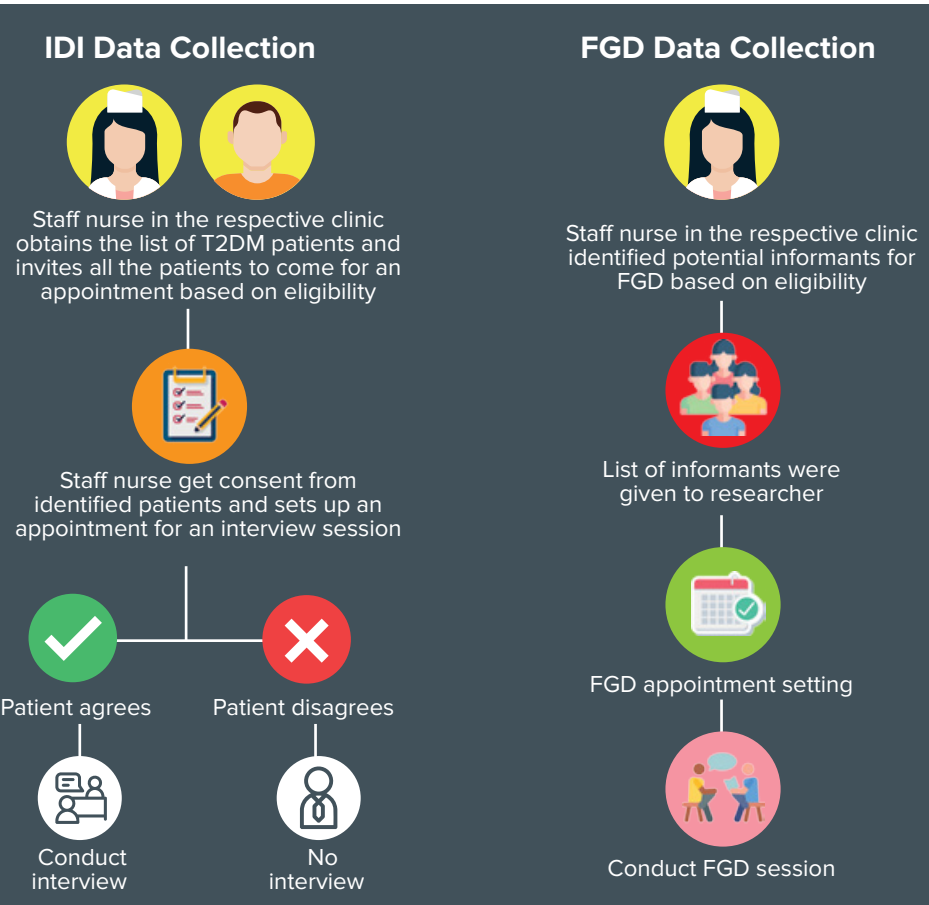


Figure 4 :
IDI and FGD Data Collection Procedures

b Sampling Method

A purposive sampling was utilised to select eligible participants for IDI and FGD. The IDI participants were patients attending both facilities recruited via nurse supervisors while FGD participants consisted of various groups of HCPs including medical officers, endocrinologists, pharmacists, family medical specialists (FMS), dietitians, diabetic educators, and physiotherapists.

c Sample Size Calculation

The sample size for IDI was calculated based on the Minimum Maximum Variation Sampling (Patton & Collumbien et al., 2012) in which the researcher's judgment was used to select participants with diverse characteristics whereas the FGD sample size was calculated using segmentation (Morgan, 1996). The participants were then categorised as either controlled or uncontrolled T2DM patients based on their HbA1c level. As for the HCPs, they were categorised as management, professional, or paramedic. The interviews were continued until data saturation was achieved. Sample size calculations for IDI and FGD are tabulated in Table 3 and Table 4.

Table 3:

Minimum – Maximum Sampling Matrix Variation for IDI

		Malay		Chinese		Indian		Total
Area	**Group**	**Male**	**Female**	**Male**	**Female**	**Male**	**Female**	
HTAR	Controlled	1-2	1-2	1-2	1-2	1-2	1-2	6-12
	Uncontrolled	1-2	1-2	1-2	1-2	1-2	1-2	6-12
KK Meru	Controlled	1-2	1-2	1-2	1-2	1-2	1-2	6-12
	Uncontrolled	1-2	1-2	1-2	1-2	1-2	1-2	6-12
	Total	4-6	4-6	4-6	4-6	4-6	4-6	**24-36**

Table 4:

Sampling Matrix for FGD

Area	Group	Total
HTAR	Management and Professional	6-10
	Paramedic	6-10
KK Meru	Management and Professional	6-10
	Paramedic	6-10
	Total	**24-40**

d Inclusion and Exclusion Criteria

The inclusion and exclusion criteria used for the selection of IDI and FGD participants are tabulated in Table 5.

Table 5:

Inclusion and Exclusion Criteria

Criteria	Inclusion	Exclusion
IDI	a. Able to communicate in Malay or English b. Duration of having diabetes - more than three years c. T2DM patients 18 years and above d. Mentally fit	a. Not able to communicate in Malay or English b. Duration of having diabetes less than three years c. T2DM patients below 18 years
FGD	a. Diabetic Resource Centre Staff inclusive of Endocrinologists, Family Medicine Specialists, Medical Officers, Health Education Officers, Dietitians, Counsellors, Pharmacists, Staff Nurses, Medical Assistants, and Physiotherapists (involved in handling diabetes patients) b. Willing to participate in the FGD	a. Not willing to participate in the FGD

e Interview Guides

A semi-structured interview guide used in the IDI and FGD are available as Appendices 1 and 2 respectively.

f Training and Quality Control

Training sessions prior to actual data collection were carried out on 6th August 2019 at KK Meru. The quality control for qualitative data collection involved the use of an audio recorder, note-taking during IDI and FGD, as well as transcription. First, an audio recorder was utilised to capture the participants' responses and interactions accurately during IDI and FGD. Apart from that, the researchers actively took notes, documented key points and participants' responses as well as made noteworthy observations. These notes served as a supplementary reference to facilitate the analysis process, ensuring that no significant information was overlooked. Lastly, accurate interview transcription from audio recording into written text is vital in maintaining the quality control of qualitative research. By transcribing, researchers can conduct a more comprehensive analysis by reviewing and coding the transcribed data systematically. This process ensures the accuracy of representing participants' spoken words, nuances, and non-verbal cues in the results, thereby enhancing the overall validity and reliability of the qualitative data. Overall, these methods can facilitate thorough documentation of participants' insights and experiences to produce robust findings that can make valuable contributions to the research.

g Data Collection

FGD and IDI were conducted from November until December 2019.

h Thematic Analysis

Descriptive codes were generated by exploring the words and phrases in the interviews to uncover shared meanings and perceptions across all the participants using a thematic analysis approach. All of the themes expressed in the interviews were identified either based on the previous literature or as emerging themes from the data. All themes from both literature and newly emerging works were refined and then incorporated into the design of the instrument.

3.1.2 | Stage 2: Assessment of Comprehensibility & Item Revision

3.1.2.1 Content Validity

The panel of subject matter experts for content validity included endocrinologists, general physicians, health education officers, diabetes nurse educators, and dietitians who evaluated the initial version of DBDI. They were required to evaluate the relevance and clarity of each item to determine the adequacy of language, content, and structure of the overall instrument. The process of content validity involves measuring the instrument based on the construct of interest (relevance & representativeness). It was recommended to have at least three experts who rate the items on a four-point scale with 1=not relevant, 2=somewhat relevant, 3=quite relevant, and 4=highly relevant (Polit & Beck, 2006).

3.1.2.2 Face Validity

Face validity was assessed by recruiting a convenience sampling of T2DM patients from the target group to obtain feedback on the language used, the clarity and relevance of the questions, as well as the ease for the respondents to answer the questions. The minimum sample size required was 30 respondents (Perneger et al., 2015). In this study, face validity was performed in two cycles. Each cycle was done after the instrument evaluation by subject matter experts and psychometric experts with a total of 30 and 40 T2DM patients respectively.

3.1.3 | Stage 3: Instrument Validation (Pilot Study)

A pilot study was conducted to validate the instrument. The process employed the use of construct validity and reliability to determine the subdomains within the Information, Motivation, and Behaviour (IMB) construct to confirm the consistency of the item in the instrument.

3.1.3.1 Pilot Study

a Study Location and Duration

The study initially aimed to cover the entire geographical area of Malaysia as outlined in Table 6. However, due to the COVID-19 pandemic and the subsequent movement restrictions, the study was restructured and confined only to the state of Selangor for logistical reasons.

Table 6:

Study Location by Malaysia Zoning

Area	Group	Urban		Rural	
		Hospital	Klinik Kesihatan (KK)	Hospital	Klinik Kesihatan (KK)
North	Pulau Pinang	Hospital Pulau Pinang	KK Jln Perak	Hospital Balik Pulau	KK Bukit Jambul
East	Pahang	Hospital Tengku Ampuan Afzan	KK Bandak Kuantan	Hospital Pekan	KK Pekan
Middle	Selangor	Hospital Putrajaya	KK Putrajaya Presint 9	Hospital Banting	KK Telok Datok
South	Melaka	Hospital Melaka	KK Peringgit	Hospital Jasin	KK Jasin
Sabah	Sabah	Hospital Queen Elizabeth II	KK Luyang	Hospital Ranau Hospital Tuaran	KK Bundu Tuhan KK Tamparuli
Sarawak	Sarawak	Hospital Umum Kuching	KK Jalan Masjid	Hospital Bau	KK Singai

The study location was further narrowed down to health clinics (KK) and hospitals in the seven districts of Selangor; Petaling, Klang, Kuala Selangor, Kuala Langat, Shah Alam, Gombak, and Banting (Table 7).

Table 7:

Health Facilities Involved in The Pilot Study

District	Health Facility Name
Petaling	Klinik Kesihatan Kelana Jaya Klinik Kesihatan Seri Kembangan
Klang	Klinik Kesihatan Rantau Panjang Klinik Kesihatan Kapar Klinik Kesihatan Botanik
Kuala Selangor	Klinik Kesihatan Tanjung Karang Klinik Kesihatan Kuala Selangor
Kuala Langat	Klinik Kesihatan Jenjarom Klinik Kesihatan Telok Panglima Garang
Shah Alam	Hospital Shah Alam
Gombak	Hospital Selayang
Banting	Hospital Banting

However, the three hospitals were also removed as they were designated as COVID-19 treatment centres. Ultimately, the data collection was conducted from September until November 2021 in the health clinics in the districts of Petaling, Klang, Kuala Selangor, and Kuala Langat.

b Study Population and Sampling Method

Data was obtained from T2DM patients who sought treatment at the designated health clinics. Convenience sampling was employed to select eligible participants. The recruitment was facilitated by nurse supervisors at each facility.

c Training and Quality Control

Training sessions were conducted prior to data collection to ensure familiarity and a standardised understanding of the questionnaire. Team members with limited experience underwent continuous medical education (CME), participated in mock data collection, and received training in data management as part of their preparation for the actual data collection.

Quality monitoring was also performed throughout the data collection to ensure that the questionnaire was properly completed and all information provided was consistent. Quality control was conducted by data collectors at the respective sites by checking the completeness of the instrument. Furthermore, before leaving the data collection site, the team leader randomly picked 10% of the questionnaires collected to check if all questions had been answered.

3.2 | DBDI Version for Pilot Study

The questionnaire was initially divided into six sections that included 132 questions. The first section captured personal information and demographic profile including age, gender, ethnicity, religion, marital status, living situation, education level, occupation, household income, duration of diabetes, other comorbid diseases, family history of diabetes, medication intake, type of treatment received, attendance of diabetes management class, sources of diabetes information, recent HbA1c level, body mass index (BMI), and smoker. In the next section, the question was designed under construct Information (Sections A and B). Under Section A, questions was categorised as dichotomous (Correct or Wrong) while multiple answer options were provided in Section B. Patients were also asked regarding the general knowledge of diabetes and diabetes self-care.

Responses for the section under the construct of Motivation (Section C) were categorised as five-point Likert Scale (Strongly Disagree, Disagree, Neutral, Agree, and Strongly Agree). T2DM patients were required to answer based on their self-motivation and the support they need for diabetes self-care. The Behaviour construct was divided into two sections. For Section D, the participants were required to answer based on their self-care activity using the response selection of a five-point Likert Scale (Often, Sometimes, Rarely, Never, Not Applicable). Lastly, in Section E, the patients were required to answer the frequency and duration of the physical activity performed (Never, Less than 20 minutes, 20-60 minutes, more than 60 minutes, Not Applicable).

3.2.1 | Exploratory Factor Analysis (EFA) and Confirmatory Factor Analysis (CFA)

Item construction was validated using factor analysis, i.e. Exploratory Factor Analysis (EFA) and Confirmatory Factor Analysis (CFA). Factor analysis is a series of psychometric analyses to test the dimensionality (internal structure) of the construct measurement (Bandalos & Finney, 2019; Mvududu & Sink, 2013). EFA is also performed to delineate the implicit dimensionality between sets of items by identifying the clusters of items into factors or domains, each of which represents a different component of the larger construct that is being measured (Beavers et al., 2013).

Initially, the suitability of the data was determined based on a Kaiser Meyer Olkin (KMO) value of 0.6 and above and a significant value of Bartlett's test of less than 0.05. To identify the total number of factors or domains to be extracted, eigenvalues of 1.0 and above with a minimum factor loading of 0.35 were set as the standardised score. After that, experts and research team members decided on the relevance of the factor or the need for further refinement.

CFA or reliability analysis was also conducted to determine the consistency of scores of the factors or domains derived (Gregory, 2016). The internal reliability was measured by Cronbach's alpha (α = 0.8, good; α = 0.6, acceptable). All statistical analyses were performed using the Statistical Packages for Social Sciences (SPSS) software Version 26.

3.3 | Ethical Consideration

This study received ethical approval from the National Medical Research Registry (NMMR) of MOH. In addition, permission was also obtained from the respective heads of health clinics. All participants were provided with an information sheet and informed consent form before the start of the data collection.

RESULTS

4.1 | Participant Characteristics

A total of 21 IDIs were conducted among nine female and 12 male T2DM patients. Their average age was 56 years. Table 8 and Table 9 show the demographic profiles of IDI respondents. As for the FGD, a total of 15 informants (13 females and two males) from various fields participated in providing their perspectives on the behaviours of T2DM patients. Table 10 and Table 11 show a detailed summary of the FGD respondents' demographic profiles.

Table 8:

Summary of Demographic Profile for IDI Respondents

Variables		N (%)
Gender		
	Female	9 (43)
	Male	12 (57)
Age (years old)		
	49 or below	6 (29)
	50-59	6 (29)
	60 or above	9 (42)
Ethnicity		
	Malay	8 (38)
	Chinese	5 (24)
	Indian	7 (33)
	Others	1 (5)
Religion		
	Islam	8 (38)
	Buddha	4 (19)
	Hindu	7 (33)
	Others	2 (10)
Education Level		
	Primary school	3 (14)
	Secondary	12 (57)
	Tertiary	6 (29)
T2DM Diagnosis (Years)		
	5 or less	5 (24)
	5-10	11 (52)
	More than 10	5 (24)

Table 9:

Details of Demographic Profile for IDI Respondents

ID	Gender	Age	Race	Religion	Education Level	Occupation	DM Since	Smoker	Medication intake
I1KMM46	Male	46	Malay	Islam	Tertiary	Manager	2016	No	N/A
I2KMF65	Female	65	Malay	Islam	Primary	Unemployed	2016	No	Pill 2 x 2 /day
I3KMF46	Female	46	Indian	Hindu	Secondary	Unemployed	2014	No	N/A
I4KMM64	Male	64	Indian	Hindu	Secondary	Unemployed	2015	No	N/A
I5KMF50	Female	50	Malay	Islam	Secondary	Business	2015	N/A	Pill 1 x 2 /day
I6KMM44	Male	44	Chinese	Buddha	Secondary	Unemployed	2010	No	Pill 1 x 2 /day
I7KMM53	Male	53	Malay	Islam	Secondary	Unemployed	2009	No	Pill 1 x 2 /day
I8KMF48	Female	48	Indian	Hindu	Secondary	Unemployed	2016	N/A	Pill
I9KMM66	Male	66	Indian	Hindu	Secondary	Private sector	2012	No	Pill
I10KMM66	Male	46	Chinese	Buddha	Secondary	Transporter	2009	Yes	Pill
I11KMF79	Female	79	Chinese	Buddha	Primary	Unemployed	2011	No	Pill 1 x 2 /day
I1HTF57	Female	57	Indian	Hindu	Secondary	Unemployed	2002	No	Pill 2 x 2 /day
I2HTM59	Male	59	Sinhalese	Christian	Tertiary	Private sector	2012	No	Pill 2 x 2 /day
I3HTM61	Male	61	Indian	Hindu	Tertiary	Lecturer	1996	No	Pill & Insulin
I4HTM55	Male	55	Malay	Islam	Secondary	Technician	2009	No	Pill 2 x 2 /day
I6HTF29	Female	29	Indian	Hindu	Tertiary	Private sector	2011	No	Insulin 3 x /day
I7HTM60	Male	46	Chinese	Buddha	Primary	Unemployed	2015	No	Insulin
I8HTF39	Female	39	Malay	Islam	Secondary	Unemployed	2011	No	Insulin & Pill
I9HTM72	Male	72	Chinese	Christian	Secondary	Self-employed	2007	Yes	Pill
I10HTF63	Female	63	Malay	Islam	N/A	Pensioner	2005	No	Insulin

Table 10:

Summary of Demographic Profile for FGD Respondents

Variables	Number of HCP
Position	
Dietician	2
Endocrinologists	3
Medical Officer	2
Pharmacist	4
Diabetic Nurse Educator	4
Involved in DM management (years)	
- 5	2
5-10	8
+ 10	2
Not Stated	3

Table 11:

Details of Demographic Characteristic for FGD Respondents

ID	Gender	Age	Race	Religion	Education Level	Occupation	Service in DM	Expertise
F1KM	Female	34	Malay	Islam	Bachelor	Dietician	10 years	Dietician
F2KM	Female	43	Malay	Islam	Bachelor	Medical Officer	10 years	Medical Officer
F3KM	Female	29	Malay	Islam	Bachelor	Pharmacist	N/A	N/A
F4KM	Female	34	Chinese	Buddha	Bachelor	Pharmacist	N/A	N/A
F5KM	Female	30	Malay	Islam	Bachelor	Medical Officer	N/A	N/A
F6KM	Female	44	Malay	Islam	Diploma	Staff Nurse	3 years	Primer
F1HT	Male	29	Chinese	Buddha	Bachelor	Dietician	5 years	N/A
F2HT	Male	37	Malay	Islam	Master	Medical Officer	12 years	Internal Medicine
F3HT	Female	31	Indian	Hindu	Bachelor	Medical Officer	7 years	Medical MO
F4HT	Female	37	Malay	Islam	Diploma	Diabetes Educator	9 years	N/A
F5HT	Female	33	Malay	Islam	Diploma	Diabetes Educator	6 years	N/A
F6HT	Female	32	Chinese	Buddha	Bachelor	Pharmacist	8 years	N/A
F7HT	Female	35	Chinese	Buddha	Bachelor	Pharmacist	9 years	N/A
F8HT	Female	38	Indian	Christian	Master	Medical Officer	13 years	Internal Medicine
F9HT	Female	38	Malay	Islam	Diploma	Staff Nurse	3 years	DM

4.2 | Item Generation

This section presents the qualitative results surrounding the behavioural domains of diabetes self-care management among T2DM patients. The results of the IDI and FGD are summarised under the three respective constructs of information, motivation, and behaviour. The domains and sub-domains that emerged from the verbatim were grouped and tabulated in Table 12. Appendix 3 outlines the detailed findings from IDI and FGD.

Table 12:

Summary of Domain and Sub-domain Emerged

Construct	Domain	Sub-domain
Information	**Sources**	➢ Family ➢ Community (Friends & Neighbours) ➢ Experience • Self-experience • Family/Others' experience
	Types	➢ Diet • General • Control sugar • Quantity/ Portion • Carbo-counting ➢ Medicine ➢ SMBG ➢ Physical Activity ➢ Eye & Footcare • Symptom • Foot exercise • Foot treatment (cuts/callus) • Footcare (cutting nails/ foot wash/ footwear) ➢ Symptom and Complication
	Information needed by patients	➢ General • Detailed result explanation • Detailed lifestyle modification in between follow-up • Detailed lifestyle modification based on gender, age, type of occupation, and type of disease • Detailed information on complications regarding disease/ medicine intake ➢ Medicine • Ways of medicine intake if missed/forgotten • Confusion about sweet intake for hypo patient • Side effects of medications • Medicine suitability with the patient's condition • Ways of medicine intake (all together /separately/ consume with alkaline/alcohol/carbonated drink) ➢ Diet • Detailed food group/classification (Food pyramid) • Amount of insulin intake based on food consumption • Calorie content in food consumption
	Information delivery issues among HCP	➢ Patient's education level/attitude (ignorance) ➢ HCP knowledge ➢ Financial constraint (Information utility)
Motivation	**Self-motivation**	**IDI** ➢ Negative perception • Perceived no changes in blood glucose reading when skipping medication • Perceived stereotype of HCP (providing medicine without further concern) • Perceived better health condition if received early exposure of DM • Perceived the importance of diet and medicine only in DM

Construct	Domain	Sub-domain
Motivation	**Self-motivation**	➢ Positive perception • Perceived importance of HCP support • Perceived importance of lifestyle modification ➢ Perception on medicine • Perceived that the fast effect of insulin can cause hypoglycaemia • Perceived that medicine will control disease • Perceived that medicine can cause kidney problems ➢ Perception of diet • Perceived food load in Malaysia as challenges in DM • Perceived cheat day (eat once in a while) as acceptable ➢ Perception of physical activity • Perceived running as an unsuitable exercise ➢ Perception of influencing factors • Attitude • Family • Experience i. Self-experience ii. Others' experience • Complications ➢ Other perceptions (Stress/ TCM/ Sleep) **FGD** ➢ Perception of HCP • Perceived importance of social support • Perceived social influence leading to patient's misconception of diabetes • Perceived negative feedback from doctors (prefer DE) • Perceived importance of financial support ➢ Influencing factors that motivated patient (from HCP view) • Family experience • Afraid of complication ➢ Influencing factors for HCP to motivate patients • Update knowledge • Inspired by the achievement of other facilities • Loaded waste (medicine) • Patient improvement • To help young people • To reduce DM cases • Patient's gratitude • To help a variety of patients • Avoid complications
	Socio-motivation	**IDI (Socio-support within patients)** ➢ Diet • Spouse • HCP • Friend ➢ SMBG/Medicine • HCP • Spouse ➢ Physical activity ➢ Footcare • HCP • Family

Construct	Domain	Sub-domain
Motivation	**Socio-motivation**	▸ General/Others (moral support) • HCP • Family/Spouse • Community (neighbours) • Ex-boss/ employer **Financial support** ▸ HCP **FGD (Socio-support within the HCP circle)** ▸ HCP approach in supporting patients • Psychological approach (tackle patient's emotion) • Involvement of family members • Sharing of knowledge and experience • HCPs' effort in delivering knowledge (providing photocopies of materials/ establishing specific websites/ organising talks) • Continuous advice from HCP • Financial assistance ▸ Lack of social support among patients • Employer (welfare)/ Family (Food preparation) / Patients living alone
	Communication/ Interaction	**IDI** ▸ Positive communication ▸ Passive communication • HCP's attitude (negative) • Shy (different gender) • Time constraints due to too many patients • Perceived that doctors will add on medicine **FGD** ▸ Positive communication ▸ Passive communication • Patient's character (inconsistent, secretive, ignorant, stubborn) • Facility (limited space) • Society influence • Older age (Difficult to understand) • Less confident with Health Care Services • Time constraint • Caregiver issue • Language constraint
Behaviour	**Medicine**	Compliance Non-compliance **IDI** ▸ Afraid of needle ▸ Lack of self-discipline ▸ Afraid of complications caused by the medicine ▸ Hypoglycaemia ▸ Busy schedule **FGD** ▸ Patient's character (stubborn/ inconsistent statement) ▸ Large quantity of medicine given to patients ▸ Patients belied in homeopathy ▸ Type of medication (need frequent medication intake/insulin injection)

Construct	Domain	
Behaviour	**Diet**	Compliance

		Non-compliance
		IDI
		- Unsatisfactory taste (home-prepared/ alternative food)
		- Large portions of food in restaurants
		- No self-discipline
		- Busy schedule
		- Cultural and religious activity (Sweet things after prayer (Hindu)/ Fasting/ Taboo to waste food/ Attending wedding/ convocation/ programme)
		FGD
		- Uncontrolled eating habits due to:
		  - Cultural factor
		  - Patient attitude (lack of discipline)
		  - Financial constraint
		  - Unhealthy eating norms
		  - Lack of supportive family members
		  - Misleading advertisement

	SMBG	Compliance - Application software to record and track SMBG
		Non-compliance **IDI** - Afraid of high blood glucose reading - Expensive equipment **FGD** - Patient's ignorance - Financial issue - Equipment availability
	Footcare	Compliance

		Non-compliance
		- Attitude
		  - Assumed that foot condition is good
		  - Neglect advice from HCP
		  - Fully relied on HCP

	Physical activity	Non-compliance **IDI** - Time - Self-discipline - Safety (snatch case) - Health conditions (Asthma, spine problem, physical limitations)
	Health seeking behaviour	- Experimenting with different food - Study and consult others about HbA1C result - Love to search for health information

Suggestion	**General**	**IDI**
		- Frequent TCA
		- Alternative treatment (Ozone therapy)
		- Follow-up with patients on medication intake
		FGD
		- Improvement of the facility
		  - Increase the number of staff
		  - Special consultation room
		  - Sufficient supply of health promotion materials (flyers/ pamphlets)

Construct	Domain	Sub-domain
Suggestion	General	• Updated and enough medicine • Computerised system ➢ Increase the number of DM centres ➢ Community-based DM clinic ➢ Advanced /Latest treatment
	Information	**IDI** ➢ Different forms of information sharing ➢ Early motivation programme at school levels ➢ Knowledge exchange **FGD** ➢ Different forms of information sharing ➢ Training/ courses/ attachment for staff ➢ Electronic information sources (website/application) ➢ Increase awareness via: • Health camps in mosques • Booth for foot check-up • Social media • Early education at school and home ➢ Ban the sale of junk food in school
	Motivation	**IDI** ➢ Separate counselling unit ➢ Q&A approach (written questions) ➢ Patients to visit wards to raise awareness ➢ Counselling team **FGD** ➢ Loan glucometer to patients who can't afford to buy ➢ Employer support (welfare, healthy food access) ➢ Courses/training in communication skills ➢ NGO support (welfare/financial)
	Behaviour	**IDI** ➢ Reduce medicine based on progress **FGD** ➢ Alter medication amount ➢ Aid in equipment usage
	Communication	**IDI** ➢ Communication between HCPs and researchers **FGD** ➢ Courses/ training in communication skills ➢ Cognitive Behavioural Therapy (CBT) ➢ Continuous education in different languages ➢ Counselling tools (apps, QR code, pamphlet) ➢ Family involvement in patient's appointment

4.3 | Item Reduction

The next section presents items that can be used as indicators to assess the cognitive, affective, and diabetes care skills of T2DM patients. A total of 250 items were gathered based on the findings from the IDI and FGD as well as items compiled from previous instruments (Appendix 4). Guided by the IMB model, all items were classified into three major constructs: information, motivation, and behaviour. Table 13 summarises the item generation process from the initial version to the final DBDI. Five subject matter experts from various disciplines provided insights and suggestions for DBDI improvement through content validity and psychometric analysis. Table 14 contains - Summary of DBDI Content Validation.

Table 13:

Summary of Item Generation from DBDI Version 1 to Final Version

Version	Construct								Total Item
	Socio-demograhic		Information		Motivation		Behaviour		
	No of Item	Type of Question	No of Item	Type of Question	No of Item	Type of Question	No of Item	Type of Question	
V1	19	Choose one answer Multiple choice	145	3 likert scale (Yes, No, Not Sure) Choose one answer	33	5 likert scale (Strongly Disagree, Disagree, Neutral, Agree, Strongly Agree)	53	5 likert scale (Often, Sometimes, Rarely, Never, Not Applicable) 5 likert scale (Never, Less than 20 min, 20-60 min, more than 60 min, Not Applicable)	250
V2, V3, V4	16	Choose one answer Multiple choice	126	3 likert scale (Yes, No, Not Sure) Choose one answer	33	5 likert scale (Strongly Disagree, Disagree, Neutral, Agree, Strongly Agree)	51	5 likert scale (Often, Sometimes, Rarely, Never, Not Applicable) 5 likert scale (Never, Less than 20 min, 20-60 min, more than 60 min, Not Applicable)	226
V5	16	Choose one answer Multiple choice	121	3 likert scale (Yes, No, Not Sure)	32	5 likert scale (Strongly Disagree, Disagree, Neutral, Agree, Strongly Agree)	51	5 likert scale (Often, Sometimes, Rarely, Never, Not Applicable) 5 likert scale (Never, Less than 20 min, 20-60 min, more than 60 min, Not Applicable)	220
V6	16	Open ended Choose one answer Multiple choice	90	Dichotomous (Correct, Wrong)	33	5 likert scale (Strongly Disagree, Disagree, Neutral, Agree, Strongly Agree)	49	5 likert scale (All the time, Usually, Sometimes, Once in a while, Never) 5 likert scale (Always, Often, Sometimes, Seldom, Never) Dichotomous (Less than 30 min, 30 min or more)	188
V7	17	Open ended Choose one answer Multiple choice	41	Dichotomous (Correct, Wrong)	33	5 likert scale (Strongly Disagree, Disagree, Neutral, Agree, Strongly Agree)	38	5 likert scale (All the time, Usually, Sometimes, Once in a while, Never) 5 likert scale (Always, Often, Sometimes, Seldom, Never) Dichotomous (Less than 30 min, 30 min or more)	129
V8	16	Open ended Choose one answer Multiple choice	24	Dichotomous (Correct, Wrong)	24	5 likert scale (Strongly Disagree, Disagree, Neutral, Agree, Strongly Agree)	30	5 likert scale (All the time, Usually, Sometimes, Once in a while, Never) 5 likert scale (Always, Often, Sometimes, Seldom, Never) Dichotomous (Less than 30 min, 30 min or more)	94
V9	16	Open ended Choose one answer Multiple choice	24	Dichotomous (Correct, Wrong)	21	5 likert scale (Strongly Disagree, Disagree, Neutral, Agree, Strongly Agree)	29	5 likert scale (All the time, Usually, Sometimes, Once in a while, Never) 5 likert scale (Always, Often, Sometimes, Seldom, Never) Dichotomous (Less than 30 min, 30 min or more)	90

*V= Version

Table 14:

Summary of DBDI Content Validation

Construct	Items	Actions	Reasons
DBDI Version 1 to DBDI Version 2 refinement by research team members and qualitative experts			
Socio demographic	Religion, Education level, Occupation, Duration of Diabetes, Recent HbA1C level	Improvised based on literatures	Standardised
	Medication intake, Attend Diabetes Management Class	Rephrased	To ease in understanding
	Marital Status (Number of children), Type of treatment received, Sources of Diabetes Information, Smoker	Removed	Considered not significant to be evaluate in the study
Information	IG8, IG18, IG19, IM15, ID7	Removed	Considered not significant to be evaluate in the study
	IG10, IG11, IG12, IG13, IG14, IG15, IG20, IM1, IM2, IM4, IM5, IM6, IM7, IM9, IM10, IM11, IM12, IM14, IM17, IM18, IM19, IM20, ID1, ID2, ID3, ID4, ID5, ID 10, ID 11, ID 12, IE1, IF3, IF4, IG23, ID13, IS1, IS2	Rephrased, Re-structured by making item as an individual item instead of sub	To ease in understanding of the phrase and for analysis purpose
Motivation	MA1, MA2, MA3, MA5, MA7, MA9, MA10, MB2, MB3, MB4, MB5, MB6	Rephrased, Re-structured by making item as an individual item instead of sub	To ease in understanding of the phrase and for analysis purpose
Behaviour	BM3	Removed	Considered not significant to be evaluate in the study
	BM4, BM5, BM6, BD1, BD3, BD4, BD5, BD6, BD7, BD9, BS1, BS6, BF4, BF5, BF6, BF8, BA1, BE2, B1	Rephrased, Re-structured by making item as an individual item instead of sub	To ease in understanding of the phrase and for analysis purpose
DBDI Version 2 to DBDI Version 3 refinement by certified proofread			
Socio demographic	Education level, Household monthly income, Health Education Attended, Recent Haemoglobin A1c (HbA1c) level	Rephrased	Improvised
	IG1, IG2, IG4, IG5, IG6, IG7, IG8, IG9, IG11, IG12, IG13, IG15, IG16, IM1, IM2, IM3, IM4, IM5, IM6, IM7, IM8, IM9, IM11, IM12, IM13, IM14, IM15, IM16, IM17, IM18, IM19, IM20, ID1, ID2, ID3, ID4, ID5, ID6, ID7, ID8, ID10, IE1, IF1, IF2, IF3, IF4, IF5, IG17, ID11, ID12	Rephrased	Improvised

Construct	Items	Actions	Reasons
Information	IG1, IG2, IG4, IG5, IG6, IG7, IG8, IG9, IG11, IG12, IG13, IG15, IG16, IM1, IM2, IM3, IM4, IM5, IM6, IM7, IM8, IM9, IM11, IM12, IM13, IM14, IM15, IM16, IM17, IM18, IM19, IM20, ID1, ID2, ID3, ID4, ID5, ID6, ID7, ID8, ID10, IE1, IF1, IF2, IF3, IF4, IF5, IG17, ID11, ID12	Rephrased	Improvised
DBDI Version 3 to DBDI Version 4 refinement by experts (technical & language)			
Information	IG3, IG4, IG5, IG6, IG7	Rephrased	To ease in the level of patient's comprehension
DBDI Version 4 to DBDI Version 5 face validity (pre-test1) by patient			
Socio demographic	Ethinicity	Add sub-item	Based on literature
	Medication intake	Rephrased	Suggested to use familiriaze word by patient
Information	IG8, IG9, IG11, IG12, IG13, IG16, IG5, ID8, ID11, ID12, IS1, IS2, IE2	Rephrased, Re-structured by making item as an individual item instead of sub	Improvised
	IM6, IM12, IM16, ID3, ID6, IE1, IG17, IS2(d)	Removed	Item contain conflict answer
Motivation	MB1(f)	Removed	Question is answered through another question
Behaviour	BM2	Rephrased	Improvised
DBDI Version 5 to DBDI Version 6 face validity (pre-test 2) by patient			
Socio demographic	Duration of Diabetes, Body Mass Index (BMI)	Changed structure to open ended question	To ease patient to answer
	Current Haemoglobin A1c (HbA1c) level	Rephrased and changed structure to open ended question	To ease patient to answer
Information	IG4, IG8(a,b,d,i), IG9(b, e,g,h), IG10(e), IG11(c), IG12(c,f,g), IG13(b), IM2_ii, IM2_iii, IM8, IM9, IM11(b), IM19, IM20, ID1, ID2, ID14, ID16, IE1(b,c), IE2, IF1, IF2, IF3(d), IF5	Rephrased	Improvised
	IG1, IG3, IG5, IG7, IG8(c,e,f,g,h,j), IG9(a,c,d,f,i,j), IG10(a,b,c,d,e,f,g,h,i,j,k), IG11(a,b,d,e), IG12(a,b,d,e), IG13(a,c,d), IG14,IG 15, IG16, IM1, IM1_i, IM2_i, IM3, IM7, IM11(a,c), IM13, IM14, IM18, ID4, ID5, ID8, ID9, ID10,ID11,ID12, ID13, ID15, IS1, IS2, IE1(a,d), IE2(a,b,c,d), IF3(a,b,c,e), IF4	Removed	Item contain conflict answer, question is answered through another question

Construct	Items	Actions	Reasons
Motivation	MX1, MX6, MX7, MX8, MX10, MY4, MB1(a-e)	Rephrased	Improvised
	MB1(f)	Removed	
Behaviour	BM1, BM2, BM4(b,c), BD1, BD3, BD6, BD7, BS1, BS4, BF1, BF3, BF5, BF6, BBE1, BG1(a,b,d,e,f), BE2	Rephrased, changed question structure	Facilitate understanding to answer
	BS3, BA1, BE1, BG1(c,g)	Removed	Question is answered through another question
DBDI Version 6 to DBDI Version 7 discussion with expert (psychometric & technical)			
Socio demographic	Duration of diabetes, HbA1c level	Rephrased and reconstruct to open-ended question	Facilitate understanding to answer
	Body Mass Index (BMI)	Split item to Height and Weight	To ease patient to answer
Information		49 items removed	Item contain conflict answer, question is answered through another question
Motivation		9 items removed	Question is answered through another question
Behaviour		8 items removed	Question is answered through another question

4.4 | Factorial Construct Validity

The pilot test for construct validity involved 201 patients from the Klang District. Tables 15 and 16 show the sociodemographic distribution of the patients. Tables 17-19 show the results of the exploratory factor analysis (EFA) for each construct. For the constructs of information, motivation, and behaviour, the analysis produced two, four, and six factor loadings with high internal consistency respectively. In addition, several items were removed because they were not applicable to any factor loading or domain. The domains were labelled based on the suitability of items for each factor loading upon the agreement of all the team members.

Table 15:

Demographic Profile EFA (N=201)

Items	Frequency	Percentage (%)
District		
Klang		
KK Bandar Botanik	118	58.7
KK Kapar	44	21.9
KK Rantau Panjang	39	19.4
Duration Diagnosed with Diabetes		
Less than 1 year	13	6.5
1 - 5 years	60	29.9
6 - 10 years	59	29.4
More than 10 years	69	34.2
BLOOD SUGAR LEVEL		
Less than 5.6	21	10.5
5.6 - 6.2	29	14.4
6.3 and above	151	75.1
BMI		
Less than 18.5 (Underweight)	3	3 1.5
18.5 - 24.9 (Normal)	62	30.8
25 - 29.9 (Overweight)	81	40.3
30 and above (Obese)	55	27.4
Age (years old)		
40 and below	13	6.5
41-49	35	17.4
50-59	63	31.3
60 and above	90	44.8
Gender		
Male	85	2.3
Female	116	57.7
Ethnicity		
Malay	101	50.2
Chinese	15	7.5
India	82	40.8
Bumiputera of Sabah	3	1.5
Marital Status		
Single	3	1.5
Married	166	82.6
Widowed / Divorced	32	15.9
Marital Status		
Live alone	24	11.9
Live with family	177	88.1
Level of Education		
Never attended school	7	3.5
Primary school	43	21.4
Secondary school	118	58.7
Higher education	33	16.4

Items	Frequency	Percentage (%)
Occupation		
Government employee	13	6.5
Private employee	53	26.3
Self-employed	14	7.0
Retiree	32	15.9
Unemployed	89	44.3
Monthly Household Income		
Less than RM4,850	175	87.1
RM4,850 - RM10,970	23	11.4
More than RM10,970	3	1.5
Diabetes Family History of Diabetes		
Yes	127	63.2
No	74	36.8
Have Comorbid Diseases		
Yes	153	76.1
No	48	23.9
Other Comorbid Diseases		
Heart Diseases	54	34.2
Hypertension	96	60.7
Others	8	5.1
Cholesterol	*6*	
Cancer	*1*	
Stroke	*1*	
Diabetes Medication Intake		
Oral pill only	120	59.7
Insulin only	8	4.0
Oral pill and insulin	72	35.8
None	1	0.5
Has Attend Health Education Session?		
Yes	67	33.3
No	134	66.7

Table 16:

Descriptive Statistic (N=201)

	Minimum	Maximum	Mean	Std. Deviation
1. Duration Diagnosed with Diabetes (Year)	0	41	9.14	7.131
2. Patient's Current Haemoglobin A1c (HbA1c) Level/ Blood Sugar Level	3.8	25.9	8.454	3.3466
3. Height (m)	1.40	1.86	1.6062	0.08747
4. Weight (kg)	36	131	71.80	15.965

Table 17:

Construct Validity (Section A: Information)

Domain	Variable	Items	Construct Validity (Factor loading)	
			Factor 1	Factor 2
Diabetes Knowledge	A2	Diabetes berpunca daripada kegagalan badan untuk menghasilkan insulin *Diabetes is caused by body's failure to produce insulin*	0.589	
	A4	Kerap membuang air kecil merupakan gejala diabetes *Frequent urination is a symptom of diabetes*	0.496	
	A6	Diabetes berpunca daripada pengambilan gula atau makanan manis secara berlebihan *Diabetes is caused by taking too much sugar or sweet foods*	0.525	
	A7	Luka lambat sembuh merupakan komplikasi diabetes *Wound heals slowly is a diabetes complication*	0.586	
	A8	Pesakit berisiko untuk kehilangan deria rasa di kaki *Patient is at risk in loss of senses in the feet*	0.520	
	A9	Pesakit akan mengalami hipoglisemia (paras gula dalam darah rendah) jika tidak makan selepas mengambil ubat *Patient will experience hypoglycaemia (low blood sugar) if not eating after taking medicine*	0.609	
	A13	Diabetes boleh dikawal dengan pengambilan ubat *Diabetes can be controlled with medication intake*	0.382	
	A16	Kebas / kesemutan di tangan atau kaki merupakan gejala diabetes *Numbness / tingling in hands or feet is a symptom of diabetes*	0.562	
	A17	Masalah berkaitan kaki (cth. luka / gangren / kaki berlubang) merupakan komplikasi diabetes *Foot related problems (i.e. injured / gangrene / hollow leg) is a diabetes complication*	0.647	
	A19	Diabetes boleh berpunca daripada keturunan *Diabetes can be caused by inheritance*	0.407	
	A23	Sekiranya pesakit mengalami hipoglisemia (paras gula dalam darah yang rendah), pesakit perlu segera mengambil makanan atau minuman manis (cth. gula-gula / minuman ringan) *If a patient has hypoglycaemia (low blood glucose level), the patient should immediately consume sugary food or drink (i.e. sweets / soft drinks)*	0.551	
	A28	Pesakit boleh menggigil apabila mengalami hipoglisemia (paras gula dalam darah yang rendah) *Patients may shiver when hypoglycaemia (low blood sugar)*	0.586	
	A32	Pesakit perlu potong kuku kaki secara tegak dan tidak terlalu pendek *Patients need to cut their toe nails in straight shape and not too short*	0.399	
	A33	Pengsan merupakan gejala hipoglisemia (paras gula dalam darah yang rendah) *Fainting is a symptom of hypoglycaemia (low blood sugar)*	0.585	
	A34	Penglihatan yang kabur merupakan gejala diabetes *Blurred vision is a symptom of diabetes*	0.529	
	A36	Pesakit disarankan mengambil 2-4 pertukaran (hidangan) *Patient is recommended to take 2-4 exchange (meal)*	0.455	
	A38	Paras gula dalam darah dapat dikawal melalui aktiviti fizikal *Blood sugar levels can be controlled through physical activity*	0.440	
	A40	Pesakit perlu bersenam sekurang-kurangnya 30 minit per sesi *Patients should exercise for at least 30 minutes per session*	0.350	
	A12	Pil diabetes boleh diambil bersama jus buah *Diabetes pill can be taken with fruit juice*		0.379
	A22	Pil diabetes boleh diambil bersama minuman berkarbonat *Diabetes pill can be taken with carbonated drinks*		0.554
Medication and Food Consumption	A24	Minuman berkafein (cth. kopi / teh) tanpa gula boleh meningkatkan paras gula dalam darah *Caffeinated beverages (i.e. coffee / tea) without sugar can increase blood sugar level*		0.498
	A27	Pesakit boleh mengubah sendiri pengambilan ubat *Patients can change medication intake themselves*		0.397
	A35	Semua buah-buahan adalah baik untuk pesakit dan boleh dimakan tanpa had *All fruits are good for patients and can be eaten without restriction*		0.435

Domain	Variable	Items	Construct Validity (Factor loading)	
			Factor 1	Factor 2
Suggest to drop or remove	A1	Diabetes boleh menjangkiti pasangan *Diabetes can be transmitted to one's spouse*		
	A3	Diabetes mampu mengancam nyawa sejak pertama kali dikesan *Diabetes can be life-threatening since it was first detected*		
	A5	Diabetes mampu mengancam nyawa sejak pertama kali dikesan *Diabetes can be life-threatening since it was first detected*	0.473	
	A10	Diet yang tinggi kandungan fiber (serat) adalah digalakkan kepada pesakit *A diet that high in fibre is suggested for patients*	0.396	
	A11	Aktiviti fizikal dapat mengurangkan tahap kolesterol dalam badan *Physical activity can reduce cholesterol levels in the body*	0.566	
	A14	Pil diabetes boleh diambil semasa perut kosong *Diabetes pill can be taken with an empty stomach*		
	A10	Dos insulin perlu diambil berdasarkan jumlah karbohidrat (makanan berkanji) di dalam makanan *The amount of insulin should be taken based on total carbohydrate (starchy food)*	0.422	0.360
	A18	Gula putih boleh digantikan dengan gula perang dalam pemakanan *White sugar can be replaced with brown sugar in diet*		
	A20	Diabetes tidak mempunyai gejala *Diabetes has no symptom*		0.455
	A21	Insulin perlu diambil 20-30 minit selepas makan *Insulin should be taken 20-30 minutes after meals*		0.389
	A25	Pil diabetes tidak boleh diambil bersama minuman berkafein (cth. kopi/nescafe/teh) *Diabetes pill cannot be taken with caffeinated beverages (i.e. coffee / nescafe / tea)*		
	A26	Jika pesakit terlewat makan ubat (dalam tempoh 2 jam), pesakit haruslah segera mengambil ubat tersebut *If patients missed their medication (within 2 hours), they have to take it immediately*	0.368	
	A29	Rehat yang mencukupi boleh membantu ubat untuk berfungsi dengan berkesan *Adequate rest can help the medication to function effectively*		
	A30	Pankreas menghasilkan insulin *The pancreas produces insulin*	0.551	
	A31	Penglihatan yang kabur merupakan gejala hipoglisemia (paras gula dalam darah yang rendah) *Blurred vision is a symptom of hypoglycaemia (low blood sugar)*		
	A37	Pemakaian stoking yang ketat adalah baik untuk pesakit *Tight socks are good for patients*		0.397
	A39	Ubat diabetes boleh menyebabkan kerosakan buah pinggang *Diabetes medicine can cause kidney failure*		
	A41	Diet yang rendah lemak adalah digalakkan kepada pesakit *A diet that is low in fat is suggested for patients*		

*Kaiser-Meyer-Olkin Measure of Sampling Adequacy: 0.738, Bartlett's Test of Sphericity: Significance value < 0.05

Table 18:

Construct Validity (Section B: Motivation)

Domain	Variable	Items	Construct Validity (Factor loading)			
			Factor 1	Factor 2	Factor 3	Factor 4
Social-Support	B2	Saya memerlukan seseorang untuk membantu memeriksa keadaan kaki saya *I need someone to help check the conditions of my feet*	0.441			
	B4	Saya memerlukan seseorang untuk membantu menyuntik insulin *I need someone to help me with insulin injections*	0.457			
	B6	Saya memerlukan seseorang untuk menemani saya melakukan senaman *I need someone to accompany me in doing exercise*	0.492			
	B13	Saya menghadapi masalah kewangan berkenaan perbelanjaan pengangkutan (cth. menjalani temu janji susulan / senaman) *I am having financial problems on transportation expenses (i.e. undergoing follow-up appointments / exercises)*	0.595			
	B15	Saya memerlukan seseorang untuk membantu memotong kuku jari kaki saya *I need someone to help cut my toenails*	0.490			
	B17	Saya memerlukan seseorang untuk mengingatkan tentang pengambilan ubat *I need someone to remind me in taking medicine*	0.497			
	B22	Saya memerlukan seseorang untuk berkongsi masalah saya *I need someone to share my problems*	0.466			
	B25	Saya memerlukan seseorang untuk membawa saya ke temu janji susulan *I need someone to take me to my follow-up appointments*	0.389	-0.364		
	B26	Saya menghadapi masalah kewangan untuk membeli peralatan untuk memeriksa gula dalam darah (cth. glukometer / kertas jalur ujian / kapas alkohol) *I am having financial problems to buy equipment to check blood glucose levels (i.e. glucometer / test strip / alcohol swab)*	0.664		-0.363	
	B27	Saya memerlukan seseorang untuk membantu memantau paras gula dalam darah *I need someone to help me monitor my blood sugar levels*	0.557			
	B29	Saya menghadapi masalah kewangan untuk membeli bahan makanan yang sihat (cth. stevia / beras perang / beras kurang kanji) *I am having financial problems to buy healthier food ingredients (i.e. stevia/ brown rice/ less starch rice)*	0.557			
	B30	Saya menghadapi masalah kewangan untuk membeli bahan makanan yang sihat (cth. stevia / beras perang / beras kurang kanji) *I am having financial problems to buy healthier food ingredients (i.e. stevia/ brown rice/ less starch rice)*	0.557			
Awareness	B12	Saya memerlukan lebih pendedahan tentang diabetes bagi memahami dan menguruskan penjagaan diri *I need more exposure about the diabetes in order to understand and manage self-care*		0.440		
	B16	Jika saya tahu mengenai laporan terperinci ujian darah saya, saya boleh menguruskan diabetes saya dengan lebih baik *If I knew about my blood test detailed report, I could manage my diabetes in a better way*		0.434		
	B23	Saya lebih selesa untuk berbincang dengan staf kesihatan yang mesra pesakit *I am more comfortable to discuss with a friendly health care staff*		0.604		
	B24	Perbincangan yang kerap dengan staf kesihatan yang berbeza kepakaran boleh menambahbaik pengurusan diabetes saya *Regular discussions with a health care staff of different expertise can improve my diabetes management*		0.581		

Domain	Variable	Items	Construct Validity (Factor loading)			
			Factor 1	Factor 2	Factor 3	Factor 4
Self-Care	B5	Saya tahu tentang cara-cara yang berkesan untuk mengatasi penyakit diabetes *I am aware of the effective ways to cope with diabetes*		0.416	-0.617	
	B3	Saya mampu mengatasi halangan dalam pengurusan diabetes saya *I manage to overcome barriers in my diabetes management*			-0.464	
	B14	Penyakit diabetes saya membebankan orang lain *My diabetes is a burden to other people*			0.401	
	B19	Penjagaan kaki yang kerap adalah tidak penting bagi keadaan saya *Frequent foot care is not crucial for my condition*			0.393	
	B1	Saya berada dalam keadaan yang baik dan memilih untuk mengamalkan penjagaan diri yang sesuai *I am in a good condition and choose to practice a suitable diabetes self-care*			-0.419	
Negative Perception	B7	Penjagaan kendiri dalam diabetes adalah menyusahkan *Self-care in diabetes is difficult*				
	B8	Walaupun saya telah berusaha sedaya upaya untuk mengawal diabetes, ia tidak berhasil seperti yang saya harapkan *Although I have tried my best to manage my diabetes, it did not work out as I had hoped*				
	B10	Saya berasa bosan dengan rutin pengurusan diabetes yang sama *I feel bored with the same diabetes management routine*	0.378			0.468
Suggest to drop or remove	B9	Saya memerlukan seseorang untuk menyokong saya dari segi kewangan *I need someone to support me financially*	0.562			0.468
	B11	Saya memerlukan seseorang untuk menenangkan saya ketika dalam kesusahan *I need someone to calm me down when in trouble*	0.510			
	B18	Saya mematuhi pengurusan diabetes yang disarankan kerana saya takut mendapat komplikasi *I follow recommended diabetes management because I am afraid of getting complications*				
	B20	Saya memerlukan seseorang untuk membantu menyediakan makanan pesakit diabetes *I need someone to help me prepare my diabetic meals*				
	B21	Saya lebih selesa untuk membincangkan keadaan kesihatan saya dengan staf kesihatan yang sama jantina *I feel more comfortable talking about my health condition with a health care staff of the same gender*				
	B28	Saya takut untuk menggunakan pen insulin *I am afraid to use an insulin pen*	0.471			
	B31	Saya menghadapi masalah kewangan untuk membeli makanan sihat *I am having financial problems to buy healthy food*	0.588			
	B32	Saya memerlukan seseorang untuk menemani saya menghadiri temu janji susulan *I need someone to accompany me to attend follow-up appointments*	0.483			
	B33	Saya menghadapi masalah kewangan untuk membeli jarum insulin *I am having financial problems to buy insulin needles*	0.623			

*Kaiser-Meyer-Olkin Measure of Sampling Adequacy: 0.708, Bartlett's Test of Sphericity: Significance value < 0.05

Table 19:

Construct Validity (Section C: Behaviour)

Domain	Variable	Items	Construct Validity (Factor loading)					
			Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	Factor 6
Footcare	C12	Saya memeriksa keadaan kaki walaupun sibuk *I check feet condition even though I am busy*	0.824					
	C14	Saya memastikan celah jari kering selepas membasuh kaki *I make sure the spaces between my toes are dry after washing my feet*	0.752					
	C17	Saya memeriksa keadaan kaki saya *I check the condition of my feet*	0.822					
	C22	Saya memotong kuku kaki saya dengan berhati-hati *I cut my toenails carefully*	0.730					
Self-Monitoring Blood Glucose (SMBG)	C13	Saya memeriksa paras gula dalam darah saya setiap kali saya mengambil makanan/minuman manis *I check my blood sugar levels whenever I consume sweet food/drink*		0.808				
	C15	Saya memeriksa paras gula dalam darah saya *I check my blood sugar levels*		0.806				
	C19	Saya memantau paras gula dalam darah walaupun sibuk *I monitor my blood sugar levels even though I am busy*		0.691				
	C21	Saya merekodkan paras gula dalam darah saya *I record my blood sugar levels*		0.759				
Medication Compliance	C2	Saya terlepas untuk mengambil ubat saya apabila menghadiri majlis tertentu (cth. majlis perkahwinan / keagamaan / festival) *I miss my medication when attending certain occasions (i.e. weddings /religious events / festivals)*			0.402			
	C11	Sekiranya saya terlepas jadual makan ubat, saya segera mengambil ubat tersebut (jika jarak masa pengambilan ubat seterusnya masih panjang) *If I miss my medication intake, I will take it immediately (if the gap of the next scheduled medication intake is long)*			0.778			
	C27	Sekiranya saya terlepas untuk mengambil ubat, saya hanya mengambil ubat yang dijadualkan pada waktu berikutnya (jika jarak masa pengambilan ubat seterusnya adalah hampir) *If I miss my medication intake, I only take the next scheduled medicine (if the next period of schedule medication intake is short)*			0.733			
Footwear	C23	Saya memakai kasut bertutup ketika berada di luar rumah *I wear covered shoes when I am outside my house*				0.830		
	C24	Saya memeriksa bahagian dalam kasut sebelum memakainya *I check on the inside of my shoes before wearing it*				0.709		
	C29	Saya memakai selipar yang sesuai di dalam rumah *I wear suitable slippers indoors*				0.545		
Medication (Insulin)	C3	Saya mengambil insulin walaupun sibuk *I take insulin even though I am busy*					0.889	
	C26	Saya mengambil insulin mengikut jadual yang ditetapkan *I take insulin on schedule*					0.925	

Domain	Variable	Items	Construct Validity (Factor loading)					
			Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	Factor 6
Diet	C8	Saya mengamalkan pemakanan pinggan sihat Malaysia (Suku Suku Separuh) ketika makan di luar *I practice a Malaysian healthy plate diet (Suku Suku Separuh) when eating outside*						0.556
	C9	Saya makan tiga hidangan utama dalam sehari (cth. sarapan pagi / makan tengahari / makan malam) *I eat three main meals in a day (i.e. breakfast / lunch / dinner)*						0.589
	C10	Saya makan lebih banyak sayur-sayuran daripada daging *I eat more vegetables than meat*						0.661
	C16	Saya minum minuman manis (cth. minuman berkarbonat / dalam tin / isotonic / segera 3-dalam-1) *I drink sugary drinks (i.e. carbonated / canned / isotonic / 3-in-1 instant drinks)*						0.784
	C18	Saya menggunakan bahan makanan yang lebih sihat dalam penyediaan makanan seharian (cth. stevia/ beras perang/ beras kurang kanji/ susu rendah lemak) *I use healthier ingredients in food preparation (i.e. stevia/ brown rice/ less starchy rice/ low-fat m*						0.534
Suggest to drop or remove	C1	Saya mengambil pil diabetes pada masa yang ditetapkan *I take my diabetes pill on time*						
	C4	Saya menggunakan kotak pil untuk memastikan saya tidak terlepas daripada mengikuti jadual pengambilan ubat *I use pill box to ensure that I will not miss the medication schedule*						
	C5	Saya makan makanan tinggi lemak (cth. roti canai / masakan bersantan / makanan bergoreng) *I eat high-fat food intake (i.e. 'roti canai' / food contain coconut milk / fried food)*						
	C6	Saya mengawal pengambilan makanan yang bergula *I control my sugary food intake*						-0.479
	C7	Saya mengambil pil diabetes walaupun sibuk *I take diabetes pill even though I am busy*						
	C20	Saya menghadapi kesukaran untuk mengamalkan pelan diet diabetes yang disarankan apabila menghadiri majlis tertentu (cth. majlis perkahwinan / keagamaan/ festival) *I have difficulties in following my recommended diabetes diet plan when attending certain*			0.780			
	C25	Saya menghadapi masalah dalam mengawal pengambilan gula dalam diet saya *I have difficulties in controlling sugar intake in my diet*						0.597
	C28	Saya susah untuk bersenam disebabkan ketiadaan peralatan senaman *I face difficulties to exercise due to the lack of exercise instrument*			0.436			
	C30	Saya melakukan senaman dengan kerap walaupun sibuk *I exercise regularly even though I am busy*						

*Kaiser-Meyer-Olkin Measure of Sampling Adequacy: 0.684, Bartlett's Test of Sphericity: Significance value < 0.05

4.5 | Internal Consistency Reliability

After that, a Confirmatory Factor Analysis (CFA) involving 222 patients from three districts in Selangor (Kuala Langat, Petaling, and Kuala Selangor) was conducted. Table 20 shows the demographic profiles of the patients. Table 21 - 23 shows the results of the reliability statstistic. Four items were removed during this process. All items under the information construct were retained because the analysis yielded Cronbach's Alpha values of 0.876 and 0.616 for each domain, respectively. To obtain Cronbach's Alpha values of 0.783 and 0.562 for the motivation construct, two items from the self-care domain and one item from the awareness domain were dropped. Cronbach's Alpha became 0.544 after one item was removed from the diet domain under the behaviour construct.

Table 20:

Demographic Profile (N=222)

Items	Frequency	Percentage (%)
District		
Kuala Langat	60	27.0
KK Jenjarom	33	
KK Telok Panglima Garang	27	
Petaling	103	46.4
KK Kelana Jaya	68	
KK Seri Kembangan	35	
Kuala Selangor	59	26.6
KK Kuala Selangor	24	
KK Tanjong Karang	35	
Duration Diagnosed with Diabetes		
Less than 1 year	21	9.5
1 - 5 years	74	33.3
6 - 10 years	46	20.7
More than 10 years	81	36.5
BLOOD SUGAR LEVEL		
Less than 5.6	17	7.7
5.6 - 6.2	28	12.6
6.3 and above	177	79.7
BMI		
Less than 18.5 (Underweight)	3	1.4
18.5 - 24.9 (Normal)	73	32.9
25 - 29.9 (Overweight)	72	32.4
30 and above (Obese)	74	33.3
Age (years old)		
40 and below	20	9.0
41-49	20	9.0
50-59	69	31.1
60 and above	113	50.9
Gender		
Male	98	44.1
Female	124	55.9

Items	Frequency	Percentage (%)
Ethnicity		
Malay	141	63.5
Chinese	33	14.8
India	44	19.8
Aborigines	2	0.9
Bumiputera of Sabah	1	0.5
Others	1	0.5
Bangladesh	1	
Marital Status		
Single	12	5.4
Married	177	79.7
Widowed / Divorced	33	14.9
Living Situation		
Live alone	20	9.0
Live with family	201	90.5
Others	1	0.5
Old folks care home	1	
Level of Education		
Never attended school	7	3.1
Primary school	47	21.2
Secondary school	136	61.3
Higher education	32	14.4
Occupation		
Government employee	20	9.0
Private employee	35	15.8
Self-employed	28	12.6
Retiree	35	15.8
Unemployed	104	46.8
Monthly Household Income		
Less than RM4,850	194	87.4
RM4,851 - RM10,97	28	12.6
Diabetes Family History of Diabetes		
Yes	146	65.8
No	76	34.2
Diabetes Family History of Diabetes		
Yes	149	72.0
No	73	28.0
Other Comorbid Diseases		
Heart Diseases	22	8.5
Hypertension	130	50.0
Others	35	13.5
Cholesterol	27	
Asthma	2	
Gout	2	
Cancer	1	
Hypothyroid	1	
Nerve	1	
Low blood pressure	1	
Prostate	1	
Stroke	1	

Items	Frequency	Percentage (%)
Diabetes Medication Intake		
Oral pill only	119	53.6
Insulin only	11	5.0
Oral pill and insulin	89	40.1
None	3	1.4
Has Attend Health Education Session?		
Yes	109	49.1
No	113	50.9

Table 21:

Reliability Statistic (Section A: Information)

Domain	Variable	Items	Cronbach's Alpha
Diabetes Knowledge	A2	Diabetes berpunca daripada kegagalan badan untuk menghasilkan insulin *Diabetes is caused by body's failure to produce insulin*	0.876
	A30	Pankreas menghasilkan insulin *The pancreas produces insulin*	
	A19	Diabetes boleh berpunca daripada keturunan *Diabetes can be caused by inheritance*	
	A6	Diabetes berpunca daripada pengambilan gula atau makanan manis secara berlebihan *Diabetes is caused by taking too much sugar or sweet foods*	
	A16	Kebas / kesemutan di tangan atau kaki merupakan gejala diabetes *Numbness / tingling in hands or feet is a symptom of diabetes*	
	A4	Kerap membuang air kecil merupakan gejala diabetes *Frequent urination is a symptom of diabetes*	
	A34	Penglihatan yang kabur merupakan gejala diabetes *Blurred vision is a symptom of diabetes*	
	A9	Pesakit akan mengalami hipoglisemia (paras gula dalam darah rendah) jika tidak makan selepas mengambil ubat *Patient will experience hypoglycaemia (low blood sugar) if not eating after taking medicine*	
	A28	Pesakit boleh menggigil apabila mengalami hipoglisemia (paras gula dalam darah yang rendah) *Patients may shiver when hypoglycaemia (low blood sugar)*	
	A33	Pengsan merupakan gejala hipoglisemia (paras gula dalam darah yang rendah) *Fainting is a symptom of hypoglycaemia (low blood sugar)*	
	A23	Sekiranya pesakit mengalami hipoglisemia (paras gula dalam darah yang rendah), pesakit perlu segera mengambil makanan atau minuman manis (cth. gula-gula / minuman ringan) *If a patient has hypoglycaemia (low blood glucose level), the patient should immediately consume sugary food or drink (i.e. sweets / soft drinks)*	
	A32	Pesakit perlu potong kuku kaki secara tegak dan tidak terlalu pendek *Patients need to cut their toe nails in straight shape and not too short*	
	A7	Luka lambat sembuh merupakan komplikasi diabetes *Wound heals slowly is a diabetes complication*	
	A8	Pesakit berisiko untuk kehilangan deria rasa di kaki *Patient is at risk in loss of senses in the feet*	
	A17	Masalah berkaitan kaki (cth. luka / gangren / kaki berlubang) merupakan komplikasi diabetes *Foot related problems (i.e. injured / gangrene / hollow leg) is a diabetes complication*	
	A36	Pesakit disarankan mengambil 2-4 pertukaran (hidangan) *Patient is recommended to take 2-4 exchange (meal)*	
	A13	Diabetes boleh dikawal dengan pengambilan ubat *Diabetes can be controlled with medication intake*	
	A38	Paras gula dalam darah dapat dikawal melalui aktiviti fizikal *Blood sugar levels can be controlled through physical activity*	
	A40	Pesakit perlu bersenam sekurang-kurangnya 30 minit per sesi *Patients should exercise for at least 30 minutes per session*	

Domain	Variable	Items	Cronbach's Alpha
Medication and Food Consumption	A27	Pesakit boleh mengubah sendiri pengambilan ubat *Patients can change medication intake themselves*	0.616
	A12	Pil diabetes boleh diambil bersama jus buah *Diabetes pill can be taken with fruit juice*	
	A22	Pil diabetes boleh diambil bersama minuman berkarbonat *Diabetes pill can be taken with carbonated drinks*	
	A24	Minuman berkafein (cth. kopi / teh) tanpa gula boleh meningkatkan paras gula dalam darah *Caffeinated beverages (i.e. coffee / tea) without sugar can increase blood sugar level*	
	A35	Semua buah-buahan adalah baik untuk pesakit dan boleh dimakan tanpa had *All fruits are good for patients and can be eaten without restriction*	

Table 22:

Reliability Statistic (Section B: Motivation)

Domain	Variable	Items	Cronbach's Alpha
Self-Care	B5	Saya tahu tentang cara-cara yang berkesan untuk mengatasi penyakit diabetes *I am aware of the effective ways to cope with diabetes*	0.783
	B3	Saya mampu mengatasi halangan dalam pengurusan diabetes saya *I manage to overcome barriers in my diabetes management*	
	B1	Saya berada dalam keadaan yang baik dan memilih untuk mengamalkan penjagaan diri yang sesuai *I am in a good condition and choose to practice a suitable diabetes self-care*	
Deleted item	B19	Penjagaan kaki yang kerap adalah tidak penting bagi keadaan saya *Frequent foot care is not crucial for my condition*	
	B14	Penyakit diabetes saya membebankan orang lain *My diabetes is a burden to other people*	
Negative Perception	B7	Penjagaan kendiri dalam diabetes adalah menyusahkan *Self-care in diabetes is difficult*	0.562
	B10	Saya berasa bosan dengan rutin pengurusan diabetes yang sama *I feel bored with the same diabetes management routine*	
	B8	Walaupun saya telah berusaha sedaya upaya untuk mengawal diabetes, ia tidak berhasil seperti yang saya harapkan *Although I have tried my best to manage my diabetes, it did not work out as I had hoped*	
Awareness	B16	Jika saya tahu mengenai laporan terperinci ujian darah saya, saya boleh menguruskan diabetes saya dengan lebih baik *If I knew about my blood test detailed report, I could manage my diabetes in a better way*	0.562
	B24	Perbincangan yang kerap dengan staf kesihatan yang berbeza kepakaran boleh menambahbaik pengurusan diabetes saya *Regular discussions with a health care staff of different expertise can improve my diabetes management*	
	B23	Saya lebih selesa untuk berbincang dengan staf kesihatan yang mesra pesakit *I am more comfortable to discuss with a friendly health care staff*	
Deleted item	B12	Saya memerlukan lebih pendedahan tentang diabetes bagi memahami dan menguruskan penjagaan diri *I need more exposure about the diabetes in order to understand and manage self-care*	
Social-Support	B25	Saya memerlukan seseorang untuk membawa saya ke temu janji susulan *I need someone to take me to my follow-up appointments*	0.811
	B17	Saya memerlukan seseorang untuk mengingatkan tentang pengambilan ubat *I need someone to remind me in taking medicine*	
	B4	Saya memerlukan seseorang untuk membantu menyuntik insulin *I need someone to help me with insulin injections*	
	B27	Saya memerlukan seseorang untuk membantu memantau paras gula dalam darah *I need someone to help me monitor my blood sugar levels*	

Domain	Variable	Items	Cronbach's Alpha
	B30	Saya memerlukan seseorang untuk membantu mengamalkan diet yang sihat (cth. kawalan pengambilan gula / sukatan makanan / makanan untuk pesakit) *I need someone to help me practise a healthy diet (i.e. sugar intake control / food portion / diabetic meals)*	
	B2	Saya memerlukan seseorang untuk membantu memeriksa keadaan kaki saya *I need someone to help check the conditions of my feet*	
	B15	Saya memerlukan seseorang untuk membantu memotong kuku jari kaki saya *I need someone to help cut my toenails*	
	B6	Saya memerlukan seseorang untuk menemani saya melakukan senaman *I need someone to accompany me in doing exercise*	
	B22	Saya memerlukan seseorang untuk berkongsi masalah saya *I need someone to share my problems*	
	B13	Saya menghadapi masalah kewangan berkenaan perbelanjaan pengangkutan (cth. menjalani temu janji susulan / senaman) *I am having financial problems on transportation expenses (i.e. undergoing follow-up appointments / exercises)*	
	B26	Saya menghadapi masalah kewangan untuk membeli peralatan kesihatan (cth. glukometer / kertas jalur ujian / kapas alcohol/jarum insulin) *I am having financial problems to buy health equipment (i.e. glucometer / test strips / alcohol swabs/insulin syringe)*	
	B29	Saya menghadapi masalah kewangan untuk membeli bahan makanan yang sihat (cth. stevia / beras perang / beras kurang kanji) *I am having financial problems to buy healthier food ingredients (i.e. stevia/ brown rice/ less starch rice)*	

Table 23:

Reliability Statistic (Section C: Behaviour)

Domain	Variable	Items	Cronbach's Alpha
Self-Monitoring Blood Glucose (SMBG)	C19	Saya memantau paras gula dalam darah walaupun sibuk *I monitor my blood sugar levels even though I am busy*	0.875
	C15	Saya memeriksa paras gula dalam darah saya *I check my blood sugar levels*	
	C13	Saya memeriksa paras gula dalam darah saya setiap kali saya mengambil makanan/minuman manis *I check my blood sugar levels whenever I consume sweet food/drink*	
	C21	Saya merekodkan paras gula dalam darah saya *I record my blood sugar levels*	
Medication (Insulin)	C26	Saya mengambil insulin mengikut jadual yang ditetapkan *I take insulin on schedule*	0.984
	C3	Saya mengambil insulin walaupun sibuk *I take insulin even though I am busy*	
Medication Compliance	C2	Saya terlepas untuk mengambil ubat saya apabila menghadiri majlis tertentu (cth. majlis perkahwinan / keagamaan / festival) *I miss my medication when attending certain occasions (i.e. weddings /religious events / festivals)*	0.792
	C11	Sekiranya saya terlepas jadual makan ubat, saya segera mengambil ubat tersebut (jika jarak masa pengambilan ubat seterusnya masih panjang) *If I miss my medication intake, I will take it immediately (if the gap of the next scheduled medication intake is long)*	
	C27	Sekiranya saya terlepas untuk mengambil ubat, saya hanya mengambil ubat yang dijadualkan pada waktu berikutnya (jika jarak masa pengambilan ubat seterusnya adalah hampir) *If I miss my medication intake, I only take the next scheduled medicine (if the next period of scheduled medication intake is short)*	
Diet	C8	Saya mengamalkan pemakanan pinggan sihat Malaysia (Suku Suku Separuh) ketika makan di luar *I practice a Malaysian healthy plate diet (Suku Suku Separuh) when eating outside*	0.544

Domain	Variable	Items	Cronbach's Alpha
	C9	Saya makan tiga hidangan utama dalam sehari (cth. sarapan pagi / makan tengahari / makan malam) *I eat three main meals in a day (i.e. breakfast / lunch / dinner)*	0.544
	C6	Saya mengawal pengambilan makanan yang bergula *I control my sugary food intake*	
	C10	Saya makan lebih banyak sayur-sayuran daripada daging *I eat more vegetables than meat*	
	C18	Saya menggunakan bahan makanan yang lebih sihat dalam penyediaan makanan seharian (cth. stevia/ beras perang/ beras kurang kanji/ susu rendah lemak) *I use healthier ingredients in food preparation (i.e. stevia/ brown rice/ less starchy rice/ low-fat milk)*	
Deleted Item	C16	Saya minum minuman manis (cth. minuman berkarbonat / dalam tin / isotonic / segera 3-dalam-1) *I drink sugary drinks (i.e. carbonated / canned / isotonic / 3-in-1 instant drinks)*	
Footcare	C17	Saya memeriksa keadaan kaki saya *I check the condition of my feet*	0.856
	C12	Saya memeriksa keadaan kaki walaupun sibuk *I check feet condition even though I am busy*	
	C14	Saya memastikan celah jari kering selepas membasuh kaki *I make sure the spaces between my toes are dry after washing my feet*	
	C22	Saya memotong kuku kaki saya dengan berhati-hati *I cut my toenails carefully*	
Footwear	C29	Saya memakai selipar yang sesuai di dalam rumah *I wear suitable slippers indoors*	0.607
	C23	Saya memakai kasut bertutup ketika berada di luar rumah *I wear covered shoes when I am outside my house*	
	C24	Saya memeriksa bahagian dalam kasut sebelum memakainya *I check on the inside of my shoes before wearing it*	

4.6 | Scoring

The DBDI Instrument uses scoring as a method of data interpretation to analyse behavioural diagnosis. The levels of knowledge, motivation, and behaviour of the patients were measured based on the scoring system. The total score for each domain was determined using the original Bloom's cut-off point (Bloom, 1956). Bloom's cut-off point was also used in previous studies by Mohammadi et al., 2015; Kasa et al., 2018 and Al-Asbali et al., 2020. The total score for all 24 questions in the information domain was further categorised as "Poor" if the score was 50% or less, "Good" if it was between 51% and 74%, and "Excellent" if it was 75% or higher. Next, the median score of the questions in the motivation domain was calculated and categorised into positive (equal to or higher than the median) or negative (below the median). For the behaviour domain, individuals who had a score of 0-50% were considered to have poor behaviour, those who received a score of 51-74% were considered to have good behaviour, and those who received a score of 75-100% were considered to have excellent behaviour. The summary of the scoring scale for each domain is shown in Table 24.

Table 24:

Summary of Scoring

Domain	Sub-Domain	Item (s)	Scoring	Citation
Information	Diabetes in general Diabetes self-care (medication & food consumption)	19 5	The score for information were classified into three levels as excellent, good and poor	Mohammadi S, et al. (2015)
Motivation	Self-care Perception Social Support	21	*Equal or above median =positive Below median =negative	Kasa A.S. et al. (2018)
Behaviour	SMBG Diet Medication Foot care Foot wear Physical activities Frequency Duration	29	Describe by mean score Poor Good Excellent	A-Asbali et al. (2020)

4.7 | Diabetes Behavioural Diagnosis Instrument (DBDI)

All four components that were evaluated made up the validated version of the DBDI, including sociodemographic profiles, information, motivation, and behaviour.

DISCUSSION

This study provided a positive contribution to the development of an instrument (DBDI) to measure the behavioural domains of Malaysian T2DM patients. In contrast to previous studies that measured all the behavioural domains separately (Schmitt et al., 2022; Rahayu & Chen, 2020; Saputri et al., 2017), our instrument was designed to comprehensively assess all the behavioural domains related to diabetes care of individual patients.

To establish the DBDI, we followed the IMB framework to integrate and guide the development and validation process. The IMB framework comprises three primary constructs, namely Information, Motivation, and Behaviour (Fisher et. al., 2003). The IMB framework, similar to many health behaviour theories, is focused on individuals rather than the broader social, political, and economic contexts of the disease. While these theories and their associated measures and interventions have been proven to be suitable for various health-related behaviours in Western populations, more intensive research is required to assess their relevance in other cultural settings, for example, in a multicultural setting like Malaysia. With this in mind, we set out to develop the DBDI instrument in this study to assess the behavioural domains of Malaysian T2DM patients. The validated DBDI instrument is constructed based on a solid theoretical framework. It proposed a new perspective for patients, HCPs, and stakeholders in decision-making related to T2DM education and lifestyle modification. Furthermore, DBDI also represents the first step towards assessing the cross-cultural application of the IMB framework for T2DM patient adherence as the framework was our basic guideline in developing the DBDI items.

In this study, qualitative methods were utilised to explore potential factors associated with T2DM behavioural domains. Unlike a simple questionnaire or rating scale, in-depth interviews can uncover more comprehensive details of interviewees' experience and perspective on a subject (Showkat & Parveen, 2017). Moreover, experts have highlighted the importance of involving members of the population of interest via qualitative methods in the generation of questionnaire items. This is vital to ensure that the questionnaire fully reflects their perspectives and that all items are acceptable, comprehensive, and relevant to their condition (McKenna et al., 2003). In this study, we conducted IDI with T2DM patients and FGDs with HCPs. Previous studies show that the HCPs' perceptions and experience, as well as their communication with patients, cast a significant influence on diabetes self-management (Chin et al., 2000; Franklin et al., 2018; Harris et al., 2018). In addition, by exploring patients' knowledge, motivation, and behaviours via IDI, researchers can capture the complexity of individuals' feelings, thoughts, and perceptions (Goodman, 2001; Patton, 1990). All themes generated in this qualitative study were integrated within the construct of the IMB framework and subsequently served as the framework to generate items for the actual instrument development.



5.1 | Validity

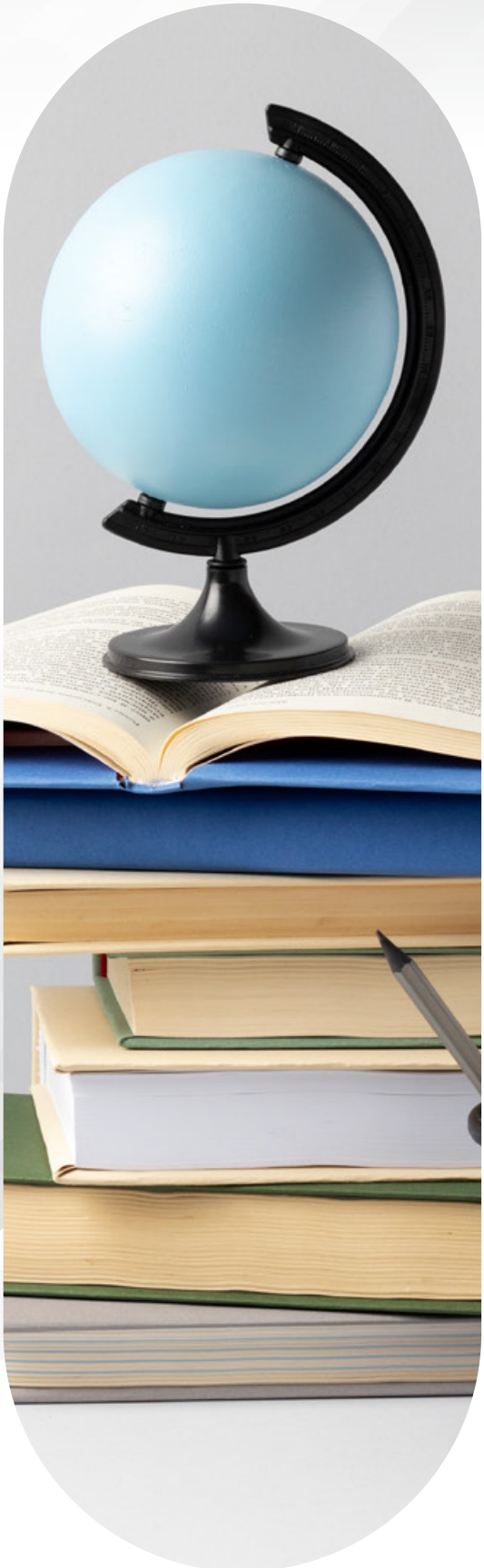
Content validity evaluates how well an instrument covers all relevant parts of the construct it aims to measure, i.e. the theoretical concept of IMB and themes generated from the qualitative data. In this study, content validity was conducted by a panel of subject matter experts (Hardesty & Bearden, 2004). Despite some panel suggestions to remove items that were considered as not relevant to the study objective, we decided to follow the suggestion to combine and rephrase some items to increase their clarity. When reviewing the items, some of the factors considered were whether the items could be understood by diabetes patients from diverse backgrounds, educational backgrounds, localities, varying levels of health literacy, and age. Previous research on health literacy in Taiwan (Chen et al., 2021) and breastfeeding intention in Nigeria also considered the importance of these parameters during content validation (Emmanuel & Clow, 2017). For construct validity, the exploratory factor analysis yielded two, four, and six factor loadings with high internal consistency for information, motivation, and behaviour, respectively. It was tested in the first of 201 samples. According to our findings, the information domain had the most items designated for removal, with 18 items removed due to low factor loading. This could be due to the fact that many participants could not understand the technical terms used in the items related to medication and diet.

5.2 | Reliability

From our findings, the DBDI has a high level of reliability. Internal consistency values ranging from 0.562 to 0.876 were obtained from the CFA. According to Pallant (2020), a Cronbach's alpha value of greater than 0.60 is considered high reliability and acceptability. Four items with values less than 0.60 were removed. Even though diet (a sub-construct of behaviour) had a low Cronbach's alpha value of 0.544, it was retained following the advice of subject matter experts that diet-related items are important measurements to obtain a comprehensive view of the behavioural domain in diabetes self-management (Sami et al., 2017). Therefore, while various adjustments were made by deleting items with low Cronbach alpha values in an attempt to achieve the highest possible alpha values, any further deduction was no longer possible due to the requirement to retain several important items under each domain (Taber et. al., 2018; Moss et. al., 1998).

LIMITATION OF STUDY

Initially, the study was planned to be conducted on a zonal basis across the whole Malaysia to capture a diverse range of responses from a sample distributed throughout the country. However, the unprecedented COVID-19 pandemic and the subsequent movement restrictions and other COVID-related SOPs gave rise to logistical challenges for the research team. The study sites had to be narrowed to only the state of Selangor. Furthermore, the number of T2DM patients who could participate in the study was also limited due to the reduced appointment for physical consultations in the health facilities. As a result, the majority of the participants were elderly patients who could not read clearly in Malay or English. As they required assistance to complete the interview, inaccurate assessment of the patient's understanding of the instrument could be present, leading to sampling bias in the results. Lastly, this study also did not address stress or other psychological issues related to the development of DBDI. Therefore, the impact of psychological factors on patient behaviour in diabetes self-management remains unclear. This issue should be explored further in future studies.



RECOMMENDATION

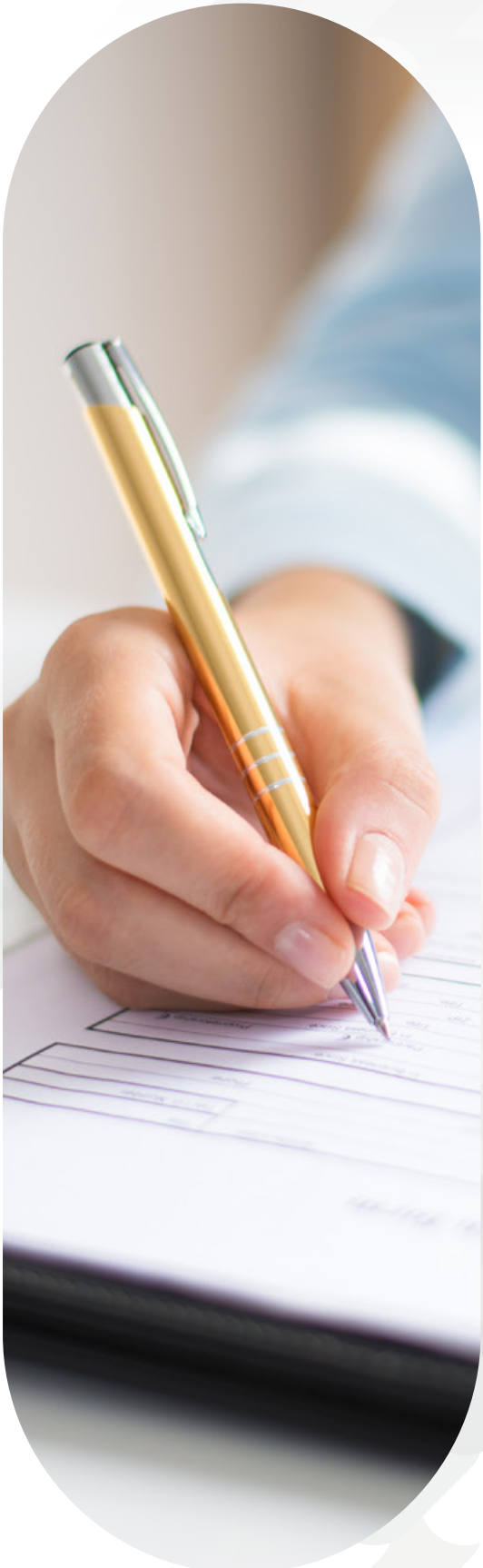
There are several suggestions and recommendations for the improvement of diabetes management to ensure smooth delivery of health services. We hope that the DBDI will be included in the Clinical Practice Guidelines (CPG) to facilitate the identification of patients' behaviour in diabetes self-management as a complement to biomarkers and clinical tests. Together, any problems related to diabetes self-management can be detected early and this will help the HCPs to customise a proper treatment plan for each individual patient.

In the future, DBDI can be used as an actual data collection tool for any diabetes-related health interventions. To begin with, it can be used in pilot studies in selected hospitals or health clinics that are conducting the relevant interventions. Furthermore, a digital version of DBDI can increase dissemination and reduce the time of appointment.

Further refinement of DBDI is required to ensure that it can be applied comprehensively among the Malaysian population. Besides, the instrument can be amended to cater to specific diseases such as hypertension, heart disease, or cancer. Future studies can look into the expansion of the credibility of DBDI by developing interventional studies using Behavioural Insight initiatives that are aligned with the needs of T2DM patients. We hope that DBDI can eventually be implemented among all T2DM patients nationwide.



CONCLUSION



The DBDI serves as a valuable tool for diagnosing the behaviour of patients with diabetes. By utilizing the DBDI, HCPs can enhance the quality of health services by placing a greater emphasis on the patient's overall health status. This validated instrument allows HCPs to diagnose patients' behaviours effectively by assessing their levels of knowledge, motivation, and behaviour. Through the utilisation of the DBDI, HCPs can gain a comprehensive understanding of patients' behavioural patterns related to diabetes management. This, in turn, enables HCPs to tailor educational programs and interventions specific to each patient's needs. By identifying and addressing areas such as knowledge gaps, motivational factors, and behavioural barriers, HCPs can develop patient-specific interventions that promote positive behavioural change. By incorporating the DBDI into clinical practice, HCPs can contribute to the optimisation of patient care and outcomes. The instrument's validated nature ensures its reliability and accuracy in diagnosing patients' behaviours, enabling HCPs to make informed decisions and provide targeted interventions. Ultimately, the use of the DBDI empowers HCPs to deliver more personalised and effective care, leading to improved health outcomes for patients with diabetes.

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APPENDICES

Appendix 1: IDI Guidelines

APPENDICES

Untuk Kegunaan Pejabat

Tarikh: _____
Masa mula: _____
Masa tamat: _____
No ID Peserta: _____
Klinik/ Hospital: _____

Survey Tapisan Pesakit [Versi Bahasa Melayu]

1. No Telefon:_____
2. Umur: _____ tahun
3. Jantina: Lelaki / Perempuan
4. Kawasan tempat tinggal adalah: _____Kampung/ Taman
5. Bangsa:
   - O Melayu
   - O Cina
   - O India
   - O Lain-lain: _____
6. Agama:
   - O Islam
   - O Buddha
   - O Hindu
   - O Kristian
   - O Lain-lain: _____
7. Tahap Pendidikan
   - O Tidak bersekolah
   - O Sekolah Rendah
   - O Sekolah Menengah
   - O Institut Pengajian Tinggi
   - O Lain-lain: _____
8. Pekerjaan
   - O Penjawat Awam
   - O Penjawat Swasta
   - O Bekerja sendiri, nyatakan _____
   - O Tidak bekerja
9. Berapa lamakah anda telah disahkan menghidap Diabetes Mellitus oleh Pegawai Perubatan? _____ tahun dan/atau _____ bulan
10. FBS/RBS: _____ HbA1c: _____
    Komplikasi penyakit (jika ada), nyatakan _____
11. Adakah anda seorang perokok (Rokok / Shisha / Vape dll) (Ya/Tidak)
12. Apakah ubat yang telah diberikan oleh Doktor untuk mengawal Diabetes Mellitus anda?
    (Jika pesakit tidak tahu, tunjukkan ubat kepada pengkaji)

No.	Nama Ubat	Masa diambil	Tempoh masa diambil
1.			
2.			
3.			

RISALAH MAKLUMAT PESERTA DAN BORANG PERSETUJUAN atau KEIZINAN PESERTA

1. **Tajuk penyelidikan:**
   The Diabetes Behavioral Diagnosis Instrument (DBDI): "Development of Instrument In Enhancing Healthy Lifestyle Among Type 2 Diabetic Patients (T2DM)"

2. **Nama Institusi and nama penyelidik:**
   Institut Penyelidikan Tingkahlaku Kesihatan (IPTK)
   Rosnani Binti Kassim, Albeny Joslyn Panting, Nadia Binti Amiruddin Dan Norbaidurah Binti Ithnain

3. **Nama penaja:**
   GERAN PENYELIDIKAN KEMENTERIAN KESIHATAN MALAYSIA

4. **Pengenalan:**
   Risalah ini menjelaskan hal-hal berkenaan penyelidikan tersebut dengan lebih mendalam dan terperinci. Amat penting anda memahami mengapa penyelidikan ini dilakukan dan apa yang dilakukan dalam penyelidikan ini. Sila ambil masa yang secukupnya untuk membaca dan mempertimbangkan dengan teliti penerangan yang diberi sebelum anda bersetuju untuk menyertai penyelidikan ini. Jika ada sebarang kemusykilan ataupun maklumat lanjut yang anda ingin tahu, anda boleh bertanya dengan mana-mana kakitangan yang terlibat dalam penyelidikan ini. Setelah anda berpuas hati bahawa anda memahami penyelidikan ini, dan anda berminat untuk turut serta, anda dikehendaki untuk menandatangani Borang Persetujuan atau Keizinan Peserta, pada muka surat akhir risalah ini.

   Penyertaan anda dalam penyelidikan ini adalah secara sukarela. Anda tidak perlu menyertai penyelidikan ini jika anda tidak mahu. Anda juga mempunyai hak untuk tidak menjawab mana-mana soalan yang anda tidak mahu jawab. Anda juga boleh menarik diri daripada penyelidikan ini pada bila-bila masa sahaja. Jika anda menarik diri, segala maklumat yang telah diperolehi sebelum anda menarik diri tetap akan digunakan dalam penyelidikan ini. Jika anda tidak mahu menyertai ataupun menarik diri dari penyelidikan ini, tindakan anda tidak akan menjejaskan segala hak dan keistimewaan perubatan kesihatan yang selayaknya anda terima.

   Penyelidikan ini telah mendapat kelulusan Jawatankuasa Etika dan Penyelidikan Perubatan, Kementerian Kesihatan Malaysia.

5. **Apakah tujuan penyelidikan ini dilakukan?**
   Tujuan penyelidikan ini dilakukan adalah untuk membangunkan instrumen yang boleh mengnalisa atau mengukur indikator pesakit. Penyelidikan ini diperlukan kerana dapat memberikan maklumat dan pemahaman yang lebih lanjut faktor-faktor tingkahlaku yang menyumbang kepada penjagaan dan pengurusan pesakit dan penyakit Diabetes dalam kalangan pesakit Diabetes jenis 2 (T2DM).

   Penyelidikan ini akan berlangsung selama 12 bulan (01/06/2019 sehingga 01/05/2020). Dijangka bahawa 76 individu akan mengambil bahagian dalam kajian ini.

6. **Apakah tanggungjawab saya sewaktu menyertai penyelidikan ini?**
   Amat penting anda menjawab kesemua soalan yang dikemukakan oleh kakitangan penyelidikan dengan jujur dan lengkap yang akan mengambil masa selama 20 hingga 30 minit. Penyelidik juga memerlukan maklumat yang berikut daripada rekod perubatan anda:

   a. HbA1c
   b. FBG
   c. Komplikasi penyakit (jika ada)

   Anda akan ditemubual oleh Pegawai Penyelidik Utama atau Penyelidik Bersama dan dua orang pembantu untuk membuat catatan dan merekodkan sesi temubual. Skop temubual merangkumi pengurusan penyakit Diabetes oleh pesakit dan perkhidmatan perubatan dari institusi kesihatan di bawah Kementerian Kesihatan Malaysia. Rakaman audio akan menjadi tanpa nama, dan tidak akan menyebutkan maklumat pengenalpastian peribadi seperti nama, nombor kad pengenalan, dll semasa wawancara rakaman audio adalah untuk tujuan transkripsi dan tidak akan disalin / dihantar kepada mana-mana individu lain atau digunakan untuk sebarang tujuan lain dan tidak akan disalin / dihantar kepada mana-mana individu lain atau digunakan untuk apa-apa maksud lain. Selepas transkripsi, rakaman audio akan dilupuskan dengan selamat

7. **Apakah manfaatnya saya menyertai kajian ini?**
Kajian ini tidak mempunyai sebarang manfaat kesihatan dan kewangan. Walau bagaimanapun, segala maklumat yang diperolehi akan dapat membantu pembuat polisi kesihatan untuk menambah baik program penjagaan pesakit Diabetes yang sedia ada di negara ini.

8. **Apakah risiko dan kesan-kesan sampingan menyertai penyelidikan ini?**
Risiko untuk penyertaan penyelidikan ini yang adalah minima dan tidak akan menjejaskan rawatan anda. Anda berhak untuk tidak menjawab jika rasa tidak selesa dengan mana-mana soalan kajian.

9. **Siapakah yang membiayai penyelidikan ini?**
Kajian ini ditaja sepenuhnya oleh Kementerian Kesihatan Malaysia. Anda tidak akan dibayar untuk menyertai kajian ini.

10. **Adakah maklumat saya akan dirahsiakan ?**
Segala maklumat anda yang diperolehi dalam penyelidikan ini akan disimpan dan dikendalikan secara sulit, bersesuaian dengan peraturan-peraturan dan/ atau undang-undang yang berkenaan. Sekiranya hasil penyelidikan ini diterbitkan atau dibentangkan kepada orang ramai, identiti anda tidak akan didedahkan tanpa kebenaran anda terlebih dahulu.

    Pihak-pihak tertentu seperti individu yang terlibat dalam penyelidikan ini, juruaudit dan jurupantau yang terlatih, pihak berkuasa kerajaan atau undang-undang, boleh memeriksa maklumat atau data kajian jika diperlukan.

11. **Siapakah yang perlu saya hubungi sekiranya saya mempunyai sebarang pertanyaan?**
Anda boleh menghubungi pegawai penyelidikan utama kajian iaitu Pn Rosnani binti Kassim pada sambungan telefon (03-3362 7600) atau Pn Norbaidurah binti Ithnain sekiranya anda mempunyai sebarang pertanyaan mengenai penyelidikan ini.

    Jika anda mempunyai sebarang pertanyaan berkaitan dengan hak-hak anda sebagai pesakit dalam penyelidikan ini, sila hubungi: Setiausaha, Jawatankuasa Etika & Penyelidikan Perubatan, Kementerian Kesihatan Malaysia, melalui talian telefon 03-3362 8407/8205/8888.

BORANG PERSETUJUAN/ KEIZINAN PESERTA (Untuk Salinan Peserta dan Penyelidik)

Tajuk penyelidikan:
The Diabetes Behavioral Diagnosis Instrument (DBDI): Development Of Instrument In Enhancing Healthy Lifestyle Among Type 2 Diabetic Patients (T2DM)

Dengan menandatangani di bawah, saya mengesahkan bahawa:

- Saya telah diberi maklumat tentang penyelidikan di atas secara lisan dan bertulis dan saya telah membaca dan memahami segala maklumat yang diberikan dalam risalah ini.
- Saya telah diberikan masa yang secukupnya untuk mempertimbangkan penyertaan saya dalam penyelidikan ini dan telah diberi peluang untuk bertanyakan soalan dan semua persoalan saya telah dijawab dengan sempurna dan memuaskan.
- Saya juga faham bahawa penyertaan saya adalah secara sukarela dan bebas menarik diri daripada penyelidikan ini pada bila-bila masa tanpa harus memberi sebarang alasan dan ianya sama sekali tidak akan menjejaskan rawatan perubatan saya pada masa akan datang. Saya tidak mengambil bahagian dalam mana-mana penyelidikan lain pada masa ini. Saya juga memahami tentang risiko dan manfaat penyelidikan ini dan saya secara sukarela memberi persetujuan untuk menyertai penyelidikan ini di bawah syarat-syarat yang telah dinyatakan di atas. Saya faham saya harus mematuhi nasihat dan arahan yang berkaitan dengan penyertaan saya dalam penyelidikan ini daripada pihak penyelidik.
- Saya faham bahawa kakitangan penyelidikan, pemantau dan juruaudit terlatih, pihak penaja atau gabungannya, dan pihak berkuasa kerajaan atau undang-undang, mempunyai akses langsung dan boleh menyemak laporan perubatan saya bagi memastikan penyelidikan ini dijalankan dengan betul dan data direkodkan dengan betul. Segala maklumat dan data peribadi akan dianggap sebagai SULIT.
- Saya akan menerima satu salinan 'Risalah Maklumat Pesakit dan Borang Persetujuan atau Keizinan Pesakit' yang lengkap dengan tarikh dan tandatangan untuk dibawa pulang.
- Saya **bersetuju/ tidak bersetuju*** untuk doktor yang merawat keluarga saya diberitahu tentang penyertaan saya dalam penyelidikan ini. (*Potong mana yang tidak berkenaan)

Peserta:

Tandatangan:		Nombor K/P:	
Nama:		Tarikh :	

Penyelidik yang mengendalikan proses menandatangani borang keizinan:

Tandatangan:		Nombor K/P:	
Nama:		Tarikh :	

Saksi tidak-berpihak/adil:

Tandatangan:		Nombor K/P:	
Nama:		Tarikh :	

IDI INTERVIEW GUIDE Kenyataan Pembuka: MAKLUMKAN...

1. Tiada jawapan **betul atau salah.** Sesi ini adalah berkenaan pengalaman mereka dan keadaan Diabetes mereka.

2. Sesi perbincangan ini akan **direkod**. Peserta mempunyai hak untuk menarik diri sekiranya mereka tidak mahu meneruskan sesi perbincangan.

3. Semua maklumat adalah SULIT dan bertujuan untuk kajian semata-mata.

SOALAN	PROBE
1. Apakah pengetahuan pesakit mengenai pengurusan Diabetes? (Informasi)	
1. Apakah maklumat penting yang anda perlukan dalam pengurusan Diabetes?	• Bagaimana anda memperolehi maklumat? • Apakah maklumat lain yang anda cari selain yang diperolehi daripada staf kesihatan? • Adakah anda rasa maklumat yang diperolehi cukup untuk pengurusan Diabetes sendiri?
2. Bagaimanakah hubungan/ komunikasi anda bersama staf kesihatan?	Adakah anda pernah mengalami sebarang masalah komunikasi bersama staf kesihatan? **Jika YA,** • Apakah masalah tersebut? • Bagaimana anda menangani?
3. Apakah komplikasi/ kesan buruk penyakit Diabetes sekiranya anda tidak menguruskan penyakit Diabetes dengan baik?	• Anda tahu kesan buruk lain akibat Diabetes? • Anda tahu kesan buruk lain jika tidak mengawal penyakit Diabetes?
2. Apakah motivasi pesakit dalam melaksanakan amalan pengurusan Diabetes yang disyorkan? (Motivasi)	
4. Apakah faktor yang mendorong anda mengawal Diabetes?	
5. Ada tak sebarang perkara yang buat anda tak nak mengawal diabetes?	• Kesan sampingan ubat • Pengalaman • Bosan • Putus asa • Malu • Susah
6. Bagaimana penglibatan pasangan/ keluarga/ rakan-rakan/ majikan/ staf kesihatan dalam pengurusan Diabetes anda?	• Pasangan /keluarga/rakan-rakan/majikan • Adakah anda rasa penting motivasi daripada mereka? **Staf kesihatan: Jika YA, Jelaskan. Jika TIDAK,** • Adakah anda rasa penting motivasi daripada staf kesihatan? • Adakah anda selesa berkongsi sebarang isu peribadi/ penyakit bersama staf kesihatan? • Bagaimanakah respon staf kesihatan?
7. Apakah faktor lain yang mendorong anda melakukan mengurus Diabetes dengan baik?	
8. Pernahkah anda mengalami tekanan perasaan (stress/kemurungan) setelah / sepanjang rawatan?	**Jika YA,** • Kenapa? • Cara mengawal?

SOALAN	PROBE	
3. Apakah kemahiran tingkah laku pesakit dalam melaksanakan amalan pengurusan diri diabetes disyorkan? (Tingkahlaku)		
9. Bagaimana cara anda menguruskan penyakit Diabetes?	**Ubat**	i. Jenis ii. Jadual iii. Masalah iv. Ubat tambahan lain
	SMBG	i. Buat ke tak? ii. Cara iii. Masalah
	Makan	i. Makan apa? ii. Waktu makan? iii. Corak makan sebelum & selepas DM iv. Masak sendiri @ Tapau? v. Makanan tambahan (beras perang, palsweet) vi. Masalah ikut jadual / pilihan makanan?
	Aktiviti fizikal	i. Buat tak? ii. Jenis iii. Berapa lama? iv. Kekerapan v. Halangan vi. Dengan siapa? vii. Tahap perubahan selepas aktiviti
	Penjagaan kaki	i. Buat tak? ii. Cara iii. Masalah iv. Ada demonstrasi dari Staf?
	• Bagaimanakah anda mempelajari dan mempraktikkan kemahiran? • Apakah kemahiran yang paling penting untuk mengawal tahap glukosa darah anda?	
10. Pada pandangan anda, adakah cara lain atau pandangan yang memudahkan / membantu pengurusan Diabetes lebih baik?		

Appendix 2: FGD Guidelines

PARTICIPANT BACKGROUND (FGD)

Untuk Kegunaan Pejabat

Tarikh: _____
Masa mula: _____
Masa tamat: _____
No ID Peserta: _____
Klinik/ Hospital: _____

Survey Tapisan Staf: [Versi Bahasa Melayu]

1. No Telefon:_____
2. Umur: _____ tahun
3. Jantina: Lelaki / Perempuan
4. Kawasan tempat tinggal adalah: _____Kampung/ Taman
5. Tempoh berkhidmat di DRC: _____
6. Bidang kepakaran: _____
7. Bangsa:
   - Melayu
   - Cina
   - India
   - Lain-lain: _____
8. Agama:
   - Islam
   - Buddha
   - Hindu
   - Kristian
   - Lain-lain: _____
9. Tahap Pendidikan
   - Tidak bersekolah
   - Sekolah Rendah
   - Sekolah Menengah
   - Institut Pengajian Tinggi
   - Lain-lain: _____

RISALAH MAKLUMAT PESERTA DAN BORANG PERSETUJUAN atau KEIZINAN PESERTA (STAF KESIHATAN)

1. **Tajuk penyelidikan:**
   The Diabetes Behavioral Diagnosis Instrument (DBDI): "Development of Instrument in Enhancing Healthy Lifestyle Among Type 2 Diabetic Patients (T2DM)"

2. **Nama Institusi and nama penyelidik:**
   Institut Penyelidikan Tingkahlaku Kesihatan (IPTK)
   Rosnani Binti Kassim, Albeny Joslyn Panting, Nadia Binti Amiruddin Dan Norbaidurah Binti Ithnain

3. **Nama penaja:**
   GERAN PENYELIDIKAN KEMENTERIAN KESIHATAN MALAYSIA

4. **Pengenalan:**
   Risalah ini menjelaskan hal-hal berkenaan penyelidikan tersebut dengan lebih mendalam dan terperinci. Amat penting anda memahami mengapa penyelidikan ini dilakukan dan apa yang dilakukan dalam penyelidikan ini. Sila ambil masa yang secukupnya untuk membaca dan mempertimbangkan dengan teliti penerangan yang diberi sebelum anda bersetuju untuk menyertai penyelidikan ini. Jika ada sebarang kemusykilan ataupun maklumat lanjut yang anda ingin tahu, anda boleh bertanya dengan mana-mana kakitangan yang terlibat dalam penyelidikan ini. Setelah anda berpuas hati bahawa anda memahami penyelidikan ini, dan anda berminat untuk turut serta, anda dikehendaki untuk menandatangani Borang Persetujuan atau Keizinan Peserta, pada muka surat akhir risalah ini.

   Penyertaan anda dalam penyelidikan ini adalah secara sukarela. Anda tidak perlu menyertai penyelidikan ini jika anda tidak mahu. Anda juga mempunyai hak untuk tidak menjawab mana-mana soalan yang anda tidak mahu jawab. Anda juga boleh menarik diri daripada penyelidikan ini pada bila-bila masa sahaja. Jika anda menarik diri, segala maklumat yang telah diperolehi sebelum anda menarik diri tetap akan digunakan dalam penyelidikan ini. Jika anda tidak mahu menyertai ataupun menarik diri dari penyelidikan ini, tindakan anda tidak akan menjejaskan segala hak dan keistimewaan perubatan kesihatan yang selayaknya anda terima.

   Penyelidikan ini telah mendapat kelulusan Jawatankuasa Etika dan Penyelidikan Perubatan, Kementerian Kesihatan Malaysia.

5. **Apakah tujuan penyelidikan ini dilakukan?**
   Tujuan penyelidikan ini dilakukan adalah untuk membangunkan instrumen yang boleh menganalisa atau mengukur indikator pesakit. Penyelidikan ini diperlukan kerana dapat memberikan maklumat dan pemahaman yang lebih lanjut faktor-faktor tingkahlaku yang menyumbang kepada penjagaan dan pengurusan pesakit dan penyakit Diabetes dalam kalangan pesakit Diabetes jenis 2 (T2DM).

   Penyelidikan ini akan berlangsung selama 12 bulan (01/06/2019 sehingga 01/05/2020). Dijangka bahawa 76 individu akan mengambil bahagian dalam kajian ini.

6. **Apakah tanggungjawab saya sewaktu menyertai penyelidikan ini?**
   Amat penting anda menjawab kesemua soalan yang dikemukakan oleh kakitangan penyelidikan dengan jujur dan lengkap yang akan mengambil masa selama 20 hingga 30 minit. Penyelidik juga memerlukan maklumat yang berikut daripada pengalaman perkhidmatan anda berkaitan pesakit Diabetes jenis 2 (T2DM).

   Anda akan ditemubual oleh Pegawai Penyelidik Utama atau Penyelidik Bersama dan dua orang pembantu untuk membuat catatan dan merekodkan sesi temubual. Skop temubual merangkumi pengurusan penyakit Diabetes oleh pesakit dan perkhidmatan perubatan dari institusi kesihatan di bawah Kementerian Kesihatan Malaysia. Rakaman audio akan menjadi tanpa nama, dan tidak akan menyebutkan maklumat pengenalpastian peribadi seperti nama, nombor kad pengenalan, dll semasa wawancara rakaman audio adalah untuk tujuan transkripsi dan tidak akan disalin / dihantar kepada mana-mana individu lain atau digunakan untuk sebarang tujuan lain dan tidak akan disalin / dihantar kepada mana-mana individu lain atau digunakan untuk apa-apa maksud lain. Selepas transkripsi, rakaman audio akan dilupuskan dengan selamat.

7. **Apakah manfaatnya saya menyertai kajian ini?**
Kajian ini tidak mempunyai sebarang manfaat kesihatan dan kewangan. Walau bagaimanapun, segala maklumat yang diperolehi akan dapat membantu pembuat polisi kesihatan untuk menambah baik program penjagaan pesakit Diabetes yang sedia ada di negara ini.

8. **Apakah risiko dan kesan-kesan sampingan menyertai penyelidikan ini?**
Risiko untuk penyertaan penyelidikan ini yang adalah minima dan tidak akan menjejaskan kerjaya anda. Anda berhak untuk tidak menjawab jika rasa tidak selesa dengan mana-mana soalan kajian.

9. **Siapakah yang membiayai penyelidikan ini?**
Kajian ini ditaja sepenuhnya oleh Kementerian Kesihatan Malaysia. Anda tidak akan dibayar untuk menyertai kajian ini.

10. **Adakah maklumat saya akan dirahsiakan ?**
Segala maklumat anda yang diperolehi dalam penyelidikan ini akan disimpan dan dikendalikan secara sulit, bersesuaian dengan peraturan-peraturan dan/ atau undang-undang yang berkenaan. Sekiranya hasil penyelidikan ini diterbitkan atau dibentangkan kepada orang ramai, identiti anda tidak akan didedahkan tanpa kebenaran anda terlebih dahulu.

    Pihak-pihak tertentu seperti individu yang terlibat dalam penyelidikan ini, juruaudit dan jurupantau yang terlatih, pihak berkuasa kerajaan atau undang-undang, boleh memeriksa maklumat atau data kajian jika diperlukan.

11. **Siapakah yang perlu saya hubungi sekiranya saya mempunyai sebarang pertanyaan?**
Anda boleh menghubungi pegawai penyelidikan utama kajian iaitu Pn Rosnani binti Kassim pada sambungan telefon (03-3362 7600) atau Pn Norbaidurah binti Ithnain sekiranya anda mempunyai sebarang pertanyaan mengenai penyelidikan ini.

    Jika anda mempunyai sebarang pertanyaan berkaitan dengan hak-hak anda sebagai pesakit dalam penyelidikan ini, sila hubungi: Setiausaha, Jawatankuasa Etika & Penyelidikan Perubatan, Kementerian Kesihatan Malaysia, melalui talian telefon 03-3362 8407/8205/8888.

BORANG PERSETUJUAN/ KEIZINAN PESERTA

(Untuk Salinan Peserta dan Penyelidik)

Tajuk Penyelidikan :

The Diabetes Behavioral Diagnosis Instrument (DBDI): Development Of Instrument In Enhancing Healthy Lifestyle Among Type 2 Diabetic Patients (T2DM)

Dengan menandatangani di bawah, saya mengesahkan bahawa:

- Saya telah diberi maklumat tentang penyelidikan di atas secara lisan dan bertulis dan saya telah membaca dan memahami segala maklumat yang diberikan dalam risalah ini.
- Saya telah diberikan masa yang secukupnya untuk mempertimbangkan penyertaan saya dalam penyelidikan ini dan telah diberi peluang untuk bertanyakan soalan dan semua persoalan saya telah dijawab dengan sempurna dan memuaskan.
- Saya juga faham bahawa penyertaan saya adalah secara sukarela dan bebas menarik diri daripada penyelidikan pada bila-bila masa tanpa harus memberi sebarang alasan dan ianya sama sekali tidak akan menjejaskan kerjaya saya pada masa akan datang. Saya tidak mengambil bahagian dalam mana-mana penyelidikan lain pada masa ini. Saya juga memahami risiko dan manfaat penyelidikan ini dan secara sukarela memberi persetujuan menyertai penyelidikan ini di bawah syarat-syarat yang telah dinyatakan di atas. Saya faham saya harus mematuhi nasihat dan arahan yang berkaitan dengan penyertaan saya dalam penyelidikan ini daripada pihak penyelidik.
- Saya faham bahawa kakitangan penyelidikan, pemantau dan juruaudit terlatih, pihak penaja atau gabungannya, dan pihak berkuasa kerajaan atau undang-undang, mempunyai akses langsung dan boleh menyemak laporan perubatan saya bagi memastikan penyelidikan ini dijalankan dengan betul dan data direkodkan dengan betul. Segala maklumat dan data peribadi akan dianggap sebagai SULIT.
- Saya akan menerima satu salinan 'Risalah Maklumat Peserta dan Borang Persetujuan atau Keizinan Peserta' yang lengkap dengan tarikh dan tandatangan untuk dibawa pulang.
- Saya **bersetuju/ tidak bersetuju*** untuk doktor yang merawat keluarga saya diberitahu tentang penyertaan saya dalam penyelidikan ini. (*Potong mana yang tidak berkenaan)

Peserta:

Tandatangan:		Nombor K/P:	
Nama:		Tarikh :	

Penyelidik yang mengendalikan proses menandatangani borang keizinan:

Tandatangan:		Nombor K/P:	
Nama:		Tarikh :	

Saksi tidak-berpihak/adil:

Tandatangan:		Nombor K/P:	
Nama:		Tarikh :	

FGD INTERVIEW GUIDE: Objektif Temubual

1. Untuk mengkaji tingkah laku di kalangan Pesakit T2DM

2. Untuk mengkaji perkara yang boleh digunakan sebagai petunjuk untuk mengukur kognitif, afektif dan kemahiran pesakit kencing manis mengenai penjagaan Diabetes

Kenyataan Pembuka: **MAKLUMKAN...**

1. Tiada jawapan **betul atau salah.** Sesi ini adalah berkenaan pengalaman mereka dan keadaan Diabetes mereka.

2. Sesi perbincangan ini akan **direkod**. Peserta mempunyai hak untuk menarik diri sekiranya mereka tidak mahu meneruskan sesi perbincangan.

3. Semua maklumat adalah **SULIT** dan bertujuan untuk kajian semata-mata.

SOALAN	PROBE
1. Apakah peranan staf kesihatan dalam menyampaikan maklumat kepada pesakit? (Informasi)	
1. Apakah maklumat yang diberikan kepada pesakit?	• Cara penjagaan / komplikasi / cabaran • Bagaimana anda memyampaikan maklumat? • Adakah anda mencadangkan carian maklumat lain kepada pesakit? • Pada pandangan anda, adakah maklumat yang diberikan kepada pesakit mencukupi? **Jika TIDAK, kenapa? Berikan cadangan.**
2. Bagaimanakah hubungan/ komunikasi anda bersama staf kesihatan?	Adakah anda pernah mengalami sebarang masalah komunikasi bersama staf kesihatan? **Jika YA,** • Apakah masalah tersebut? • Bagaimana anda menangani?
2. Apakah peranan staf kesihatan dalam motivasi pesakit? (Motivasi)	
3. Mengapa motivasi daripada staf kesihatan penting dalam pengurusan pesakit Diabetes?	• Apakah faktor yang mendorong anda untuk memberi motivasi kepada pesakit Diabetes?
4. Bagaimana anda memotivasikan pesakit?	• Pernahkah anda merasa kecewa? • Bagaimanakah anda atasi masalah tersebut? • Adakah anda sendiri memerlukan sebarang latihan/ kemahiran tambahan berkaitan motivasi? **Jika YA,** i. Apakah ii. Kenapa
5. Pada pandangan anda, adakah penting penglibatan sokongan sosial dalam pengurusan pesakit Diabetes?	• Pasangan /keluarga/rakan-rakan/majikan • Mengapa?
6. Apakah motivasi lain yang dapat mendorong pesakit untuk menguruskan Diabetes mereka?	

SOALAN	PROBE
3. Apakah kemahiran tingkahlaku pesakit dalam melaksanakan amalan pengurusan kencing manis yang disyorkan? (Tingkahlaku)	
7. Apakah kemahiran yang penting untuk mengawal tahap glukosa darah?	
8. Apakah bentuk kemahiran yang diajarkan kepada pesakit?	• Berdasarkan pengalaman anda, kemahiran apakah yang mudah diikuti oleh pesakit? • Apakah perkara yang sering menjadi masalah kepada pesakit dalam amalan dalam penjagaan diri pesakit Diabetes?
9. Adakah kemahiran yang diberikan dapat membantu dalam modifikasi tingkahlaku pesakit	• Apakah sebarang cadangan penambah-baikan

Appendix 3: Findings Details of Qualitative Study

DOMAIN	Sub-domain	Findings	
		IDI	FGD
INFORMATION	Sources	1. Family (1I) *usually...I mean, I ask my daughters and then of course (I2HTM59)* 2. Community (Friends & Neighbour) (5I) *I just bergaul untuk mendapat maklumat, information. The shared information. Itu je. Itu sahaja lah (I2HTM59)* *... Saya dapat tahu lah symptom tu...saya tanya dengan kawan-kawan surau semua, kawan-kawan masjid semua, dia kata takut kau ni kena kencing manis ni. Jadi saya pergi klinik lah the next following day, bulan puasa saya pergi tu, hari pertama puasa. (I1KMM46)* 3. Experience » Self-experience (3I) *...Saya merasakan yang sesuatu yang tidak kena dengan badan saya... Saya dapat tahu lah symptom tu... Kenapa saya cepat sangat mengantuk, lepastu saya baca whatsapp pun tak berapa clear. Itu antara simptom dia... Jadi saya pergi klinik lah the next following day, bulan puasa saya pergi tu, hari pertama puasa. (I1KMM46)* *Diabetes tu kena, kalau kena kudis, dia memang tak kering tau...Saya kadang-kadang tak kering dalam seminggu 2 minggu, saya lap-lap, cuci-cucikan, cuci dengan air putih tu...Cuci-cuci dia memang hilang. Kalau seminggu dua minggu dia boleh tutup. (I4KMM64)* » Family / Other's experience (3I) *...Because my mother was diabetic. She was an above knee amputee for ten years... sebelum dia meninggal... she lives with me... I know..what is the.. kesulitan lah...the problem with diabetes, so that's why. (I2HTM59)* 4. Health Care Provider » Internal (Website MySihat, article, demonstration/ practical, counseling eg. Medication Therapy Adherence Clinic (MTAC), Medical Nutrition Therapy (MNT)) (8I) (6F) *...doktor bagitahu at least you must spend 30minit a day, brisk walking... (I1KMM46)* *...Ada setengah doktor tu dia beritahu makan tu nak ikut time, kalau kita rasa macam takut terlupa tu kita set la jam... (I5KMF50)* *Yes, the Diabetic foot clinic they do that...and they also got the photos, pictures and so on... (I3HTM61, L399-405)* *Daripada doktorlah dengan misi dia ajar macam mana, kena kawal gula sepatutnya tak boleh tinggi lebih daripada 10 ke, 7 ke, dia ajarlah. (I8HTF39)* *...So, saya akan bagi source yang betullah. Dari segi macam exercise, boleh tengok dekat youtube, and then kalau dari segi maklumat pemakanan tu biasa saya akan bagi website yang established lah, contoh, of course lah MOH kan untuk yang portal MySihat, pastu website dietician pun ada, website nutrition pun ada dan lagi satu saya ada buat website sendiri juga untuk, khusus untuk patient yang dah berjumpa dengan saya...saya akan cadangkan... whether FB ataupun IG page yang established lah yang dia boleh follow untuk dapat support... yang memang di handle oleh dietician sahaja ...bila saya tengok macam visit tu ramailah dan yang itu memang setiap kali lepas saya bagi ceramah ataupun individual counseling, saya akan bagilah link kepada diorang. So, diorang macam boleh baca dekat handphone sebab yang tu lebih. dia bookletlah, lebih detail lah, berwarna. (F1KM)* *...first kita akan tanya pesakit, tahu tak guna glucometer machine with strips tu kan? Ok, katakan dia tahu, kita tanya macam mana dia tahu? Ok, maksudnya dia dah fahamlah. Kalau dia tak faham, kita akan suruh dia guna machine kita, demo kat kita sampai dia faham. Ok, lepastu kita akan bagi dia satu form, kita akan suruh dia buat SMBG tu melalui form yang kita berikan pada patient tulah sampailah dia faham sekali dengan demo dengan praktikal sekali. (F4HT)* *Macam saya perkhidmatan yang diberikan ialah Medical Nutrition Therapy lah kita panggil. Medical Nutrition Therapy ni means kaunseling lah, kaunseling pemakanan untuk pesakit diabetes type 2. Kita ada 2 kategorilah, satu sama ada kaunseling individu, yang kedua kaunseling secara berkumpulan lah. Kalau kaunseling berkumpulan ni lebih kepada macam ceramah tapi ada QnA, lebih macam individual ceramah lah. (F1KM)* *kita mainly for counselling... kita ada satu lagi servis panggil MTAC, Medication Therapy Adherence Clinic untuk pesakit type 2 diabetes lah...dalam MTAC tu, setiap kali patient datang, dia akan datang jumpa dengan pegawai farmasi lah, so, kita akan bagi kaunseling dari segi penggunaan ubat. Ok, macam education sikitlah, then, cara pemakanan juga, then, exercise sikit. Then, kita akan tengoklah ada apa-apa masalah dengan ubat dia, then, kita akan tengoklah dia punya, biasa kita akan suruh dia check buat SMBG sendiri di rumah lah, then, kita akan tengok trend tu, then, bagi suggestionlah. Ok, ni untuk solve patient punya medication related problem lah (F4KM*	

DOMAIN	Sub-domain	Findings	
		IDI	FGD
INFORMATION	Sources	➢ External (2I) *I got the family doctor, got two doctors' relation to me, they also. Anything advice, they advise me. They come and visit me also. (I1HTF57)* *... I like to look at my report. And then saya, I don't stop at here. So, I have my own personal physician...normally after this, I will consult my personal physician. Just to, dapat dia punya input (I2HTM59)* 5. Media ➢ Mass media (television, newspaper, radio, magazine, article) (3I) *... Oh, saya sendiri, Saya ada baca cina....Cina punya buku... (I11KMF79)* ➢ Social media (youtube/ instagram/ google/ facebook) (7I) (1F) *Sometime I go through that google, youtube to see what medication for the diabetes... (I1HTF57)* *...mostly I see Youtube. Mostly health punya saya banyak tengok. (I1HTF57, L232-234)* *Daripada internet pun ada jugak, tengok pada google. Apa yang boleh makan yang tak boleh makan... (I8HTF39)* *...especially healthy thing semua tu sekarang banyak lah nampak dalam facebook dari mungkin dulu, kita ada more info lah... (F3HT)*	
	Types	1. Diet ➢ General (10I) *Dia suruh jaga minyak-minyak jangan makan, yang goreng-goreng jangan makan, sayur kasi lebih, nasi sikit dia suruh ambil, buah makan. Buah pun jangan manis-manis punya... (I8KMF48)* *...especially healthy thing semua tu sekarang banyak lah nampak dalam facebook dari mungkin dulu, kita ada more info lah... (F3HT)* ➢ Control sugar (3I) *Diabetes ni dia bagitahu jangan makan garam, jangan makan gula, jangan lebih gula... Ha itu sajalah... (I4KMM64)* *... Dia (HCP) kata kurangkan manis, kurangkan garam, makanan kurangkan. Jangan makan ini... daging jangan makan, daging dia tak bagitahulah kan. Dia kata makan, makan tapi jangan selalulah dia kata. Dia bagi masa untuk makan lah... (I4KMM64)* ➢ Quantity/ Portion (1I) (1F) *They will tell me, you must eat less, eat like especially tosei, you must eat about like three quarter, minum one cup. I was think how is it, how to eat so little, like every weekend I eat a bit more one. (I9HTM72)* *... macam kuantiti makanan semua tu kita akan berdasarkan dietician bagilah. So, standardlah kitorang punya tu (panduan mengenai diet)(F9HT)* ➢ Carbo-counting (0I)(1F) *Cuma untuk carbo counting tu kitorang akan bagi secara macam patient type 1, kita akan ajar carbo counting tapi dia akan refer juga ke dietician sebab untuk lebih telitilah. tapi rasanya cara pemberian maklumat mengenai diet sama. (F9HT)* 2. Medicine (5I) (5F) ➢ Insulin (usage, storage and basic knowledge), *Medication intake and side effect* *... insulin I have to take half an hour before meal lah... Metformin, I take after meal...half an hour after meal...immediately after meal (I3HTM61)* *... Father saya dia pun ada Diabetes juga tapi time-time dulu dia kuat makan pain killer. Kuat makan ubat. So, one of the causes for this kidney problem is chemical lah. (I1KMM46)* *Cara nak makan ubat biasanya ada juga kita pergi seminar apa semua. Dorang akan bagi tahu. Sebab contohnya kalau ubat sebelum makan, berapa tempoh. 4 jam, 2 jam, 1 jam, 10 minit... Macam saya okaylah selepas makan, abis minum makanlah, abis minum makanlah. (I4HTM55)* *biasanya kita akan sentuh pasal perubatan pesakitlah. Kalau pesakit on insulin kita akan pastikan teknik dia betul, cara dia pakai dengan... jarum semua tu, penyimpanan semua adalah betullah. Kalau patient yang on ubat yang makan saja, kita pun akan pastikan dia faham kegunaan dia? Nak makan bila? Compliance ke tak? (F6HT)* *kalau macam insulin untuk cara pemakai, tak, macam mana nak cucuk insulin, kalau cara pemakanan ubat dia tu macam mana, lebih kepada itulah. (F3KM)*	

DOMAIN	Sub-domain	Findings	
		IDI	FGD
INFORMATION	Types	3. SMBG (2I) (5F) SMBG monitoring, Glucometer usage, HbA1c reading *saya tanya doktor ada follow up ada darah (gula dalam darah) tinggi punya cakap, kalau ada control, you no need every day, you one week, 1 minggu 2 kali. So I make it hari 3 atau hari 7 ini macam. Sunday or weekend ini macam buat 1 kali (I6KMM44)* *biasanya kita akan explain tentang pantauan macam mana patient boleh pantau di rumah, alat yang boleh digunakan macam meter semua untuk pantau gula, mungkin information awal tentang apa level yang dia patut aim (F3HT)* *"first kita akan tanya pesakit, tahu tak guna glucometer machine with strips tu kan? ... Kalau dia tak faham, kita akan suruh dia guna machine kita, demo kat kita sampai dia faham. Lepastu kita akan bagi dia satu form, kita akan suruh dia buat SMBG tu melalui form yang kita berikan pada patient tulah sampailah dia faham sekali dengan demo dengan praktikal sekali. (F4HT)* *saya akan juga terangkan dari segi kalau HbA1c, apa maksudnya HbA1c tahap itu, berapa purata gula dia dalam tiga bulan tu. So, saya akan cuba ingatkan yang itu ialah terlalu tinggi dan lagi satu emphasize kepada patient kenapa kami nak turunkan (F8HT)* *SMBG we explain to them, when to do SMBG, what is the importance of SMBG, what does it reflect. (F5KM)* 4. Physical Activity (4I) (4F) *dia suruh saya brisk walk, doktor bagitahu at least you must spend 30minit a day, brisk walking. (I1KMM46)* *Doktor Johor tu dia bagitahu, saya go for jogginglah, and jangan duduk rumah tu masa lepas makan tu petang-petang tu cukup. Two day, three days once you do lah, dia kata. (I4KMM64)* *Especially obese patient, actually dia tak boleh jalan laju sangat dan tak boleh jalan lama. Saya start dengan 4000 more toward nak bina stamina dulu, prepare dia untuk ke capai 10000 steps... (F1HT)* *...saya advice suruh ikut kemampuan dan mereka yang kurang berkemampuan tu, saya suggestkan mungkin 20 ke 30 minit sehari untuk seminggu seperti yang disarankan KKM lah...Tapi, of course orang yang tak bergerak, yang ada masalah komplikasi, yang kaki amputated, kita nasihatkan juga untuk buat exercise atas, regangan otot yang tak menggunakan pergerakan banyak lah... Jadi, kami juga, akan minta tolong refer kepada physiotherapist... buat light exercises untuk mungkin kurangkan berat badan... Mereka yang aktif tu...ikut apa yang dia sukalah, main bola ke, main badminton ke.... (F2HT)* *...Biasanya, samalah ikut kemampuan. Biasa kita cakap kat pesakit mungkin hari pertama buat 10 minit dulu, jalan ke, berjalan 10 minit dulu and then besok makin meningkat, makin meningkat, sampai dia rasa dia mampu buat 30 minit 1 sesi.(F5HT)* *Sebenarnya sama jugalah, cuma, bagi yang bekerja tu dia takde masa nak exercise kan, boleh aerobic ke malam ataupun guna bangku untuk yang exercise... Kalau hari cuti, kita galakkan berjogging ke, berjalan ke, ikut kemampuan, sekurang-kurangnya 150 minit seminggu (F4HT)* 5. Eye & Footcare (5I) (4F) Symptom, Foot exercise, Foot treatment (cuts/callus), Footcare (cutting nail/ foot wash/ footwear) *yang tadi nurse yang bawa saya tu, dia ada nasihatkan saya...Ha dia check kaki... dia check mata...lepastu dia kata urat mata tu boleh tahu. Kalau dia banyak pecah ke, banyak berdarah ke...Maknanya ...Teruklah tu. (I1KMM46)* *"Yes, the Diabetic foot clinic they do that...and they also got the photos, pictures and so on... They are the one, always tell us to wear the stockings. And if you got Diabetes, you don't wear the Japanese slipper, because of the vibration here. So you wear the Diabetic foot shoes. (I3HTM61)* *Jaga kaki tu pakailah cermin tak nampak belah bawah tu. Kita tak nampakkan. Tahulah mata rabun kan. Tengok satu. Yang kedua, air tu kena jagalah. Sebab kadang-kadang orang diabetic ni, dia kebas tak tahu suhu dia panas atau sejukkan. Yang kedua kain tu lembutlah. (I4HTM55)* *Selain nasihat, kita ada ajar pesakit untuk senaman kaki untuk pesakit diabeteslah. kita juga ada yang penyediaan untuk yang foot care, pemotongan kuku pesakit abnormal, pembuangan callus (F4HT)* *lagi satu suruh dia apply lotion sebab diabetic, kulit akan jadi cepat keringkan, kita nak elak daripada luka, jadi tu memang kena apply kat rumahlah (F4HT)* *kita galakkan pesakit check kaki dia setiap hari... saya ajar 2 kali, pagi, sebelum bangun daripada katil kita suruh tengok dulu kaki dia, then sebelum tidur suruh tengok lagi sekali, supaya dia boleh compare condition kaki dia awal pagi dengan sebelum tidur. Kita juga cakap kat dia sebab setengah patient dia terlalu dengar cakap orangkan, kalau kebas ada patient yang rendam air panas, air garamlah, kita taknak, so, kita akan advice patient jangan urut jangan pergi guna mesin urut. Kita akan cuba ajar pesakit untuk elakkan aktiviti yang boleh mendatangkan risiko pada kaki dia, foot wear, semua kita akan ajar. (F5HT)*	

DOMAIN	Sub-domain	Findings	
		IDI	FGD
INFORMATION	Types	6. Symptom and Complication (4I) (2F) *dia(HCP) suruh saya tengok pasal kulat...Ha kaki saya kalau dah berkulat tepi-tepi tu, maknanya...dah tahap kritikal lah.... dia maklumlah kalau nampak putih-putih kulat tu, cepat-cepat datang... Kebas dekat tangan ada.... Kaki tak ada....(I1KMM46)* *potong kaki, bernanah..nanah, lepastu boleh attack organs...daripada Diabetes ni (I1KMM46)* *yang saya observe, amputation and also, I mean kidney failure, heart disease... these are the main things and glaucoma. (I2HTM59)* *Kena buah pinggang, kena stroke ... Macam gula terlalu tinggi sangat, macam hilang ingatan. Itu tahulah. (I8HTF39)* *We'll explain to them, the complication of diabetes yang penting...if they are not adhered to medication, diet semua, will get stroke, so, we emphasize on the macro complication. So, kita tengok kalau yang dekat klinik kita tengok micro, but at home kalau you tak comply with medication have to tengok pada macro dia pula kan (F5KM)* *emphasize kepada patient kenapa kami nak turunkan, kenapa kami nak kawalan gula yang ketat dari segi memberitahu patient pasal komplikasi kepada mata, buah pinggang dan saraf. (F8HT)*	
	Information needed / information delivering issues	1. General (5I) • Detail result explanation *when they did the HBA1C, it was 5.8 and. the doctor said, what, kenapa dia orang buat HBA1C, and then I said, what is the meaning of the reading. And then, dia cuma jawab, no it's okay. It's okay. Don't worry about it. Macam tu, you know. I dengar tapi I balik, bila I google, I found out, what is HBA1C. what is the purpose of that, and then I realise that, according to that reading, I'm not diabetic. Diabetic is 6.0 above, so, then, I'm wondering whether my medication is too much, maybe I can reduce my medication, you know. So, benda-benda macam ni. (I2HTM59)* • Detail lifestyle modification in between TCA *Maklumat yang dibagi cara klinikal itu rasanya tak cukup lagi sebab maklumat itu perlu diperhati sendiri dan kena sokong. Kalau setakat ini. Contohnya, jumpa doktor 3 bulan sekali, tapi kita hidup 90 hari lagi tu. Yang kat situ tuan punya badan kena jaga. Maksudnya, tahu yang penting pilihan makanan. Sebab kita akan makan kan. Mana boleh berhenti makan kot. Lepas tu, kena tahu kawal lah sebab kita nak rate jangan lebih 8 jangan kurang 4. (I4HTM55)* • Detail lifestyle modification based on gender, age, type of occupation and type of disease *Inisiatif maklumat lain. Sebab kadang-kadang A, B, C ini tak sama... Orang tahap macam mana. Mungkin usia, tahap sakit, mungkin jantina, lelaki. Mungkin satu lagi pekerjaan... Dia bergantung...pada individu tersebut. (I4HTM55)* • Detail information on complication regarding disease / medicine intake *I got other sick coming in, skin problem all these, I don't know whether because of the diabetes or anything, that's the thing... Itchy. (I9HTM72)*	1. Limitation (1F) » Patient's education level/ Patient's attitude (ignorant) *education pesakit-pesakit kita masih lagi tahap yang rendah walaupun kita tinggal di bandar Klang. So, kita punya surrounding ni mereka, untuk memahami penyakit tu sendiri, untuk memahami ubat-ubatan tu sendiri juga apa komplikasi yang akan dapat, mereka tak faham yang tu sangkut-paut walaupun dah penerangan demi penerangan bagi (F2HT)* *Satu ialah mereka ni ignorantlah... Ada benda lain lagi seperti, duit, seperti kerja, seperti keluarga, yang itu penting jadi, mereka pandang ni remeh. Diorang kurang menerima dan tak kisah sangatlah. (F2HT)* » HCP knowledge *mungkin kita yang bersalah ataupun mungkin dari segi pencegahan dan komplikasi yang dibuat di luar sana yang masalah kita tak tahu (F2HT)* » Financial constraint (Information utility) *nak ada simpanan tu untuk risalah untuk 1 year tu agak sukarlah... klinik kesihatan punya bajet dia tak sama macam di hospital... Tu problem pada sayalah saya rasa itu salah satu yang saya rasa macam tak boleh nak fully utilize untuk bagi the best for the patient. (F1KM)*

DOMAIN	Sub-domain	Findings	
		IDI	FGD
INFORMATION	Information needed / information delivering issues	2. Medicine (5I) • Way of medicine intake if missed schedule/ forget *macam cara makan ubat, macam mana kita nak. Makan ubat tu kita nak ikut time ke macam mana. Sebab kadang-kadang terlupa, kadang-kadang terlambat, terlewat laaa. (I5KMF50)* • Side effect of medicine intake *...So, I'm also concern about.. apa dia.. quantity of..medication sebab itu boleh effect kidney. (I2HTM59)* • Medicine suitability with patient's condition *Even, the medicine that I'm taking, I also ...get more information of each of these medicines from the internet because there are various medicines available, so you must know which of these medicines are most suitable for you. Why the hospital is recommending that medicine for you. Then...I talk to the doctor, doctor are these medicine available, why are these medicines not prescribed in this hospital and so on. (I3HTM61)* • Ways of medicine intake (all together /separate / consume with alkaline/ alcohol/ carbonated drink) *...many patients are taking medicines, they don't really know, can we take all the medicines in one go. You cannot take any medicine with alcohol or any carbonated drink that is acidic... (I3HTM61)* 3. Diet (3I) • Detail food group / classification (Food pyramid) *Problem sini, macam kita takda itu education of the Diabetes ini macam tepung gandum, potato aa ini kita tak tahu. (I6KMM44)* *Mungkin ada lagi yang kita perlu tahu lagi. Makan apa yang penting, macam ulam-ulam tu ada yang boleh makan, ada yang tak boleh makan. Sebab dekat sini dia ajar cuma makan dari segi macam sukatan kita makan kan nasi... Macam sayur-sayur tu banyak, kadang ada yang tak tahu jugakkan? (I8HTF39)* • Amount of insulin intake based on food consumption *they have got the about Diabetic counselling unit. But they are more towards the diet that you are consuming. How to control your Diabetes based on what type of food that you can eat, what you cannot eat because you must take the insulin dosage according to the type of food you are taking, the glucose content in it. (I3HTM61)* • Calory content in food consumption *Actually to be honest it's insufficient information lah because...The dietician only says the calories, they don't tell you precisely, the amount of that insulin that you have to take...(I3HTM61)*	

DOMAIN	Sub-domain	Findings	
		IDI	FGD
MOTIVATION	Self-motivation	1. Perception Negative perception (-) • Perceived no changes in blood glucose reading when skipping medicine intake *Kiranya saya ambil ubat, kalau saya takda ambil ubat pun takda apa masalah aku, normal tau. Saya normal ambil (ubat). Saya tak nak ambil tu memang ada 1, 2 aku ada test la kan 3 hari, tapi normal saya takda masalah body sayalah. Tapi saya pergi check memang dia 8, 9 kadang 11 macam ini hari. Dia macam ni jugaklah, naik turun naik turun. (I4KMM64)* • Perceived stereotype HCP (providing medicine without further concern) *... what I feel is, when you go and see the doctors, the doctors are not, they think their knowledge on Diabetes by reading some of the breakthroughs made by research scientists in the particular fields. They all like stereotypes only for this patient come they gives this type of medicine. But the dont even ask what are the various chronic problems that they are facing. (I3HTM61)* • Perceived better health condition if received early exposure on DM *saya selalu fikir, kalau saya di bagitahu... pengetahuan ini.. mungkin 20 tahun lebih awal.. kemungkinan my diabetic condition not as serious or mungkin lewat lagi dalam... hidup saya lah..you know. (I2HTM59)* • Perceived the importance of diet and medicine only in DM *Cara lain (atasi Diabetes) tu takda. Rasanya sebab kita memang harap ubat jeklah. Kalau lain tu kita tak tahu sangat. Dengan makanan, itu jeklah yang kita tahu. (I8HTF39)* Positive perception (+) • Perceived importance of HCP support *rasanya ya jugak jadi kita sebelum, dapat membantu... sebab sebelum ni kita tak tahu kan. Tapi sebenarnya penting jugak lah macam dorongan dorang(HCP) kan, sebab kita ni bukan tahu sangat kan. jadi bila cakap macam tu, betul jugak kan. Kita pun kena jaga jugak kan untuk jaga kita punya kesihatan (I5KMF50)* • Perceived the importance of lifestyle modification in DM *Semua penting. Kita satu badan kena, mahu hidup. (I8KMF48)* *I think medication is important.. tapi.. if you ask me I think lifestyle lah.. ha acara kita jaga kita punya lifestyle. Lifestyle tu jenis makanan, senaman, you know. All these things, kalau dia tak jaga ni, banyak mana ubat makan pun, tak.. tak akan bawa manfaat lah.. (I2HTM59)* *... cara yang mudah untuk manage any disease... kita punya tahap.. understanding of our condition and then, mengamalkan cara hidup yang elok.. these two lah, you know. kalau yang paling mudah, ini dua lah... (I2HTM59)*	Perception Perceived importance of social support *Perlu sebab dia (sokongan social) sebahagian daripada hidup kita, kalau kita takde sokongan, kita takde motivasi nak bekerja. (F1KM)* *Sokongan... Patient kan, so sebab kalau kata kalau macam patient, kalau dari segi pasangan dia atau anak dia tidak tahu tentang penyakit dia, apa yang dia makan semua susah untuk dia sendirilah untuk, dia sorang-sorang yang nak hadap benda tu, agak susah tapi bila kita dapat sokongan daripada orang sekeliling mungkin benda tu jadi senang untuk dia. Jadi dia senang nak ikut semua, then berjayalah dia untuk (recover). (F3KM)* *saya rasa sokongan social daripada dia punya employer tu lagi penting juga especially because diabetic patient yang, contohnya yang not well-controlled, their appointment will be more regular sometimes too much one month depends on decision kita lah kan so obviously they will have conflict with their employer lah kan...so, if the employer boleh bagi sokongan yang penuh kan, dia akan opportunity tu lah untuk jaga kencing manis dia (F5KM)* Perceived social influence leading to patient's misconception on Diabetes *... pendedahan tentang pendidikan kencing manis lah kepada semua, kepada semua macam oranglah sebab saya rasa satu adalah kenapa patient selalu salah faham adalah diorang dapat mungkin maklumat yang salah daripada dia punya kawan-kawan ke, daripada internet ke. (F4KM)* *sometimes people punya mentality atau family members dia percaya kepada ubatan ini or anak saya cakap ubat ini ... lebih berkesan dari ubat hospital. So, kadang-kadang ada certain patient yang ada some trust issue with hospital medication (F3HT)* Perceived negative feedback from doctor (prefer DE) *kadang kadang ada mereka taknak bagi information mungkin diorang takut ...dengar doctor je dah macam saya akan terima banyak lagi ubat, saya akan terima banyak lagi marah, sebab tu dia taknak bagitau dan juga diorang menyembunyikan banyak benda, macam diorang macam ambil makanan tradisional, makan suplemen yang dia tak bagitau kita tapi kadang-kadang bila saya tanya pada DE, kadang-kadang diorang ambil juga meluahkan perasaan pada DE ni. Mungkin dia ingat kurang takut. (F2HT)* Perceived importance of financial support *... social welfare, orang yang bantuan zakat, ada juga pesakit diabetic yang macam suruhkan, nak belikan pampers semua ... nak pakai glucometer yang tak mampu. Kalau tu semua tak boleh nak survive macam mana dia nak tingkatkan dia punya kesihatan dia lah. (F6KM)*

DOMAIN	Sub-domain	Findings	
		IDI	FGD
MOTIVATION	Self-motivation	▸ Medicine (5) • perceived the fast effect of insulin and can cause hypo *People said insulin very fast it control down, without you knowing, sometimes you can get hypo, or anything all this. this one it can go slowly (I9HTM72)* • perceived medicine will control disease *kalau saya tak datang ambik ubat, saya tak jaga, kita ada asbab kan. Asbuban ni kadang-kadang ubat ni akan jadi asbab untuk menghindarkan penyakit tu daripada berlarutan. Ha jadi saya ambik tu sebab nak menjaga kesihatan lah sebab saya dah ada penyakit. (I1KMM46)* • perceived medicine can cause kidney problem *I secara personal, I memang tak balik (rutin makan ubat seperti yg disarankan HCP) but I'm monitored my blood sugar. I'm monitored blood sugar...and I find that, I don't see any adverse effect. So, I maintain just two [metformin] at night because my thinking is I don't want to harm my kidneys... So I'm quite a lot medications. So, saya memang.. itu yang saya risau lah..* *kidney... (I2HTM59)* ▸ Diet (4) • Perceived food load in Malaysia as challenges in DM *Masyarakat kita. Peringkat ni macam mana nak mengatasi. Sebab kita ada limpahan makanan terlalu banyak dekat Malaysia ni. Kalau orang Itali datang dekat Malaysia ni, senang dapat makanan Itali. Yang India, senang dapat makanan India. Yang kita ni semua makan. Itu salah satu kesedaran tu. (I4HTM55)* • Perceived cheat day (eat once in a while) acceptable *Try to follow but not all. He said durian one seed, but durian I better don't touch...Not good la.. I think once a while is okay I think la.. today a bit high, tomorrow will come downla (I9HTM72)* ▸ Physical activity (1) • perceived running as unsuitable exercise *There are quite number of people say don't run, don't run (I9HTM72)* 2. Influencing factor ▸ Attitude • *tidur kena jagalah jangan sampai engkau tak nak tidur. Sampai 2, 3 minggu tak tidur nanti habislah. Memang nak tidurlah masa kita umur macamni mesti nak relaks tu. Im good at thatlah. (I4KMM64)* *... I enjoy going out and you know, I enjoy my life lah... sampai saya masuk ke kubur, I want to be active lah you know (I2HTM59)*	1. Influencing factors that motivate patient from HCP view ▸ Family experience *The most common one is those yang very close to them lah kan, contohnya kalau dia tengok mak dia macam tu, mak dia diabetes so untuk elakkan dia dapat complication macam mak dia tu, diikuti one of her motivation dia lah, untuk makan ubat, control diabetes kuat (F5KM)* *saya rasa kalau mendorong mereka untuk menjaga lebih elok ialah tengok family members lainlah, macam pakcik-pakcik, makcik diorang, mak bapak diorang ada kencing manis then juga komplikasi, dah ada dialysis, dah ada heart attack, dah ada strok semua tu ... benda tu memang akan menyedarkan diorang untuk lebih elok lah... (F2HT)* • Afraid of complication *... bila dia dah salah satu komplikasi dia akan lebih lagi over...sebab dia dah takut... Jadi, dia sendiri yang datang kat kita bila dia dah ada komplikasi tu. (F4HT)* *Kenapa dia (patient) still continue follow up, sebab dia takut dia punya organ-organ rosak. Itu saja. Kalau tak dia memang akan makan produk luar. ha, dia datang untuk follow up (F9HT)* 2. Influencing factors for HCP in motivating patients • Update knowledge *... saya rasa apa yang bagi motivasi ialah dengan keluar menghadiri seminar untuk update knowledge, update skill... boleh macam improve kita punya knowledge, jadi dia akan bagi kita macam satu something new lah untuk kita bagi sesuatu yang lebih baik pada patient. (F1KM)* *bila kita pergi kursus kita, kita tahu ada combination dengan medication, so, actually bila kita pergi, kitorang dengar macam oh macam ni, kalau patient macam ni, kita manage macam ni, so, bila kita dapat opinion orang lain pun kita, oh, ada cara lain rupanya ha. So, macam motivated jugalah kan (F5KM)* • Inspire by other's facility achievement *kita tengok pada pencapaian klinik kita...kita bandingkan dengan klinik lain. Klinik lain boleh buat kenapa kita tak boleh buat...kita belajar dari situ dan kita cuba apply kan dalam klinik kita ... perbaiki kita punya pencapaian. (I375-379, F2KM)* • Loaded waste (medicine) *Bila ada patient yang kadang ambil ubat kat kita ke dengan banyak tak makanpun, sekali-sekali pulang kan banyak kita rasa macam membazir benda tu, jadi, kita rasa macam lagi perlu bagi diorang lagi banyak kesedaranlah kenapa perlu kawal... kecewa sebab kita sekarang ni masalah stok, lepastu bila patient tiba datang pulangkan kat kita memang sorang dengan satu plastik yang besar. So, kita rasa macam membazir. (F3KM)*

DOMAIN	Sub-domain	Findings	
		IDI	FGD
MOTIVATION	Self-motivation	*Actually to be honest, I'm always a cheerful smiling face. However, pain I have, I don't show it to others because I don't want to make them feel depressed or what. Try to be happy and cheerful, and listen to nice sounds and I read a lot, I questioned a lot. Yes to make yourself feel more active, dynamic. I must make sure before I leave the world, I utilise this talent for the benefit of the whole of mankind. So that is what main aim. Positive thinking. You must feel that you are an asset in this world. (I3HTM61)* Family *Satu sebabnya, sebab saya masih ada anak sekolah, isteri dan anak-anak. (I1KMM46)* *I don't want to trouble my brother (I1HTF57)* Experience • Self-experience *Setakat ni, kalau pun saya makan manis-manis, paling tinggi 10.. Pernah. Lepas tu saya takut baliklah. Saya sendiri oo lebih..jangan. (I8KMF48)* *Saya duduk sorang. Anything can happen to me. The most probably when I hypo just I'm very scared. I sweat, takda orang kan (I1HTF57)* • Other's experience *Tengok orang-orang sakit, ala teruk.Ha dia mungkin dia tak jaga ke atau dia tak pergi klinik. Dia tak nak pergi klinik tak check. Mungkin jadilah macamni. Kalau sakit macamni memang nak pergi klinik, ambil ubat ke apa yang dia bagi, makan. Kadang diorang tak makan tau, (I4KMM64)* *kita dapat dari pengalaman kawan-kawan ada yang tak makan ubat sampai apa kena masuk hospital ... sebab dia kata dia dah jemu sangat dia macam dah muak sampai seminggu dia tak makan ubat, risiko nya agak tinggi, jadi apa-apa hal kena makan je la. (I5KMF50)* Complication *Saya tak sedia lagi nak mati... Tapi ni kita dah tahu saya berpenyakit, jadi ni usaha saya lah. untuk mengubati penyakit saya. (I1KMM46)* *Saya takut pasal..kalau saya tak datang, dia akan melarat, ...dan penyakit tu akan jadi lagi teruk...yang saya tengoklah. Dalam youtube ni semua, yang tak datang jumpa doctor, tak makan ubat ni, boleh potong jari, lepastu potong kaki, saya rasa tu lebih teruk. Itu yang lebih teruk. Waktu yang saya urine yang semut tu, masa tu saya rasa, its about time. Sendiri dah risau. Nanti kang potong kaki kang, lagi teruk. (I1KMM46)* *kena jaga betul-betul sebab tak nak jadi macam lebih serius... Yelah kalau bila dengar kata lebih serius kan banyak risiko kan, bila sampai boleh luka, sampai busuk, kalau boleh tak nak laa macam tu, tak nak sampai macam tu kan, kena kawal jugak laa kan (I5KMF50)*	• Patient's improve condition *... satu lagi motivasi kalau saya nampak patient saya memang betul-betul follow kita punya advice then dia punya condition dah semakin elok ... (F4KM)* • Help young people *kebanyakannya orang tua yang diabetes but there are a few who are still young and that is the main my motivator lah which those yang GDM masa mengandung. So, kita nak make sure diorang takkan jadi seteruk yang the other, dah tua susah sikit nak buat apa-apa, tapi yang muda ni so, itu pun motivate juga, untuk kita make sure HbA1c tu capai, taknak komplikasi because of their age lah. (F5KM)* • Reduce DM cases *tingkat kan usaha untuk bagi perkhidmatan diabetic tu lebih mantap lagi. sebabnya pentingnya... untuk patient jangan bertambah lagi teruklah. (F6KM)* *walaupun diorang tak compliance makan ubat tapi sekurang-kurangnya ada makan jadi itu pun dah bagi harapan untuk kurangkan komplikasi dan kurangkan admission yang lebih banyak burden kepada kita punya healthcare. (F2HT)* • Patient's gratitude *Ok, terutamanya actually memang lebih akan menunjukkan appreciation kepada kita di mana dia akan, terutama kalau kita dah berjaya tolong dia untuk nak kawal dia punya makanan dan turunkan gula. Ada certain, colleague sayalah, saya tak pernah lagi, di mana mereka menerima gift daripada pesakit-pesakit. Untuk meneruskan rawatan dia (F1HT)* • Help variety of patients *Kecewa tu memang ada tapi kita tak boleh nak, stop kat situlah sebab semua pesakit tu berlain-lain dan diorang ada background lain-lain. Jadi, kita bawa diri kita kepada background dia. Kita tengok apa masalah dia, ada isteri kat rumah, tempat kerja, keluarga. Dari segi tu, kita boleh dapat faham apa masalah dia dari segi taknak makan ubat, taknak check gula, tak control pemakanan, apa, apa yang punca dia sebegitu...So, kita buat ni sebagai kita bantu lebih elok untuk pesakit-pesakit lain. Jadi, kita cuba find out apa problem dia daripada segi tu kita boleh guna yang tu untuk patient-patient lain juga. (F2HT)* *sesetengah patient yang tak compliance tapi banyak patient lain yang perlukan servis kita dari segi pengetahuan semua tu dan belum cuba belum beri perkhidmatan itu. So, mungkin selalu ada hope to change ke something like that, to motivate you for the next patient something like that lah. (F3HT)*

DOMAIN	Sub-domain	Findings	
		IDI	FGD
MOTIVATION	Self-motivation	*diabetik ni kan kalau kita ingat kesan dia terlalu besar lah...Jadi pada diri kita fungsi-fungsi abdomen, organ-organ kita memang akan kena attack lah. Haah. Lagi satu saraf, yang kedua mata, yang ketiga jantung, darah tinggi automatik lah....Ohh yaa. Kena jaga, kena pantau. (I4HTM55)* *honestly, I don't scare of die, I scared potong kaki, potong tangan, I don't want this thing to happen, die is ok but, potong kaki, I see a lot of potong kaki, ayo some young students I don't want this sort of thing. that's why I try to do my best. (line 112-118, I9HTM72)* 3. Others (Stress/ TCM/ Sleep) *Ha jangan, jangan. Cakap oh, boleh baik, boleh baik, boleh. Itu saja nak. Jangan sad your heart, your heartlah don't sadlah. Don't sad your heart, finish. Yes, itu sajalah (I4KMM64)* *perasaan tu bila kita dah cuba makan, kita buat macam jus-jus sendiri tu kan kenapa la tak turun-turun ni rasa alamak fedupnya rasa, macam malas laaa. Ada jugak (I5KMF50)* *macam rasa macam penat jugak lah, sebab kita macam dah berusaha jadi, cakap ni dah berusaha lepas tu tawakal laa apa yang doktor nak suruh tambah ubat ke apa macam tu, sebab alamak aku dah cuba macam-macam ni ikut petua tu buat je lah kan tapi bila jumpa doctor pon masih dia ada sikit la perubahan tapi macam stress pon ada (I5KMF50)* *Bila stress, nak makan ubat pun tak ada mood. Dia akan kesan lain. Itu pun nak psikologi stress ni. Bila stress, agak2 makanan kita okay tak kita nak makan kan. Kadang-kadang kita dah tak ikut. Itu lah dia. (I4HTM55)* *Penyakit tu takda jugak stress, Cuma tapi kita stress tentang kewangan. Kalau kewangan tak da pun memang masalah macam-macamlah. Kadang sampai nak bunuh diri pun semua ada. (I8HTF39)*	• Avoid complication *bila kita tengok depan mata kita daripada patient yang type 1 ok normal bila dah sampai amputate kaki, kidney rosak kena dialysis, mata ok dah sampai jadi buta. Jadi kita lagi kesian, lagi kita macam motivate dia kita taknak sampai ramai patient jadi macam tu. Biarlah dia hidup dengan sihat. (F4HT)* *kita taknak tengok ramai pesakit yang end up with complications of diabetes. So, kita nak cuba untuk kurangkan komplikasi antara pesakit type 2 DM nilah (F6HT)*
	Socio-motivation	1. Socio-motivation Diet (6) • Spouse *isteri masak. Nasi semua kitorang makan diabetes. Sebab saya dah ada Diabetes, satu family makan nasi tu. Kira anak-anak pun..dia tak nak anak-anak tu kena (I1KMM46)* *You ni tak jaga makan dia kata. So dia akan refresh saya balik, dia akan buka google, ok these are the food that you can eat. Padahal dah pernah bagitahu dah. No problem. Selalu my wife yang akan buat. (I1KMM46)* • HCP *Oh motivate. Saya ambil satu contohlah, baru ni dia cuci kakikan. Nampak kesan macam ni. Nampaknya macam tak berapa cepat nak sembuh kan, kan dia (HCP) beritahu "pak cik jangan makan macam ni, jangan makan ni". Sebab pada masa luka. ada masa sihat pula, dia tengok dia tengok berat badan pula. Okay. "Pakcik, naik ni. Turunkan." ... Walaupun cara gurau pun. Sebab kita pun faham.. (I4HTM55)*	1. Socio-support within HCP circle (1) *saya memang ada group support lah untuk dietician dalam satu Selangor dan...Malaysia, so kalau ada apa-apa masalah, ada apa-apa nak tanya, memang saya akan tanya dengan kawan-kawan saya lah...Pastu, yang keduanya bila kita pergi conference atau seminar kita mesti akan jumpa kawan-kawan yang sama-sama seperjuangan kan... so kita boleh tukar-tukar pendapat lah. Itu pun beri motivasi kepada saya sebab saya dapat idea daripada orang lain (F1KM)* 2. HCP's approach in support (12) • Psychology approach (tackle patient's emotion) *kalau dia sorang saya akan just sembang dulu... untuk tackle dia punya emotional support dulu ke. Mungkin dia belum open, yelah, strangerkan dia belum open, kita kena repo dulu lah. (F1KM)*

DOMAIN	Sub-domain	Findings	
		IDI	FGD
MOTIVATION	Socio-motivation	• Friend *cukup marah kalau saya sentuh air gas. Haa yang tu dia orang marah... ada jugak kawan-kawan cakap bagi dia kurang gula, bagi dia kurang manis. Ada juga kawan-kawan yang membantu (I1KMM46)* SMBG / Medicine (5) • HCP *Tengok gula... InshaAllah kalau dia (HCP) tengok cantik, maintain je.. dia bagi galakkan, maintain tu. Okaylah. Kadang-kadang mungkin 3 bulan dia nak tengok naik sikit (I4HTM55)* *pernah sekali tu bila tinggi dia nak bagi saya insulin.. but I did talk to her, saya tak nak insulin. Insulin dah kritikal dah, dah terlampau tinggi. So, I asked her for her consent to give me one more month. The next appointment kalau naik lagi teruk, then ok lah. I will agree for the insulin. Tapi nampak-nampak ok alhamdulillah... doktor... Dia dengar saya punya permintaan. (I1KMM46)* • Spouse *Takda, but my wifelah. Kalau buat sendiri tu memang susah sikit? Sebab itu memang tolong buatkanlah. (I4KMM64)* *Yes, she (wife) do the best. If she don't do, I don't think so I can control. She cool me down, prepare the medicine all for me, she put one week medicine or two week medicine. She did all the medicine name I don't know one (I9HTM72)* Physical activity (2) *Riadah dengan sahabat-sahabatlah. Program riadah ni berbentuk NGO dan juga masjid. Ha bila ada program tu baru saya terlibatlah... mengutip sampah, sambil kita beriadah dengan parents dan juga anak-anak... (I1KMM46)* *Dulu saya punya bos, dia cakap, dia lepas makan, kita tak pernah buat exercise punya orang, kita jalan saja. To build up the basic, exercise lepas you have the strength and then you tambah. So I everytime last time, lepas makan saya jalan setengah jam kasik dia peluh, ini macam (I6KMM44)* Footcare (5) • HCP *Sister (Staf kesihatan), dia banyak bantu jugak lah, dia suruh akak pakai losyen dekat kaki, beli dekat farmasi. Haa macam tu laa bagi jangan kering. (I5KMF50)* *The nurses are wonderful. They take so much of care and interest. They have saved many legs from getting amputated. I salute them. (I3HTM61)* • Family *Itu doktor suruh datanglah, bandage...Dia cuci lepastu bandage...lepas tu doktor kata you can do yourself, he said. Then saya buat dekat rumahlah. Anak saya tolong buatkan (I4KMM64)* *my wife, dia tolong saya tengok tapak kaki lah for any lesion. (I2HTM59)*	• Involve family member *Sebab tu saya perlu kalau dia macam tak boleh nak cerita balik, kalau ada family member dia, saya akan tanya family member dia... biasa family member akan bagitau yang sebenarlah (F1KM)* *Lebih bagus kalau pesakit datang dengan ahli keluargalah, jadi kita akan nasihat bersama-sama ahli keluarga terlibat juga... lebih baguslah ada pesakit yang warga emas dia ... terkadang kurang dengar, tak faham, dia punya language kan, lebih bagus ada ahli keluarga. (F4HT)* *kalau macam yang memang bedbound tak boleh bangun, kita akan suruh family members buat pergerakanlah, tangan, kaki, biar ada pergerakan dan kita taknak jadi contracture lah, kalau langsung takde pergerakan (F5HT)* • Share knowledge and experience *last 2 years saya pernah ada buat training dekat Jepun so... salah satunya nutrition, apa yang dia amalkan dekat sana so, bila saya dapat idea daripada situ jadi tu saya akan cerita kan balik lah kepada patient-patient saya. (F1KM)* • HCP self-effort in delivering knowledge (photostat/ build specific website/ organize talk) *apa yang saya buat sekarang ni practicality mengikut kemampuan saya sorang. So, saya just buat fotostat sendiri saja, sometimes dekat klinik, sometimes saya guna duit sendiri je fotostat. Saya akan guna, sepatutnya risalah tu dia macam satu buku lah baru lengkap tapi, because of kekangan macam tadi, bajet dan seorang diri buat so saya just buat a few muka surat lah jadi at least diorang tak lupalah benda penting apa yang saya sampaikan. (F1KM)* • Continuous advices from HCP *Jika ada masa yang panjang tu kita lebih kaunseling dan tanya kenapa sebenarnya yang dia taknak cucuk, apa sebab dia, mungkin sebab dia takut jarum ke ataupun sakit ke apa benda? So, kita explain benda tu tak sakit, benda tu kita bagi jenis yang pen, apa benda jarum dia kecil, takde keluar darah, takde menyebabkan bengkak tu semua, kemudian tak menyebabkan komplikasi lain lah. Lepastu temu janji akan datang, maksudnya kita bagi temu janji yang lebih pendek lah untuk kita kaunseling lebih lagi, dan masa yang sama kita rujuk juga pada MTAC dan ni lah DE. Kalau tak boleh juga barulah kita rujuk pada FMS. (F2KM)* *Lagi satu, cuba ingatkan selalu untuk jaga apa yang dimakan, makanan sihat sebab akan saya akan juga ingatkan patient pasal risiko penyakit jantung dua kali lebih tinggi dalam pesakit kencing manis so sebab tu kena exercise, kawal berat badan dan kawal dietlah (F8HT)*

DOMAIN	Sub-domain	Findings	
		IDI	FGD
MOTIVATION	Socio-motivation	▸ General/ Others (moral support) (8) • HCP *Kebiasaannya yang akan bercakap, yang menasihatkan saya, doctor. (I1KMM46)* *maybe when they go to the report and all this. They (HCP) said, everything is good ...maybe that is the motivation (I2HTM59)* • Family/ Spouse *isteri saya sangat-sangat. Banyak sangat membantu (I1KMM46)* *Family saya ni kira support tu anak-anak saya tu baguslah...Kadang-kadang pagi, anak saya hantar, petang anak saya ambil sayalah. Dia tak bagi sekarang bawa kereta. (I4KMM64)* *No, I'm staying alone. I'm a bachelor still. I and my married sister are staying separately. But even our family members who are having Diabetes ... so we sit down and discuss our ideas... because we help them to understand the thing better, why their doctor prescribed with these medicines. (I3HTM61)* • Community (neighbour) *my neighbours ada communicate with me. Anything call me. Dulu my neighbour Malay dah pindah. Anak dia mari jaga saya pun ada. Suami meninggal, diorang yang jaga saya (I1HTF57)* • Ex-boss/ employer *my ex-boss once dia cakap... "you dapat penyakit, you bukan you dapat itu penyakit bukan cakap mati punya penyakit. Boleh control, you try" (I6KMM44)* *...urusan dengan my management, so macam hari ni, saya sudah bagi tahu dia.. saya kena pergi klinik... And then, they're aware of it. So, we work around it. Caused I'm, I'm contactable (I2HTM59)* 2. Financial support (1) ▸ HCP *Saya jumpa-jumpa pun staff semua banyak bantu sayalah. Doktor-doktor pun banyak bantu. Sebab saya ni memang ada masalah kewangan kat sini. Kadang saya pergi jalan kaki saya datang... Sebab kadang doktor bagi duit tambang kadang balik. (I8HTF39)*	• Assist in financial help *for those patient who actually need glucometer but they cannot afford... I ask my DE to get help with the social welfare... ada certain patient who are macam OKU so my nurses actually tolong dia macam carikan bantuan kewangan lah (F5KM)* 3. Lack of social support among patients • Employer (welfare)/ Family (Food preparation) / patient living alone *ahli keluarga yang penting. Dari segi kewangan, contoh yang untuk SMBG , dia punya strip kan mahalkan, sebabnya bila warga emas yang dah tak kerja, dah takde duit, perlu duit daripada anak, anak tak boleh beli kata takde duit, tapi bila untuk mainan dia punya anak sendiri yang mahal dia boleh beli, untuk strip mak dia tak boleh beli, tu salah satu jugalah factor yang penting untuk sokongan ahli keluarga. (F4HT)* *Majikan pun sama juga sebab ada setengah majikan, tak bagi untuk datang appointment, bila datang appointment tak dapat gaji, pastu nak cucuk pun tak bagi. Ada setengah tu sampai curi-curi cucuk dekat toilet. (F4HT)* *support sangat penting sebab memang satu kes di mana makcik ni...dia uncontrolled DMD ni sebab kebanyakan dia hypo then problem ialah sebab dia tinggal sorang, anak dia kerja kat oversea... so dia start serious ...sebab takde orang (F1HT)* *sebab kalau keluarga tak faham pasal kencing manis ... dan apa yang dia tak boleh makan dan apa yang dia sepatutnya makan dan risiko kepada ahli keluarga, semua akan makan cara yang tak sihat. (F8HT)* *kalau patient dah tua, so dia, satu yang dia taknak ubah dia punya diet dan kedua ialah takda family member yang nak support dia. (F9HT)*
	Commu-nication/ Interaction	1. Positive communication *pernah sekali tu bila tinggi dia nak bagi saya insulin.. but I did talk to her, saya tak nak insulin. Insulin dah kritikal dah, dah terlampau tinggi. So, I asked her for her consent to give me one more month. The next appointment kalau naik lagi teruk, then ok lah. I will agree for the insulin. Tapi nampak-nampak ok alhamdulillah... doktor... Dia dengar saya punya permintaan. (I1KMM46)* *Doktor boleh. ... kalau kita cakap apa-apa pun dia boleh pahamkan... Kalau apa-apa saya tanya, diorang bagitahu macamni. (I4KMM64)*	1. Positive communication *So, memang individualize lah... saya akan tackle mengikut jenis pesakit lah dan cara komunikasi dia... saya kena repo dulu tanya dia, kerja apa, datang dari mana apa semua, at least kita dah repo dengan dia, dia tak segan sangatlah nak cerita apa yang dia makan dengan saya. (F1KM)* *Tapi nak kena tengok baliklah sekarang dia, ilmu tu kalau tak betul dia how they interpret the thing, bahaya jugakan. So, when they do their own research, we have to ask again, apa yang puan faham sebenarnya. Then, kita boleh access, when they really understand, or they understand the wrong way, kita betulkan lah apa yang salah. (F5KM)* *kalau tak faham boleh call bila-bila. (F7HT)*

DOMAIN	Sub-domain	Findings	
		IDI	FGD
MOTIVATION	Communication/ Interaction	2. Passive communication • HCP's attitude (negative) *tu laa tu yang saya kata dekat youtube tu makan ni je katanya bebas, tapi betul ke itu kadang tanya la kan. Tu tanya-tanya doktor, Doktor kata mungkin, dia pun tak tahu nak cakap macam mana. Dia pon cuma kata dia tak sarankan (I5KMF50)* *some doctors are.. okay. Diaorang sudi nak, nak explain dengan mendalam. Some of them, they..mungkin they fikir tak penting bagi saya tahu cuma saya penting, ambil ubat, itu saja (I2HTM59)* *doktor tu bukan nak membina langsung lagi macam dia perli-perli kita pulak asyik suka makan (I5KMF50)* • Shy (different gender) *Saya tak cerita (masalah kelamin). Benda macam ni kadang malu lah nak cakap. (I1KMM46)* • Time constraint due too many patients/ *Biasa saya takda tanya, saya ingat ialah, sini... macam apa, pesakit banyak. (I6KMM44)* *doctor kerajaan, dia, dia kena process terlalu ramai patient, so they don't have time. (I2HTM59)* *sometimes actually, we like to ask a lot of questions to get more answers from them, but because of the quantity of patients is so high, and you find that, they don't have much time. (I3HTM61)* • Perceived doctor will add on medicine *Tapi my, my readings, everything is very good, ya. I tak nak explain...Because saya risau kalau saya explain, mungkin dia, dia, they may change anything or... you know.. haa so, urm I just leave it as it is. (I2HTM59)*	2. Passive communication • Patient's character (inconsistent, secretive, ignorant, stubborn) *Kalau dari segi communication tu sangat variety lah sebab setiap pesakit berbeza kan, ada yang tak cakap banyak, ada yang cakap banyak, ada yang soal lebih-lebih, ada yang tak tanya langsung. (F1KM)* *Bila kita cakap pasal diabetic, mula-mula dia akan dengar, lepastu bila kita bagi, bila kita tanya, kenapa reading ni teruk? Kenapa tinggi? Oh. Sebenarnya saya (pesakit) stress, dia mula bercerita, meleret, meleret, saya makan lambat sebab tu, sebab ni. So, kita lebih banyak macam, bila kita nak tarik dia balik untuk dengar pasal diabetic, dia dengar sekejap je pastu nanti dia akan mula balik dengan masalah-masalah dia... dia ajak kita cerita pasal benda lain, sebab tu kitorang memang pendengar yang setialah. (F5HT)* *Ada kalanya, ada masalah, ada kalanya yang pesakit memang senang nak terima apa yang kita cakap, ada yang memang tu jugalah, bertekak juga, dia nak ikut cara dia juga, taknak ikut cara kita. So, seboleh-bolehnya kita cubalah nasihatkan sampailah dia setuju. (F2KM)* *dari segi perbualan memang diorang akan ceritalah semua benda. Tapi, bila harini dia jumpa kita dia cerita benda lain. Next week, dia jumpa kawan kita, dia akan cerita benda lain...cerita dia macam tak balance, so kita tak tahu sama ada cerita dia betul atau tidak betul. (F9HT)* » Facility (limited space) » *Fasiliti ni untuk memberikan, macam saya ada banyak buat seminar saya buat ceramah untuk diabetic kan, so masalah tempatlah, itu biasalah di klinik-klinik kesihatan tu biasalah yang kecil-kecil. (F1KM)* » Society influence *Selalunya bila dia punya HbA1c tu dah lebih daripada dia punya target dia dan kita nak cuba try turunkan sebab dah maksimum dos dah ubat oral tu, kita nak tambah dengan insulin, masing-masing tak nak, so, dia dengar cakap-cakap orang daripada dengar cakap kami lah. Dia kata nanti ada kesan sampingan pada buah pinggang walaupun kita dah cuba kata kalau tak cucuk lagi banyak kesan dia, so, dia sama juga macam tu. Ha, macam tu lah. (F2KM)* » Older age (Difficult to understand) *setakat ni sebarang masalah dari segi komunikasi tu, kalau macam kita bagi kaunseling ada setengah pesakit tu bila dia lebih berusia tu dia kurang nak faham dan ambil masa yang lama lah nak faham sebab kaunseling ni yang kita selalu buat macam ajar cara nak cucuk kan, patient dia tak boleh nak faham step by step tu macam mana. (F3KM)*

DOMAIN	Sub-domain	Findings	
		IDI	FGD
MOTIVATION	Commu-nication/ Interaction		▸ Less confident with Health Care Services *kebanyakan pesakit dengan saya jumpa, sesi kaunseling tu memang kita akan korek maklumatlah... So far, kebanyakan tu, dia boleh share tapi is ada certain pesakit di mana dia taknak share, dia punya benda ni atas factor-faktor tertentu saya pun tak, kita pun tak pasti so untuk yang itu, mungkin kita, saya rasa patient tu ada, memang kurang yakin kepada perkhidmatan kesihatan kami ke macam tu. (F1HT)* ▸ Time constraint *kekangan masa kot sebab kalau macam kita macam ada group MTAC kan tapi ada kadang tu kita tak cukup staf ke ataupun kita tak boleh nak ambil masa yang banyak untuk nak terangkan kat patient secara detail lah. (F3KM)* *I think the main issue is kekurangan doktorlah. Ideally, if 1 patient, we can spend more time, especially diabetic patient there's so many things yang kita kena tanya, explore when we see 1 patient, but its impossible to spend that much patient. (F5KM)* *... dari segi masa, pesakit yang tua datang dengan anak-anak nanti dia kata anak saya nak cepat, anak saya nak pergi kerja, boleh tak buat short je kaunseling ni. Tapi, sebenarnya, kaunseling akan ambil masa kan, jadi, bila short, macam apa yang kita sampaikan tu tak ni, jadi dia pun macam err, tengok jam... tengok luar jadi dia tak concentrate sebab dia nak kejar masa. (F5HT)* *... mereka kesuntukan masa kerana mereka tahu masih ambil masa lama untuk ambil ubat kat farmasi nanti, jadi setiap kali lepas jumpa doctor... apa yang kami tanya, mereka mungkin jawab dengan jawapan yang sangat singkat... Lepastu tak beri info yang banyaklah...(F7HT)* ▸ *kadang-kadang actually stress jugalah sebab nak kena habiskan kerja juga tapi nak tahu apa masalah dia, nak kena tanya satu-satu, bukan patient terus akan bagitau, kalau dia snack pun tak boleh tanya awak ada snack ke, dia bukan akan jawab terus, mungkin lama cakap sikit baru dia bagitau ke, actually dia actually tak cucuk malam ke dia bukan akan terus bagitau, dia terus cakap kami dah tau ini punca, tapi dia bukan terus, mungkin kena cakap lama sikit baru dia bagitaulah, so, itu punca . Kalau dia cakap awal-awal boleh settlekan awal-awal dan cari cara nak settlekanlah. (F8HT) (Further discussion for patient to open up)* ▸ Caregiver issue *We know that the patient doesn't really understand cause diorang OKU patient, so, kitorang nak educate the caregiver pun difficult. So, tu lah the most challenging part, we try to do the best for the patient but limited because of patient tak faham, caregiver pun tak faham. (F5KM)* ▸ Language constraint *Masalah bahasa satu, Untuk tuju bahasa tu memang patient kita kalau kita cakap bahasa melayu A, dia cakap B, haa... kalau yang dah tua-tua tu lagi teruklah (F9HT)*

DOMAIN	Sub-domain	Findings	
		IDI	FGD
BEHAVIOUR	Medicine	1. Compliance (7I) *Time- time saya makan ubat. Pagi saya makan darah tinggi punya ubat, lepastu pukul 12 lepas makan, makan 1 biji kencing manis. Malam saya dah makan sikit, saya makan, ambil (I4KMM64)* *Saya ada buat 1 container (ubat), pagi makan, makan, makan. Ada buat 1 hari punya (I6KMM44)* *Takda masalah. Semua. Medication so far ok for me (I1HTF57)* *...I'm quite well organized because I follow this time, this time, I must do this thing. Whenever I go out also I take my medicines along. I don't delay it. (I3HTM61)* *Masalah? Tak ada lah. Sebab itu memang dah jadi rutin...Rutin harian untuk kita. Makan je lah. Tak ada masalah dengan ubat ni. (I4HTM55)*	1. Compliance (3F) *Saya rasa ubat dia boleh makan, dia akan makan ubat tu dan lebih banyak compliance lah (F2HT)*
		2. Non-compliance (4) ➢ Afraid of needle *I maybe fobia a bit insulin. Saya memang takut jarum. (I1KMM46)* ➢ Self -discipline *...saya lupa nak ambil ubat sebelum makan. ...Lepastu saya makan. Ok hehe balik saya makan, lepas makan tu, saya makan semua sekali. Yang sebelum pun saya makan sekali. Yang sebelum pun saya makan... hehe takut doctor marah kang... Jarang lah benda tu berlaku... benda tu mudah untuk saya urus bila saya balik subuh lah. ini kalau saya terlelap selalu...Balik subuh kadang-kadang duduk dekat kerusi, terlelap. Eh. Terlelap, bangun ...lapar...terus makan. Dah terus makan, terus makan, terus oo Allah. Lupa lah nak makan ubat yang sebelum. Jadi, saya habis makan tu, saya akan ambil ubat sebelum...Ha sekali harung...3 biji. Lepas tu saya makan yang selepas makan punya. Jadi one shot lah. berapa biji tu? 3, 4...7 (I1KMM46)* *tapi kadang-kadang, erk bukan terlupa, kalau pergi kenduri ke, balik lambat... saya saja tak ambil... cuti ubat... (I2HTM59)* ➢ Afraid of complication caused by the medicine *I secara personal, I memang tak balik (rutin makan ubat seperti yg disarankan HCP) but I'm monitored my blood sugar. I'm monitored blood sugar...and I find that, I don't see any adverse effect. So, I maintain just two [metformin] at night because my thinking is I don't want to harm my kidneys... So I'm quite a lot medications. So, saya memang.. itu yang saya risau lah.. kidney... (I2HTM59)* ➢ Busy schedule jadual makan tu kadang .. tak sempat nak makan. jadi bila nak makan, ubat makan kena makan selepas makan. Tu yang kadang jadi kadang terlupa sebab kadang pagi pun ada aktiviti lain… (I5KMF50)	2. Non-compliance (9F) *...kadang-kadang kita tengok pesakit yang oh dia tak makan sebab dia tak, tak control pemakanan dia ataupun tak control insulin dia sebab dia shift, dia tak boleh nak buat, tak boleh cucuk waktu pagi. For example, dia tidur waktu pagi, dia kena kerja waktu malam so, kita kena ubah kalau kita tak tahu kalau kita tak tanya background dia. (F2HT)* ➢ Patient's character (stubborn/ Inconstant statement) *Satu ampul ubat habis, baru tukar jarum. Saya kata pakcik tak boleh. "Takpe, saya dah 20 tahun cucuk insulin guna cara yang sama, saya tak kisah pun" ... Kadang-kadang tak tukar tempat cucuk. Kadang-kadang satu jarum pakai sampai seminggu. (F5HT)* *biasa patient akan beritahu saya, 'saya cakap dengan anda secara terus terang, saya tak makan ini, tak makan ini tentang ubat-ubatlah'. So, bila kami pergi jumpa doctor untuk tukar dos, so, doctor pun shock, eh kenapa tadi dia beritahu benda yang lain pula hm. (F7HT)* ➢ Large quantity of medicine given to patient *ubat tu pun yang ambil metformin saja, kalau yang dah banyak tu memang dah susah nak followlah. (F4HT)* *Saya rasa actually patient ok makan ubat tapi dia kena 1-2 jenis je, kalau boleh sekali makan je OD, BD, QDS, QDS lagi lah memang tak jadi dah lah. kalau yang pre meal memang langsung tu memang dah, ke laut lah, kalau yang senang ikut, kalau yang 2 jenis ubat sekali sehari lepas makan. Kalau banyak-banyak ni, diorang dah tak comply. (F5KM)* ➢ Patients believe on HM *Ada juga yang tak mahu, dia kata dia nak ada cara nak berubat kampung... nak minum daun ketum lah. Dia taknak, dia sekadar ambil, datang ambil ubat untuk check glucometer dengan darah tapi sebenarnya dia tak makan ubat. (F6KM)* ➢ Type of medication (insulin need frequent intake / injection) *saya rasa ubat especially kalau pil yang sekali sehari senang sikit. Kalau insulin yang banyak kali sehari lagi susah macam itu dan regime yang complicated lagi susah. (F3HT)*

DOMAIN	Sub-domain	Findings	
		IDI	FGD
BEHAVIOUR	Diet	1. Compliance (9) *Sorry, saya manis kurang. Takda, dulu tu memang tak kira tak boleh apa yang kita nak ambil sapu saja. Sekarang tu memang sorrylah... Sekarang saya pilih makan (I4KMM64)* *bila kita dapat tau macam ni kan, akak dah mula makan pun dah kena, makan nasi pon sikit, kuantiti sedikit laa. Cuma yang penting makan jangan masuk angin kan, setakat ni tu laa makan nasi kalau macam 1 senduk jumlah yang sedikit, kalau pergi kenduri kahwin pun ambil nasi sikit je. Lauknya lebih sikit macam tu laaa ratah-ratah sayur je macam tu (I5KMF50)* *Even saya makan diluar pun, saya akan lebih kepada protein dengan vegetables dengan... kurangkan nasi. Kalau saya makan dekat rumah, makan nasi.. tengahari saya okay, makan nasi.. sebab kita biar moving. So it can burn lah.. metabolism. Tapi sebelah malam, malam kalau boleh saya elakkan carbohydrate even roti pun tak elok sebab this carbohydrate. So, I try to be aware of that... (I2HTM59)* *selalu makan teh..aa lg saya suka makan kopi.. saya makan kopi ...itu macam. saya beli itu kencing manis punya gula. (I11KMF79)* *Jadi tiga benda ni kena ada dalam satu minggu peria, bendi, kacang buncis. Mesti dalam seminggu tu, mesti ada (I4HTM55)*	
		2. Non-compliance (7) ➢ *Unsatisfied taste (home-prepared/ alternative food)* *Dekat rumah pasal nasinya tak sedap. Hehe. Kat luar nasi tu sedap jadi macam mana nak kata ye, bukannya selalu jumpa, bila dah jumpa, betul-betul makanlah. (I1KMM46)* ➢ Large portion at restaurant *saya order small tapi dia (kedai makan) kasik dia punya barang lebih so kita habis... tak mahu bazirlah. (I6KMM44)* ➢ No discipline *Saya ni atas orang yang tak jaga makan lah. main bedal je. (I1KMM46)* ➢ Busy schedule *jadual makan tu kadang alaaa tak sempat nak makan. jadi bila nak makan, ubat makan kena makan selepas makan. Tu yang kadang jadi alaaa kadang terlupa sebab kadang pagi pun ada aktiviti lain, yelah kita nak masak untuk ni lepas tunak buat niaga pulak kan, buat satay kan jadi kadang bebanan kerja (I5KMF50)* *lunch tu kebiasaannya ke luar because I'm working and I move a round. So, lunch tu kadang-kadang, I have lunch. Sometimes I skip lunch. Sometimes lunch in office, when I'm working I don't go out. Saya pun makan macam biskut, cream crackers, Jacobs (nama brand). Maybe dua tiga makan, dengan air minum di office, we have a pantry. So siapa yang provide Milo, coffee and all this. So, if I make Kopi 'o' or Teh 'o', you know. Tanpa gula... or I minum air saja. (I2HTM59)*	1. Non-compliance (13) Uncontrol eating habit due to: ➢ Cultural factor *Yang senang pemeriksaan kaki kot yang dia ikut. yang dia boleh buat. Yang macam nak makan ubat tu, kadang ada, kadang tidak. Makanan pun ikut kalau kenduri ke apa dia, dia akan skip juga... (F2KM)* *memang perkara paling susah adalah bila diorang nak comply kan balik apa yang sepatutnya dimakan. Orang Malaysia memang biasanya minum kopi, biasa makan nasi lemak, bihun goreng pagi-pagi...Biasa dia akan cakap, "saya ambil kopi kosong je" tapi bila saya korek lagi kopi kosong tu bukan kosong, kopi yang bertambah gula, gula pula berapa sudu. Bagi diorang, kopi saya yang kosong tu gula diorang macam kalau gula sikit, macam 1 sudu pun bagi diorang kopi kosong sebenarnya tidak. (F1KM)* ➢ Patient attitude (undisciplined) *Bagi saya, pemakanan. Contohnya, kalau dia nak datang jumpa doctor, malam ni memang puasa habis-habis punya, makan memang bagus sebab dia kata ni nanti nak tengok result padahalnya kita bukan nak buat macam tu, kita ada reading selepas makan dan sebelum makan. Lepastu, makan tak secara betullah. Dia ikut suka hati dia, dia akan makan, perut dia ketika lapar, bila dia lapar dia akan makan banyak, ha, saya dah cakap makan jangan macam tu, step yang step tu, ikut peraturan tu lah. tu memang susah. (F6KM)*

DOMAIN	Sub-domain	Findings	
		IDI	FGD
BEHAVIOUR	Diet	▸ Culture and religious activity (Sweet things after prayer (Hindu)/ Fasting/ Don't waste food/ convocation/ wedding/ programme) *many Asian families, especially the Indians and Chinese, they like to eat a lot of sweet food. You know when Indians pray, we put all the sweet things... Just like during the puasa months, you all take more sweet things, isn't it? If we go in Indian restaurants right in front, we can see all the sweet things. (I3HTM61)* *sebab manis banyak sekarang ni dekat luar tu. Penuh dengan manis. Pergi kenduri kahwin pun. Jadi kita kawal. Kita sendiri kena tahu nak cegah apa benda-benda macam itu. Lagi satu, yang ini yang saya risaulah. Diri orang tu sendirilah iaitu diri yang dikawal oleh nafsu. Benda manis sedap sangat dan nak je. Nafsu kan. Nak makan juga sebab takpelah dah ada ubat. (I4HTM55)* *environment is not helping me lah actually. Saya punya circle of activities...circle of friends... yang terlibat dengan NGO ni, terlibat dengan masjid...terlibat dengan makan... Tapi saya punya problem, saya nak menolak tu. Saya try sikit, saya try sikit. Lama-lama satu pinggan habis. (I1KMM46)*	▸ Financial constraint *dari segi diet dan exercise tu memang sangat-sangat susah untuk diorang follow sometimes sebab dari segi ekonomi...nak beli roti apa pun kadang-kadang mahal, nak beli biskut kadang mahal yang sihatlah kadang mahal juga. Jadi, nak ikut tu susahlah juga. (F2HT)* *makanan juga takde duitlah untuk makan healthy food because dia hanya boleh beli apa yang cheap lah. (F3HT)* ▸ Unhealthy eating norms *dari segi makanan kot yang susah. sebab diorang rasa benda tu yang dah kebiasaan, nak kurangkan mungkin agak susahlah. (F3KM)* ▸ Misleading advertisement *I think food industry ... memainkan peranan yang sangat penting especially mereka sekarang viralkan banyak makanan ... yang sedap and memang high calori dan high sugar lah and cara di promotekan dia punya produk tu contoh macam, minuman yang less sugar actually its just tak banyak beza pun daripada standard punya... oh ini less sugar dia anggap, less sugar tapi dia perfahaman mereka ialah tanpa gula ataupun kurang, sangat kurang gula, so, dia sesuai untuk kencing manis. (F1HT)*
	SMBG	1. Compliance (7) *Itu mesin saya sendiri beli... when dia suspect punya jam saya hari-hari cucuklah. (I6KMM44)* *Kadang saya rutin. Mula-mula dulu kerap. Lepas tu nampak dah okay...Hba1c dah okay. Kita buatlah dua minggu sekali. (I4HTM55)* 2. Non-compliance (afraid of high reading/ expensive equipment) (2) *saya tak nak check hari-hari. Saya takut nak check hari-hari. Saya takut. Saya takut terlampau tinggi. I fear of those things. (I1KMM46)* *The strip about.. is almost about 50 ringgit, and then there is a month. And then, the machine of course sekali saja lah.. I think about 400 plus you know. So, the main things is the test strip. Test strips and then dia punya jarum. So, because it personal, kadang-kadang apa saya buat, jarum tu pakai berulang... maybe once or twice lah (I2HTM59)* *kalau boleh kita buat our own blood test... only thing that is.., barang dia semua, a bit expensive.. (I2HTM59)*	1. Compliance (4) ▸ Application software to record and track SMBG *Saya ada nampak juga patient yang dia ada apps untuk track dia punya, dia buat SMBG then dia ada app untuk track dia punya trend, teknologi jugalah. Tapi, untuk yang muda-muda yang celik teknologilah. (F4KM)* 2. Non-compliance (4) ▸ Patient's ignorant *Lagi satu cuma sikap dia, dia dah faham sebenarnya tapi, bila datang lagi dua minggu kita lepas kaunseling, kita akan bagi appointment dia untuk review SMBG dia. Ok, bila dia datang 2 minggu lagi, dia cakap eh ye ke? Ha, dia macam dia buat-buat lupa ataupun dia taknak applykan apa yang kita ajar, tu mungkin sikap dialah kan. Tapi masa kita ajar tu, ok faham eh, nasi banyak ni, apa banyak ni, dia faham. Bila 2 minggu datang lagi, dia kata tak tahu, takde tak ajar... itulah masalah kita yang paling besar sebenarnya.(F4HT)* ▸ Financial issue *financial issue tentang strip and then financial issue tentang hospital. Banyak orang guna bas, jalan kaki sebab takde duit and then tentang makanan juga takde duitlah untuk makan healthy food because dia hanya boleh beli apa yang cheap lah (F3HT)* ▸ Equipment availability *kekangan stok, dia pun bergantung kepada supplier jugalah... Sebelum-sebelum ni memang lower pen lah, insulin pen ke ha, itulah. So, ada kala patient terpaksa beli yang jarum needle yang panjang tu dia kena beli sendirilah. (F4KM)*

DOMAIN	Sub-domain	Findings	
		IDI	FGD
BEHAVIOUR	Footcare	1. Compliance (5) *Saya everyday dressing my own (kaki) dekat rumah (I1HTF57)* *Yang check-check kulat ni, setiap kali ambil wudhuk kita tengok sekali. Saya akan tengok setiap kali ambil wudhuk. (I1KMM46)* 2. Non-compliance (2) *Cuma sekarang ni ye lah kita kerja... Cara nak jaga kaki tu dengan peralatan apa semua... Saya tak boleh potong kuku sendiri... Potong kuku yang biasa tak boleh. Dia kena dekat sini (hospital) juga. Dia ada alat dia. Lagi satu pandangan kita nak membongkok tu... Tak boleh. Kena jaga dekat sini. (I4HTM55)*	1. Compliance (2) *pemeriksaan kaki, saya akan cakap kaki kena potong semua diorang akan ikut, diorang akan ikut dosage, next diorang datang, diorang akan, oh, baguslah misi dia kata, memang kena isi lotion, kaki saya dah macam lembut sikit, dah takde merekah (F6KM)* 2. Non-compliance (4) » Attitude (assume have good foot condition, neglect advice from HCP, fully relied on HCP) *...dari segi foot care apa semua tu em, itu pun agak susah. Itu paling last diorang nak fikirlah sebab setiap kali saya tengok patient datang akan ada foot wear yang tak elok dan kaki yang tak berapa elok juga, masih ada callus apa semua tu. So, rasa tu susah nak ikut lah, tu priority yang paling bawah. (F2HT)* *ada juga "kaki saya dah elok lah buat apa mau check kaki". Dia belum lagi mula cerita kita, dia dah cerita dia punya kaki dah cantik, tak payah buka kaki, macam tu lah saya kena terima. (F6KM)* *Even patient yang follow up dengan klinik, kaki, kita pesan, setiap bulan sambil buat prosedur kita akan pesan, sapu lotion, sapu lotion, bersihkan kaki, lap kering-kering tapi bila datang sama... kaki adalah benda paling terakhir dia akan fikir. (F5HT)* *dia datang then dia expect kita yang jaga kaki dia fully sebab dia balik rumah dia takkan jaga kaki dia, dia takkan peduli pun apa yang berlaku kat kaki dia macam kaki dia luka yang ni pastu next month dia datang balik, dengan kaki dia lagi teruk daripada, maknanya dia tak sayang pun kaki dia... selagi doctor tak kata potong, dia akan biar je. (F9HT)*
	Physical activity	1. Compliance (8) *saya main hockey balik lah sekarang ni. Saya active juga sports, sekarang ni saya main balik. Kitorang ada veteran team, so every week memang saya main seminggu sekali. Saya dah start main balik dah hoki. (I1KMM46)* *Oh, saya biasa hari-hari saya jalan...Saya jalan, kadangkan takda 2 kali, 2 hari sekali, saya jalan... Biasanya, tengoklah dalam setengah jam ke 40 minit ke, berjalan, lepas tu berehat, duduk kedai sekejap, ok jalan...Ya. Dalam saya ni buat camni dalam 2 jam, 1 jam saya buat. Petanglah. Pukul 5 saya keluar (I4KMM64)* *I do my gardening... and then, waktu kerja pun saya cuba lah because my line of work kita buat cleaning services. So, saya sering kali saya kena visit site, walaupun saya ada limitations... Tapi bila saya pergi sana, saya cuba jalan... if I come here for check-up... So, saya sering kali saya naik tangga. I tak mau ambil lif lah.. so, as far as I can, mana boleh, saya ambil jalan kaki, naik tangga macam tu lah.. yes. A little bit of exercise lah.. (I2HTM59)*	1. Compliance (1) *pengalaman sayalah, walaupun bukan 100% benda yang sama tapi kalau nak katakan diet dan juga ubat, compliance slightly better dengan SMBG dan exercise. Bagi pengalaman saya. (F1HT)*

DOMAIN	Sub-domain	Findings	
		IDI	FGD
BEHAVIOUR	Physical activity	2. Non-compliance (7) • Time *Sebab orang nak jogging pukul 5, kita dekat pejabat lagi... Balik kang nak dekat maghrib, mana ada masa nak jogging. (I4HTM55)* • Self- discipline *Saya takda, tak mendisiplin kan diri saya untuk bersenam lah. sebenarnya pagi boleh. Sebelah pagi tu kan. Lepas subuh tu boleh. Tapi kita tak lazim benda tu bagi saya. (I1KMM46)* • Safety (snatch case) *...sekarang kan, kalau pagi-pagi...Ada ragutlah. saya punya tempat ...Saya takut...kalau ramai-ramai boleh jalan. Kalau 1 orang 2 orang bahaya. Dulu 2 kali kena... (I8KMF48)* • Health condition (Asthmatic/ Spine problem, physical limitation) *I memang tak boleh jogging because of my spine. Tapi jalan kaki doctor nasihat kan lah.. actually, initially bila saya diagnosed, tak ada. Tapi kebas kaki ni, also doctor cakap kemungkinan because of my spine. (I2HTM59)* *Saya asma, tak boleh buat. Itu macam duduk-duduk, goyang-goyang kaki macam tu bolehlah. Kalau nak berlari semua tu memang tak bolehlah. (I8HTF39)*	2. Non-compliance *Saya rasa ubat dia boleh makan, dia akan makan ubat tu dan lebih banyak compliance lah tapi dari segi diet dan exercise tu memang sangat-sangat susah untuk diorang follow sometimes sebab dari segi ekonomi, dari segi, nak beli roti apa pun kadang-kadang mahal, nak beli biskut kadang mahal yang sihatlah kadang mahal juga. Jadi, nak ikut tu susahlah juga. Kalau dari segi exercise, dari segi foot care apa semua tu em, itu pun agak susah. Itu paling last diorang nak fikirlah sebab setiap kali saya tengok patient datang akan ada foot wear yang tak elok dan kaki yang tak berapa elok juga, masih ada callus apa semua tu. So, rasa tu susah nak ikut lah, tu priority yang paling bawah. (F2HT)* *Sebenarnya sama jugalah, cuma, bagi yang bekerja tu dia takde masa nak exercise kan, boleh aerobic ke malam ataupun guna bangku untuk yang exercise, itulah sebab nak keluar pun, kita keluar rumah pukul 7, kita balik rumah dah pukul 6, masa takde, nak masak lagi, nak itu dah takde aktiviti jadi kita galakkan macam tulah bagi yang bekerja. Kalau hari cuti, kita galakkan berjogging ke, berjalan ke, ikut kemampuan, sekurang-kurangnya 150 minit seminggu (F4HT)*
	Health seeking behaviour (4)	• Food experimenting *so sendiri buat, ujikajilah buat experiment macam makan, apa manis punya barang, dia punya level ada high ke apa. (I6KMM44)* *That is why I used to think, today I eat, let say for example I don't drink tea with sugar all la, lets say today I took some sugar thing, then I'll try check and see what it caused me. lets say for example, I went for a dinner, come back and rest, then I check and see lah, how much can I eat like that (I9HTM72)* • Study and consult HBA1C result *I like to look at my report. And then saya, I don't stop at here. So, I have my own personal physician. So, after.. normally after this, I will consult my personal physician. Just to, dapat dia punya input (I2HTM59)* • Love to search health information *kalau ada orang buat seminar, saya pergi. Lepas tu, search kat web...Contohnya dekat web Indonesia tu, nak tahu diabetik ni ada berapa diabetik? Yang tahap 1, tahap 2 dan ibu mengandung... Lepas tu tengok pula gula dalam darah. Kita tak tahu kan. Kat mana kan. Kemudian, kita pergi seminar, kat mana-mana, dan hospital jemputlah sekali tu. (I4HTM55)* *bila I google, then I found out, what is HBA1C. what is the purpose of that, and then I realise that, according to that reading, I'm not diabetic. Diabetic is 6.0 above, so, then, I'm wondering whether my medication is too much, maybe I can reduce my medication (I2HTM59)* *kita kaji kita baca. Okay yang ini ini. Sedangkan saya pun terpaksa kaji apa GI?..Ya. Itu kalau saya lah. Nak kaji...Ya tengok dekat content GI makanan. Oooo. Kita tengok... Pada kita ada manfaat dia... (I4HTM55)*	

DOMAIN	Sub-domain	Findings	
		IDI	FGD
SUGGESTION	General	1. General (1) ➢ Prompt TCA *appointments are given not immediately after a few weeks or months. But that time, the patient will continue with the normal diet. By right, they should make the patients to see the dietician within a week. (I3HTM61)* ➢ Advance / Updated treatment (Ozone therapy) *Such a big hospital with a lot of ganglion patients they're treated but all have their leg amputated. So, they must introduce ozone therapy and they don't have them. So, this is where the Minister of Health should find out. (I3HTM61)* *... check and see, does the pharmacy in the various hospitals, have the relevant medications that can help to treat a newcomer, who is a new Diabetic patient or a person having Diabetes for 5 years, 10 years, 20 years, see, how effective medicines can be to help these patients. Because sometimes, some patients are taking the medicines for too long of time. There's no improvement. What we want to see is a reduction in the number of patients in the hospitals (I3HTM61)* ➢ Advance / Updated treatment (Ozone therapy) *Such a big hospital with a lot of ganglion patients they're treated but all have their leg amputated. So, they must introduce ozone therapy and they don't have them. So, this is where the Minister of Health should find out. (I3HTM61)* ➢ Follow up with patients on medication intake *That method must be there. And then, the doctor can communicate with them. If they got their email address and that should be able...because there's a lot of things that the doctor can learn from the patients. Because the patients, different types of patient, with different level, degree of the sickness, they can immediately tell the doctor, how are they responding to that medicines... You must check, ask the nurse to contact the patient after one week and find out with the new medication and dosage that has been given, how is the patient now feel it, is he seeing any improvement or no improvement at all... because if you prescribed a medicine and that doesn't produce result, what is the point of the patient taking the medicine for one month, two months, three months, four months... (I3HTM61)*	1. General (11) ➢ Improve facility • Increase staff • Special consultation room materials (flyers/ pamphlet) • Updated and enough medicine • Computerized system *Bagi saya penambahbaikan yang pertama dari segi saya punya bidang sendiri. Memang sangat kekurangan dietician. ... yang kedua kalau mengkhusus kepada klinik dari segi facility lah memang saya rasa sangat perlu setiap klinik ada facility untuk menempatkan patient, untuk bilik kaunseling khas... yang ketiga ni...segi duitlah. sumber kewangan untuk klinik kesihatan, perubahan pendidikan pesakit, sebab pesakit dia datang, kenalah dia, kalau ada risalah berwarna cantik sikit. (F1KM)* *Kemudahan ... tentang computerized lah and the whole system lah and dengan facility lah saya rasa. Macam kekurangan tempat untuk kita bagi kaunseling... (F4KM)* *dari segi tempatlah tu sendiri, bagi patient selesa, dari segi kemudahan lain tu macam dari segi system computerized lagi senang begitu...Lepastu, dari segi pembekalan ubat tu kalau boleh nak sentiasa tak terputus. (F3KM)* ➢ Increase DM centre *Satu lagi ialah dari segi kita tak cukup one-stop centre untuk kencing manis di mana-mana sebab kalau tengokkan di negara jiran kita, mereka sekarang ni target pre-diabetes, keadaan sebelum diabetes, bukan saja diabetes...(F2HT)* ➢ Community based DM clinic *ada banyak klinik dekat hospital overcrowded... macam community-based punya kalau itu boleh up sikit dan boleh divert a few less serious one kepada mereka. Maybe that can off load a bit, specialist clinic ke macam tu. (F3HT)* ➢ Advance / Updated treatment *Dari segi bajet kami tak boleh mula ubat yang sepatutnya dimulakan awal macam DDP-4 inhibitors patutnya Metformin dan DDP-4 inhibitor dan bukan terus pergi kepada Gliclazide ke. So, sekarang kami tak amalkan macam tu, masih macam dulu. So, kami bukan memberi rawatan yang mungkin bukan sama dengan negara barat ke, yang lebih develop lah. (F8HT)*
	Information	Information (2) ➢ Form of information sharing *they must have a chart you know, a system. Like if you take one slice of banana, banana also got various types. So, they must said, each of these banana, you take one slice, how much of insulin you can take. Like for, if you take porridge, one bowl, see how many litres, the volume of it. Then, for 100 millilitres, this is the unit you inject, so if you take 500 millilitres, you times it by five. But then, you must check and see whether your body can withstand that insulin or not. Cause otherwise you will get hypo. (I3HTM61)*	Information (2) ➢ Form of information sharing *kekangan macam bahan pendidikan, kekangan untuk fasiliti, tulah. Bahan pendidikan contohnya, macam risalah kan, risalah pemakanan untuk diabetic. (F1KM)*

DOMAIN	Sub-domain	Findings	
		IDI	FGD
SUGGESTION	Information	*Message je kot. Pemakluman. Lepas tu signage ke, kedai makan ke... sentiasa diingatkan contoh advert dekat phone, especially for... doctor dah tahu siapa yang ada Diabetes ni... keep on sending them (1KMM46)* *Message je kot. Pemakluman. Lepas tu signage ke, kedai makan ke... sentiasa diingatkan contoh advert dekat phone, especially for... doctor dah tahu siapa yang ada Diabetes ni... keep on sending them (1KMM46)* *So, that is why I request you all to give in pictorial form. Okay, even the various fruits that they are eating, if one slice of this fruit, how many units of intermediate insulin or actrapid insulin or if you are taking at night, the insulatard... They don't explain all that, and we have to search for all these on the internet. (I3HTM61)* Early motivation programme in school *Pergiatkan lagi lah program-program kesihatan ni untuk bagi motivasi especially kat sekolah. ...start with them yang belum kena ni. Yang dulu saya punya time, we don't have team like your team yang datang nak bagi penjelasan. Maybe you can start lah by giving all this talk in school, or universities, ataupun di medan-medan selera (I1KMM46)* Interchange knowledge *They (Ministry of Health) must encourage the doctors in the hospitals to visit other leading universities or hospitals in the world and find out how the particular doctors there, specialists are diagnosing and treating their patients to get the effective result. I hope you can make these recommendations. (I3HTM61)*	Training/ courses/ attachment for staff *Memang perlu lah training tu untuk staf memberikan perkhidmatan lebih baik kepada pesakit so macam salah satu saya rasa tak semestinya training untuk klinikal, training tu cukup penting untuk update knowledge, untuk skill semua, lepastu saya rasa, yang kedua saya rasa untuk update pembangunan klinik (F1KM)* *Setiap staf ni memang perlu ada kursus yang dari segi kemahiran dari segi berkala lah, mungkin bila kita attach kat hospital ke apa, kita boleh lagi tahu tentang satu-satu kes tu ke, kita boleh tambah lagi lah kemahiran yang kita ada (F3KM)* *Kita perlulah hadir kursus tapi tak semestinya... bahagian perubatan sahaja, seronok juga kalau nak dengar bahagian pemeriksaan kaki...kita dapat pengetahuan daripada situ so kita boleh advice patient kita sebelum kita refer kepada DE. Kemudian, kita boleh dengar ataupun menghadiri kursus yang bahagian pemakanan so at least kita boleh bagi dia intro sikit-sikit walaupun tak secara detail so dia dengar dua pihak lah daripada doctor. Ada setengah orang tu kadang-kadang dia dengar lebih kepada doctor daripada dietician ha, so bila dia dengar dua-dua tu dia lebih kuat lah untuk dia ikut benda tu. (F2KM)* *kursus-kursus atau attachment di hospital memang perlulah sebab di klinik kesihatan ni kita punya resources terhad then kita punya patient pun mungkin dia tak se-complicated hospital lah. So, saya rasa memang perlu lah dengan attachment (F4KM)* To suggest electronic information sources (website / application) *Kalau patient tu memang celik teknologi so kita boleh suggest kan apa website atau apps yang sesuai untuk dia menguruskan penyakit dia. (F1KM)* *...kalau patient tahu website tertentu, kalau dia tahu, dia boleh mungkin tahu lebih terperinci pasal apa penyakit dia semua tu kan macam pemakanan semua tu. (F3KM)* Increase awareness • Health camp at mosque, Booth on foot check-up , Through social media, Early education from school and home *...lebihkan awareness lah macam dalam kem kesihatan tu semua kan. So, lebihkan kepada kem kesihatan tu kalau boleh kena ramai lagi crowd yang datang, kadang ada setengah tu yang datang cuma yang selalu datang kat klinik yang lain-lain tu yang dekat pedalaman atau pun yang jauh-jauh tu jarang datang ke klinik, sebenarnya dia pun ada juga risiko ataupun memang tanda-tanda symptom kencing manis tu kan. So, kena lebih kena banyak awareness lah bukan setakat dekat klinik je, dekat tempat-tempat lain macam masjid ke surau ke pun kena ada awareness sekali dari segi kem kesihatan lah boleh panggil kita untuk bagi awareness tu lah. (F2KM)*

DOMAIN	Sub-domain	Findings	
		IDI	FGD
SUGGESTION	Information		*pendedahan tentang pendidikan kencing manis lah kepada semua, kepada semua macam oranglah sebab saya rasa satu adalah kenapa patient selalu salah faham adalah diorang dapat mungkin maklumat yang salah daripada dia punya kawan-kawan ke, daripada internet ke so saya rasa perlu lah. Macam pendedahan lah tentang pendidikan yang betullah tentang macam mana kita nak detect kencing manis, apa dia punya complication dan macam tulah. (F4KM)* *Social awareness lah, just like apa yang saya cakap tadi, the social awareness lah tentang pendidikan yang betullah tentang kencing manis lah. Saya ada nampak juga patient yang dia ada apps untuk track dia punya, dia buat SMBG then dia ada app untuk track dia punya trend, teknologi jugalah. Tapi, untuk yang muda-muda yang celik teknologilah. (I605-609, F4KM)* *...kemudahan yang lainlah. contohlah, booth-booth pemeriksaan kaki, ada gambar kaki, kasut-kasut yang sesuai untuk pesakit diabetis supaya disitu nampak apa yang sebenarnya. (F6KM)* ▸ Banned selling junk food in school *peringkat sekolah lah kita kena lebih bagi pendidikan awal, sekolah-sekolah macam Kementerian Pelajaran tu kena pastikan semua sekolah clear, takde junk food semua tu untuk bagi budak tu belajar makanan sihat daripada awal so bila dah besar kita nak ubah balik dah memang susah. (F9HT)*
	Motivation	Motivation (2) ▸ Separate counselling unit, Q&A approach (written question) *they should have a separate counselling unit, where patients can go and ask herself and the doctors must say what "okay, any patients to come visit us, if you have any questions, please write down and come, and forward it to us". (I3HTM61)* ▸ Patients to visit ward (awareness) *Melawatlah dekat hospital yang apa akibat daripada kencing manis. Pergi tengok dia yang baru lepas potong kaki. Kesedaran itu akan datang... Kalau boleh, kalau ada keluarga tu. Tengoklah, jaga macam mana (I4HTM55)* ▸ Counselling team *the counselling unit, you know, where the nurses together with the pharmacist, they do the counselling. And that's the first time I've seen in K Hospital. I've not seen this in KL GH (general hospital). I hope every government hospital they'll do that... because we must have the interaction with the pharmacists. (I3HTM61)*	Motivation (7) ▸ Provide loan unit glucometer for unaffordable patients *... benda tu kalau patient kita rasa tak mampu beli glucometer, kita bagi dia pinjam glucometer ke ha, so banyak bendalah boleh improve but I think because of limitation tu semua susahlah. (F5KM)* ▸ Employer support (welfare, healthy food access) *Tu satu, lagi satu ialah kalau majikan semua, kalau mereka boleh sediakan kemudahan macam kalau ada tempat yang dekat yang ada menjual makanan yang sihat dan bukan macam yang tak sihat, bukan macam fast food kalau ada kemudahan makanan sihatlah.(F8HT)* … saya rasa sokongan social daripada dia punya employer tu lagi penting juga especially because diabetic patient yang, contohnya yang not well-controlled, their appointment will be more regular sometimes too much one month depends on decision kita lah kan so obviously they will have conflict with their employer lah kan. Asyik cuti, asyik minta off, so, if the employer boleh bagi sokongan yang penuh kan, dia akan opportunity tu lah untuk jaga kencing manis dia (F5KM)

DOMAIN	Sub-domain	Findings	
		IDI	FGD
SUGGESTION	Motivation		*Saya rasa apa yang dicakapkan oleh staf lain semua, sokongan ekonomi wajib, sokongan social daripada keluarga, kawan-kawan, majikan. Lepastu, sokongan teknologi juga, semua tu berdasarkan patient lah. Kalau patient tu memang celik teknologi so kita boleh suggest kan apa website atau apps yang sesuai untuk dia menguruskan penyakit dia. (I626-629, F1KM)* ▸ Courses/ training in communication skill *kalau kita boleh come out something to actually tackle benda ni maybe, don't know maybe psychology wise something else. Satu cara yang kita boleh tolong dia untuk kawal nafsu makan boleh sangat membantu dari segi ini. (F1HT)* ▸ NGO support (welfare/financial) *Macam kepada bajet kerana ramai pesakit yang macam tak mampu nak beli strip dan tak mampu beli jarum baru. That's why mereka kurang nak tukar yang baru dan mungkin boleh ada kan lebih banyak NGO ke, kebajikan ke untuk tolong patient untuk beli alat-alat tu. (F7HT)* *sometimes selain keluarga, masyarakat punya sokongan like macam zakat and all the NGO, JKSP semua punya memainkan peranan walaupun dia so far, I think dia tak dapat banyak tapi at least dia perlukan sikit, dapat machine semua bantuan untuk mereka lah. (F3HT)*
	Behaviour	Behaviour (1) ▸ Reduce medicine based on progress *... doctor ... Dia cuma follow on saja. They don't look at the report and they don't ... okay maybe, can we reduce medication... Because there's a history of good control. Maybe you can reduce, and see the control is sufficient. Because end of the day is general health of the patients, that is why I believed (I2HTM59)*	Behaviour (1) ▸ Alter medication amount ▸ Aid in equipment usage *Kalau kita tengok, patient yang boleh tak comply ni memang boleh faham kenapa dia tak compliance sebab ubat dia banyakkan. So, if we can really help them with number of medications tu pun dah ok. So, dari segi kewangan kan, benda tu kalau patient kita rasa tak mampu beli glucometer, kita bagi dia pinjam glucometer ke. (F5KM)*
	Commu-nication	▸ Communication between HCPs and researchers *Minister of Health must communicate with all the endocrinologists in the various hospitals in the country to find out what is the rate of growth of new Diabetic patients in the country. and look at the particular places, where this increases taking place, what is the main reason for the increase of the new T2DM patients, what is their lifestyle, what is their dietary habits? Are they well informed, that if they were to suffer from Diabetes, what are the various complications that they can encounter and how it is? (I3HTM61)*	▸ Courses/ training in communication skill • Cognitive Behavioral Therapy (CBT) *pendapat saya lebih saya perlu kemahiran di mana actually is more on how to manage patient punya cognitive of behavioral maybe for like CBT, cognitive behavioral therapy like that so, actually, to my, macam improve saya punya cara-cara untuk counsel patient. Ok, so actually to ensure dia punya compliance. More on the thinking, because patient tahu, cuma how to dia manage dia punya talk atau dia punya behavior untuk nak control dia punya benda tadi. (F1HT)* ▸ Continuous education in multi-language *saya rasa continuous education dalam multi-language kerana mereka akan rasa macam lebih selesa dengan bahasa yang mereka boleh faham. Kalau mereka faham, then, mereka boleh ikut. (F7HT)* ▸ Counselling tools (apps, QR code, pamphlet) *Tambahan untuk pharmacist side mungkin ialah nak macam dapatkan tools baru untuk buat counseling dengan patient, mungkin sekarang banyak apps ke, QR code ke, pamphlet ke semua tu. (F7HT)* ▸ Family involvement in patient's appointment *Lebih bagus kalau pesakit datang dengan ahli keluargalah, jadi kita akan nasihat bersama-sama ahli keluarga terlibat juga... lebih baguslah ada pesakit yang warga emas dia ... terkadang kurang dengar, tak faham, dia punya language kan, lebih bagus ada ahli keluarga. (F4HT)*

Appendix 4: DBDI Items (Compilation from Literature Review & Qualitative Study)

INFORMATION							
No	**Sub-domain**	**DBDI Item (edit)**	**Item (original text)**	**Published article/ Instrument**	**Scale**	**Item (Quali)**	**Verbatim IDI**
1	**General**	*Diabetes is not a communicable disease*		KAP (Solanki et al., 2020)	YES/NO		
2	**General**	*Diabetes is a heritable disease*		KAP (Solanki et al., 2020)	YES/NO	Diabetes is a heritable disease	I5KMF50-ID2, I3HTM61-ID3, I1HTF57-ID4
3	**General**	*Diabetes can be transmitted to spouse*		KAP (Solanki et al., 2020)	YES/NO		
4	**General**	*There are two main types of diabetes: Type 1 (insulindependent) and Type 2 (noninsulin dependent)*		DKQ-24 (item 11) (Alexandra et al., 2001)	YES/NO/ Don't know		
5	**General**	*The best way to check my diabetes is by testing my urine*		DKQ-24 (item 9) (Alexandra et al., 2001)	YES/NO/ Don't know		
6	**General**	*Diabetes often causes poor blood circulation*		DKQ-24 (item 14) (Alexandra et al., 2001)	YES/NO/ Don't know		
7	**General**	Which age group are commonly suffered T2DM? a. Children and adolescent b. Middle age and elderly c. young adults and middle aged	which age group are commonly affected by diabetes	KAP (item 2.2) (Mukhopadhyay et al., 2010)	multiple choice		
8	**General**	Diabetes is a condition that:		DKQ (item 3) (Eigenmann et al., 2011)	multiple choice		
		Can be cured by adopting a healthy lifestyle		DKQ (item 3) (Eigenmann et al., 2011)			
		Currently not curable		DKQ (item 3) (Eigenmann et al., 2011)		Diabetes cannot be cure (Y/N)	I2HTM59-ID5, I1KMM46-ID6
		Can be life threatening when first diagnosed	It always life threatening when first diagnosed	DKQ (item 3) (Eigenmann et al., 2011)			
		Can be cured with pill and/or insulin	Can be cured with tablet and/or insulin	DKQ (item 3) (Eigenmann et al., 2011)			
		Unsure		DKQ (item 3) (Eigenmann et al., 2011)			
			Diabetes is treatable?	KAP (Nagar et al., 2018)	3- Likert scale (disagree, neutral, agree)		
9	**General**	What is the condition of this disease? a. Cures by itself b. Lifelong, controlled with treatment c. short term, cured with treatment d. unsure	what is the course of this disease? Others (specify)/ Don't know	KAP (item 2.4) (Mukhopadhyay et al., 2010)	multiple choice		
10	**General**	What is the ideal range for blood glucose (sugar) levels a person with diabetes should aim for? a. 2 to 6mmol/L (2-4) hypo b. 4 to 8mmol/L (4-7) c. 7 to 13mmol/L d. 4.5 to 15mmol/L e. Unsure		DKQ (item 1) (Eigenmann et al., 2011)	multiple choice		
11	**General**	What is the HbA1c result that indicates a lowest risk of developing long-term diabetes complica-tions? a. less than equal to 7% b. 9% c. less than 8% d. less than or equal to 10% e. Unsure		DKQ (item 1) (Eigenmann et al., 2011)	multiple choice		

INFORMATION							
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12	**General**	Why are people with diabetes advised to test their own blood glucose? a. To alert them to changes in blood glucose level patterns b. It can make people more confident in looking after their diabetes c. To help make decisions in relation to exercise, treating 'hypo' (low blood glucose) or sick-day management d. All of the above e. Unsure	c. To help make decisions in relation to exercise, treating 'hypo' (low BG) or sick-day management	DKQ (item 9) (Eigenmann et al., 2011) DKQ (item 9) (Eigenmann et al., 2011)	multiple choice		
13	**General**	Causes of diabetes? a. Failure of the kidneys to keep sugar out of the urine b. Contact with another diabetic c. Lack of insulin d. Fate e. Medication f. Genetic g. Obesity h. Lack of physical activity i. Eating too much sugar and other sweet foods	According to you, what causes diabetes? Lack/defect of insulin Destiny Eating more sugar Food habit	KAP (item 2.1) (Mukhopadhyay et al., 2010) KAP (item 2.1) (Mukhopadhyay et al., 2010) questionnaire (Islam et al., 2015) KAP (item 2.1) (Mukhopadhyay et al., 2010) questionnaire (Islam et al., 2015)	multiple choice multiple choice		
14	**General**	What are the symptoms of diabetes? a. Frequent urination b. Asymptomatic c. Poor wound healing d. Numbness/ tingling in the hands/ feet e. Weight gain f. Frequent hunger and thirst g. Shaking and sweating are signs of high blood sugar. h. Unsure	What do you think are common symptoms of DM? Weight gain/loss Delay wound healing Diabetes can cause loss of feeling in my hands, finger and feet	KAP (item 2.6) (Mukhopadhyay et al., 2010) KAP (item 2.6) (Mukhopadhyay et al., 2010) KAP (Kant & Thapliyal, 2015) KAP (Kishore et al., 2015) DKQ-24	multiple choice multiple choice & answer YES/NO	I know symptom of diabetes (multiple choice: sleepy, blur vision, ulcer, presence of ants at urine, numbness, lesion at toes) A skin problem is a symptom of diabetes complication	I3HTM61-ID7, I1HTF57-ID8, I1KMM46-ID9/ID10 I9HTM72-ID11
15	**General**	Complication(s) of diabetes a. Heart problems b. Eye problems c. Stroke d. Dementia e. Sexual Dysfunction f. Kidney Problems g. Nervous system problems	Numbness and tingling may be symptoms of: kidney disease, nerve disease, eye disease, eye disease, liver disease what are the common complication(s) resulting from DM - heart disease - death -vascular complication - kidney disease - Renal complication - Neuropathy	MDKT (item 13) KAP (item 2.7) (Mukhopadhyay et al., 2010) KAP (item 2.7) (Mukhopadhyay et al., 2010) KAP (Rahaman et al., 2017) KAP (item 2.7) (Mukhopadhyay et al., 2010) KAP (Rahaman et al., 2017) KAP (item 2.7) (Mukhopadhyay et al., 2010), (Rahaman et al., 2017) KAP (Ahmad et al., 2016) KAP (Rahaman et al., 2017) KAP (item 2.7) (Mukhopadhyay et al., 2010) KAP (Rahaman et al., 2017) KAP (Rahaman et al., 2017)	multiple choice & answer	diabetes can cause complication (amputation, kidney failure, heart disease, heart attack, glaucoma, blindness, memory lost, genital problem) (multiple choice question)	I2HTM59-ID13/ID14, I3HTM61-ID15, I4HTM55-ID16, I8HTF39-ID17, I1KMM46-ID18/ID19

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		h. Foot Problems i. Teeth Decay	- Others (specify)/ Don't know	KAP (item 2.7) (Mukhopadhyay et al., 2010) KAP (Rahaman et al., 2017)			
16	**General**	Well-managed diabetes decreases the risk of: Kidney damage, Melanoma, Foot ulcers, Blindness, Heart disease, Unsure		DKQ (item 7) (Eigenmann et al., 2011)	multiple choice		
17	**General**	Which self-management required for diabetic? Healthy diet Weight control Quit smoking Monitoring blood glucose Foot examination Regular exercise Medication intake Insulin Monitoring blood pressure Eye examination		DKQ (item 7) (Eigenmann et al., 2011)	multiple choice	Which factor is important in your diabetes management? (lifestyle-diet, hygiene, SMBG, exercise, medicine) multiple choice question-	I2HTM59-ID31/ID32, I3HTM61-ID33
18	**General**	What should a diabetic do if he/she becomes ill (e.g. flu, gastric upset, infection)? - Check blood glucose level more frequently (every 2 to 4 hours) - Stop taking all diabetes pill or insulin - Seek medical attention if very unwell and unable to check blood glucose - Consume lots of non-sweet drinks if blood glucose levels are over 15mmol/L - Try to do as much exercise as possible to lower blood glucose levels	drink lots of non-sweet fluid if blood glucose levels are over 15mmol/L	DKQ (item 10) (Eigenmann et al., 2011)			
19	**General**		Which of the following statement about diabetes medication is true? - If blood glucose level normal for two months, diabetes medication can be stopped - People taking diabetes medication do not need to worry about healthy eating - Tablet for diabetes work by increasing blood glucose levels - Regular medical check-up are necessary to assess the need for adjustments to diabetes medication - Once diabetes is control, eating restrictions are no longer required	DKQ (item 13) (Eigenmann et al., 2011) KAP (item 3.7) (Mukhopadhyay et al., 2010)	multiple choice Agree/ Disagree/ Don't know		
20	**General**					I receive detail explanation of my medical report (yes/no) I am happy with information given by HCP in managing my diabetes (yes/no) I am clear with information given by HCP in managing my diabetes (yes/no) I am aware diabetes management/knowledge is changing/ updated (yes/no)	I2HTM59-ID20 I2HTM59-ID21, I3HTM61-ID22/ID23/ID24/ID27, I4HTM55-ID25, I8HTF39-ID26 I2HTM59-ID28, I1KMM46-ID29 I2HTM59-ID30

INFORMATION							
No	**Sub-domain**	**DBDI Item (edit)**	**Item (original text)**	**Published article/ Instrument**	**Scale**	**Item (Quali)**	**Verbatim IDI**
21	**Medication Intake**	An insulin reaction is caused by eat too much	An insulin reaction is caused by too much food	DKQ-24 (item 12) (Alexandra et al., 2001)	YES/NO/ Don't know		
		Kidneys produce insulin		DKQ-24 (item 4) (Alexandra et al., 2001)			
			If you take your morning insulin but skip breakfast, your blood glucose will usually: - increase - decrease - remain the same	MDKT (item 21)	multiple choice		
			you realised just before lunch that you forgot to take your insulin at breakfast, what should you do now? - skip lunch to lower your blood glucose - take the insulin that you usually take at breakfast - take twice as much insulin as you usually take at breakfast - check your blood glucose level to decide how much insulin to take	MDKT (item 18)	multiple choice		
22	**Medication Intake**	If a diabetic has a hypo (low blood glucose level) reaction, he/she should: - Immediately take insulin or diabetes pill - Rest and wait until she/he feels better - Immediately have some sugary food or drink (e.g., sweets, chocolate, soft drink) - Drink some diet soft drink	If a person with diabetes has a hypo (low blood glucose level) reaction, he/she should: - Immediately take some insulin or diabetes tablet - Immediately have some sugary food or drink (e.g. jelly beans, soft drink)	DKQ (item 14) (Eigenmann et al., 2011)	multiple choice		
23	**Medication Intake**	Insulin is the last treatment option and should be avoided as far as possible	KAP (item 3.8) (Mukhopadhyay et al., 2010)		Agree/-disagree/ Dont know	Insulin is the last treatment option and should be avoided as possible	I1KMM46-ID65
						Taking insulin indicates my diabetes is at critical stage	I1KMM46-ID66
						I am aware of my condition (lack of insulin dosage) when symptom shows (yes/no) or I know the symptom if my body is lack of insulin	I3HTM61-ID67, I8HTF39-ID68
24	**Medication**					I know the medicine that I consume	I2HTM59-ID34, I3HTM61-ID35/ID36/ID37, I1HTF57-ID38, I8HTF39-ID39, I1KMM46-ID40
						I know the amount of insulin to take based on my sugar level	I1HTF57-ID41/ID42, I8HTF39-ID43
						I am aware of my medicine intake schedule	I2HTM59-ID44, I3HTM61-ID45/ID46/ID47, I1HTF57-ID48/ID49/ID50, I1KMM46-ID51/ID52/ID53, I5KMF50-ID54
						I am aware of my medicine intake (insulin) 30 minutes before/ after meals	I1HTF57-ID55,I4HTM55-ID 56
						Consume too much medicine can caused side effect (kidney problem) (yes/no)	I2HTM59-ID57, I1KMM46-ID58/ID59
						Diabetes medicine (Metformin)	I2HTM59-ID60, I1KMM46-ID6
25	**Diet**	Which of the following statements about diabetes and diet is true? Red meat is a carbohydrate food		DKQ (item 4) (Eigenmann et al., 2011)	multiple choice	I know which food is good for T2DM patients	I8HTF39-ID83,I9HTM72-ID 84, I6KMM44-ID85/ID86, I8KMF48-ID87/ID88
		It is fine to eat fried take away food three times a week	It is OK to eat fried take away food three times a week			it is okay for me to eat sweet food once in a while/ cheat day (yes/no)	I2HTM59-ID111/ID112, I1HTF57-ID113, I9HTM72-ID114, I4KMM64-ID115

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		A diet which is low in fat, high in fibre, low in added sugar is recommended for diabetic	A diet which is low in fat, high in fibre, low in added sugar is recommended for everyone with diabetes			I am clear with information given by HCP on my diabetes diet plan (yes/no)	I4KMM64-ID76/ID77/ID78
		Diabetic should eat a sugar free diet	People with diabetes should eat a sugar free diet			I know that eat less sugar in my diet can control my diabetes	I1HTF57-ID101/ID102/ID103 , I4HTM55-ID104
						It is okay to take less sugar drink (tea with less sugar, no sugar coke)	I8HTF39-ID117, I1KMM46-ID118
						I am aware that Diabetic can consume brown sugar or stevia in replace of white sugar	I1HTF57-ID107, I4HTM55-ID108
						It is okay to consume pure honey in replace of white sugar	I6KMM44-ID116
						sugary drinks can increase blood glucose level (yes/no)	I2HTM59-ID109
						It is okay for me to eat sweet food once in a while/ cheat day as long as I take my medication (yes/no)	I4HTM55-ID120
						caffeine with no sugar can affect my blood glucose level (yes/no)	I2HTM5-ID110
						I know which vegetable is good for T2DM patients	
						I know which fruit is suitable for T2DM patients	I1HTF57-ID90, I8HTF39-ID91, I9HTM72-ID92
						I know which food (nuts) is good for T2DM patients or	I1HTF57-ID93/ID94, I5KMF50-ID95, I8KMF48-ID96
						I am aware that nuts is not good for T2DM patients	I4HTM55-ID97
						I know the basic ingredient in cooking that contain sugar (soysauce)	I4HTM55-ID98/ID99/ID100
26	**Diet**	Knowledge on carbo counting	Recognizing the amount of calorie needs	KDDQ / DBQ (Primanda et al., 2011)	Yes / No / 4-Likert scale ("1" = never, "2" = some-times, "3" = often, and "4" = routinely)	I get information on diabetic diet plan (carbo counting) (Y/N)	I2HTM59-ID72, I3HTM61-ID73, I4HTM55-ID74, I9HTM72-ID75
		Carbohydrate 45- 60 gm/meal				I get information on diabetic diet plan (carbo counting) (Y/N)	I3HTM61-ID79/ID80, I4KMM64-ID81
						I know the amount/ portion of food to be taken for diabetic patient	I9HTM72-ID89
27	**Diet**		Dietary modification is useful for keeping under control	KAP (item 3.3) (Mukhopadhyay et al., 2010)	Agree/- Disagree/ Don't know	My blood sugar level is still high even with controlled diet plan	I4KMM64-ID119
						Diet management is different/varies for each person	I4HTM55-ID82
			What effect does unsweetened fruit juice have on blood glucose? - Raises it - lowers it - has no effect	MDKT (item 7)	multiple choice	sweet from plant/ fruit doesn't affect my blood glucose level (yes/no)	I2HTM59-ID105,I4HTM55-ID106
			If I am aware of the kind of foods that will increase my blood sugar level, I'll have more control over my diabetes	EBADE questionnaire (item 9) (Carro-Bautista et al., 2019)	Very unlikely to very likely (7-point scale)		
28	**Diet**	Which of the following has your health care provider (doctor, nurse, dietitian or diabetes educator) advised you to do? Please tick all that apply:		SDSCA (Gao, Wang, Zheng, et al., 2013)	Multiple answer		

INFORMATION							
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		- Follow a balance and healthy diet plan - Follow 3 meal times per day - Follow a healthy food preparation (replace coconut milk with low fat milk/ yogurt) - Follow a healthy portion - Avoid sugary drinks (carbonated/ canned/ isotonic/ instant 3 in 1) - I have not been given any advice on diet by health care provider - Follow a low-fat eating plan - Follow a complex carbohydrate diet - Reduce the number of calories eat to lose weight - Eat lots of food high in dietary fiber - Eat lots (at least 5 servings per day) of fruits and vegetables Eat =very few sweets (for example:desserts, non-diet sodas, candy bars)					
29	**SMBG**	Test blood glucose using a machine to read the results Test sugar in urine I have not been given any advice on blood glucose level by health care provider	People with diabetes should monitor their own blood glucose at home	KAP (item 3.5) (Mukhopadhyay et al., 2010)	Agree/- Disagree/ Don't know	I clearly understand ways to control blood sugar level (rate < 8, > 4) Stress can increase my blood sugar level. (Y/N) Lack of sleep can increase my blood sugar level	I4HTM55-ID122/ID123, I8HTF39-ID124 I3HTM61-ID125, I4HTM55-ID126 I3HTM61-ID127, I1KMM46-ID128
30	**Footcare**	Diabetics should take extra care when cutting their toenails	The best way to take care of your feet is to: - Look at and wash them each day - massage them with alcohol each day - soak them for one hour each day - buy shoe a size larger than usual Footcare is important in diabetes, what should you do to look after your feet? (do not wear any shoes when walking outdoors, keep the spaces between your toes dried, treat any foot ulcer/ wound by yourself)	DKQ-24 (item 16) (Alexandra et al., 2001) MDKT (item 11) Questionnaire based on Health believe model (HBM), MYDEMO (Ahmad et al., 2014)	YES/NO/ Don't know multiple choice multiple choice (choose one correct answer)	Regular foot care is not important/crucial in my condition	I1HTF57-ID141
31	**Footcare**	Tight elastic hose or socks are good for diabetic	Tight elastic hose or socks are not bad for diabetic	DKQ-24 (item 23) (Alexandra et al., 2001)	YES/NO/ Don't know	I am aware diabetic patient should wear suitable footwear	I4HTM55-ID140
32	**Footcare**	What foot problems are diabetic most at risk of? - Foot ulcers - Hammer toe - Poor blood circulation - Loss of feeling in the feet - Infections	What foot problems are people with diabetes most at risk of?	DKQ (item 8) (Eigenmann et al., 2011)	multiple choice	I am aware the symptom for diabetic foot complication I am happy with information given by HCP on footcare (yes/no) I clearly understand ways to care for my foot	I1KMM46-ID137, I4KMM64-ID138/ID139 I3HTM61-ID131 I2HTM59-ID132, I1HTF57-ID133, I4HTM55-ID134/ID135, I5KMF50-ID136

INFORMATION							
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33	**Physical Activity**	How often should diabetic exercise or be physically active? - Most days of the week for at least 30 minutes - Once a month for one hour - Once a week for at least 30 minutes - At least every fortnight for two hours	How often should people with diabetes exercise or be physically active?	DKQ (item 6) (Eigenmann et al., 2011)	multiple choice		
		Knowledge on types of beneficial exercise	If I take regular physical exercise, I'll have more control over my diabetes	EBADE questionnaire (item 10) (Carro-Bautista et al., 2019)	Totally disagree to totally agree (7-point scale)		
34	**Physical Activity**	Why regular exercise or being active is good for your health? - It can lower blood pressure - It can help to control blood glucose level - It can reduce the risk of skin cancer - It can lower cholesterol levels - It can help to regulate a person's mood	Why is doing regular exercise or being physically active good for your health?	DKQ (item 5) (Eigenmann et al., 2011)	multiple choice		
			regular exercise helps in keeping diabetes under control	KAP (item 3.1) (Mukhopadhyay et al., 2010)	Agree/-Disagree/ Don't know		
35	**Physical Activity**	Which of the following has your health care provider (doctor, nurse, dietitian or diabetes educator) advised you to do? Please tick all that apply: - Get low level exercise (such as walking) on a daily basis - Exercise continuously for a minimum 20 minutes for at least 3 times a week - Fit exercise into your daily routine (for example, take stairs instead ofelevators, park a block away and walk, etc.) - Engage in a specific amount, type,duration and level of exercise. - I have not been given any advice on physical activity by health care provider		SDSCA (item 2A) (Gao et al., 2013)	multiple answer	I get information/advice on physical activity (Y/N) I know suitable exercise for my condition	I4KMM64-ID129 I3HTM61-ID130
36	**Information needed**	- Causes of diabetes - Treatment - Acute complications - Diabetes management in daily life - Lifestyle adjustment and prevention - Scientific surveys and research on diabetes - Course of the disease - Social and legal aspects - Late complications - Mental strain - Support, helplines and information sources - Preferred educational method - Direct face to face - Indirect education (eg: advertisement, social media)		Information needed questionnaire (IND) (Chernyak et al., 2016)			

MOTIVATION

No	Sub-domain	Item	Item (original text)	Published article/ Instrument	Scale	Item (Quali)	Verbatim IDI
1	**Self-motivation general**	I know myself better to choose diabetes self-care that suit me well	I believe that I know enough about myself as a person to make diabetes care choices that are right for me		5-point scale (strongly disagree-strongly agree)	I get information/advice on physical activity (Y/N)	I3HTM61-MD43/MD44/MD45/MD46/MD47, I1HTF57-MD48, I4KMM64-MD49/ MD50/MD51
		I can try out different ways of overcoming barriers to my diabetes goals					
		I know the positive ways to cope with having diabetes	I handle myself well with respect to my diabetes	PDSMS (Wallston et al., 2007)			
			I believe that I can find ways to feel better about having diabetes	DES-SF			
			I believe that I know the positive way I cope with diabetes- related stress	DES-SF		I believed i can still control my diabetes with active lifestyle and food control even though i reduce my medication intake (Y/N) or If i change my medication intake, i believed i still can control my diabetes by having active lifestyle and good diet management (Y/N)	I2HTM59-MD53
2	**Self-motivation general**	I can ask for support for having and caring for my diabetes when needed		DES-SF	5-point scale (strongly disagree-strongly agree)	I always refer to HCP regarding my condition	I4HTM55-MD6
						I always refer to HCP regarding diet managment	I4HTM55-MD6
						I refer to other professional sources regarding my condition (yes/no)	I2HTM59-MD8, I1HTF57-MD9, I1KMM46-MD10
						I refer to other professional sources regarding my blood test result (yes/no)	I2HTM59-MD11
						I refer to other professional sources on diet management (yes/no)	I1HTF57-MD12
3	**Self-motivation general**	Self-care in diabetes is troublesome	I'm generally believe...diabetes is hard because you never get a break from it	DAS3 (item 18)	5-point scale (strongly disagree-strongly agree)	having diabetes is troublesome (yes/no)	I2HTM59-MD13/MD14/MD15, I3HTM61-MD16
						having diabetes will limit my daily activities (yes/no)	I2HTM5-MD17/MD18
			I'm generally believe...it is frustrating for people with diabetes to take care of their disease.	DAS3 (item 29)			
4	**Self-motivation general**	No matter how hard I try, managing my diabetes doesn't turn out the way I would like.	I find efforts to change things I don't like about my diabetes are ineffective	PDSMS (Wallston et al., 2007)	5-point scale (strongly disagree-strongly agree)	having diabetes is troublesome (yes/no)	I2HTM59-MD13/MD14/MD15, I3HTM61-MD16
5	**Self-motivation general**	Type 2 Diabetes Mellitus is a very serious disease	I find efforts to change things I don't like about my diabetes are ineffective	DAS3 (item 21)	5-point scale (strongly disagree-strongly agree)		
6	**Self-motivation general**	Diabetic should understand more of their disease to manage self-care	In general, I believe that the important decision regarding daily diabetes care should be made by the person with diabetes	DAS3 (item 5)	5-point scale (strongly disagree-strongly agree)	My lifestyle would have change if I have the knowledge on diabetes before I get diabetes	I2HTM59-MD54
			I'm generally believe...people with diabetes should learn a lot about the disease so that they can be in charge of their own diabetes care.				
7	**Self-motivation general**	Having diabetes will trouble my family and others				I control diabetes management because I have family responsibility	I1KMM46-MD20/MD21, I6KMM44-MD22, I8KMF48-MD23
						I want to take care my diabetes because I don't want to trouble my family	I1HTF5-MD24

MOTIVATION							
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8	Self-motivation general					I want further explanation of my blood test result (yes/no) I want further explanation of my medicine intake (yes/no) I look for further information on diet management myself (yes/no) I follow diabetes management to maintain my health condition	I2HTM59-MD2/MD3 I2HTM59-MD4 I3HTM61-MD5 I1KMM46-MD19
9	Self-motivation general					I fear of getting diabetic complication (yes/no) I am not afraid to discuss with HCP regarding my condition I am afraid to inform HCP if i change my medication intake I will visit hospital (diabetes complication) to gain awareness	I2HTM59-MD25/MD26/MD27, I1HTF57-MD28, I4HTM55-MD29, I8HTF39-MD30, I9HTM72-MD31/MD32, I1KMM46- MD33/MD34, I5KMF50-MD35/MD36/MD37, I8KMF48-MD38 I3HTM61-MD39, I4HTM55-MD40/MD41 I2HTM59-MD42 I4HTM55-MD52
10	Self-motivtion Medicine	Diabetes can be controlled solely by antidiabetic drugs Hypoglycemia is more dangerous than hyperglycemia Diabetic who take pills should be as concerned about their blood glucose as those who take insulin Switching to insulin indicates complication in Type 2 Diabetes Mellitus Insulin is harmful People who do not need to take insulin to treat their diabetes have a pretty mild disease		DAS3 (item 2)	5-point scale (strongly disagree-strongly agree)		
11	Self-motivation Physical Activity	Exercise is important for controlling diabetes Exercise important for preventing complications					
12	Socio-motivation	Interaction with Health care providers Health care providers should have good interpersonal skill dealing with Diabetic Diabetic need to have frequent follow up with health care providers Health care providers should know how to guide diabetic on self-care	in general, i believed that health care proffesionals who treat people with diabetes should be trained to communicate well with their patient it is important for the nurses and dietitians who teach people with diabetes to learn counseling skills	DAS3 (item 3) DAS3 (item 10)	5-point scale (strongly disagree-strongly agree)		

MOTIVATION

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13	Socio-motivation	I received support from others on:				I have someone to look after me even though I stay alone	I1HTF57-MD55/MD56
		Diet				I usually have someone to help me follow diabetic diet plan	I2HTM59-MD60/MD61, I1KMM46-MD62/MD63/MD64, I4KMM64-MD65
						I usually have someone to remind me on diabetic diet (family, friends)	I1KMM46-MD66, I4KMM64-MD67
						I usually have someone to prepare food for diabetic	I2HTM5-MD68 /MD69, I4HTM55-MD70, I9HTM72-MD71, I1KMM46-MD72
		Self-Monitoring Blood Glucose				I usually have someone to help me monitor my blood sugar level	I4KMM64-MD76
		Medication intake				I usually have someone to help me with my medication	I2HTM59-MD57
						I usually have someone to remind me to take medicine on time (family, friends)	I5KMF50-MD58
						I usually have someone to help me taking insulin	I1HTF57-MD59
		Physical activity				I usually have someone to accompany me exercise	I8KMF48-MD81
		Footcare				I usually have someone to help me check my foot	I2HTM59-MD79
						I received compliment from HCP about my footcare management	I1HTF57-MD80
		Follow-up appointment				I usually have someone to bring me to the hospital for follow-up appointment	I1HTF57-MD82
						My employer allows me to go for follow up appointment during working hours (Y/N)	I2HTM59-MD83, I4HTM55-MD84
		Others				I usually have someone to help me dealing my emotion	I9HTM72-MD86
						I received compliment from HCP whenever my blood result is good	I2HTM59-MD77, I4HTM55-MD78
						Caregiver should have aware/ knowledge on diet management for diabetic patient	I4HTM55-MD73
						I usually have someone to help me when having hypo (Yes or no)	I1HTF57-MD74, I8HTF39-MD75
						My employer understands about my disease (Y/N)	I2HTM59-MD85
						I receive other support (emotional/ financial) from family	I4KMM64-MD87
						I receive other support (emotional/ financial) from HCP	I8HTF39-MD88/MD89
						I receive other support (emotional/ financial) from financial institution	I8HTF39-MD90
						I discuss with other T2DM patients to have better understanding	I3HTM61-MD91
						I am not comfortable to discuss on my condition with different gender HCP	I5KMF50-MD92
14	Socio-motivation	I need support from others on:	I'm generally believe...support from family and friends is important in dealing with diabetes	DAS3 (item 33)	5-point scale (strongly disagree-strongly agree)		
			If you needed it, how often is someone available...	mMOS-SS & MOS-SS (item 2) (Moser et al., 2014)	using a five-point Likert rating scale ranging from (1) none of the time to (5) most of the time		

MOTIVATION

No	Sub-domain	Item	Item (original text)	Published article/ Instrument	Scale	Item (Quali)	Verbatim IDI
		Diet	to prepare your meal if you are unable to do it yourself	mMOS-SS & MOS-SS (item 3) (Moser et al., 2014)			
		Physical activity	If my family and/or friends help me take physical exercise, it will be...	EBADE questionnaire (item 1) (Carro-Bautista et al., 2019)	More difficult to control my diabetes to easier to control my diabetes (7-point scale)		
		Follow-up appointment	to take you to the doctor if you need it	mMOS-SS & MOS-SS (item 2) (Moser et al., 2014)	using a five-point Likert rating scale ranging from (1) none of the time to (5) most of the time		
		Emotion	who understand your problem	mMOS-SS & MOS-SS (item 7) (Moser et al., 2014)	using a five-point Likert rating scale ranging from (1) none of the time to (5) most of the time.		
			you can count on to listen to you when you need talk	MOS-SS (item 9) (Moser et al., 2014)			

BEHAVIOUR

No	Sub-domain	Item	Item (original text)	Published article/ Instrument	Scale	Item (Quali)	Verbatim IDI
1	General				*(scale: often (6-7 days/week), sometimes (4-5 days/week), rarely (1-3 days/week), never (0 day/week), not applicable (888)*	I can search for diabetes information (social media/conference) myself	I1HTF57-BD2, I4HTM55-BD3, I1HTF57-BD4
						I update myself with latest diabetes information (yes/no)	I2HTM59-BD76, I4HTM55- BD77/ BD78/BD79/BD80
						I update myself with latest diabetes information (medicine) (yes/no)	I3HTM61-BD96
						I clarify with HCP on diabetes information obtained (latest medicine)	I3HTM61-BD97
						I am the one who look for further information or I like to look for further information	I1HTF57-BD5, I11KMF79-BD6
						I look for other sources (social media) regarding diabetes management	I1HTF57-BD7
						I am the one who ask my HCP for further explanation on diabetes (yes/no)	I1HTF57-BD8, I4HTM55-BD9
						I have no problem to ask my HCP for further explanation on diabetes (yes/no)	I2HTM59-BD10, I4HTM55-BD11
						I ask my HCP for further explanation on diabetes whenever I come for appointment (yes/no)	I2HTM59-BD82, I4HTM55-BD83
						I always have time to discuss with HCP on diabetes management	I2HTM59-BD12, I3HTM61-BD13, I4HTM55-BD14, I8KMF48-BD15
						I clarify with HCP on diabetes information obtained	I2HTM59-BD84, I4HTM55-BD85/BD86/BD 87/BD88
						It is not necessary for me to discuss on my condition with HCP	I1KMM46-BD16
						I go through my medical report (yes/no)	I2HTM59-BD81
						I can manage myself to not trouble others	I1HTF57-BD17
						I know how to deal when I hypo	I1HTF57-BD18, I4HTM55-BD19, I8HTF39-BD20/BD21

BEHAVIOUR

No	Sub-domain	Item	Item (original text)	Published article/ Instrument	Scale	Item (Quali)	Verbatim IDI
2	**Diet**	I follow healthy dietary plan	Selecting healthy diet	KDDQ / DBQ (Primanda et al., 2011)	Yes / No / 4-Likert scale ("1" = never, "2" = sometimes, "3" = often, and "4" = routinely)	I can control my daily food intake based on diabetic diet recommendation	I2HTM59-BD33/BD34/BD35, I3HTM61-BD36, I1HTF57-BD37/BD38/BD39/BD40, I4HTM55-BD41, I1KMM46-BD42, I4KMM64-BD43/BD44, I6KMM44-BD45/BD46/BD47/BD48/BD49/BD50
						sometimes/once in a while I eat sweet food (yes/no)/ (multiple choice question: frequency)	I2HTM5-BD199, I1HTF57-BD200, I9HTM72-BD201, I9HTM72-BD202
						I am able to adapt with the new diabetic diet plan	I4HTM55-BD114, I4KMM64-BD115
			How many of the last SEVEN DAYS haveyou followed a healthful eating plan?	SDSCA (Gao, Wang, Zheng, et al., 2013)	7-point scale		
			On average, over the past month, howmany DAYS PER WEEK have you followed your eating plan?				
			Have you modified your diet as per doctor/ dietitian advice following diagnosis of your disease?	KAP (item 4.5.1) (Mukhopadhyay et al., 2010)	YES/NO		
			If yes, how frequently in the last month did you take your diet as advice by the doctor/ dietitian?	KAP (item 4.5.2) (Mukhopadhyay et al., 2010)	multiple choice: (mostly, sometimes, rarely/ never)		
			Are you following a planned diet?	KAP (Nagar et al., 2018)	2-point scale (Positive practises/ negative practises)		
		I eat healthy diet when outside				I can control my daily food intake even eating outside	I4HTM55-BD51, I9HTM72-BD52, I1KMM46-BD53/BD54
		I eat 3 meal times per day I consume alternative/ supplement food (stevia, brown rice, less starch rice)	On how many of the last SEVEN DAYS did you space carbohydrates evenly through the day	SDSCA (Gao, Wang, Zheng, et al., 2013)	7-point scale	I take alternative food for diabetic patient (brown rice, stevia, wholemeal bread)	I9HTM72-BD130, I1KMM46-BD131 I6KMM44-BD132, I11KMF79-BD133
						I take alternative food/ drinks for diabetic patient (brown rice, stevia, wholemeal bread, low fat milk)	
		I consume sugary drinks (carbonated/ canned/ isotonic/ instant 3 in 1)				sometimes/once in a while I drink sweet drink (Teh Tarik, isotonic, carbonated, 3 in 1 drink, canned) (yes/no)/ (multiple choice question: frequency)	I2HTM5-BD203, I1KMM46-BD204
		I follow a healthy food preparation (replace coconut milk with low fat milk/ yogurt)	On how many of the last SEVEN DAYS did you eat high fat foods such as red meat or full-fat dairy product	SDSCA (Gao, Wang, Zheng, et al., 2013)	7-point scale	I can prepare my daily food intake based on diabetic diet recommendation	I2HTM59-BD29/BD30/BD31, I1HTF57-BD32
			On how many of the last SEVEN DAYS did you eat five or more servings of fruits and vegetable?	SDSCA (Gao, Wang, Zheng, et al., 2013)	7-point scale		
			How many days have you followed your diabetes diet in the past 7 days?	DIAB-Q (item 7)	7-point scale (days)		
			Arranging a meal plan, Managing dietary behaviors challenges	KDDQ / DBQ (Primanda et al., 2011)	Yes / No / 4-Likert scale ("1" = never, "2" = sometimes, "3" = often, and "4" = routinely)		
			I am able to choose the correct food	DMSES (item 4)			
			I am able to choose different food and stick to a healthy eating pattern	DMSES (item 5)			
			I am able to follow a healthy pattern most of the time	DMSES (item 10)			
			I am able to follow a healthy pattern when I am away from home	DMSES (item 13)			

BEHAVIOUR

No	Sub-domain	Item	Item (original text)	Published article/ Instrument	Scale	Item (Quali)	Verbatim IDI
			I am able to adjust my eating plan when I am away from home	DMSES (item 14)		I adjust my meal to 5 times a day with small amount/portion (yes or no)	I6KMM44-BD134
			I am able to follow a healthy pattern when I am on holiday	DMSES (item 15)			
			I am able to follow a healthy eating pattern when I am eating out or at the party	DMSES (item 16)		I reduce my sugar intake in my diet management (yes/no)	I2HTM59-BD116,I1HTF57-BD117, I6KMM44-BD118, I8KMF48-BD119
						I adjust my sugary food intake according to my blood glucose level (yes or no)	I6KMM44-BD136
						I always check ingredient (glycemic index-GI) before I buy food	I4HTM55-BD135
						I eat more vegetable and less rice (Y/N)	I11KMF79-BD120
						I eat more meat (protein) and less rice (carbohydrate) (Y/N)	I9HTM72-BD121, I6KMM44-BD122/BD123
						I eat more vegetable and less meat (Y/N)	I3HTM61-BD124, I4HTM55-BD125, I8HTF39-BD126, I4KMM64-BD127
						I take meat according to my body size. or I eat more meat (beef/mutton) as my body size is small	I9HTM72-BD138
						I eat healthy food (wholemeal bread) for my daily meal	I1HTF57-BD128/BD129
						I always feel hungry even after eating light breakfast (oat) or Having cereal/oat for breakfast is not enough for me	I9HTM72-BD139
						I only control my diet management when my blood sugar level increase	I5KMF50-BD137
						I have difficulty to follow my recommended diet plan (portion) (Y/N)	I9HTM72-BD140, I1KMM46-BD141, I4KMM64-BD142
						I have problem to follow my recommended diet plan due to busy schedule (Y/N)	I2HTM59-BD143, I5KMF50-BD144/BD145
						I have difficulty to follow my recommended diet plan when eating outside (Y/N)	I1KMM46-BD146
						It is difficult for me to find alternative food at restaurant	I1KMM46-BD147
						I have difficulty to follow diabetes diet plan due to a variety of food choices. (multiculture/ multicountry food available)	I4HTM55-BD148
						I have difficulty to control my diet due to big appetite	I1KMM46-BD149/BD150/BD151/BD152, I6KMM44-BD153
						I have difficulty to control my diabetes recommended diet due to cultural activity (wedding ceremony, state local food)	I1HTF57-BD154,I4HTM55-BD155, I1KMM46-BD156, I5KMF50-BD157
						I have difficulty to control my sugary intake due to cultural activity (wedding ceremony, state local food)	I3HTM6-BD158
						I have difficulty to control my sugary intake due to big appetite	I1KMM46-BD159/BD160
						I have difficulty to control my diet due to norm (food hunting)	I1KMM46-BD161
						I have difficulty to control my sugary intake due to norm (carbonate drink lover)	I1KMM46-BD162
						I have difficulty to control my sugary intake due to religious practices (prayer session-indian, breakfast (iftar)- muslim)	I3HTM61-BD163

BEHAVIOUR							
No	**Sub-domain**	**Item**	**Item (original text)**	**Published article/ Instrument**	**Scale**	**Item (Quali)**	**Verbatim IDI**
						I have difficulty to control my sugary intake after marriage	I1KMM46-BD164
						I eat something when I hypo (sugary food, biscuit, tea)	I1HTF57-BD165
						I am not be able to exercise but I control sugar in my diet	I4HTM55-BD166
						I am able to manage my diabetes depending only on medication and diet	I8HTF39-BD28
3	**Medication**	I take oral medication on time	do you forget to take your anti diabetic drugs?	KAP (Nagar et al., 2018)	2-point scale (Positive practises/ negative practises)	I can manage my own medication intake (Y/N)	I2HTM59-BD22/BD23, I3HTM61-BD24, I4HTM55-BD25, I6KMM44-BD26
			did you ever forget to take any drugs prescribed by your doctor?	KAP (item 4.6.1) (Mukhopadhyay et al., 2010)	YES/NO		
			if yes, mention how many times in the last one month?	KAP (item 4.6.2) (Mukhopadhyay et al., 2010)	multiple choice: (never, 1-2 days/ week, 1-3 days/month, more than 2 days)	I take medication regularly/ on time/ based on prescription	I1KMM46-MD198
			do you sometimes forget to take your medication	MMAS8 (item 1)	4- Likert scale (never, almost never, sometimes, always)	I will find ways not to miss my medication when I forgot to bring my medicine.	I4HTM55-BD100/BD101
						I immediately take medication when I miss my medication schedule (Y/N)	I1KMM46-BD102, I5KMF50-BD103/BD104, I6KMM44-BD105
						I take medicine in one shot when I miss medication schedule	I1KMM46-BD106, I5KMF50-BD107
						I take medicine with empty stomach	I1KMM46-BD106, I5KMF50-BD107
						I avoid taking insulin and prefer eat oral medicine	I1KMM46-BD109
			On how many of the last SEVENDAYS, did you take your recom-mended diabetes medication?	SDSCA (Gao, Wang, Zheng, et al., 2013)	7-point scale		
			I am able to take medication as prescribed	DMSES (item 19)	7-point scale	I don't have any problem to follow my medication intake	I4HTM55-BD98, I4KMM64-BD99
		I take insulin on schedule	On how many of the last SEVEN DAYS did you take your recommend-ed insulin injections?	SDSCA (Gao, Wang, Zheng, et al., 2013)	7-point scale	I am phobia with syringe/ needle (insulin)	I1KMM46-BD110
		I miss taking the dose of my medications	On how many of the last SEVEN DAYS did you take your recommend-ed num-ber of diabetes pills?	SDSCA (Gao, Wang, Zheng, et al., 2013)	7-point scale	I am able to inject insulin myself (Y/N)	I1HTF57-BD27
			Which of the following medicationsfor your diabetes has your doctor pre-scribed? Please check all that apply. a. An insulin shot 1 or 2 times a day. b.An insulin shot 3 or more times a day. c. Diabetes pills to control my bloodsugar level. d.Other (specify): e. I have not been prescribed either insulin or pills for my diabetes	SDSCA (Gao, Wang, Zheng, et al., 2013)	multiple answer		
			have you ever stopped taking your medication or decrease the dose without first warning your doctor because you feel worse when you took them?	MMAS8 (item 3)	4- Likert scale (never, almost never, sometimes, always)	I have problem to take my medication on time due to busy schedule (Y/N)	I5KMF50-BD111/BD112/BD113

BEHAVIOUR

No	Sub-domain	Item	Item (original text)	Published article/ Instrument	Scale	Item (Quali)	Verbatim IDI
			when you travel/ leave the house, do you sometimes forget to take your medications?	MMAS8 (item 4)	4- Likert scale (never, almost never, sometimes, always)		
			when you feel your diabetes is controlled, do you sometimes stop taking your medications?	MMAS8 (item 6)	4- Likert scale (never, almost never, sometimes, always)		
			drugs can be stopped once blood sugar is normal	KAP (Nagar et al., 2018)	3- Likert scale (disagree, neutral, agree)		
			I don't need to take medication once I feel better	DAI30 (CERP) (item 1)	True/ False		
4	**SMBG**	I check blood glucose level at home	I am confident that I am able to check my blood/ urine sugar if necessary	DMSES (item 1)		I am able to monitor blood glucose level myself (Y/N)	I2HTM59-BD55, I3HTM61-BD56, I1HTF57-BD57, I4HTM55-BD58/BD59, I1KMM46-BD60, I4KMM64-BD61
			On how many of the last SEVEN DAYS did you test your blood sugar?	SDSCA (Gao, Wang, Zheng, et al., 2013)	7-point scale	I regularly monitor my blood sugar level (Y/N)	I2HTM59-BD205/BD206, I1HTF57-BD207, I4HTM55-BD208/BD209, I9HTM72-BD210/BD211/BD212/BD213/BD214, I1KMM46-BD215
			do you use any device to monitor your blood sugar at home?	KAP (item 4.3.1) (Mukhopadhyay et al., 2010)	YES/ NO	I record my blood glucose level every time I do SMBG	I1HTF57-BD167
			If yes, how often do you check your blood sugar at home?	KAP (item 4.3.2) (Mukhopadhyay et al., 2010)	multiple choice: (more than 5 days a week, two to five days a week, once a week, two to three times / month, rarely/ never (state the reason...)	I monitor/ check my blood sugar level whenever I eat food/ drink containing sugar	I9HTM72-BD168/BD169
		I check blood glucose level at hospital/clinic	On how many of the last SEVEN DAYS did you test your blood sugar the number of times recommended by your healthcare provider	SDSCA (Gao, Wang, Zheng, et al., 2013)	7-point scale		
			Which of the following has your healthcare team (doctor, nurse, dietitian, or diabetes educator) advised you to do? Please check all that apply: a. Test your blood sugar using a drop of blood from your finger and a color chart. b. Test your blood sugar using a machine to read the results. c. Test your urine for sugar. d. Other (specify): e. I have not been given any advice either about testing my blood or urine sugar level by my health care team	SDSCA (Gao, Wang, Zheng, et al., 2013)	multiple answer	I ask my HCP for further explanation on my blood test result whenever I come for appointment (yes/no)	I2HTM59-BD177/BD178
						I have no problem to ask my HCP for further explanation on my blood test result (yes/no)	I2HTM59-BD62/BD63
						I adjust medication dosage according to my blood glucose level (yes or no)	I2HTM59-BD170/BD171
5	**Footcare**	I check my foot	On how many of the last SEVEN DAYS did you check your feet?	SDSCA (Gao, Wang, Zheng, et al., 2013)	7-point scale	I am able to check my foot on my own	I3HTM61-BD72, I1HTF57-BD73
			did you undergo any foot examination in the past one year?	KAP (item 4.7) (Mukhopadhyay et al., 2010)	YES/ NO	I regularly monitor my foot (Y/N)	I1KMM46-BD223
			I am able to examine my feet for cut	DMSES (item 7)		I am able to take care of my foot	I3HTM61-BD74, I1HTF57-BD75
			Do you check your foot regularly?	KAP (Nagar et al., 2018)	2-point scale (Positive practises/ negative practises)	I usually do foot care on my own (homecare) or I only go to health facility for foot care treatment	I2HTM59-BD190, I1HTF57-BD191/BD192, I4HTM55-BD193
		I wear covered shoes outdoors	do you always wear covered shoes when outdoors?	KAP (item 4.8.2) (Mukhopadhyay et al., 2010)	YES/ NO		

BEHAVIOUR

No	Sub-domain	Item	Item (original text)	Published article/ Instrument	Scale	Item (Quali)	Verbatim IDI
		I inspect inside my shoes	On how many of the last SEVEN DAYS did you inspect the inside of your shoes?	SDSCA (Gao, Wang, Zheng, et al.,2013)	7-point scale		
		I soak my feet	On how many of the last SEVEN DAYS did you soak your feet?	SDSCA (Gao, Wang, Zheng, et al.,2013)	7-point scale		
		I dry between my toes after wash	On how many of the last SEVEN DAYS did you dry between your toes after washing	SDSCA (Gao, Wang, Zheng, et al.,2013)	7-point scale		
6	**Eyecare**	I undergo an eye examination	did you undergo any eye examination in the past one year?	KAP (item 4.8.1) (Mukhopadhyay et al., 2010)	YES/ NO	I go for eye check-up (yes/no)	I2HTM59-BD224
7	**Follow up appointment**	I comply to my follow-up appointment	Do you have regular visit to health facility?	KAP (Nagar et al., 2018)	2-point scale (Positive practises/ negative practises)	I have no problem to attend follow up appointment (Y/N)	I1HTF57-BD90, I1KMM46-BD91
						I have no problem to attend follow up appointment even though i am working (Y/N)	I2HTM59-BD92, I4HTM55-BD93
			I am able to visit my doctor once a year to monitor my diabetes	DMSES (item 18)			
8	**Physical activity**	*I do (scale: often (6-7 days/week), sometimes (4-5 days/week), rarely (1-3 days/week), never (0 day/week), not applicable (888)*	Do you have regular visit to health facility?	DMSES (item 8)		I am able to do exercise on my own	I8KMF48-BD64
						I exercise (walking, bicycle, hockey, badminton) (Y/N)/ length of exercise (1, 2 hours)/ frequency (in a week)	I3HTM61-BD216/BD217, I4HTM55-D218, I9HTM72-D219, I1KMM46-D220, I4KMM64-D221, I8KMF48-BD222
						I exercise whenever and wherever possible	I2HTM59-BD179/BD180/BD181, I3HTM61-BD182, I4HTM55-D183, I1KMM46-D184, I8KMF48-BD185
						I can go exercise alone	I8KMF48-BD65
						Exercise made me feel light and healthier	I4HTM55-BD70
						Running is not suitable for diabetic patient	I9HTM72-BD71
			For the past months, about how often have you taken part in any moderate physical activity lasting more than half an hour (such as yoga, light sports, physical exercise, gardening, taking long walks)	KAP (item 4.1.1) (Mukhopadhyay et al., 2010)	multiple choice: (more than 5 days a week, two to five days a week, once a week, two to three times / month, rarely/ never (state the reason...)		
		Brisk walking/jogging	On how many of the last SEVEN DAYS did you participate in a specific exercise session (such as swimming, walking, biking) other than what you do around the house or as part of your work?	SDSCA (Gao, Wang, Zheng, et al., 2013)	7-point scale		
		Gardening, Gym, Going up and down the stairs, House cleaning, sports (eg: cycling/ swimming/ hiking/ badminton), Flexibility workout (eg: yoga/ dancing/aero-bics/tai chi/xi gong)	For the past months, about how often have you taken part in any moderate physical activity lasting more than half an hour (such as yoga, light sports, physical exercise, gardening, taking long walks)	KAP (item 4.1.1) (Mukhopadhyay et al., 2010)	multiple choice: (more than 5 days a week, two to five days a week, once a week, two to three times / month, rarely/ never (state the reason...)	Running is not suitable for diabetic patient	
			On how many of the last SEVEN DAYS did you participate in at least 30 minutes of physical activity?	SDSCA (Gao, Wang, Zheng, et al., 2013)	7-point scale		
			On how many of the last SEVEN DAYS did you participate in a specific exercise session (such as swimming, walking, biking) other than what you do around the house or as part of your work?	SDSCA (Gao, Wang, Zheng, et al., 2013)	7-point scale		

BEHAVIOUR							
No	**Sub-domain**	**Item**	**Item (original text)**	**Published article/ Instrument**	**Scale**	**Item (Quali)**	**Verbatim IDI**
			How many days have you exercised in the past 7 days?	DIAB-Q (item 1)	7-point scale (Days)		
		I do (scale: never, < 20 min, 20-60 min, > 60 min, not applicable) Brisk walking/jogging, Gardening, Gym, Going up and down the stairs, House cleaning, sports (eg: cycling/ swimming/ hiking/ badminton), Flexibility workout (eg: yoga/ dancing/aero-bics/tai chi/xi gong)	Beneficial types of exercises Walking Swedish exercise Gardening Household chores	KP (Mikhael et al. 2019)	Multiple choice and answer		
			I take physical exercise, even if I have joint pain in my joints or another injuries	EBADE questionnaire (item 1) (Carro-Bautista et al., 2019)	Totally disagree to totally agree (7-point scale)	I can still exercise even having health limitation (Y/N) or I can still exercise (light activity-walking) even having health limitation (Y/N)	I2HTM59- BD66/ BD67, I3HTM61-BD68, I8HTF39-BD69
						I exercise according to my age capability	I4HTM55-BD186
9	**Barrier for diabetes self-care**	Lack of money to:	do you take anti diabetic drugs as advised by your doctor? If no, (tick): Lack of finance,	DMKQ (Factor associated with patient adherence to antidiabetic medication)	YES/NO	I have expenses/financial problem in managing diabetes (Y/N)	
		Buy healthy food Buy alternative food (stevia, brown rice, less starch rice)					
		Buy blood glucose equipment (glucometer/ test strip/ alcohol swab)	Barrier to glucose testing: Cost of strips	KP (Mikhael et al. 2019)	Multiple choice and answer	I have expenses/financial problem in monitoring blood glucose level (Y/N)	I2HTM59-D172, I1HTF57-BD173, I8HTF39-BD174
						I cannot afford to buy glucometer (yes/no)	I2HTM59-BD175 I8HTF39-176
		Buy insulin needle	Main barriers for adherence to anti-diabetic medications: Cost of medications	KP (Mikhael et al. 2019)	Multiple choice and answer		
			do you take anti diabetic drugs as advised by your doctor. If no, (tick): Side effect	DMKQ (Factor associated with patient adherence to antidiabetic medication)	YES/NO		
		Painful/ afraid (glucometer/ insulin pen)	Barrier to glucose testing: Pain of pricking the skin / Stress from test results	KP (Mikhael et al. 2019)	Multiple choice and answer		
		Don't know how to read glucometer results					
		Follow-up: Transportation (attend follow up/ go for exercise), Gym fee, Foot wear expenses (sock/ cover shoes)				I have expenses/financial problem to attend follow-up appointment (Y/N)	I8HTF39-BD94
						I don't have a proper equipment for foot care	I4HTM55-BD194
		Barrier-footcare				I have difficulty to take care my own foot due to physical limitation (unable to bend, blur vision)	I4HTM55-BD195
						I am not comfortable when applying lotion/ moisturizer onto my foot or I rarely apply lotion/ moisturizer onto my foot because I am not comfortable	I2HTM59-BD196
						I have difficulty to maintain wearing footwear due to religious practices (indian function-temple)	I1HTF57-BD197

BEHAVIOUR							
No	Sub-domain	Item	Item (original text)	Published article/ Instrument	Scale	Item (Quali)	Verbatim IDI
		Far distance from residence to... Health facility (hospital/clinic/ pharmacy)	Barriers to regular physician visit: Cost of appointment Lack of symptoms Negative attitudes toward physicians Busy schedule Fear from detecting diabetes complications Travel abroad Physician waiting time Environmental factors	KP (Mikhael et al. 2019)	Multiple choice and answer		
		Dissatisfied with long queues and waiting hours (follow-up appointment)					
		Exercise facility (recreational park/gym)	Barriers for exercising: - Environmental factors such as hot weather, dirty roads, and lack of sports centers	KP (Mikhael et al. 2019)	Multiple choice and answer		
		Time constraint: Medication intake (pill), Insulin intake, Diet (food preparation), Self-Monitoring Blood Glucose, Footcare/ eyecare					
		Physical activity Limited facility to exercise	Barriers for exercising: Stress of life and busy work schedule	KP (Mikhael et al. 2019)	Multiple choice and answer	I rarely exercise due to busy schedule	I1KMM46-D187, I6KMM44.BD188 I8KMF48-BD189
		Follow-up appointment	Barriers to regular physician visit Busy schedule	KP (Mikhael et al. 2019)	Multiple choice and answer		
		Tired/ Bored with same routine	Presence of other diseases such as rheumatoid arthritis, osteoarthritis, angina, vertigo, and weakness				
			Environmental factors such as hot weather, dirty roads, and lack of sports centers				

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Institute for Health Behavioural Research,
National Institutes of Health,
Ministry of Health, Malaysia