

Validation of the Comprehensive ICF Core Sets for Diabetes Mellitus: A Malaysian Perspective

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Abstract

Introduction: Diabetes mellitus (DM) is a chronic disease that is prevalent in many countries. The prevalence of DM is on the rise, and its complications pose a heavy burden on the health-care systems and on the patients' quality of life worldwide. **Materials and Methods:** This is a multicentre, cross-sectional study involving 5 Health Clinics conducted by Family Medicine Specialists in Malaysia. Convenience sampling of 100 respondents with DM were selected. The International Classification of Functioning, Disability and Health (ICF) based measures were collected using the Comprehensive Core Set for DM. SF-36 and self-administered forms and comorbidity questionnaire (SCQ) were also used. **Results:** Ninety-seven percent had Type 2 DM and 3% had Type 1 DM. The mean period of having DM was 6 years. Body functions related to physical health including exercise tolerance (b455), general physical endurance (b4550), aerobic capacity (b4551) and fatiguability (b4552) were the most affected. For body structures, the structure of pancreas (s550) was the most affected. In the ICF component of activities and participation, limitation in sports (d9201) was the highest most affected followed by driving (d475), intimate relationships (d770), handling stress and other psychological demands (d240) and moving around (d455). Only 7% (e355 and e450) in the environmental category were documented as being a relevant factor by more than 90% of the patients. **Conclusion:** The content validity of the comprehensive ICF Core set DM for Malaysian population were identified and the results show that physical and mental functioning were impaired in contrast to what the respondents perceived as leading healthy lifestyles.

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Introduction

In Malaysia, the National Health and Morbidity Survey III (NHMS III) showed an increase in adult (aged 18 to 64 years old) onset diabetes mellitus (DM) in Malaysia from 6.3% in 1986 to 11.6% in 2006. The prevalence of DM among Malaysian adults aged above 30 years is 14.9%. Another 4.7% suffer from impaired glucose tolerance which puts them at risk of developing a full blown DM in the future.¹

Admissions for DM and its related complications into the Malaysian Ministry of Health hospitals had also risen by about 80% over the past decade, from 21,872 in 1995

to 39,358 in 2004.² The NHMS III revealed that 4.3% of those with DM had lower limb amputation, 3.4% had stroke and 1.6% were undergoing dialysis or have had kidney transplant.¹ Fortunately, mortality among these admissions had remained fairly constant at around 1%. However, overall mortality due to diabetes mellitus is 4.0%.³

A large number of persons with DM are disabled. In the United States, it is estimated that 20% to 50% of the diabetic population are disabled. The 1989 the US National Health Interview Survey (NHIS) reported that activity limitations and restricted activity days were 2 to 3 times higher among

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persons with diabetes surveyed.⁴ However, in Malaysia, there is no known documented study on functional disability for non amputee diabetics

Many studies have described the prevalence of complications and morbidity in DM patients. Previous data suggest that patients with DM experience a lowered quality of life compared to healthy individuals and that functional health status decreases as complications become more severe.⁴

These investigations have been conducted from a medical perspective, from which measurement of functioning and health are required to evaluate patient-relevant outcomes of an intervention and from which functioning and health are seen primarily as a consequence of the disease. Many of these investigations include patient-oriented instruments, e.g. patient and proxy self-report on health status, quality of life, and health preferences. These instruments have also been developed according to the medical perspective and in line with the current concept in outcomes and quality-of-life research of condition-specific measures,⁵ i.e., they are based on the assumption that different conditions are associated with salient patient problems in functioning. The individual influence of environment and personal factors is, however, scarcely taken into account.⁶

Healthcare Functioning is recognised as an important study outcome in diabetes mellitus. The number of clinical studies addressing functioning as a study endpoint in patients with diabetes mellitus has steadily increased during the past decades. Widely used instruments are as follows: Diabetes Health Profile (DHP-1, DHP-18), Appraisal of Diabetes Scale (ADS), Audit of Diabetes – Dependent Quality of Life (ADDQoL), Diabetes-Specific Quality of Life Scales (DSQOLS), Diabetes Impaired Measurement Scale (DIMS), Diabetes Quality of Life Measure (DQOL), Diabetes - Specific Quality of Life Scale (DSQOLS), Questionnaire on Stress in Diabetic Patient - Revised (QS-DSR), Diabetes-39 (D-39) and Well being Enquiry for Diabetes (WED).⁷

However, most of these instruments address the quality of life and functional activities far more than participation in social and life activities. Thus, a very comprehensive approach is required when addressing diabetes mellitus (DM).

The bio-psycho-social model of Functioning, Disability and Health of the World Health Organization (WHO)⁸ establishes the basis for a more comprehensive description of the experience of patients suffering from determined disease. Based on this model, functioning with its components *Body Functions*, *Body Structures* and *Activities and Participation* is seen in relation to the health condition under consideration, as well as *Personal* and *Environmental Factors* (Fig. 1).⁸

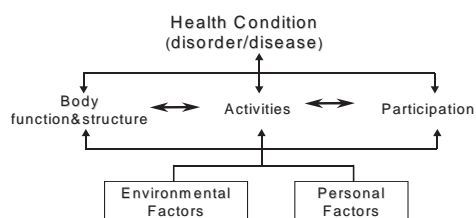


Fig 1. The current framework of functioning, disability and health.

This bio-psycho-social view guided the development of the International Classification of Functioning, Disability and Health (ICF), which was approved by the World Health Assembly (WHA), in May 2001. Since ICF has been developed in a worldwide, comprehensive consensus process over the last few years and was endorsed by WHA as a member of the WHO Family of International Classifications, it is likely to become the generally accepted framework to describe functioning and health. ICF is intended for use in multiple sectors that include health, education, insurance, labour, health and disability policy, statistics, etc.

In the clinical context, it is intended for use in needs assessment, matching interventions to specific health states, rehabilitation and outcome evaluation. With the ICF, not only an etiologically neutral framework, but a globally-agreed-on language and a classification is available to describe functioning both on an individual and population levels and from both the patients' as well as health professionals' perspectives. ICF contains more than 1400 ICF categories, each allotted to the named components in the bio-psycho-social model with the exception of the component *Personal Factors*, which has not yet been classified. Each ICF category is denoted by a code composed by a letter that refers to components of the classification (b: *Body Functions*; s: *Body Structures*; d: *Activities and Participation* and e: *Environmental Factors*) and is followed by a numeric code starting with the chapter number (one digit), followed by 2nd level (two digits) 3rd and 4th levels (one digit each) (Fig. 1).

All member states of the WHO are now called upon to implement ICF in multiple sectors. However, ICF has to be tailored to suit these specific applications.⁹ In clinical context, the main challenge is the abundance of its categories of over 1400. In order to address the issue of feasibility regarding the number of categories, ICF Core Sets have been developed in a formal decision-making and consensus-based process integrating evidence gathered from preliminary studies for a number of most burdensome, chronic health conditions, including DM.¹⁰

ICF Core Sets for patients with a determined health

condition represent a selection of ICF categories out of the whole classification which can serve as minimal standards for the reporting of functioning and health for clinical studies and clinical encounters (Brief ICF Core Set) or as standards for multi-professional, comprehensive assessment (Comprehensive ICF Core Set) under consideration of influential environmental factors. Since the ICF Core Sets address aspects within all the components of the ICF (*Body Functions, Body Structures, Activities and Participation, Environmental Factors*) they present a broad, condition-specific perspective that may reflect the whole health experience of patients. The current version of the *Comprehensive ICF Core Set for DM* has 99 categories, with 85 categories at the 2nd level of the classification and 14 categories at the 3rd level classification. The 99 categories of the Comprehensive ICF Core Set for DM are made up of 36 categories from *Body Functions* component, 16 categories from *Body Structures* component, 18 categories from *Activities and Participation* component and 29 categories from *Environmental Factors* component.¹¹

The Comprehensive ICF Core Set for DM describes the typical spectrum of problems in functioning among patients with DM in comprehensive assessments or in clinical studies. Additionally, it provides an ideal basis from which to define theoretically sound models of functioning and disability in patients with DM.

The Comprehensive ICF Core Set for DM is now undergoing worldwide testing and validation using a number of approaches including an international multicentre validation study. Within the testing and validation of the Comprehensive ICF Core Set for DM, it is important to study to what extent all ICF categories included in it are relevant in different countries. It will also be useful to study to what extent ICF categories are relevant for patients with DM from the perspective of determined countries that are not included in the Comprehensive ICF Core Set for DM yet. It is expected that there will be a number of core ICF categories applicable all over the world and that will assure comparability of data hence reducing the number of ICF categories specific for one or more countries.

Within this international validation of the comprehensive ICF Core Sets for DM, a multicentre study involving patients with DM was performed in Malaysia. The objective of the present investigation is to study the content validity of the Comprehensive ICF Core Set for DM from the Malaysian perspective.

The specific aims are to examine the frequency with which a Malaysian population of DM patients present problems in the ICF categories included in the Comprehensive ICF Core Set for DM and to determine the Physical and Mental Component Summary Score among them.

Materials and Methods

Study Design

This is a multicentre, cross-sectional study involving 5 Health Clinics headed by Family Medicine Specialists in Malaysia. Three clinics serve suburban and the other two serve urban communities. Ethical Clearance was obtained from Ethics Committee, Ministry of Health Malaysia.

Subjects

Convenient sampling of patients with DM treated in study centres were done amongst patients aged 18 years and above and they must be fluent in Malay and/or English language(s).

Patients who had incomplete wound healing after surgery and limb amputation were excluded from the study. Informed consents were obtained.

Measures

The following were documented: Diagnosis based on the ICD-10 i.e. DM type 1 or 2, treatment, the number of surgeries done and hospitalisations due to DM.

ICF-based data were collected using the Comprehensive ICF Core Set for DM.¹¹ ICF categories are designated by the letters ‘b’ (*Body Functions*), ‘s’ (*Body Structures*), ‘d’ (*Activities and Participation*), and ‘e’ (*Environmental Factors*), followed by a numeric code starting with chapter number (1 digit), followed by the second level (2 digits), and third and fourth levels (1 digit each). Within each component, the categories are arranged in a stem/branch/leaf scheme. Consequently, a higher-level category shares the attributes of the lower-level categories to which it belongs, i.e., the use of a higher-level (more detailed level) category automatically implies that the lower-level category is applicable.

To evaluate the extent of the patient’s problems in each of the 99 ICF categories contained in the Comprehensive ICF Core Set for DM, a generic qualifier scale was used. The qualifier scale of the components of *Body Functions, Body Structures* and *Activities and Participation* has 5 response categories, each ranging from 0 to 4: no/mild/moderate/severe/complete impairment or difficulty. The qualifier scale of the component *Environmental Factors* has 9 response categories ranging from –4 to +4. A specific environmental factor can be a barrier (–1 to –4), a facilitator (1 to 4), or can have no influence (0) on the patient’s life. If the factor has an influence, the extent of the influence (either positive or negative) can be coded with mild/moderate/severe/complete. In addition, there are the response options “8: not specified” and “9: not applicable”.¹¹

In this study, a broad range of percentages as provided by WHO¹¹ were used as a reference system to quantify problems faced by patients in each of the ICF categories

and the extent to which a determined environmental factor was a barrier or a facilitator.

Table 1. The following scale was used to quantify problems faced by patients in each of the ICF categories.

Scale	Percentage (%)
0 – NO problem (none, absent, negligible,...)	0-4
1 – MILD problem (slight, low,...)	5-24
2 – MODERATE problem (medium, fair...)	25-49
3 – SEVERE problem (high, extreme,...)	50-95
4 – COMPLETE problem (total,...)	96-100

SF-36 was derived from a large battery of questions administered in Medical Outcomes Study. SF-36 includes 8 multi-item scales containing 2 to 10 items each and a single item to assess health transition between 2 different time points of assessment. Two summary scales can also be obtained – the Physical Component Summary Score (PCS) and the Mental Component Summary Score (MCS). The first item of the questionnaire addresses health in general and reads: “In general, would you say your health is (excellent / very good / good / fair / poor)?”

Empirical work has consistently shown that this item requires recalibration since the intervals between adjacent response categories are unequal. Therefore, the item scale values are transformed as follows: excellent = 5.0, very good = 4.4, good = 3.4, fair = 2.0 and poor = 1.0. The transformed data were used for data analyses in this study.¹²

Self-administered forms and comorbidity and questionnaire (SCQ) is an instrument used to assess comorbidities for clinical and health services research. Patients are first asked whether they have problems with each of the following health conditions: (1) heart disease, (2) high blood pressure, (3) lung disease, (4) cancer, (5) depression, (6) arthritis and (7) back pain. If their answer is yes, they are then asked if they are receiving treatment. To assess the burden of disease on the patient, he or she is asked whether the problem limits their activities. The subjects can also add 3 additional health conditions. The number of diseases as measured by the SCQ was used as a control variable in the regression models of this study.

Data Collection

Recruitment of patients and ICF-based data collection were performed by Family Medicine Specialists who had been trained by researchers from the Department of Rehabilitation Medicine, University of Malaya, Sunway Medical Centre and the ICF Research Branch of the WHO Collaborating Centre for the Family of International

Classifications, Ludwig–Maximilian–University Munich during a structured 3-day workshop. During the training, participants were familiarised with the ICF framework, classification and were provided with instructions for data collection. The range of percentages used as reference for the quantification of problems faced by patients in each of the different ICF categories were also introduced and explained. An exemplary case was discussed to facilitate data collection.

Healthcare professionals were requested to document areas of functioning that were problematic for patients but were not included in the Comprehensive ICF Core Set for DM. Similarly, they were requested to document all environmental factors that were either barrier or facilitator but were not included in the Comprehensive ICF Core Set for DM.

The Bahasa Malaysia version of SF-36 self-administered forms and comorbidity questionnaire (SCQ1) were filled by patients themselves. However, Family Medicine Specialists who had prior training on the subjects were at hand to help.

Analysis

Descriptive statistics were used to define the study population and describe the health status of patients based on the 8 subscales of SF-36.

The ICF qualifier “9 – not applicable” was recoded to 0 “no problem” based on the assumption that if a determined ICF category is not applicable to a patient, it does not pose as a problem.

In addition, for the components body functions and structures, activities and participation the response options 1 to 4 were collapsed. For environmental factors, the response options from –1 to –4 and the response options 1 to 4 were collapsed, respectively. Descriptive statistics were used to examine the frequency with which the study population had a problem in the ICF categories for components body functions and structures, activities and participation of the Comprehensive ICF Core Set for DM. The frequency with which environmental factor represents a barrier and/or a facilitator is also calculated. The corresponding 95% confidence intervals (CI)¹³ are reported.

The areas of functioning and the environmental factors that were documented by the healthcare professionals because they were missing in the Comprehensive ICF Core Set for DM were translated into the ICF language based on established linking rules¹⁴ and their frequency was also calculated.

Results

One hundred respondents were included in the study, of which 49% were women. Their age ranged between 20 and 74 years (mean age 50 years, median age 53 years).

Their mean and median body mass indexes were found to be 27.19 and 27.00 respectively. Mean duration of formal education was 11.72 and median 11 years. The duration of illness among the respondents were between 1 and 27 years, the mean being 8 years, mode being 3 years and median being 6 years.

All respondents lived with their families. Thirty-four percent were gainfully employed while the others were self-employed (10%), students (2%), homemaker (31%) and retired (23%). One percent was unemployed and pensioned off due to health reasons like DM.

Among the respondents, 97% had Type 2 DM and 3% had Type 1 DM. The mean and median duration of having DM were 8 and 6 years, respectively. Almost all respondents (99%) received nutrition and lifestyle advice. With regards to medication, 60% were on sulphonylurea, 1% on glinides, 72% on metformin, 2% on glitazones, 7% on glycosidase inhibitor, 2% on intensive insulin therapy, 25% on conventional insulin and 17% on bedtime insulin therapy. Overall, insulin therapy in the community was 44%.

Concomitant diseases found in the surveyed patients were as follows: 49% had hypertension, 4% Stroke, and 3% had ischaemic heart disease. Twenty-eight percent respondents reported to have more than 2 different diseases. During the study, 93% were not hospitalised, however 4% had been admitted once, 2% twice and 1% more than 5 times. Sixty-nine percent of the respondents perceived their health as excellent and 31% as fair. Their perception of function was excellent in 73%, fair in 3% and moderately well in 24%. Ninety-seven percent respondents never had surgery before and 3% had surgery done 2 to 8 years prior to the interview.

In the SF-36, the lowest health status reported was for physical and health role components. Maximum score was

found in all scales. Stronger limitations were found in the PCS compared to MCS score. Information on health status as measured by the SF-36 are shown in Table 2.

Tables 3 to 5 (illustrates in Fig. 2 to 4 respectively) present the frequency (and corresponding 95% CI) with which the study population had a problem in the ICF categories included in the Comprehensive ICF Core Set for DM.

Body functions related to physical health including exercise tolerance (b455), general physical endurance (b4550), aerobic capacity (b4551) and fatigability (b4552) were the highest and were comparable to PCS in SF 36 reported in the study. This was followed by sexual functions (b640), blood pressure functions (b420) and endocrine gland functions (b555), seeing functions (b210), weight maintenance functions (b530) and sensation related to the skin (b840).

Body functions that were related to mental health include emotional (b152), energy and drive (b130), energy level (b1300) and sleep functions (b134) and were comparable to MCS in SF 36.

Under body structures component, the structure of pancreas (s550) was the most affected followed by structure of the eyeball (s220) and kidney (s610).

In the ICF component activities and participation, sports (d9201) was the most affected followed by driving (d475), intimate relationships (d770), handling stress and other psychological demands (d240) and moving around (d455).

Discussion

Diabetes mellitus is a component of metabolic syndrome which is considered a paradigm of chronic non communicable diseases. Psychological, social, sexual and cultural factors have an intimate role in the course of

Table 2. Descriptive Statistics SF-36 (Scales and Summary Measures, n = 100)

SF-36	N	Min	Max	Mean	Std
Scales					
Physical Functioning	100	10	100	67.65	23.4 Skewed to R
Role Physical	100	0	100	66.0	38.9 Skewed to R
Bodily Pain	100	22	100	69.6	20.6
General Health	100	10	100	57.7	19.9
Vitality	100	5	100	58.4	16.32
Social Functioning	100	25	100	75.38	20.60
Role Emotional	100	0	100	74.0	38.37
Mental Health	100	32	100	73.96	16.01
Summary Measures					
	N	Min	Max	Mean	Std
Physical Component Summary Score (PCS)	100	23.63	61.63	43.22	8.74
Mental Component Summary Score (MCS)	100	28.61	71.39	50.12	8.80

Table 3. Percentage of Malaysian Population with DM presenting with International Classification of Functioning, Disability and Health (ICF) Categories of the Component ‘Body Functions’ which are Included in the Comprehensive ICF Core Set for DM at 95% CI.

ICF Code	ICF Category Title	% Patients (95% CI)
b110	Consciousness functions	1
b130	Energy and drive functions	12
b1300	Energy level	10
b1302	Appetite	1
b134	Sleep functions	10
b140	Attention function	9
b152	Emotional functions	17
b210	Seeing functions	14
b260	Proprioceptive functions	3
b265	Touch functions	6
b270	Sensory function related to temperature & other stimuli	5
b280	Sensation of pain	9
b410	Heart functions	3
b 415	Blood vessel functions	4
b420	Blood pressure functions	36
b430	Haematological system functions	1
b435	Immunological system functions	2
b455	Exercise tolerance function	32
b4550	General physical endurance	41
b4551	Aerobic capacity	63
b4552	Fatiguability	37
b515	Digestive functions	1
b530	Weight maintenance function	16
b540	General metabolic functions	3
b545	Water, mineral and electrolyte balance functions	0
b555	Endocrine gland functions	23
b610	Urinary excretory functions	3
b620	Urination functions	2
b630	Sensation associated with urinary functions	0
b640	Sexual functions	39
b660	Procreation functions	3
b710	Mobility of joints functions	9
b730	Muscle power functions	4
b810	Protective functions of the skin	1
b820	Repair functions of the skin	4
b840	Sensation related to the skin	13

Table 4. Percentage of Malaysian Population with DM presenting with International Classification of Functioning, Disability and Health (known more commonly as ICF) categories of the component ‘Body Structure’ which are included in the Comprehensive ICF Core Set for DM at 95% CI.

ICF Code	ICF Category Title	% Patients (95% CI)
S140	Structure of sympathetic nervous system	6
S150	Structure of parasympathetic nervous	0
S220	Structure of eyeball	33
S410	Structure of cardiovascular system	3
S4100	Heart	7
S4101	Arteries	5
S4102	Veins	2
S4103	Capillaries	1
S550	Structure of pancreas	83
S610	Kidney	22
S630	Structure of reproductive system	12
S750	Structure of lower extremity	6
S7502	Structure ankle and foot	5
S810	Structure of areas of skin	6
S830	Structure of nails	4

Table 5. Percentage of Malaysian Population with DM presenting with International Classification of Functioning, Disability and Health (ICF) categories of the component ‘Activities and Participation’ which are included in the Comprehensive ICF Core Set for DM at 95% CI.

ICF Code	ICF Category Title	% Patients (95% CI)
d240	Handling stress and other psychological demands	13
d440	Fine hand use	5
d450	Walking	5
d455	Moving around	11
d475	Driving	31
d520	Caring for body parts	1
d570	Looking after one’s health	7
d620	Acquisition of goods and services	3
d630	Preparing meals	3
d750	Informal social relationships	2
d760	Family relationships	2
d770	Intimate relationships	19
d845	Acquiring, keeping and terminating a job	2
d850	Remunerative employment	1
d920	Recreation and leisure	4
d9201	Sports	32
d9204	Hobbies	2
d9205	Socialising	3

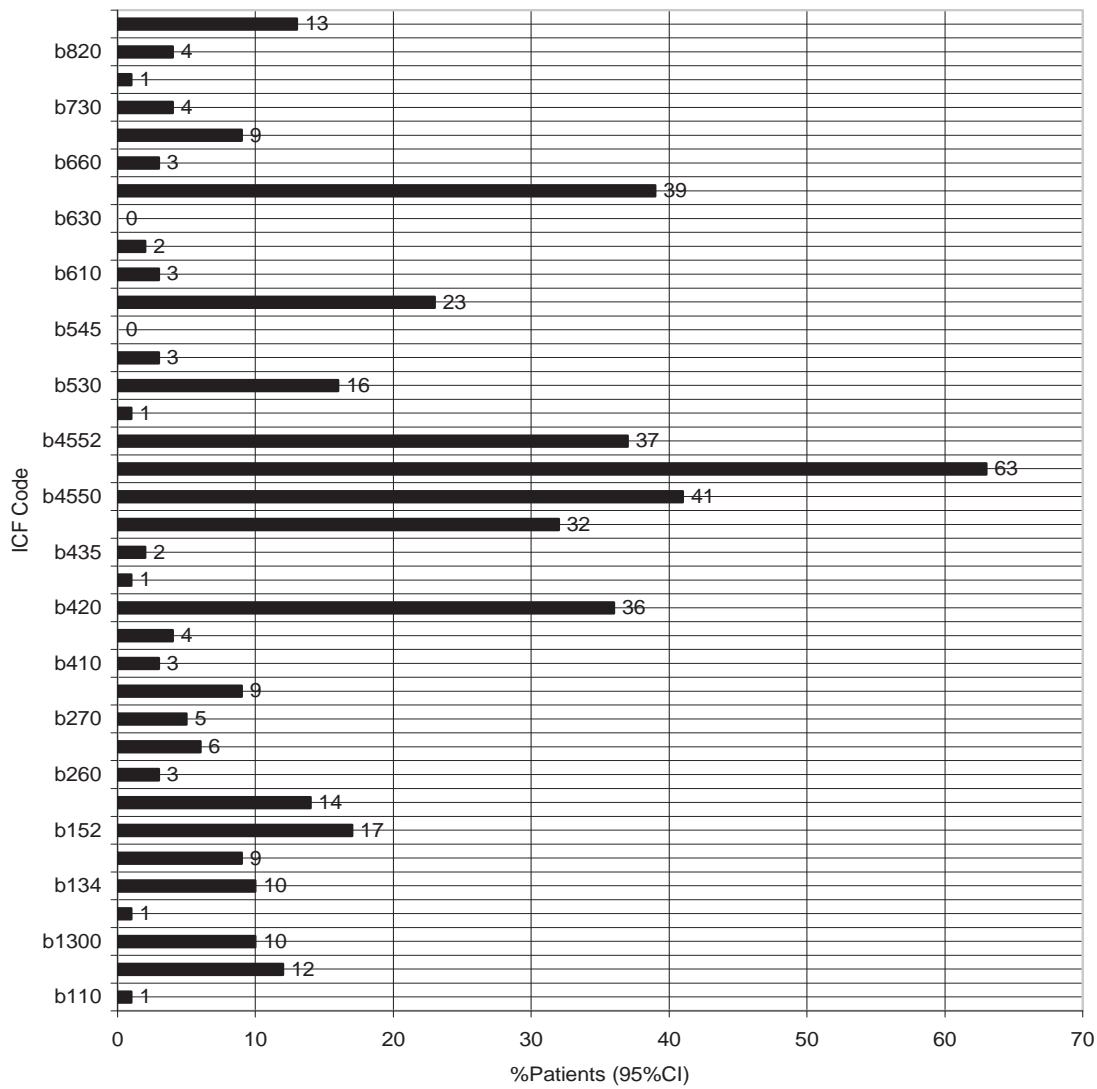


Fig. 2. The percentage of Malaysian Population with DM presenting with ICF categories of the component 'Body Functions' which are included in the Comprehensive ICF Core Set for DM at 95% CI.

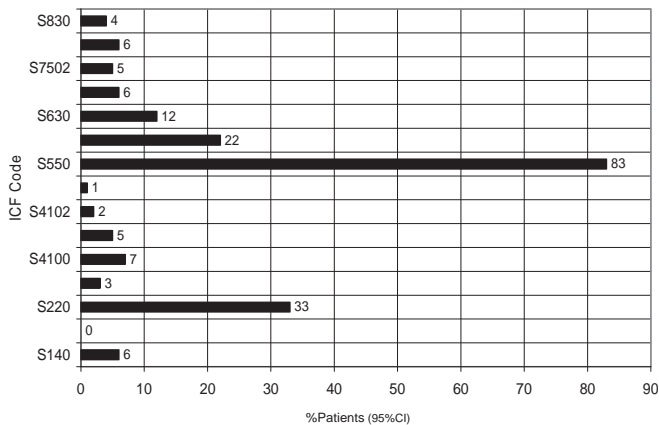


Fig. 3. The percentage of Malaysian Population with DM presenting with ICF categories of the component 'Body Structure' which are included in the Comprehensive ICF Core Set for DM at 95% CI.

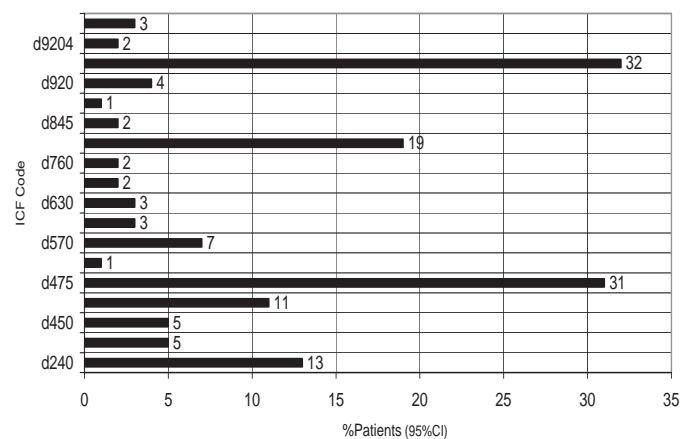


Fig. 4. The percentage of Malaysian Population with DM presenting with ICF categories of the component 'Activities and Participation' which are included in the Comprehensive ICF Core Set for DM at 95% CI.

managing a disease, and in some ways may have a role in the cause of the disease itself.

DM is a chronic condition which can result in disability and early death. Management of a person with DM requires a multidisciplinary approach consisting of doctors, allied health professionals including nurses, dietician, physiotherapist and diabetic educator as well as active participation of the patient and family. As DM is systemic disease, multiple body functions and structures may be affected.

Amongst the respondents who attended the primary

health care clinics headed by Family Medicine Specialists, 44% were on insulin therapy and 56% were on oral hypoglycaemic agents. In contrast, NHMS III 2006 showed only a small percentage (7.2%) of patients were on insulin.¹ The study also showed that 56% of the respondents suffered from concomitant diseases such as hypertension, stroke and ischaemic heart disease; 49% has hypertension. The study also showed that 28% of respondents reported to have 2 and more concomitant diseases.

Table 6 (illustrated in Fig. 5) showed only 7% (e355 and e450) of the categories were documented as being a problem or being a relevant environmental factor by more

Table 6. Percentage of Malaysian Population with DM presenting with International Classification of Functioning, Disability and Health (ICF) categories of the component 'Environmental Factors' which represents facilitator and/or barrier, which are included in the Comprehensive ICF Core Set for DM at 95% CI.

ICF Code	ICF Category Title	% Patients (95% CI) Facilitator	% Patients (95% CI) Barrier
e110	Products or substances for personal consumption	28	7
e115	Products and technology for personal use in daily living	8	0
e310	Immediate family	46	1
e315	Extended family	23	2
e320	Friends	28	2
e325	Acquaintances, peers, colleagues, neighbours and community members	17	2
e330	People in positions of authority	18	0
e340	Personal care provider and personnel assistant	2	0
e355	Health professionals	98	0
e360	Other professionals	4	1
e410	Individual attitudes of immediate family members	35	7
e415	Individual attitudes extended family members	16	4
e420	Individual attitudes of friends	21	4
e425	Individual attitudes of acquaintances, peers, colleagues, neighbours and community members	10	2
e430	Individual attitudes of people in positions of authority	5	3
e450	Individual attitudes of health professionals	94	0
e440	Individual attitudes of personal care providers and personal assistants	3	2
e455	Individual attitudes of other professionals	9	3
e465	Social norms, practices and ideologies	14	13
e510	Services, systems and policies for the production of consumer goods	6	1
e550	Legal services, systems and policies	4	0
e555	Association and organisational services, systems and policies	10	1
e560	Media services, systems and policies	47	4
e570	Social security services, systems and policies	9	1
e575	General social support services, systems and policies	3	1
e580	Health services, systems and policies	85	0
e585	Education and training services, systems and policies	10	0
e590	Labour and employment services, systems and policies	6	1
e595	Political services, systems and policies	11	0

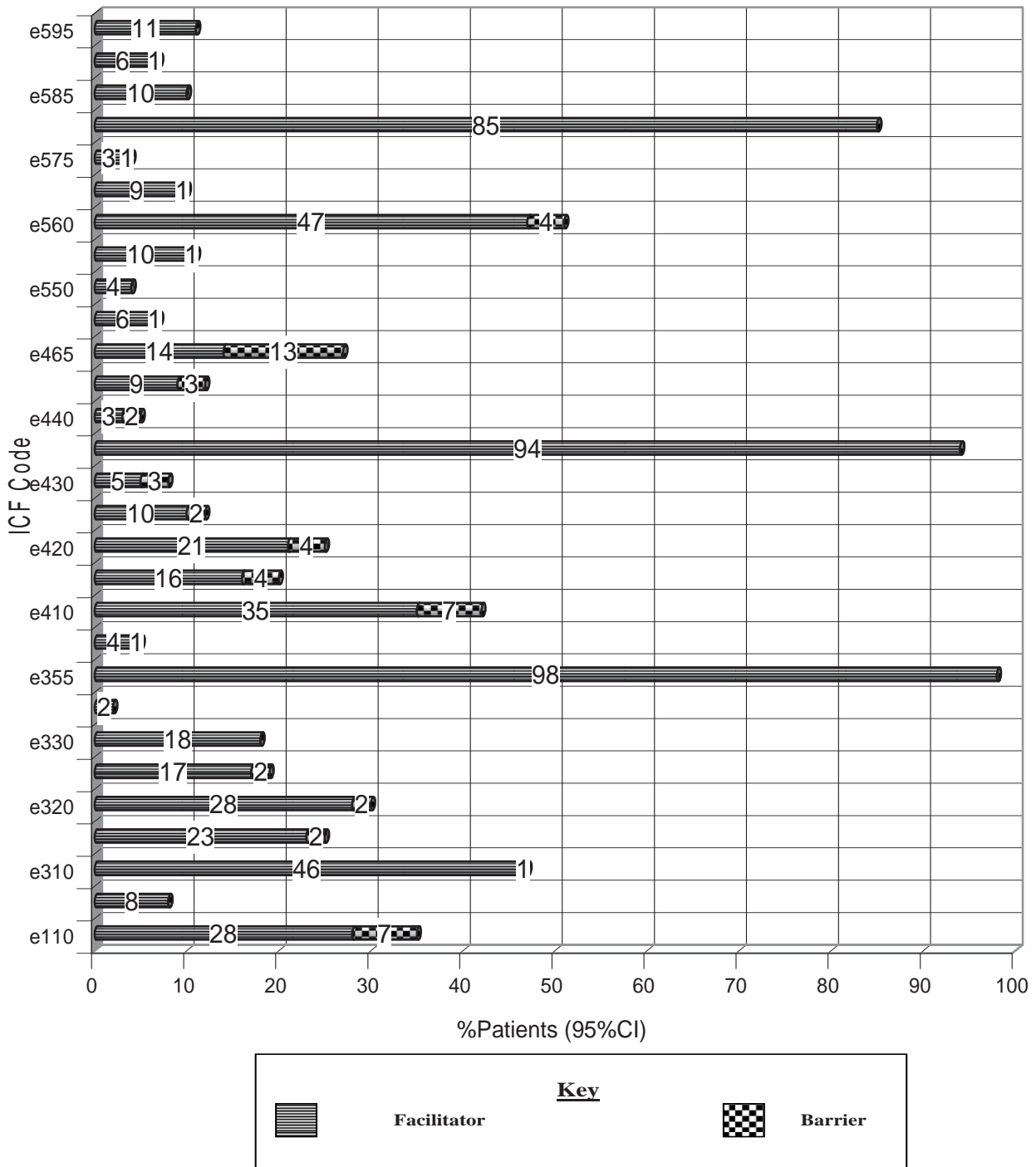


Fig 5. The percentage of Malaysian Population with DM presenting with ICF categories of the component 'Environmental Factors' which represents facilitator and /or barrier, which are included in the Comprehensive ICF Core Set for DM at 95% CI.

than 90% of the patients.

In Type 1 DM, the incidence of hypertension ranges from 5% at 10 years to 33% at 20 years and 70% at 40 years, and appears to be closely related to renal disease. In type 2 DM, hypertension is even more prevalent. Hypertension in a Diabetes Study Group reported 39% prevalence of hypertension among newly diagnosed patients and in approximately half of them the elevated blood pressure predated the onset of micro albuminuria and was strongly associated with obesity.^{15,16} The association between diabetes mellitus and hypertension has been described in 60% to 65% of diabetic patients, with implications for cardiovascular risk.^{17,18}

As DM is a metabolic disorder that affects organs as a whole, the focus of ICF Core Sets was on complex body functions, such as general metabolic functions, weight maintenance, energy and drive function, and water balance functions. Some selected functions are related to specific organs e.g. seeing functions, sensory functions, cardiovascular functions and urinary functions such as polyuria were also included.

This study shows that perceived problem in the body function category appears to be related to physical functioning which includes exercise tolerance function, general physical endurance, aerobic capacity and fatigability. As the average of duration of illness is longer than 5 years, limitation in physical functioning may be attributed by deconditioning due to chronic illness, comorbidities, and lack of awareness of which leading to a sedentary lifestyle. There are compelling evidence to show that physical exercise is a cornerstone of diabetes management along with diet and medication, hence the result of this study indicate the need to incorporate physical activity in diabetic care at primary care setting.¹⁹⁻²¹

Thirty-nine percent of respondents reported problems in sexual function. To date, there is a lack of data pertaining to this issue. The demographic data of which the frequency of duration of illness is 3 years, indicating early screening is required. Around 50% of diabetic men are impotent. In most diabetic men, erectile dysfunction (ED) develops during the course of the disease, but in a small proportion, it may be the presenting feature. It has been suggested that the likelihood of developing ED is related to the degree of glycaemic control.²²

This study showed that endocrine gland functions were also affected among the respondents. This can be directly related to Type 2 Diabetes which is a metabolic disorder affecting glucose and lipid turnover and it is caused by a combination of insulin resistance and pancreatic beta cell failure.

In the ICF component for activities and participation,

respondents appear to have participation restriction in sporting activities and driving. In terms of activity limitation, intimate relationship (d770), handling stress and other psychological demands (d240) and moving around (d455) appear to be frequent problems in these categories. Handling of stress and psychological demands were consistent with the findings of Mental Health Index (MHI) of SF 36.

Respondents regard health services system and policies, health professional (e355) and individual attitude as facilitators in the component of environment factors. Barriers in the environmental component were unremarkable.

Conclusion

In conclusion, the content validity of the Comprehensive ICF Core Set for the Malaysian population with DM were identified based on the results of this study.

The study also shows that physical and mental functioning were low in contrast to what the respondents perceived as leading healthy lifestyles. Surprisingly, 39% respondents reported in sexual function were not known before due to lack of data on the above matter and thus requiring an early screening at the primary care level. As for activities and participation, respondents appear to have participation restriction in sporting activities (68%) and driving (69%). In terms of activity limitation, intimate relationship (81%), handling stress and other psychological demands (87%) and moving around (89%) appear to be frequent problems in these categories.

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