Validation of the Modified Filipino Version of the American Diabetes Association Diabetes Risk Test and the St. Luke's Internal Medicine Diabetes Risk Test to Identify Population at Risk for Type 2 Diabetes Mellitus among Adults

Sweet Garllie Albert R. Tappan, M.D.*; Oliver Allan C. Dampil, M.D.**; Marie Sigourney S. Machacon, M.D.***; and Sachi E. Yumul, M.D.***

Abstract

Introduction: In 2017, the American Diabetes Association (ADA) have introduced and recommended a Diabetes Risk Test for immediate detection of diabetes mellitus. Given the growing number of diabetics worldwide and in our country, early diagnosis and control of diabetes is vital. This study aimed to validate the modified filipino version of the ADA Diabetes Risk Test and the SLIM (St. Luke's Internal Medicine) Diabetes Risk Test.

Methods: Phase I of this study involved questionnaire formulation, forward-back-forward translation, pilot testing and cognitive debriefing, and initial validation process (content validity, face validity, and test-retest reliability). There were 30 participants in the pilot testing, six experts for content validity, 40 patients in face validity, and 30 subjects for the test-retest reliability.

Results: The modified filipino version of the ADA Diabetes Risk Test and the SLIM Diabetes Risk Test formulated were considered relevant by majority of the subjects from the pilot testing and face validity and had content validity score from experts ranging from 80-100%. Items 1-4, and 8 of the questionnaires showed a kappa of one (*p*-value of <0.001) while the rest of the questions had kappa scores ranging from 0.60 to 0.86.

Conclusion: The St. Luke's Internal Medicine (SLIM) Diabetes Risk Test, a 12-item questionnaire, was developed from the modified Filipino version of the ADA Diabetes Risk test incorporating other risk factors for diabetes to cater for adult Filipino patients. Phase I of this study showed that this questionnaire has acceptable content validity with moderate to perfect test-retesting reliability. Phase II of this study testing the criterion validity to determine diagnostic accuracy is ongoing.

Keywords: risk, risk factors, type 2 diabetes mellitus, surveys and questionnaires, cross-sectional studies

Introduction

Diabetes and its complications are major causes of morbidity and mortality in the Philippines. It ranks fourth among the top causes of mortality in the country where it is responsible for about 51,127 deaths in 2015. Statistics showed that there was a total of 3.5 million cases of diabetes nationwide and around 1.8 million of these were undiagnosed.[1] In 2016, with more than four million of cases diagnosed with diabetes, the Philippines has ranked 15 in the world for diabetes prevalence and about 50% of these people are not aware of their condition.

Fasting blood glucose remains to be the recommended laboratory screening test of choice, however, a significant proportion of the population lack access to health care while other patients may not be aware of their risk for diabetes and need for screening test. Furthermore, universal screening may not be feasible and is not currently recommended. For these reasons, many remain unaware of their diagnosis. It has been estimated that 1.8 million Filipino with diabetes mellitus remain undiagnosed.[1] Different diabetes risk tests are currently being used in other countries but a Filipino version is yet to be developed.

According to the Unite for Diabetes Philippines[2], risk factors for type 2 diabetes mellitus (DM) include age more than 40 years old, body mass index (BMI) more than 23 kg/m^2, waist circumference of ≥80 cm (females) and ≥90 cm (males) or Waist-hip ratio (WHR) of ≥1 for males and ≥0.85 for females, first-degree relative with type 2 DM, history of impaired glucose tolerance (IGT) or impaired fasting glucose (IFG), history of gestational diabetes mellitus (GDM) or delivery of a baby weighing eight pounds or above, hypertension (BP ≥140/90 mmHg), diagnosis or history of any vascular diseases including stroke, peripheral arterial disease, or coronary artery disease, HDL cholesterol <35 mg/dL (<0.9 mmol/L) and/or triglycerides >250 mg/dL (>2.82

*Graduate Fellow, Section of Endocrinology, Diabetes, and Metabolism, St. Luke's Medical Center – Quezon City, Philippines
** Active Consultant, Section of Endocrinology, Diabetes, and Metabolism, St. Luke's Medical Center – Quezon City, Philippines
*** Resident, Department of Medicine, St. Luke's Medical Center – Quezon City, Philippines

Corresponding author: Sweet Garllie Albert R. Tappan, M.D., St. Luke's Medical Center – Quezon City, Philippines
Email: sgartmd@gmail.com

mmol/L), having polycystic ovarian syndrome (PCOS)[3], schizophrenia, tuberculosis[4-7], acanthosis nigricans, and being physically inactive. A wide variety of factors such as diet[8], sedentary lifestyle, physical inactivity, smoking and alcohol consumption are also of great importance to the development of type 2 DM reaching the odds ratio of 0.7.[9]

This study aimed to validate the modified Filipino version of the ADA Diabetes Risk Test and the SLIM (St. Luke's Internal Medicine) Diabetes Risk Test accommodating the Asia Pacific BMI cut off as well as incorporation of other risk factors such as waist circumference, presence of tuberculosis and PCOS, and diet for the Filipino population.

Methods

This is a cross-sectional analytic study involving adult individuals aged 18 and above residing in Brgy. Kalusugan, Quezon City, with informed consent prior to participation, who know how to read and write in Filipino. Ethical approval for this study was obtained from the Institutional Ethics Review Committee (IERC) of St. Luke's Medical Center, Quezon City. Patients who were previously diagnosed with any type other than gestational DM, are suspected to have anemia, known to have cancer, severe kidney or liver disease, who are pregnant or lactating, who are taking medications that alter blood sugar levels (oral antidiabetics, atypical antipsychotics, corticosteroids, and calcineurin inhibitors), with mental retardation or cognitive dysfunction, with history of acute illness requiring hospitalization for the past three months other than tuberculosis, or any febrile illness for the past two weeks other than tuberculosis were excluded.

Phase I: Questionnaire formulation

Part 1: Forward-back-forward translation

The first phase of this study involved questionnaire formulation wherein an independent forward translator generated a forward translation of the English version of the questionnaires. It was subsequently evaluated by an expert physician, an endocrinologist to assess if it captured the clinical state of the patients. The final forward translated questionnaires were back translated by another independent backward translator. The backward translated questionnaires were compared to the original version by an endocrinologist to again evaluate if it captured the medical state of the patients. The team consolidated and modified the final questionnaires to make it easier to understand for Filipino patients.

Part 2: Pilot testing and cognitive debriefing

The final version of the forward translated questionnaires were used for pilot testing, done in the same setting where the respondents of actual survey will be recruited. A total of 30 subjects from Brgy. Kalusugan were sampled, following the inclusion and exclusion criteria. The following questions were asked per item:

- Do you have difficulty answering each question?
  - If yes, how will you restate them?
- Are the responses difficult to understand?
  - If yes, how will you restate them?
- Are the questions relevant to your condition?
- Are the questions offensive/upsetting to you as a patient?
  - If yes, how will you restate them.

The questionnaires were examined for grammar, content, and cognitive issues and then were modified to create the final translated version.

Part 3. Validation process

a. Content validity

The risk test was graded by Content Validity Index (CVI), a Likert scale of 1 to 4 with: 1-not relevant, 2-somewhat relevant, 3-quite relevant, or 4-highly relevant. A CVI of at least 0.80 was considered accepted.

b. Face validity

This was a qualitative assessment wherein 40 respondents (30 subjects from Brgy. Kalusugan and 10 patients from SLMC QC OPD) were recruited to review each item of the Filipino questionnaire. The subjects were asked the following questions:

- Did you have any difficulty understanding this question?
- What does the question mean to you?
- Is the question relevant to you?

After all the comments and suggestions were reviewed from the face validity, the authors collaborated on the modification of the final questionnaire prior to proceeding with test-retesting reliability.

c. Test-retest reliability

The final questionnaire was administered to 30 patients fulfilling inclusion and exclusion criteria were conveniently sampled from Barangay Kalusugan. The questionnaires were collected then re-administered after three to seven days, a period where answers were not expected to change. Intraclass correlation coefficient between the test and retest scores were then computed.

Results

Phase I: Questionnaire formulation

Part 1: Forward-back-forward translation

Forward and backward translations of the questionnaires were done by hired translators from Department of Language, University of St. La Salle, Bacolod City. Each translation was also assessed by an expert physician, an endocrinologist to capture clinical state of patients and both translations were deemed true to the original version.

Table I. Baseline characteristics of subjects for pilot testing (n=30)

Gender	Age range (mean)	Civil status	Highest educational attainment	Occupation	Comorbids	Mean BMI	Smoking history
Female 23 (76.7%) Male 7 (23.3%)	21-87 (47.1)	Married 20 (66.7%) Single 8 (26.6%) Widow 2 (6.66%)	Elem. undergraduate 2 (6.66%) Elem. graduate 2 (6.66%) HS undergraduate 3 (10%) HS graduate 14 (46.66%) Vocational 1 (3.33%) College undergraduate 3 (10%) College graduate 4 (13.33%) No formal education 1 (3.33%)	Unemployed 6 (20%) Housewife 7 (23.3%) Retired 2 (6.66%) Employed 15 (50%)	Hypertension 10 (33.33%) Dyslipidemia 3 (10%) CVD 1 (3.33%) Bronchial asthma 1 (3.33%) No known comorbids 15 (50%)	25.4	Smoker 10 (33.33%) Previous smoker 3 (10%) Nonsmoker 17 (56.6%)

Part 2: Pilot testing and cognitive debriefing

Among the 30 subjects for pilot testing (Table I), 23 (76.7%) were females and seven (23.3%) were males. The mean age was 47.1 and majority were high school graduates (46.6%), married (66.7%), and employed (50%) but 10 (66.6%) out of the 15 employed have low income jobs. Hypertension (33.33%) was a common comorbid among the participants. Most of the participants (56.6%) were nonsmokers while 10 (33.33%) were current smokers and three (10%) were previous smokers. The mean BMI was 25.4. Length of time to finish questionnaire ranged from two minutes and 22 seconds to 15 minutes and 24 seconds, with a median of seven minutes and 22 seconds.

Part 2.1: Modified Filipino version ADA diabetes risk test (see Appendix A)

Pilot testing on 30 subjects identified recommendations to: (1) place instructions in bold at the start of the questionnaire, (2) emphasize charts by putting it in bold (eg. TSART #1) with adequate space followed by specific instructions to understand each chart, (3) change of age range "40 taong gulang pababa" to "39 taong gulang pababa" in question #1 so as not to overlap with the age range of "40-49 taong gulang", (4) clarify and specify statement regarding physical activity for question #6. 5 out of the 30 (16.66%) respondents verbalized having slight difficulty in question #7. One subject inquired if there isn't any other option for question #2 referring to gender preference apart from being a man/"lalaki" or woman/"babae". Overall, the 30 subjects considered all questions as relevant to their condition without being offensive or upsetting.

Part 2.2: SLIM diabetes risk test (see Appendix B)

Pilot testing on 30 subjects identified recommendations to: (1) make two charts for question #7 providing options to use either pounds or kilograms, whichever would the subject be more familiar with, (2) increase the size of the charts to be more visualized by the respondents, (3) use inches alone in referring to waist circumference instead of both centimeters and inches for question #12 to make it simpler. Most (25 out of 30, 83.33%) of the subjects found it easy to answer and understand the items and all the 30 participants thought that the questions were relevant and not offensive or upsetting.

Part 3. Validation process

a. Content validity

The diabetes risk tests were graded by CVI showing: 100% for Questions 1 and 3-5 with 80% CVI for Questions 2, 6, and 7 for the Modified Filipino version of the ADA Diabetes Risk test (Table II). In addition, for the SLIM Diabetes Risk Questions 8, and 10-12 also 100% while Question 9 garnered 80% (Table III). All questions were considered as acceptable. Comments and recommendations by the experts were also taken into consideration by the team in modifying the final questionnaire (Table IV).

b. Face validity

For face validity (Table V), 30 subjects were residents of Barangay Kalusugan and 10 were from the SLMC QC Outpatient Department. Thirty-one (77.5%) were females and nine (22.5%) were males. The age range was 21-77 years old with a mean age of 45.05. Out of the 30 subjects from Brgy. Kalusugan, 21 (70%) have five siblings or more in their household. Majority (19/40 or 47.5%) were highschool graduates, seven (17.5%) college graduates, 10% finished vocational courses, another 10% only graduated from elementary, three (7.5%) highschool undergraduates, two (5%) college undergraduates and one (2.5%) elementary undergraduate. More than half (55%) were employed and only 36% have middle income while 64% have low income jobs. Nine (22.5%) were housewives and another nine (22.5%) were reported to be unemployed.

For the qualitative assessment in both questionnaires (Table VI and Appendix C), 19 out of the 40 respondents (47.5%) had difficulty understanding question #7 while 6/20 (15%) had difficulty in question numbers 1, 10, and 12. Out of the 19 who had difficulty in question #7, 5 (26.3%) mentioned the need for assistance in answering the question, "Kailangan i-guide" o "Kailangan po ituro" while six out of 40 (15%) verbalized not knowing their height and weight or not knowing their weight in pounds hence difficulty answering question number 7 with verbatims as follows: "don't know height and weight", "I don't know lbs.", "Don't know lbs.", "Hindi ko nakita ang pounds. Easier if kilograms", "I don't know weight in lbs.". One subject also pointed out that if a person is not educated and does not know the less than or equal and greater than or equal sign, he/she may not be able to answer question #7. For question #1, three

Table II. Modified Filipino version of the ADA diabetes risk test content validity among experts (n=6)

Items	Item relevance rating				CVI	Decision
	Not relevant	Somewhat relevant	Quite relevant	Highly relevant		
	Frequency (%)					
Q1	0	0	0	6 (100.0)	1.0	Accepted
Q2	0	1 (16.7)	0	5 (83.3)	0.8	Accepted
Q3	0	0	0	6 (100.0)	1.0	Accepted
Q4	0	0	0	6 (100.0)	1.0	Accepted
Q5	0	0	0	6 (100.0)	1.0	Accepted
Q6	0	1 (16.7)	0	5 (83.3)	.8	Accepted
Q7	0	1 (16.7)	0	5 (83.3)	.8	Accepted

Table III. SLIM diabetes risk test content validity among experts (n=6)

Items	Item relevance rating				CVI	Decision
	Not relevant	Somewhat relevant	Quite relevant	Highly relevant		
	Frequency (%)					
Q1	0	0	0	6 (100.0)	1.0	Accepted
Q2	0	1 (16.7)	0	5 (83.3)	0.8	Accepted
Q3	0	0	0	6 (100.0)	1.0	Accepted
Q4	0	0	0	6 (100.0)	1.0	Accepted
Q5	0	0	0	6 (100.0)	1.0	Accepted
Q6	0	1 (16.7)	0	5 (83.3)	.8	Accepted
Q7	0	1 (16.7)	0	5 (83.3)	.8	Accepted
Q8	0	0	0	6 (100.0)	1.0	Accepted
Q9	0	1 (16.7)	2 (33.3)	3 (50.0)	.8	Accepted
Q10	0	0	2 (33.3)	4 (66.7)	1.0	Accepted
Q11	0	0	5 (83.1)	1 (16.7)	1.0	Accepted
Q12	0	0	1 (16.7)	5 (83.3)	1.0	Accepted

Table IV. Comments by experts (n=6)

	Comments
Q1	"Age gap criteria <40 0; 40-49 1"
Q2	"Redundant because there is already assign point base on sex in the box; may be better to just state: Ikaw ba ay babae o lalaki?"
Q3	"Suggest to remove "kung""
Q4	None
Q5	"Should you specify BP based on latest guidelines eg. JNC (BP 130/80 or 140/90)?"
Q6	1. "Identify the kind of job and respondent will check - 1. employer, 2. skills, etc." 2. "hard to quantify 'madalas'" 3. "standardization of physical activity (as recommended by guidelines)"
Q7	1. "Can this be done easier? Re: investigator to compute." 2. "chart maybe confusing since it combined both S.I. units and American units"
Q8	"Stroke is sometimes confused with heart attack rather than CVA"
Q9	"Is TB an established risk factor of diabetes?"
Q10	"May be skewed, what if patient doesn't know what PCOS is?"
Q11	1. "What is the socioeconomic status of target audience?" 2. "Should you quantify amount of fruits or vegetables based on guidelines?"

(7.5%) verbalized having difficulty regarding the chart or point system, "Nahirapan sa puntos", "Sa chart medyo nalito" while for question #10, all those who had difficulty is because they do not know what PCOS is or what it means. Regarding question number 12, one subject mentioned "nalito" while another said "Mahalaga po kaya lang di ko masyado naintindihan. Para sa akin lang, mahirap intindihin" and four (10%) said that they needed guidance or more explanation to fully understand the question and interpret the choices in the chart provided. Overall, 12 out of the 40 subjects (30%) considered the questionnaire as "madaling intindihin" and that there was no longer any need to edit or change anything. All subjects (100%) considered questions 1, 3-9, 11 and 12 as relevant to them while 39 out of the 40 (97.5%) considered questions 2 and 10 as important.

c. Test-retest reliability

The 30 patients included in the test-retesting reliability were all residents of Barangay Kalusugan. Twenty-four (60%) were females and six (15%) were males with an age range of 21 to 87 years of age and a mean age of 48.5. Twenty-one (70%) of the subjects have more than five siblings in their household. Most of the patients (46.66%) were highschool graduates, five (16.66%) college graduates, three (10%) elementary

Table V. Baseline characteristics of subjects for face validity (n=40) and test-retesting reliability (n=30)

Gender	Age range (mean)	Highest educational attainment	Occupation	Comorbids
Face validity (n=40)				
Female 31 (77.5%) Male 9 (22.5%)	21-77 (45.05)	Elem. undergraduate 1 (2.5%) Elem. graduate 4 (10%) HS undergraduate 3 (7.5%) HS graduate 19 (47.5%) Vocational 4 (10%) College undergraduate 2 (5%) College graduate 7 (17.5%)	Employed 22 (55%) • Middle income jobs 8 (36%) • Low income jobs 14 (64%) Housewife 9 (22.5%) Unemployed 9 (22.5%)	Hypertension 14 (35%) Dyslipidemia 4 (10%) No known other comorbids 22 (55%)
Test-retesting (n=30)				
Female 24 (60%) Male 6 (15%)	21-87 (48.5)	Elem. undergraduate 1 (3.33%) Elem. graduate 3 (10%) HS undergraduate 3 (10%) HS graduate 14 (46.66%) Vocational 2 (6.66%) College undergraduate 1 (3.33%) College graduate 5 (16.66%) No formal education 1 (3.33%)	Employed 14 (46.66%) Housewife 8 (26.6%) Retired 2 (6.66%) Unemployed 6 (20%)	Hypertension 14 (46.66%) Dyslipidemia 3 (10%) CVD 1 (3.33%) No known other comorbids 12 (40%)

Table VI. Face validity of the questionnaire by (n=40)

	Question is important	Difficulty in understanding
	Frequency (%)	
Q1	40 (100)	6 (15)
Q2	39 (97.5)	2 (5)
Q3	40 (100)	3 (7.5)
Q4	40 (100)	0
Q5	40 (100)	1 (2.5)
Q6	40 (100)	1 (2.5)
Q7	40 (100)	19 (47.50)
Q8	40 (100)	0
Q9	40 (100)	0
Q10	39 (97.50)	6 (15)
Q11	40 (100)	0
Q12	40 (100)	6 (15)

Table VII. Modified Filipino version of ADA diabetes risk test-retest reliability (n=30)

Question	Agreement (%)	Kappa	Interpretation	*p*-value
Q1	100	1.00	Perfect	<0.001
Q2	100	1.00	Perfect	<0.001
Q3	100	1.00	Perfect	<0.001
Q4	100	1.00	Perfect	<0.001
Q5	93.33	0.86	Almost perfect	<0.001
Q6	86.67	0.7	Substantial	<0.001
Q7	83.33	0.75	Substantial	<0.001

Kappa interpretation: <0.2: poor (0.2 – 0.4]: fair, (0.4 – 0.6]: moderate, (0.6 – 0.8]: substantial, (0.8 – 1): Almost perfect, 1: Perfect

graduates, three (10%) highschool undergraduates, two (6.66%) finished vocational courses, one elementary undergraduate, one college undergraduate, and one without formal education but knows how to read and write in Tagalog/Filipino. Six (20%) out of the 30 participants were unemployed, eight (26.6%) were housewives/keeper, two retirees (6.66%; a seaman and a driver), and 14 (46.66%) employed with mostly low income range (Table V).

The agreement between the test and retest results was calculated using kappa. The test-retesting reliability as

Table VIII. SLIM diabetes risk test-retest reliability (n=30)

Question	Agreement (%)	Kappa	Interpretation	*p*-value
Q1	100	1.00	Perfect	<0.001
Q2	100	1.00	Perfect	<0.001
Q3	100	1.00	Perfect	<0.001
Q4	100	1.00	Perfect	<0.001
Q5	93.33	0.86	Almost Perfect	<0.001
Q6	86.67	0.7	Substantial	<0.001
Q7	83.33	0.75	Substantial	<0.001
Q8	100	1.00	Perfect	<0.001
Q9	96.67	0.65	Substantial	<0.001
Q10	96.67	0.65	Substantial	<0.001
Q11	93.33	0.83	Almost Perfect	<0.001
Q12	80	0.6	Moderate	<0.001

Kappa interpretation: <0.2: poor (0.2 – 0.4]: fair, (0.4 – 0.6]: moderate, (0.6 – 0.8]: substantial, (0.8 – 1): Almost Perfect, 1: Perfect

shown in Tables VII and VIII are as follows: 100% agreement and Kappa 1 for questions 1-4 (*p*-value <0.001), 93.33% agreement for question 5 (Kappa 0.86), 86.67% agreement for question 6 (Kappa 0.70), and 83.33% agreement for question 7 (Kappa 0.75) for both questionnaires. With the SLIM Diabetes Risk Test, 100% agreement was also noted for question 8 with a *p*-value of <0.001, 96.67% agreement for questions 9 and 10 (Kappa 0.65), 93.33% agreement for question 11 (Kappa 0.83), and 80% agreement for question 12 (Kappa 0.60).

Discussion

Diabetes control must be early, effective and sustained to prevent chronic complications and avoid the deleterious effects of metabolic memory. Early intervention with lifestyle modifications or pharmacotherapy has been shown to effectively delay or prevent type 2 DM in adults. In order to properly manage diabetes, early diagnosis is essential. Several screening tools to detect undiagnosed diabetes have been developed to facilitate early detection and prompt intervention.

In the 2017 ADA Standard on the Diabetes Care[10], a Diabetes Risk test (see Appendix D) was introduced and recommended to promote early diagnosis. It is a validated, self-administered, user-friendly questionnaire designed to reach a large number of population with ease even in the rural areas. The use of such assessment tool is recommended to identify individuals at high risk to develop diabetes and would warrant laboratory testing. This diabetes risk test incorporates several risk factors for development of type 2 DM and has already been validated but only in the Western population. Studies have shown differences in risk factors between Western and Asian population. Asians were noted to have greater risk at a lower BMI.[11] Furthermore, studies argue that waist circumference is a better predictor of diabetes risk compared with BMI.[12] The ADA Diabetes Risk test cut-point defined approximately 35% of the adult population as high risk for undiagnosed diabetes and yielded a sensitivity of 79%, specificity of 67%, PPV of 10%, and NPV of 99%, with an AUC of 0.83 in the validation NHANES data set. On the other hand, the Finnish Diabetes Risk Score (FINDRISC) was developed to assess whether an individual has type 2 DM or dysglycemia or the probability of developing type 2 DM during the following 10 years among individuals between 45–74 years in two districts in the north of metropolitan Madrid, Spain. Eight variables were included in the FINDRISC: BMI, waist circumference, family history of diabetes, use of blood pressure medication, history of elevated blood glucose, daily physical activity, and daily consumption of vegetables, fruit, and berries. The study used four different gold standards, as follows: fasting plasma glucose (FPG), oral glucose tolerance test (OGTT), HbA1c, and OGTT or HbA1c, where dysglycemia and type 2 DM were defined according to ADA criteria. The FINDRISC ROC- AUC for type 2 DM was 0.72 (95% CI, 0.69–0.74) and score ≥12 for detecting any dysglycaemia offered the best cut-off point when HbA1c alone or OGTT and HbA1c were the criteria used.[13] In the study by Bang et al.[9], they identified that age, sex, family history of diabetes, personal history of hypertension, obesity, and physical activity were statistically significant predictors of undiagnosed diabetes. Hence, the risk factors mentioned were also considered and included in the development of the questionaires in this study.

A 12-item questionnaire, also known as the SLIM Diabetes Risk Test, was formulated from the seven-item modified Filipino version of the ADA Diabetes Risk test incorporating additional risk factors to be applicable for adult Filipino patients by forward-backward translation, pilot testing with respondents from the barangay, and consultations with relevant experts grading each item question with acceptable content validity scores.

The subjects of the Phase I of this study are slightly younger compared to subjects in a few studies done using the Finnish Diabetes Risk score[13,14] but is comparable to subjects of other diabetes risk score studies in terms of age, gender, and BMI.[15-18]

With regards to test-retesting reliability of the SLIM Diabetes Risk Test, overall the questionnaires received moderate to perfect kappa scores. The lower Kappa for questions 6-7, 9-10, and 12 may be attributed to the possibility that the participants initially did not understand the question the first time around then understood it three to seven days after retesting hence the slight variation in their respective answers.

We have yet to determine the diagnostic accuracy of the SLIM Diabetes Risk Test to be compared with that of the ADA Diabetes Risk test and FINDRISC since the criterion validity of this study is still in process.

One limitation seen in this study is regarding the choices in question 2 of both risk tests as man/"lalaki" or woman/"babae" without any option for other sex as raised by one participant. However, the authors opted to maintain it as such with the intention that the said item is primarily referring to a subject's biological sex at birth and not his/her gender preference at present time. Another limitation identified is the educational attainment of patients subjected to both questionnaires. Even if most of the participants were highschool graduates and know how to read and write, some of them still verbalized difficulty answering and understanding particularly the questions involving charts (eg. question numbers 1, 7, and 12) and that they needed assistance or further explanation in completing the items mentioned. As pointed out by one subject, a person with a lower educational level may know how to read and write and may also know his/her height and weight but may not fully understand the signs less than or greater than equal to (> or <) which could probably affect his/her ability to answer item #7 of the modified Filipino version of the ADA Diabetes Risk test, hence, the authors revised the charts into a range format for the final SLIM Diabetes Risk test as seen in Appendix B. Apart from their level of comprehension, this difficulty may be attributed to the fact that many Filipino patients are afraid to commit mistakes hence they prefer being taught or guided accordingly instead of answering the questionnaires on their own.

In the Philippines, there is a limited resource in the primary care setting. While traditional diabetes screening methods, including the fasting plasma glucose (FPG), the two-hour oral glucose tolerance test (OGTT) are available in most public hospitals in the country, a significant proportion of the population still lack access to health care. Moreover, other patients may not be aware of their risk for diabetes and need for screening test and that universal screening may not be feasible and is not currently recommended. Consequently, many persons with diabetes mellitus remain undiagnosed.

Hence, the development of a Filipino version of the diabetes risk test aims to reach a large number of

individuals including those in the rural areas which may be understandable and easily answered by laypersons so they can personally assess their own risk for undiagnosed diabetes.

Conclusion

The St. Luke's Internal Medicine (SLIM) Diabetes Risk Test, a 12-item questionnaire, was developed from the modified Filipino version of the ADA Diabetes Risk test incorporating other risk factors for diabetes to cater for adult Filipino patients. Phase I of this study showed that this questionnaire has acceptable content validity with moderate to perfect test-retesting reliability. Phase II of this study testing the criterion validity to determine diagnostic accuracy is ongoing.

References

1. **International Diabetes Federation.** IDF Diabetes Atlas, 7th edition. Brussels, Belgium, 2015.
2. **Unite for Diabetes Philippines.** Philippine Practice Guidelines on the Diagnosis & Management of Diabetes. Compendium of Philippine Medicine 16th Edition. 2013.
3. **Kasper DL, Fauci AS, Hauser SL, Longo D, Jameson JL, Loscalzo J.** Harrison's Principles of Internal Medicine. New York: McGraw-Hill Education, 2015, 19th edition.
4. **Dooley, KE and Chaisson, RE.** Tuberculosis and diabetes mellitus: convergence of two Epidemics. Lancet Infect Dis. December 2009; 9(12):737-746. [PubMed: 19926034]
5. **Pickup, JC.** Inflammation and Activated Innate Immunity in the Pathogenesis of Type 2 Diabetes. Diabetes Care. March 2004; 27(3):813-23.
6. **Workneh MH, Bjune GA, Yimer SA.** Prevalence and associated factors of tuberculosis and diabetes mellitus comorbidity: A systematic review. PLoS ONE. 2017; 12(4): e0175925. [PubMed: 28430796]
7. **Alisjahbana B, van Crevel R, Sahiratmadja E, den Heijer M, Maya A, Istriana E, Danusantoso H, Ottenhoff TH, Nelwan RH, van der Meer JW.** Diabetes mellitus is strongly associated with tuberculoses in Indonesia. International Journal of Tuberculosis and Lung Disease. June 2006; 10(6):696-700. [PubMed: 16776459]
8. **Lv J, Yu C, Guo Y, Bian Z, Yang L, Chen Y, Hu X, Hou W, Chen J, Chen Z, Qi L, Li L, C**hina Kadoorie Biobank Collaborative Group. Adherence to a Healthy Lifestyle and the Risk of Type 2 Diabetes in Chinese Adults: A Prospective, Longitudinal Cohort Study. The Lancet Diabetes & Endocrinology. Nov. 2016; 4(S28). [PubMed: 28582543]
9. **Bang H, Edwards AM, Stat M, Bomback AS, Ballantyne CM, Brillon D, Callahan MA, Teutsch SM, Mushlin AI, Kern LM.** Development and Validation of a Patient Self-Assessment Score for Diabetes Risk. Ann Intern Med. Dec. 1, 2009; 151(11): 775-783.
10. **American Diabetes Association.** Diabetes Care. Jan. 2017; 40 (Supplement 1): S11-S24. https://doi.org/10.2337/dc17-S005.
11. **WHO expert consultation. 2004.** Appropriate body-mass index for Asian populations and its implications for policy and intervention strategies. The Lancet. 2004; 363(9403):157-163.
12. **Mamtani M, Kulkarni H, Dyer TD, Almasy L, Mahaney MC, Duggirala R, Comuzzie AG, Blangero J, Curran JE.** Correction: Waist Circumference Independently Associates with the Risk of Insulin Resistance and Type 2 Diabetes in Mexican American Families. PLoS ONE. Nov. 1, 2013; 8(11). [PubMed: 23536864]
13. **Salinero-Fort MA, Burgos-Lunar C, Lahoz C, Mostaza JM, Abanades-Herranz JC, Laguna-Cuesta F, Estirado-de Cabo E, Garcia-Iglesias F, Gonzalez-Alegre T, Fernandez-Punero B, Montesano-Sanchez L, Vicent-Lopez D, Cornejo-del Rio V, Fernandez-Garcia PJ, Sanchez-Arroyo V, Sabin-Rodriguez C, Lopez-Lopez S, Patron-Barandio P, Gomez-Campelo P, and SPREDIA-2 Group.** Performance of the Finnish Diabetes Risk Score and a Simplified Finnish Diabetes Risk Score in a Community-Based, Cross- Sectional Programme for Screening of Undiagnosed Type 2 Diabetes Mellitus and Dysglycaemia in Madrid, Spain: The SPREDIA-2 Study. PLoS ONE. 2016; 11(7): e0158489. [PubMed: 27441722]
14. **Omech B, Mwita JC, Tshikuka JG, Tsima B, Nkomazna O, and Amone-P'Olak K.** Validity of the Finnish Diabetes Risk Score for Detecting Undiagnosed Type 2 Diabetes among General Medical Outpatients in Botswana. Hindawi Publishing Corporation. Journal of Diabetes Research. Volume 2016: 1-7; Article ID 4968350. [http://dx.doi.org/10.1155/2016/4968350]
15. **Dugee O, Janchiv O, Jousilahti P, Sakhiya A, Palam E, Nuorti JP, Peltonen M. A**dapting existing diabetes risk scores for an Asian population: a risk score for detecting undiagnosed diabetes in the Mongolian population. BMC Public Health. 2015; 15:938.
16. **Li HY, Chang YC, Wei JN, Chuang LM.** Validation of diabetes risk scores for predicting diabetes diagnosed by oral glucose tolerance test. Diabetes Care. 2010 Feb; 33(2):e26. [PMID: 20103552]
17. **Glümer C, Carstensen B, Sandbæk A, Lauritzen T, Jørgensen T, Borch-Johnsen K.** A Danish Diabetes Risk Score for Targeted Screening. Diabetes Care. 2004 Mar; 27(3): 727-733.
18. **Ku GM, Kegels G.** The performance of the Finnish Diabetes Risk Score, a modified Finnish Diabetes Risk Score and a simplified Finnish Diabetes Risk Score in community-based cross-sectional screening of undiagnosed type 2 diabetes in the Philippines. Prim Care Diabetes 2013; 7(4):249-59. [PMID: 23953706]

Appendices

Appendix A. The Modified Filipino Version of the ADA Diabetes Risk Test

Modified Filipino Version of ADA Diabetes Risk Test

Direksyon. Isulat ang kaukulang puntos ng iyong sagot sa kahon sa kanan.

1. Sumangguni sa **TSART #1** sa ibaba.
   Ayon sa edad mo ngayon, ilagay ang kaukulang puntos sa kahon sa kanan. ----------

TSART #1

Edad	Puntos
39 taong gulang pababa	0
40-49 taong gulang	1
50-59 taong gulang	2
60 taong gulang pataas	3

2. Kung ikaw ay lalaki, maglagay ng isang (1) puntos sa kahon sa kanan.----------
   Lalaki (1 puntos) Babae (0 puntos)

3. Kung ikaw ay dating nagbuntis na at napagalamang may *gestational diabetes* o diabetes ng pagbubuntis, maglagay ng isang (1) puntos sa kahon sa kanan----------
   Oo (1 puntos) Hindi (0 puntos) Hindi ko alam(0 puntos)

4. Kung ikaw ay may kapamilya – ina, ama, kapatid,o anak na may *diabetes*, maglagay ng isang (1) puntos sa kahon sa kanan----------
   Oo (1 puntos) Wala (0 puntos) Hindi ko alam(0 puntos)

5. Kung ikaw ay may mataas na *blood pressure* o umiinom ng gamot para sa *high blood*, maglagay ng isang (1) puntos sa isang puntos sa kahon sa kanan----------
   Oo (1 puntos) Hindi (0 puntos) Hindi ko alam (0 puntos)

6. Kung ang trabaho mo ay nangangailangan ng madalas na pagtayo, paglalakad o pagbubuhat o kung ikaw ay may regular na ehersisyo na hindi bababa sa 30 minuto kada araw, maglagay ng isang (1) puntos sa kahon sa kanan. ----------
   Oo (0 puntos) Hindi (1 puntos)

7. Sumangguni sa **TSART #2** sa ibaba.
   Saang kategorya nabibilang ang iyong timbang?

TSART #2 Direksyon. Sa unang hilera (column), hanapin ang iyong taas (height) sa centimetro or feet. Sa kaparehong hanay, hanapin ang iyong timbang, pounds (lbs) or sa kilogram (kg) at hanapin ang kaukulang puntos sa itaas ng tsart at isulat sa kahon sa ibaba. Kung ang iyong timbang ay mas mababa kaysa sa nakasaad na bilang sa hanay sa kaliwa, isulat ang 0 puntos sa kahon sa ibaba.

Ilagay ang kaukulang puntos sa kahon sa kanan ----------

		1 punto				2 puntos				3 puntos	
Taas (Height)		Timbang (Weight)									
Cm	Feet	Lbs		Kg		Lbs		Kg		Lbs	Kg
142	4'8"	>102	<110	>46	<50	>111	<133	>51	<60	>134	>61
145	4'9"	>106	<114	>48	<52	>115	<137	>53	<62	>138	>63
147	4'10"	>110	<118	>50	<54	>119	<142	>55	<65	>143	>66
150	4'11	>114	<123	>51	<55	>124	<147	>56	<67	>148	>68
154	5'0"	>120	<130	>55	<59	>131	<156	>60	<70	>157	>71
155	5'1"	>121	<131	>56	<59	>132	<157	>60	<72	>158	>72
157	5'2"	>125	<135	>57	<61	>136	<163	>62	<74	>164	>74
160	5'3"	>130	<140	>59	<63	>141	<168	>64	<76	>169	>77
163	5'4"	>134	<144	>61	<65	>145	<174	>66	<78	>175	>79
165	5'5"	>138	<149	>62	<67	>150	<179	>68	<81	>180	>82
168	5'6"	>142	<154	>65	<69	>155	<185	>70	<83	>186	>84
170	5'7"	>147	<158	>66	<72	>159	<190	>73	<86	>191	>87
173	5'8"	>151	<163	>68	<74	>164	<196	>75	<89	>197	>90
175	5'9"	>155	<168	>70	<76	>169	<202	>77	<91	203	>92
178	5'10"	>160	<173	>72	<78	>174	<208	>79	<94	>209	>95
180	5'11"	>165	<178	>74	<80	>179	<214	>81	<97	>215	>98
183	6'0"	>169	<183	>77	<83	>184	<220	>84	<100	>221	>101
185	6'1"	>174	<188	>79	<85	>189	<226	>86	<102	>227	>103
188	6'2"	>179	<193	>81	<87	>194	<232	>88	<105	>233	>106
190	6'3"	>184	<199	>83	<90	>200	<238	>91	<108	>239	>109
193	6'4"	>189	<204	>85	<92	>205	<245	>93	<111	>246	>111
BMI		>23	24.9	>23	24.9	>25	29.9	>25	29.9	>30	>30

Appendix B. The St. Luke's Internal Medicine (SLIM) Diabetes Risk Test

Direksyon. Isulat ang kaukulang puntos ng iyong sagot sa kahon sa kanan.

1. Sumangguni sa **TSART #1** sa ibaba.
   Ayon sa edad mo ngayon, ilagay ang kaukulang puntos sa kahon sa kanan. ----------

TSART #1

Edad	Puntos
39 taong gulang pababa	0
40-49 taong gulang	1
50-59 taong gulang	2
60 taong gulang pataas	3

2. Ikaw ba ay lalaki o babae? Ilagay ang kaukulang puntos sa kahon sa kanan.----------
   Lalaki (1 puntos) Babae (0 puntos)

3. Ikaw ba ay dating nagbuntis na at napag-alamang may *Gestational Diabetes* o diabetes ng pagbubuntis?
   Ilagay ang kaukulang puntos sa kahon sa kanan.----------
   Oo (1 puntos) Hindi (0 puntos) Hindi ko alam (0 puntos)

4. Ikaw ba ay may kapamilya – ina, ama, kapatid,o anak na may *Diabetes*?
   Ilagay ang kaukulang puntos sa kahon sa kanan.----------
   Oo (1 puntos) Wala (0 puntos) Hindi ko alam (0 puntos)

5. Ikaw ba ay may mataas na BP (*blood pressure)* o umiinom ng gamot para sa *high blood*?
   Ilagay ang kaukulang puntos sa kahon sa kanan.----------
   Oo (1 puntos) Hindi (0 puntos) Hindi ko alam (0 puntos)

6. Ang trabaho mo ba ay nangangailangan ng madalas na pagtayo, paglalakad, o pagbubuhat o ikaw ba ay may regular na ehersisyo na hindi bababa sa 30 minuto kada araw?
   Ilagay ang kaukulang puntos sa kahon sa kanan. ----------
   Oo (0 puntos) Hindi (1 puntos)

7. Saang kategorya nabibilang ang iyong timbang?
   Kung alam mo ang timbang mo sa Pounds (Lbs), sumangguni sa **TSART #2** sa ibaba.
   Kung alam mo ang timbang mo sa Kilograms (Kg), sumangguni sa **TSART #3** sa ibaba.

TSART #2 Direksyon. Sa unang hilera (column), hanapin ang iyong taas (height) sa feet. Sa kaparehong hanay ng iyong taas (height), hanapin ang iyong timbang sa pounds (Lbs) at hanapin ang kaukulang puntos sa ibaba ng tsart at isulat sa kahon sa ibaba.

Taas (Height)	Timbang (Weight)		
Feet	Pounds (Lbs)		
4'8"	102 – 110	111 – 133	134+
4'9"	106 – 114	115 – 137	138+
4'10"	110 – 118	119 – 142	143+
4'11	114 – 123	124 – 147	148+
5'0"	120 – 130	131 – 156	157+
5'1"	121 – 131	132 – 157	158+
5'2"	125 – 135	136 – 163	164+
5'3"	130 – 140	141 – 168	169+
5'4"	134 – 144	145 – 174	175+
5'5"	138 – 149	150 – 179	180+
5'6"	142 – 154	155 – 185	186+
5'7"	147 – 158	159 – 190	191+
5'8"	151 – 163	164 – 196	197+
5'9"	155 – 168	169 – 202	203+
5'10"	160 – 173	174 – 208	209+
5'11"	165 – 178	179 – 214	215+
6'0"	169 – 183	184 – 220	221+
6'1"	174 – 188	189 – 226	227+
6'2"	179 – 193	194 – 232	233+
6'3"	184 – 199	200 – 238	239+
6'4"	189 – 204	205 – 245	246+
Puntos	1 punto	2 puntos	3 puntos

TSART #3 Direksyon. Sa unang hilera (column), hanapin ang iyong taas (height) sa feet. Sa kaparehong hanay ng iyong taas (height), hanapin ang iyong timbang sa kilograms (Kg) at hanapin ang kaukulang puntos sa ibaba ng tsart at isulat sa kahon sa ibaba.

Taas (Height)	Timbang (Weight)		
Feet	Kilogram (Kg)		
4'8"	46 – 50	51 – 60	61+
4'9"	48 – 52	53 – 62	63+
4'10"	50 – 54	55 – 65	66+
4'11	51 – 55	56 – 67	68+
5'0"	55 – 59	60 – 70	71+
5'1"	56 – 59	60 – 71	72+
5'2"	57 – 61	62 – 73	74+
5'3"	59 – 63	64 – 76	77+
5'4"	61 – 65	66 – 78	79+
5'5"	62 – 67	68 – 81	82+
5'6"	65 – 69	70 – 83	84+
5'7"	66 – 72	73 – 86	87+
5'8"	68 – 74	75 – 89	90+
5'9"	70 – 76	77 – 91	92+
5'10"	72 – 78	79 – 94	95+
5'11"	74 – 80	81 – 97	98+
6'0"	77 – 83	84 – 100	101+
6'1"	79 – 85	86 – 102	103+
6'2"	81 – 87	88 – 105	106+
6'3"	83 – 90	91 – 108	109+
6'4"	85 – 92	93 – 110	111+
Puntos	1 punto	2 puntos	3 puntos

Kung ang iyong timbang ay mas mababa kaysa sa nakasaad na bilang sa hanay sa kaliwa, isulat ang 0 puntos sa kahon sa ibaba.
Ilagay ang kaukulang puntos sa kahon sa kanan. ----------

8. Ikaw ba ay dating nagkaroon ng *stroke* o atake sa puso? Ilagay ang kaukulang puntos sa kahon sa kanan.----
   Oo (1 puntos) Hindi (0 puntos) Hindi ko alam (0 puntos)

9. Ikaw ba ay dating nagkaroon o kasalukuyang umiinom ng gamot para sa *TB (tuberculosis)?*
   Ilagay ang kaukulang puntos sa kahon sa kanan.----------
   Oo (1 puntos) Hindi (0 puntos) Hindi ko alam (0 puntos)

10. Ikaw ba ay babae na nakapagpatingin na sa doktor at napag-alamang may *PCOS (Polycystic Ovarian Syndrome)?* Ilagay ang kaukulang puntos sa kahon sa kanan.----------
    Oo (1 puntos) Hindi (0 puntos) Hindi ko alam (0 puntos)

11. Ikaw ba ay kumakain ng gulay o prutas araw-araw? Ilagay ang kaukulang puntos sa kahon sa kanan.----------
    Oo (0 puntos) Hindi (1 puntos)

12. Sumangguni sa **TSART #4.** Saang kategorya nabibilang ang sukat ng iyong baywang (inches)?

TSART #4. Direksyon. Sa unang hilera (column), hanapin ang iyong kasarian (lalaki o babae). Sa kaparehong hilera ng iyong kasarian, hanapin ang sukat ng iyong baywang (inches) at hanapin ang kaukulang puntos at isulat sa kahon sa ibaba.

Sukat ng Baywang		
Kasarian	inches	puntos
Lalaki	35 o higit pa	1
	34 pababa	0
Babae	31 o higit pa	1
	30 pababa	0

Isulat ang puntos sa kahon sa kanan. ----------

Pagsamasamahin o i-*add* ang iyong mga puntos (mula number 1-12) at isulat sa kahon sa kanan----------

Appendix C. Meaning for and comments of the respondents		
	Meaning for the respondents	Comments of respondents
Q1	• "Pagkuha ng edad" • "Para sa pansarili ko" • "Para sa diabetes" • "Age" • "Tinatanong lang yung age" • "Kung ano yung edad" • "Tamang puntos" • "Hindi ko po alam" • "Hindi maintindihan" • "Para malaman edad" • "Malaman edad" • "Para sa kabutihan at kaalaman ng edad" • "Para malaman edad" • "Para malaman edad- nasaang age ang edad" • "Sa chart medyo nalito" • "Mahalagang kailangan impormasyon ko po"	• "Nahirapan sa puntos" • "Okay lang" • "Sa chart medyo nalito"
Q2	• "Tinatanong lang ano ang kasarian" • "Kung babae o lalaki" • "Para sa kalusuguan o sarili mo" • "Tawag dito…nagpapatunay lang anong kasarian" • "Yung kasarian" • "Yung gender mo" • "Tinatanong kung babae o lalaki" • "Syempre, nagpapatunay kung babae o lalaki" • "Tinatanong kung babae o lalaki" • "Hindi ko po maano doc" • "Para malaman kasarian" • "Tinatanong lang kung babae o lalaki" • "Kaalaman tungkol sa kasarian" • "Yung kasarian" • "Gender specific" • "Mahalagang kailangan impormasyon ko po"	
Q3	• "Tinatanong lang history" • "Inaalam kung nagkadiabetes nung buntis" • "Ano yung tungkol sa nanganak ka. Awa ng Diyos, di ako nagka-ganito" • "Meron po. Para malaman ng nagtatanong yung history ng pagbubun-tis" • "Concern- kalusugan" • "If ever nagbuntis ako, kung nagkakaroon ng diabetes" • "Tinatanong kung may history about diabetes - eh wala naman" • "Tinatanong kung nagkaroon ka ng diabetes" • "Kung nagkaroon ng diabetes" • "Sinusuggest kung may naramdaman dati nung buntis" • "Kaalaman tungkol sa kalusugan" • "Kung nagkadiabetes na ba nung buntis" • "Para malaman po kung may diabetes ako po"	• "Okay naman po" • "Hindi alam ano ang gestational diabetes" • "Kasi hindi alam ibig sabihin ng gestational diabetes" • "Yun lang term na gestational diabetes, hindi alam" • "Di ko alam"
Q4	• "Tinatanong lang history" • "Yung history sa pamilya" • "Meron po akong kapamilya na may diabetes - asawa ko" • "Nagtatanong kung ang kamaganak ay may history ng diabetes" • "Concern - kalusugan ng pamilya" • "Yung sa family history, kung may diabetic" • "Inaalam kung may kapamilya na diabetic" • "Kung meron ding diabetes sa pamilya" • "Kung may kamag-anak na diabetic" • "Para malaman - inheritance" • "Tinatanong sakit sa pamilya" • "Kaalaman tungkol sa kalusugan ng pamilya o kamag-anak" • "History sa pamilya" • "May kinalaman sa history kung pwede magkaroon sa pamilya" • "Para po kung may isa sa kapamilya ko po ang mayron diabetes po"	• "Okay lang"

Appendix C. Meaning for and comments of the respondents

	Meaning for the respondents	Comments of respondents
Q5	• "Inaalam status ng health" • "Kung nagkahighblood na ba ako" • "Yung ano to eh para sa kung anong nararamdaman mo, para sa sarili mo" • "Tinatanong ako kung mataas ba BP ko o nagmamaintain ba ako ng gamot." • "Kondisyon ng katawan" • "Para lang mamonitor kung ikaw ay may mataas na dugo" • "Kung nagkakaroon ng mataas na BP" • "Kung nagkaroon na ng highblood" • "Para alam tama o mali" • "Tinatanong kung mataas BP" • "Kaalaman sa kalusugan ko" • "Sa BP" • "Kung nagmomonitor ng BP; Importante pero di ko naman ginagawa" • "Sa kalusugan ko po" • BP blood pressure	• "Actually, medyo naguluhan ako, kaya nagtanong ako. Kaya sana nakalagay kung dating nagkaroon ng high blood." • "Okay lang"
Q6	• "Tinatanong lang anong environment ng work" • "Kung nageexercise" • "Yung exercise sa sarili…para sa kapakanan ko…kalusugan ko." • "Yung exercise, meron bang ganito" • "Regarding sa trabaho" • "Tinatanong lang kung ikaw ay may routine araw-araw" • "Kung madalas natayo o naglalakad sa trabaho" • "Yung kung nageexercise" • "Yung sa trabaho, gawain" • "Kung nagbubuhat" • "Tungkol sa pangaraw-araw kong ginagawa" • "Kung nageehersisyo ba" • "Kung ano po ang kapasidad ng katawan ko po" • "Tungkol sa daily activities nalalaman o namomonitor ba galaw"	• "Nagzuzumba po ako araw-araw" • "Okay lang" • "Nalito kasi 2 options; either/or pala"
Q7	• "Tinitingnan- kase meron talagang level ng timbang; tinitingnan kung tama ba sa height mo." • "Inaalam kung tama yung height sa bigat" • "Tungkol sa sarili ko, sa timbang yun pagkakaintindi ko." • "Timbang kung mababa…kung kailangan na ba ng vitamins" • "Yung hanapin yung height mo saka timbang tapos ilalagay puntos." • "Para malaman timbang" • "Kaalaman kung obese o hindi" • "Sa timbang at height" • "Para mahanap eksakto o specific sa height na timbang" • "Paghanap sa chart" • "Kung ano ang bigat at sukat ng katawan o haba ng katawan po"	• "Noong una nahirapan. Noong napaliwanag nakuha ko na po. Para makuha lang anong height at timbang. Nahirapan sa equivalent ng kg…kaya tinanong ko equivalent ng 47 kg" • "Medyo pero kung babasahin ok naman. Sa ibang tao, baka mahirapan sila. Siguro dito lang sa tsart. Kailangan iguide pagsagot lalu na if may edad o di nakapagtapos ng pag-aaral" • "Medyo nahirapan. Okay lang. Kailangan i-guide." • "Medyo naano ako slight. Kumbaga parang binabae height sa weight kung tama. Dito sa medyo naka-highlight, nalito kaunti. Hindi naman need baguhin. Okay lang sakin ganito" • "Dito ako nahihirapan, nagmamadali kasi. Madali naman sagutan kung may sapat na oras." • "Di ko po maintindihan, nahirapan po. Kailangan i-guide." • "Kailangan po ituro" • "Hirap sa timbang" • "Nahirapan kaunti sa tsart" • "Nalito kaunti sa tsart" • "Nahirapan hanapin sa tsart" • "Medyo nalito sa tsart" • "Yung sign na less than or greater than if hindi alam, maaaring hindi masagutan"

Appendix C. Meaning for and comments of the respondents		
	Meaning for the respondents	Comments of respondents
Q8	• "Tinatanong lang kung nastroke ka na ba, history ng stroke" • "Kung nagkastroke o atake na ba sa puso" • "Kung nagkaroon ka ng atake sa puso. Sa awa naman ng Diyos…" • "Kung nagkasakit na ba ng stroke o sa puso" • "Sa puso…sa kondisyon" • "Kung inatake ka" • "Kung nagkastroke" • "Medyo inaalam ng interviewee kung nakaranas ng ganoong sakit" • "Kung nagkaroon ng atake sa puso" • "Kung nagkaroon na ng stroke" • "Kailangan malaman" • "Kaalaman sa dating sakit kung nagkaroon man" • "Kung nagkasakit na ba" • "Kung nakaranas na ba" • "Kung ano ang mga sakit ko po"	
Q9	• "Tinatanong lang kung naTB ka na ba, history ng TB" • "Kung may TB" • "Sa kondisyon" • "Para sa baga" • "Kung nagkaroon ka dati ng TB" • "Un lang inaalam kung nagkaTB" • "Kung dating nagkaroon ng TB" • "Kung nagkaroon na ng TB" • "Para malaman" • "Kaalaman tungkol sa tuberculosis" • "Kung nagka-TB" • "Kung nakaranas na ba" • "Kung isa po ito sa sakit ko noon po"	• "Okay lang naman po." • "Okay lang"
Q10	• "Tinatanong lang kung nagkaPCOS ka na ba, history ng PCOS" • "Kung may problema sa obaryo" • "Hindi pa po ako nagpapatingin" • "Sa ovary, sa babae, sa matres" • "Sa mga ano eh, yung nagpapacheck-up sa OB, nahirapan ba magbuntis" • "Ganun din, inaalam" • "Kung nagpapatingin ba sa OB" • "Para sa babae naman" • "Tungkol sa PCOS" • "Dahil hindi alam kondisyon" • "Sa obaryo" • "Kung may problem po sa ovary ko po"	• "Hindi ko alam ano ang PCOS" • "Hindi ko alam PCOS" • "Ano po bang ibig sabihin po nitong PCOS? Pagkakaintindi ko sakit sa obaryo" • "Medyo. Hindi ko alam ano ang PCOS" • "Kung nagkaroon na ng PCOS...Hindi ko po alam kung ano ang PCOS. Hindi ko naintindihan. Hindi ko alam kaya nilagay ko 0" • "Hindi importante kasi para sa babae, hindi sa akin" • "Kasi walang ganyan; hindi ko alam ibig sabihin"
Q11	• "Tinatanong kung healthy living" • "Kung tama ba kinakain, may prutas at gulay ba" • "Para sa kalusugan, kung ikaw ay kumakain ng tama" • "Araw-araw naman po" • "Eto if balanced diet" • "Kung kumakain ng mga gulay" • "Prutas at gulay ay kailangan talaga natin. More intake ba" • "Kung kumakain ng gulay o prutas araw-araw" • "Kung kumakain ng prutas o gulay" • "Ganon din" • "Kung kumakain ng gulay" • "Tungkol sa pagkain ng gulay o prutas" • "Kung masustansiya ba kinakain" • "Para malaman diet; kung may gulay sa kinakain nya" • "Kung kumakain po ako ng nutrition na magpapalakas sa katawan ko po"	• "Maganda"

Appendix C. Meaning for and comments of the respondents		
	Meaning for the respondents	Comments of respondents
Q12	• "Tinitingnan ano sukat mo, kung maliit o malaki ka na ba" • "Kinukuha sukat ng baywang" • "Kailangan tanungin sukat ng katawan" • "Eto sa baywang" • "Yung ano ng waist line" • "Kung ikaw ba ay nasusukat mo ang iyong baywang" • "Hanapin kasarian saka sukat ng baywang." • "Ganon pa rin" • "Oo; kailangan i-explain o i-guide" • "Sukat ng baywang" • "Sa baywang, kung malaki ba" • "Para malaman gaano ako kalaki o kabilog" • "Sukat ng baywang ko po"	• "Nahirapan ako. Sinagutan na lang. Hindi ko alam pagkaintindi. Hindi ko naintindihan; kailangan iguide o ipaliwanag" • "Okay lang naman" • "Madali po." • "Hindi ko po maintindihan. Kailangan iexplain" • "Nahirapan sa paghanap"

Appendix D. The original ADA diabetes risk test