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Prevalence and Factors Associated with Diabetes Related Emotional Distress (DRED) Among Filipino Adult Patients with Type 2 Diabetes Mellitus Using A Validated Filipino Version of the Diabetes Distress Scale (DDS)

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Abstract

Background. Diabetes related emotional distress (DRED) is important in diabetes management. There are limited studies involving diabetes distress and its association with glycemic control and other clinicodemographic factors among Filipinos.

Objective. This study aimed to translate the Diabetes Distress Scale (DDS) into Filipino and validate this version among Filipino adult patients with type 2 DM and assess the prevalence of DRED and its association with glycemic control and other factors.

Methodology. A Filipino DDS was constructed through forward and backward translation of the English version and was validated. A subsequent cross-sectional study was conducted among 186 individuals with type 2 diabetes in a single-center tertiary hospital. The prevalence of DRED and its association with HbA1c level and other related factors were assessed.

Results. The overall prevalence of DRED for this study was 34.41% with a mean overall score for the DDS of 2.02. Age (AOR 0.95, 95% CI 0.93–0.98; p = 0.002), higher medication burden, (AOR 1.33, 95% CI 1.01–1.77; p = 0.043) and peripheral artery disease (AOR 6.03, 95% CI 1.79–23.29; p = 0.005) were predictors of DRED.

Conclusion. This Filipino version of the DDS showed that it is a valid instrument in the assessment of diabetes related distress among Filipino patients with type 2 diabetes. Diabetes distress scores were not associated with glycemic control. A younger age of diagnosis of diabetes, a history of PAD, and higher medication burden were found to be associated with development of DRED.

Key words: Diabetes Distress Scale, Filipino, validity, type 2 diabetes, diabetes-related distress

INTRODUCTION

Living with diabetes can be influenced by psychosocial factors that may affect both clinical outcomes and psychological well-being. Adjusting to the demands of diabetes management involving lifelong adherence to medications, dietary modifications, regular exercise, glucose monitoring, surveillance for complications, and medical follow-up may place a significant psychological burden on individuals.[1] This burden is reflected in the high prevalence of depressive symptoms among patients with diabetes which may occur in 1 out of 4 patients with diabetes, but only 10-15% are diagnosed with clinical depression.[2] In a local study in the Philippines, the prevalence of depression among patients with type 2 diabetes mellitus was 19.9%.[3] Patients with diabetes who already had depression were found to have worse glycemic control, and have two times higher risk of mortality compared to those without depression.[4]

While depression is an important comorbidity, literature differentiates it from a distinct condition termed as diabetes related emotional distress (DRED) or diabetes distress (DD). Diabetes related emotional distress refers to the significant negative psychological reactions related to the emotional burdens and worries specific to an individual's experience in the daily self-management, social stigma, financial implications, and the prospect of long-term complications involved in diabetes. It pertains to symptoms that overlap with depression but does not meet the criteria for major depressive disorder and is regarded as a separate construct which requires different assessment and management strategies.[5-7]

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The reported prevalence of DRED is approximately 36% among people with type 2 diabetes. Higher rates were observed among populations with a greater proportion of women and those with comorbid depressive conditions.[8,9] Increased prevalence has also been reported among patients with diabetic complications, poor glycemic control, younger age, lack of partners, and non-white ethnicity.[9,10] A cross-sectional study done locally showed a higher prevalence of 42.6% with a majority of the study population being young, pre-obese, and a having a diabetes duration of approximately 5 years.[11]

Multiple sociodemographic, clinical, and behavioral factors have been linked to DRED, including early life and environmental exposures, lower socioeconomic status, living alone, limited social support, and lower educational attainment.[2,12,13] Behavioral factors such as smoking and alcohol use, along with female sex, higher HbA1c, elevated triglycerides, more diabetes-related complications, and higher BMI, also increase risk.[13–15] Overall, patients with greater clinical burden and extensive self-management demands are at higher risk for developing DRED.

High levels of DRED have been associated with poorer self-management behaviors, including suboptimal medication adherence, unhealthy dietary patterns, and reduced physical activity which may result to a higher A1C and lower self-efficacy. Elevated DRED was linked with higher HbA1c values, higher depression scores, and heightened concerns regarding eating, body shape, and weight concerns as well as poorer psychological well-being, especially among younger patients.[12,15,16] Although one local study revealed no significant association between DRED with diabetes self-care behavior or level of glycated hemoglobin, a trend toward higher HbA1c values was observed among participants reporting diabetes distress, suggesting a potential indirect effect on glycemic outcomes.[11]

The American Diabetes Association recommends the routine monitoring for the presence of diabetes distress using person-based diabetes-specific validated measures.[17] The two most widely used scales are the Problem Areas in Diabetes (PAID) Scale and Diabetes Distress Scale (DDS). The PAID scale is a 20 – item instrument focused on diabetes related emotional concerns and has been found to have a high sensitivity and specificity.[18] The DDS scale on the other hand is comprised of 17 questions, which are separated into four different subscales: 1) regimen-related distress; 2) physician-related distress; 3) emotional burden; and 4) interpersonal distress. It is a brief self-reporting measure of diabetes-related emotional distress that identifies a diabetic patient's concerns about disease management, emotional burden, social support, and health care accessibility.[5] A study found that while the PAID Scale emphasizes emotional concerns and correlates more with dysfunctional coping, quality of life, and depressive symptoms, the DDS focuses on physician-related factors and self-management distress and is more strongly associated with diabetes self-care and metabolic outcomes.[19]

In the Philippines, there has been no locally adapted scale to screen for diabetes distress among patients with type 2 DM. Local data on the association between DRED and glycemic outcomes and other related factors remain limited. This study therefore aimed to translate the DDS to Filipino and determine the association of DDS with metabolic outcomes among Filipinos with type 2 diabetes mellitus.

OBJECTIVES

As a general objective, this study aims to determine the prevalence of diabetes related emotional distress and its association with glycemic control and other related factors of adult Filipinos with type 2 Diabetes Mellitus at St Luke's Medical Center, Quezon City using a validated Filipino version of the Diabetes Distress Scale. Specifically, it aims: 1) to determine the association between diabetes distress status and glycemic control (HbA1c) as well as clinicodemographic factors such as age, sex, level of education, BMI, duration of diabetes, DM medications, and presence of macrovascular or microvascular complications using a Filipino version of the Diabetes Distress Scale; 2) to determine the prevalence of diabetes-related emotional distress overall and across DDS subdomains including, emotional burden, physician-related distress, regimen-related distress, and interpersonal distress; 3) to translate and validate the clinimetric properties of the Diabetic Distress Scale, specifically its content validity, face validity, cross-cultural validity, and its reliability.

METHODOLOGY

Phase I: Translation and validation of the Diabetes Distress Scale

The English version of the questionnaire was forward translated to Filipino by two separate individuals: one professor from the University of the Philippines Department of Linguistics and one physician expert in the medical field particularly in diabetes who is fluent in both English and Tagalog. The two versions of the forward translated questionnaires were then synthesized by the research team. Any edits were incorporated into the questionnaire. The synthesized forward translated questionnaire was then back translated to English. Similarly, two translators were assigned to generate two separate back translations. The first translator was a professional translator who is fluent in both English and Filipino from the UP College of Linguistics and who has not read the original questionnaire. The second translator was again another physician who was bilingual (proficient in English and Filipino). The two versions of the back translated questionnaires were once again synthesized by the research team and qualitatively checked against the original questionnaire. Further revisions were done to the translated scale.

Method of validation of translated Filipino Diabetes Distress Scale

A minimum of 3 experts but ideally 8-12 experts was required to assess the content validity index of the translated questionnaire.[20] To fully assess for content validity, questions were asked from the expert panel, based on the COnsensus-based Standards for the selection of health Measurement Instruments (COSMIN) criteria for content validity (Appendix A).

A minimum of 10 patients with type 2 diabetes mellitus was required for this study to assess the face validity of the translated scale.[21] They were asked to evaluate the translated scale with the following guide questions:[22]

A. Description of the survey questionnaire: Are the title and instructions clear and easy to follow?
B. For each item: The respondents will be asked the following questions, using the "think aloud testing" technique:
   i. Do you have difficulty answering each question?
   ii. If yes, how will you restate them?
   iii. Are the responses difficult to understand?
   iv. If yes, how will you restate them?
   v. Are the questions relevant to your condition?
   vi. Are the questions offensive/upsetting to you?
   vii. If yes, how will you restate them?

Feedback was organized according to themes. Major remarks regarding face validity were noted. The translated scale was reevaluated using the feedback pertaining to content, grammar, cultural differences and was further modified to obtain the final translated version of the DDS (Appendix B).

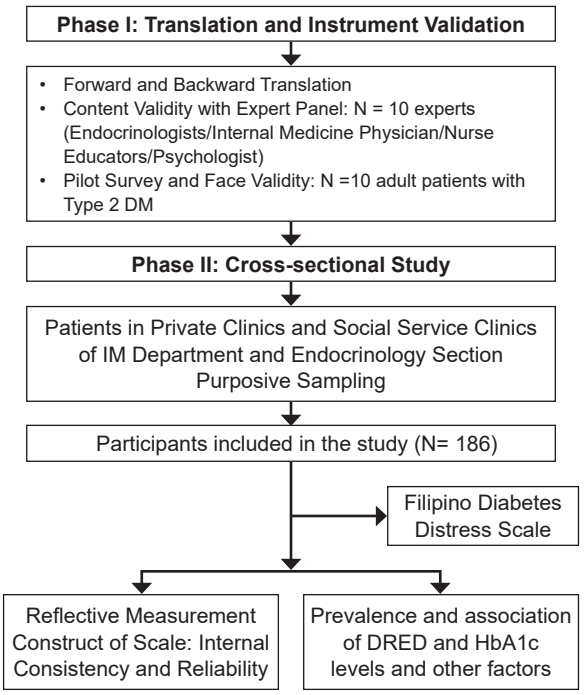

Figure 1. Flowchart of study design.

Phase II: Cross-sectional study

The final version of the scale was used in a cross-sectional, analytical study on the Association of Diabetes Related Emotional Distress with Glycemic Control Among Filipino Adult Patients with Type 2 Diabetes Mellitus in St. Luke's Medical Center (Figure 1). Sample size was computed using two approaches to ensure adequate power for both reliability and association analyses. For the logistic regression analysis assessing associations, a minimum of 115 participants was calculated using a 5% significance level, 80% power, and an assumed odds ratio of 3.0, representing a large effect size with the following equation:

Sample Size based on odds ratio: [23]

$$n \geq \frac{\left(z_{1-\alpha/2} + z_{1-\beta}\right)^2}{P(1-P)E^2}$$

where $P = \frac{OR}{1+OR}$ and $E = ln(OR)\left(\frac{\sqrt{3}}{\pi}\right)$

Legend:
$z_{1-\alpha/2}$ = 1.96
$z_{1-\beta}$ = 0.842 or 1.282
OR = 3.00 (assuming that this will have large effect)[24]

For the internal consistency analysis, a minimum of 104 participants was required, based on a 5% significance level, 80% power, and an assumed Cronbach's α of 0.8, which is within the acceptable reliability range using the following equation: [25]

$$n \geq \frac{2k}{k-1} \times \frac{\left(Z_{\alpha/2} + Z_{\beta}\right)^2}{ln(\delta)^2} + 2$$

where $\delta = \frac{1-c}{1-p_k}$

Legend:
k = number of items = 17
c = lowest acceptable Cronbach alpha = 0.7
p_k = expected Cronbach alpha = 0.8
$z_{\alpha/2}$ = standard normal distribution corresponding to the specified size of the critical region (5%) = 1.960
z_{β} = standard normal distribution corresponding to the chosen level of power (80%) = 0.842

The larger of the two estimates was adopted to ensure sufficient power for all planned analyses.

Study participants who were recruited included private and social service patients seen face-to-face at the outpatient department of Internal Medicine and Endocrinology of the St. Luke's Medical Center in the year 2022 who were

diagnosed with type 2 diabetes mellitus and met the inclusion criteria. A member of the investigator team from the Department of Internal Medicine recruited patients with diabetes mellitus. Once recruited, the investigators obtained the subject's consent using a form approved by the IERC prior to participation in the study.

The inclusion criteria for the study consisted of Filipino adults 18 years old and above who were diagnosed with type 2 diabetes mellitus, with good comprehension (able to read and write) of the Filipino language, and submitted the signed Informed Consent Form (ICF). Those who were unable to understand Filipino language, critically ill and with presence of psychiatric illness were excluded from the study.

Informed consent and ethical considerations

The study protocol and informed consent form were reviewed and approved by the Institutional Review Board of St. Luke's Medical Center prior to study initiation. Eligible patients from the Internal Medicine and Endocrinology outpatient private and social service clinics were approached for participation. All participants underwent an informed consent process wherein the nature, procedures, and potential risks of the study were fully explained, and written informed consent was obtained prior to participation. The study was conducted in accordance with local and international ethical standards, including the principles of the Declaration of Helsinki, World Health Organization guidelines, International Conference on Harmonization, Good Clinical Practice, the Data Privacy Act of 2012 and the National Ethics Guidelines for Health Research (2017). Participant confidentiality was strictly maintained throughout the study. All data were de-identified and assigned code numbers, with the master list linking identifiers stored separately and accessible only to the research team. Physical and electronic records were securely stored and will be retained for five years before secure destruction. No personally identifiable information was disclosed outside the research team. Participants were informed of their right to withdraw at any time without penalty. No monetary compensation was provided. The study was self-funded by the authors, and no conflicts of interest were declared.

Materials and methods

Baseline characteristics of the patients were determined including age, gender, BMI, personal and social history, duration of diabetes, medications for diabetes, presence of macro/microvascular complications through an interview and cross referenced with existing clinical records. The level of DRED was measured using the Filipino Diabetes Distress Scale (Filipino-DDS), a self-administered 17-item Likert scale with each item scored from 1 (no distress) to 6 (serious distress) and the mean item score was computed by summing all item scores and dividing by the total number of items. The participants were given 5-15 minutes to answer the questionnaire by themselves. Participants who required more time were given the opportunity to complete the questionnaire at their own pace to ensure thoughtful and accurate responses. The corresponding questionnaires were then tabulated. A mean item score of <2.0 was classified as little to no distress, 2.0 – 2.9 was considered 'moderate distress,' and a mean item score >3.0 considered 'high distress.'[26] The latest HbA1c (within 3 months) was obtained from medical records. All questionnaires and clinical data were complete at the time of collection, and no missing or implausible values were identified. Completeness was verified by cross-checking patient responses with clinical records, and as such, no imputation or replacement methods were required.

Description of outcome measures

The outcome of interest was the Diabetes Distress Scale (DDS) total score measured with the validated Filipino DDS. The association of the score with clinicodemographic and metabolic factors including age, sex, level of education, BMI, duration of diabetes, DM medications, and presence of macrovascular or microvascular complications were reported as odds ratios with 95% confidence intervals.

Secondary outcomes included DDS subscale scores and the prevalence of moderate or high distress based on prespecified cut points. The clinimetric properties of the Filipino DDS were evaluated, including the content validity index, face validity, cross-cultural validity, and reliability.

Data analysis

Content validity was measured using item-level content validity index (I-CVI); the proportion of experts who agree that the item is either quite or highly relevant; items with higher than I-CVI 0.80 were accepted, while those lower were subject to discussion by the expert panel and the investigators.

The reliability of the scale was obtained using the internal consistency reliability using Cronbach's α coefficient. A Cronbach's α coefficient value less than 0.40 is considered unreliable, a value between 0.40 and 0.59 is less reliable, between 0.60 and 0.79 is reliable, and between 0.80 and 1.00 is extremely reliable. Item-total correlations, and Cronbach's alpha if item is deleted were used to conduct item analysis for the instrument. An item-total correlation is acceptable with a value no less than 0.40, as estimated by Pearson's correlation coefficient.

Descriptive statistics was used for categorical variables were frequency and percentage. Shapiro-Wilk test was used to determine the normality distribution. Continuous quantitative data that meet normality assumption were summarized using mean and standard deviation (SD), while those that do not were described using median and interquartile range. For group comparisons by diabetes-related distress [moderate to high (with distress) vs none/

low (no distress)], all variables were analyzed in categorical form, and comparisons used chi-square or Fisher's exact tests as deemed appropriate. No inferential tests on continuous outcomes were conducted.

Logistic regression was used to determine the association of clinicodemographic and metabolic factors with moderate to high diabetes-related distress (vs none/low). Crude and adjusted odds ratios with 95% confidence intervals were reported. For the multivariable analysis, all variables were entered as candidate covariates; the final model was derived using backward stepwise selection based on the Akaike information criterion. Null hypothesis was rejected at 0.05α-level of significance. Stata version 15.0 (StataCorp SE, College Station, TX, USA) was used for data analysis.

RESULTS

Phase I: Translation and validation of Diabetes Distress Scale

A total of 10 experts were requested to review the translated questionnaire to assess the content validity index.[17] This pool included 5 Endocrinologists, 2 Internal Medicine Physicians, 2 Nurse educators and 1 Psychologist. All the items had high item relevance, with eight items receiving a perfect rating of 100%. The ratings ranged from highly relevant to quite relevant. There were no comments regarding the comprehensiveness of the questionnaire. Comments regarding the comprehensibility of items were about the translation. Other comments regarding the tool expressed concerns regarding the tone of the items. It was suggested to change the tone from negative to positive or neutral. It was also noted that no item mentioned specific complications of the condition.

Meanwhile, ten patients were recruited for face validity. Some of the items were perceived to have some level of difficulty (1;10%). However, all items were perceived to be important. It was mentioned that items 2 and 5 were difficult to answer due to its sensitivity with regards to patient-doctor relationship.

Phase II: Cross-sectional study

A total of 186 patients with type 2 diabetes mellitus was recruited for the study with the following characteristics (Table 1). The patients had a median age of 60 years (51-66), and majority were female (65%). Most patients had completed college education (69.35%) and were married (79.03%). The majority of patients (90.86%) were treated with oral medications. Diabetic retinopathy (30.65%), MI/CAD (24.73%), and diabetic nephropathy (21.51%) were the most common macro/microvascular complications. The majority of patients were nonsmokers (87.63%) and had a BMI in the normal range (43.01% with BMI 18.5-24.9 kg/m^2). The median HbA1c was 7.2% with a median diabetes duration of 84 months (36-135).

Internal consistency reliability of the Filipino DDS was assessed among 186 participants. Cronbach's alpha values for the four subscales ranged from 0.81 to 0.85, and the overall Cronbach's alpha for the 17 items was 0.922, demonstrating excellent internal consistency.

Table 1. Characteristics of patients with T2DM recruited (n = 186)

Continuous clinicodemographic factors	Median (IQR)
Age	60 (51-66)
Duration of diabetes, months	84 (36-135)
Systolic blood pressure (mmHg)	120 (120-130)
Diastolic blood pressure (mmHg)	80 (78-80)
Heart rate, bpm	78 (71-83)
Respiratory rate, cpm	18 (16-19)
Temperature, degrees Celsius	36.5 (36.1-36.8)
HbA1c	7.2 (6.5-8.7)
Categorical Clinicodemographic Factors	**Frequency (%)**
Sex	
Male	65 (34.95)
Female	121 (65.05)
Highest educational attainment	
Elementary	11 (5.91)
Highschool	38 (20.43)
College	129 (69.35)
Post-grad	8 (4.3)
Civil status	
Single	21 (11.29)
Married	147 (79.03)
Widowed	17 (9.14)
Separated/Divorced	1 (0.54)
DM medications	
Oral medications	169 (90.86)
Injectable medications	11 (5.91)
Insulin	69 (37.10)
Total number of DM medications	3 (2-3)
Macro/Microvascular complications	
Diabetic retinopathy	57 (30.65)
Diabetic nephropathy	40 (21.51)
Diabetic neuropathy	24 (12.9)
History of TIA/Stroke	13 (6.99)
History of MI/CAD	46 (24.73)
History of PAD	15 (8.06)
Comorbidities	
Hypertension	143 (76.88)
Dyslipidemia	149 (80.11)
Thyroid disease	33 (17.74)
Chronic lung disease	4 (2.15)
Heart failure	17 (9.14)
Liver disease	30 (16.13)
Bone/Mineral disorder	33 (17.74)
Malignancy	35 (18.82)
Smoking status	
Nonsmoker	163 (87.63)
Current	17 (9.14)
Previous	6 (3.23)
Alcoholic beverage drinker	34 (18.28)
BMI (kg/m^2)	
<18.5	1 (0.54)
18.5-22.9	50 (26.88)
23.0-24.9	30 (16.13)
≥25	105 (56.45)

Table 2. Diabetes distress as measured by DDS17 among patients with T2DM (n = 186)

	Mean score Mean ± SD	Moderate Distress	High Distress
		Frequency and prevalence % [95% CI]	
Overall	2.02 ± 0.73	64 (34.41) [27.61-41.71]	21 (11.29) [7.13-16.74]
Emotional Burden Domain	2.33 ± 0.95	74 (39.78) [32.70-47.20]	45 (24.19) [18.23-31.00]
Physician related Distress Domain	1.42 ± 0.71	21 (11.29) [7.13-16.74]	11 (5.91) [2.99-10.34]
Regimen related Distress Domain	2.34 ± 0.89	84 (45.16) [37.87-52.61]	43 (23.12) [17.26-29.85]
Interpersonal Distress Domain	1.79 ± 0.91	52 (27.96) [21.63-34.99]	20 (10.75) [6.69-16.12]

The overall prevalence of DRED for this study was 34.41% [95% CI: 27.61-41.71] (Table 2). Specifically, the prevalence of moderate distress was highest for regimen-related distress at 45.16% [95% CI: 37.87-52.61], followed by emotional-related distress at 39.78% [95% CI: 32.70-47.20]. The lowest prevalence of moderate distress was found in the physician-related distress domain at 11.29% [95% CI: 7.13-16.74]. For high distress, emotional burden had the highest prevalence at 24.19% [95% CI: 18.23-31.00], followed by regimen at 23.12% [95% CI: 17.26-29.85]. Physician domain had the lowest prevalence of high distress at 5.91% [95% CI: 2.99-10.34]. There is a higher proportion of DRED among patients with shorter duration of diabetes and with history of peripheral artery disease (Table 3).

In terms of distress scores, the mean overall DDS score was 2.02 (SD = 0.73). Regimen-related distress had the highest mean score at 2.34 (SD = 0.89), closely followed by emotional distress at 2.33 (SD = 0.95). Interpersonal distress and physician-related distress had lower mean scores of 1.79 (SD = 0.91) and 1.42 (SD = 0.71), respectively.

Age was found to be a significant predictor of diabetes distress, with the odds decreasing for every one-year increase in age (OR 0.97, 95% CI 0.95–1.00), starting from the median study age of 60 years (range 27–86). The HbA1c level showed no significant association with developing diabetes distress including other factors such as sex, duration of diabetes, presence of DM complications, having extensive DM regimen, smoking status, alcohol consumption status, BMI, lack of family or social support, and level of education (Table 4).

In the adjusted model for moderate to high distress versus none/low, age was still associated with lower odds for every year increase in age (AOR 0.95, 95% CI 0.93–0.98; $p = 0.002$). A higher medication burden increased odds (per additional diabetes medication: AOR 1.33, 95% CI 1.01–1.77; $p = 0.043$). Peripheral artery disease (PAD) was a strong predictor of diabetes distress (AOR 6.03, 95% CI 1.79–23.29; $p = 0.005$), while prior TIA or stroke showed a nonsignificant trend (AOR 3.20, 95% CI 0.98–11.50; $p = 0.059$). Injectable therapy and systolic blood pressure were not significantly associated with diabetes distress (injectable therapy: AOR 0.29, 95% CI 0.06–1.23; $p = 0.108$; systolic blood pressure per mmHg: AOR 0.98, 95% CI 0.94–1.01; $p = 0.141$) (Table 5).

DISCUSSION

This study was able to systematically translate the English DDS into the Filipino language and evaluate its psychometric properties. Overall results show that for both content and face validity, all items in the Filipino-DDS were relevant, easy to comprehend, and important. The process of translation and cultural adaptation of a questionnaire is complex and requires evidence of the semantic equivalence of the items, cultural fit of the instrument and adequate psychometric properties. The Filipino-DDS was able to maintain the 17 items of the original English DDS as in the translation done in Mexico.[27] In contrast, other translations including those in Thailand and China, have modified or reduced items and domains.[28,29] Experts have commented that the translation of the scale can also be improved by switching the phrasing to a positive or neutral tone. Some respondents have expressed discomfort when responding to items, particularly in the physician related domain. This feedback highlights the importance of cultural and contextual adaptation in instrument development, ensuring that respondents can answer honestly without fear of affecting their relationship with healthcare providers. Nonetheless, this research has demonstrated that the Filipino-DDS is a valid and reliable instrument in the assessment of diabetes related distress among Filipino patients with diabetes.

One of the limitations of the translation and validation process of this study is that the Filipino-DDS was not compared with other DM-related health or psychological indicators as such criterion validity was not assessed. Comparison of the Filipino-DDS with other measures of diabetes distress or self-care behaviors would be warranted in future studies. In addition, the Filipino-DDS was only used for validation among patients with type 2 diabetes mellitus, while the original DDS17 was validated for patients with type 1 DM as well. A validation of this scale among patients with type 1 diabetes would be of interest in further studies.

More than a third of the study population had reported moderate level of diabetes distress which coincided with the global prevalence estimates at 34% but was much lower when compared with the local study done (42.6%), and in another southeast Asian country that is Malaysia (49.2%).[30] Factors that may lead to a lower prevalence in this study include the sample size, health care setting, current health condition of the study population, and other

Table 3. Proportion of patients with and without diabetes distress

	With distress N, %	No distress N, %	*P*-value
Age, years			
<60	42 (47.2%)	47 (52.8%)	0.183
≥60	36 (37.1%)	61 (62.9%)	
Sex			
Male	23 (35.4%)	42 (64.6%)	0.214
Female	55 (45.5%)	66 (54.5%)	
Highest educational attainment			
Elementary	4 (36.4%)	7 (63.6%)	0.654
Highschool	15 (39.5%)	23 (60.5%)	
College	54 (41.9%)	75 (58.1%)	
Post-grad	5 (62.5%)	3 (37.5%)	
Civil status			
Single	12 (57.1%)	9 (42.9%)	0.175
Married	61 (41.5%)	86 (58.5%)	
Widowed/Separated	5 (27.8%)	13 (72.2%)	
Duration of diabetes, months			
<12	17 (63%)	10 (37%)	0.002*
12-36	16 (61.5%)	10 (38.5%)	
37-60	4 (16%)	21 (84%)	
61-120	22 (39.3%)	34 (60.7%)	
>120	19 (36.5%)	33 (63.5%)	
DM medications			
Oral medications	71 (42%)	98 (58%)	0.947
Injectable medications	4 (36.4%)	7 (63.6%)	0.764
Insulin	32 (46.4%)	37 (53.6%)	0.360
OAD+Insulin	25 (48.1%)	27 (51.9%)	0.323
OAD + injectable	0	0	-
OAD+Injectable+Insulin	2 (40%)	3 (60%)	0.929
Insulin + Injectable	2 (33.3%)	4 (66.7%)	0.504
Total number of DM medications			
<3	32 (36.8%)	55 (63.2%)	0.233
≥3	46 (46.5%)	53 (53.5%)	
Macro/Microvascular complications			
Diabetic retinopathy	22 (38.6%)	35 (61.4%)	0.629
Diabetic nephropathy	16 (40%)	24 (60%)	0.857
Diabetic neuropathy	11 (45.8%)	13 (54.2%)	0.825
History of TIA/Stroke	8 (61.5%)	5 (38.5%)	0.155
History of MI/CAD	20 (43.5%)	26 (56.5%)	0.864
History of PAD	10 (66.7%)	5 (33.3%)	0.043*
Comorbidities			
Hypertension	57 (39.9%)	86 (60.1%)	0.378
Dyslipidemia	59 (39.6%)	90 (60.4%)	0.200
Thyroid disease	11 (33.3%)	22 (66.7%)	0.332
Chronic lung disease	2 (50%)	2 (50%)	1.000
Heart failure	9 (52.9%)	8 (47.1%)	0.440
Liver disease	13 (43.3%)	17 (56.7%)	0.865
Bone/Mineral disorder	16 (48.5%)	17 (51.5%)	0.440
Malignancy	11 (31.4%)	24 (68.6%)	0.186
Smoking status			
Nonsmoker	69 (42.3%)	94 (57.7%)	0.906
Current	2 (33.3%)	4 (66.7%)	
Previous	7 (41.2%)	10 (58.8%)	
Alcoholic beverage drinker	13 (38.2%)	21 (61.8%)	0.703
BMI, kg/m²			
18.5-24.9	28 (34.6%)	53 (65.4%)	0.039*
25.0-29.9	28 (41.2%)	40 (58.8%)	
≥30	22 (59.5%)	15 (40.5%)	
HbA1c			
<7%	25 (35.7%)	45 (64.3%)	0.165
≥7%	51 (46.8%)	58 (53.2%)	

Table 4. Predictors of diabetes distress (n = 186)

	Odds Ratio [95% CI]	*p*-value
Age	0.97 [0.95 – 1.00]	0.040
Sex		
Male	Reference	
Female	1.43 [0.77 – 2.63]	0.254
Highest educational attainment		
Elementary	Reference	
Highschool	1.58 [0.39 – 6.28]	0.520
College	1.43 [0.40 – 5.12]	0.583
Post-grad	2.92 [0.44 – 19.23]	0.266
Civil status		
Single	Reference	
Married	0.65 [0.26 – 1.62]	0.353
Widowed	0.31 [0.08 – 1.21]	0.092
Duration of diabetes, months	1.00 [1.00 – 1.00]	0.330
DM medications		
Oral medications	1.22 [0.45 – 3.37]	0.695
Injectable medications	0.66 [0.19 – 2.35]	0.524
Insulin	1.26 [0.69 – 2.28]	0.452
Total number of DM medications	1.16 [0.90 – 1.49]	0.241
Macro/Microvascular complications		
Diabetic retinopathy	0.66 [0.35 – 1.24]	0.197
Diabetic nephropathy	0.96 [0.48 – 1.95]	0.920
Diabetic neuropathy	1.22 [0.52 – 2.88]	0.651
History of TIA/Stroke	1.99 [0.63 – 6.34]	0.242
History of MI/CAD	1.12 [0.57 – 2.18]	0.739
History of PAD	2.56 [0.84 – 7.81]	0.099
Comorbidities		
Hypertension	0.67 [0.34 – 1.32]	0.244
Dyslipidemia	0.58 [0.28 – 1.19]	0.134
Thyroid disease	0.63 [0.29 – 1.36]	0.238
Chronic lung disease	1.19 [0.16 – 8.65]	0.862
Heart failure	1.38 [0.51 – 3.74]	0.531
Liver disease	0.89 [0.41 – 1.96]	0.776
Bone/Mineral disorder	1.15 [0.54 – 2.43]	0.723
Malignancy	0.75 [0.36 – 1.59]	0.453
Smoking status		
Nonsmoker	Reference	
Current	1.04 [0.38 – 2.84]	0.934
Previous	0.59 [0.10 – 3.29]	0.545
Alcoholic beverage drinker	0.80 [0.38 – 1.70]	0.559
BMI, kg/m²		
18.5-24.9	Reference	
25.0-29.9	1.06 [0.55 – 2.04]	0.864
≥30	2.09 [0.95 – 4.62]	0.069
Systolic blood pressure, mmHg	0.99 [0.96 – 1.02]	0.619
Diastolic blood pressure, mmHg	1.03 [0.98 – 1.08]	0.291
Heart rate, bpm	0.99 [0.96 – 1.03]	0.739
Respiratory rate, cpm	0.94 [0.79 – 1.12]	0.486
HbA1c	1.00 [1.00 – 1.00]	0.538

Table 5. Predictors of diabetes distress – multivariate analysis

	Adjusted Odds Ratio [95% CI]	*p*-value
Age	0.95 [0.93 – 0.98]	**0.002**
DM medications		
Injectable medications	0.29 [0.06 – 1.23]	0.108
Total number of DM medications	1.33 [1.01 – 1.77]	**0.043**
Macro/Microvascular complications		
History of TIA/Stroke	3.20 [0.98 – 11.50]	0.059
History of PAD	6.03 [1.79 – 23.29]	**0.005**
Systolic blood pressure, mmHg	0.98 [0.94 – 1.01]	0.141

sociodemographic factors. In this study, the participants were recruited from a tertiary hospital and majority of the patients enrolled were from Endocrine specialty clinics who had an older mean age, and lower mean HbA1c levels. The discrepancy may also result from better family support and social support in Filipino culture and the increased trust in healthcare providers in Philippines with lower levels of diabetes scale scores in the interpersonal -related distress domains and physician -related stress domains.

Glycemic control was not associated with DRED which is similar to Totesora et al. Other factors such as gender, education level, marital status, duration of diabetes, presence of DM complications and other comorbidities, as well body mass index were not associated with diabetes-related distress.

A younger age was significantly associated with DRED. The research showed that for every year increase in age above a median age of 60 years old, the odds of DRED decrease by 5%. This was in congruence with a study showing that a younger age was significantly more associated with DRED and depressive symptoms.[31] Previous studies have shown that societal judgment, blame, and stigma expressed toward people living with type 2 diabetes can become more internalized, resulting in self-blame and self-judgment.[31,32] These may be more prominent among younger people since having diabetes at a younger age is less common.

The presence of PAD was also found to be significantly associated with diabetes distress. While no studies were found that directly measured diabetes distress in PAD patients, several studies show that PAD is correlated with depression, which was mentioned to have overlapping symptoms with DRED. It was also correlated with anxiety, pain, mobility limitations, and impaired quality of life which are known contributors to psychosocial burden in diabetes.[33] In another study, patients with PAD and T2DM have reduced physical function and are more sedentary, which may increase emotional burden of these patients.[34] There may be some indirect evidence that PAD is associated with higher diabetes distress in our sample. The association of diabetes distress with PAD may also reflect the psychological impact of more advanced or symptomatic vascular complications, which are often linked to chronic pain, mobility limitation, and fear of amputation.

A higher medication burden was also significantly associated with increased DRED. Studies have demonstrated that multiple concurrent medications are associated with greater psychological burden and worse health-related quality of life in people with diabetes.[35] It may also reflect a more advanced or multimorbid disease, signaling greater perceived disease severity and fear of complications, both of which can contribute to developing DRED. In a separate study, patients who have high levels of diabetes distress had lower odds of adhering to their medications. Consequently, the treatment burden is included along with negative emotions about living with diabetes, dietary concerns, and dissatisfaction with external support as areas of distress by patients with type 2 DM.[36] Our findings thus align with reports that polypharmacy and perceived treatment burden are important psychosocial determinants in diabetes and DRED.

The findings of this study differed from reports in Southwest Ethiopia, India, Saudi Arabia, and Vietnam, where HbA1c, BMI, treatment regimen, and physical activity were significant predictors of diabetes distress, although younger age was a consistent determinant across studies.[13,37-40] Compared with these populations, our cohort was older, had longer diabetes duration, lower mean HbA1c levels, higher educational attainment, and was predominantly treated with oral hypoglycemic agents, which may partly explain the observed differences. Variations in sociodemographic characteristics, healthcare access, and treatment patterns, as well as cultural factors such as strong family support, collectivist values, optimism, religiosity, and acceptance, may further mitigate emotional distress among Filipino patients.[41-44] These findings further give importance of interpreting diabetes distress within its cultural context and support the need for culturally tailored interventions.

This study is able to examine a wide range of clinico-demographic factors and diabetes-specific characteristics that may be associated with diabetes distress and resulting glycemic control. This allows for additional evidence to support screening for patients with type 2 DM for DRED especially those who develop this condition at a younger age. Targeted interventions for specific domains and a holistic approach to diabetes management should be adopted among patients with moderate to high level of distress. Diabetes self-management education and support (DSMEs) among these patients are important to provide help and empowerment and assist them on how to navigate self-management decisions and activities.

The lack of association between HbA1c and diabetes distress may reflect the limitation of HbA1c in effectively capturing short-term fluctuations, glycemic variability, or episodes of hypoglycemia, which may have a stronger impact on emotional distress. Psychosocial factors such as coping mechanisms, perceived support, and self-efficacy may also influence distress independently of glycemic control. Future longitudinal studies using continuous glucose monitoring or incorporating measures of hypoglycemia could provide a clearer understanding of this relationship. The psychometric properties, such as sensitivity to change and predictive validity, as well as the temporal change of glycemic control and other factors and how it correlated with presence of diabetes distress were not assessed in this study. Other prospective studies can be conducted to assess if the Filipino-DDS can assess diabetes distress dynamically over time especially among patients undergoing specific interventions in relation to their diabetes related distress.

Another limitation of the study includes the fact that it had a smaller sample size as compared to other cross-sectional

studies done to determine the association of diabetes distress and glycemic control. It was only done in one tertiary hospital and may not be representative of the whole Filipino population. The population pool was only mainly from IM and Endocrinology specialty clinics and might not be exhaustive since other patients with diabetes from other General Medicine practice and other subspecialty clinics were not included. Furthermore, the study population largely did not have diabetic kidney disease, and nearly 70% were college graduates, which may limit generalizability to the broader Filipino population with differing clinical and sociodemographic profiles. It may be prudent to conduct further validation studies in a larger multicenter population among Filipino patients with type 2 diabetes mellitus.

CONCLUSION

This study demonstrated that the Filipino-DDS is a valid instrument in the assessment of diabetes related distress among Filipino patients with type 2 diabetes mellitus. Diabetes related distress has a significant prevalence among type 2 DM patients and requires special attention by healthcare providers in order to prevent it. Diabetes distress scores were not associated with glycemic control. Age, history of peripheral artery disease, and a higher medication burden were found to be a significant predictors for developing diabetes distress with a younger age being associated with the development of diabetes distress.

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Statement of Authorship
All authors certified fulfillment of ICMJE authorship criteria.

CRediT Author Statement
CMM: Conceptualization, Methodology, Validation, Formal Analysis, Investigation, Resources, Data curation, Writing – original draft preparation, Writing – review and editing, Visualization, Project administration; **HCT:** Conceptualization, Methodology, Validation, Formal Analysis, Data curation, Investigation, Writing – review and editing, **OAD:** Conceptualization, Methodology, Supervision; Validation, Data curation, Visualization, Writing – review and editing.

Data Availability Statement
Datasets are not publicly available because participants in the study did not give written consent for their data to be shared.

Author Disclosure
The authors declared no conflict of interest.

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References

1. Young-Hyman D, de Groot M, Hill-Briggs F, Gonzalez JS, Hood K, Peyrot M. Psychosocial care for people with diabetes: A position statement of the American Diabetes Association. Diabetes Care. 2016;39(12):2126-40. PMID: 27879358 PMCID: PMC5127231 DOI: 10.2337/dc16-2053
2. Holt RIG, de Groot M, Golden SH. Diabetes and depression. Curr Diab Rep. 2014;14(6):491. PMID: 24743941 PMCID: PMC4476048 DOI: 10.1007/s11892-014-0491-3
3. Bernabe-Dela Victoria GM, Dampil AO. Prevalence of depression among patients with type 2 diabetes mellitus and its associated clinical factors. J ASEAN Fed Endocr Soc. 2019;34(2):197-203. PMID: 33442156 PMCID: PMC7784119 DOI: 10.15605/jafes.034.02.11
4. Hermanns N, Caputo S, Dzida G, Khunti K, Meneghini LF, Snoek F. Screening, evaluation and management of depression in people with diabetes in primary care. Prim Care Diabetes. 2013;7(1):1-10. PMID: 23280258 DOI: 10.1016/j.pcd.2012.11.002
5. Hendrieckx C, Halliday JA, Beeney LJ, Speight J. Diabetes and emotional health: A practical guide for health professionals supporting adults with type 1 or type 2 diabetes. 3rd ed. Arlington, VA: American Diabetes Association; 2021. https://diabetes.org/sites/default/files/media/ada_mental_health_workbook_r4.pdf
6. Owens-Gary MD, Zhang X, Jawanda S, Bullard KM, Allweiss P, Smith BD. The importance of addressing depression and diabetes distress in adults with type 2 diabetes. J Gen Intern Med. 2019;34(2):320-4. PMID: 30350030 PMCID: PMC6374277 DOI: 10.1007/s11606-018-4705-2
7. Kreider KE. Diabetes distress or major depressive disorder? A practical approach to diagnosing and treating psychological comorbidities of diabetes. Diabetes Ther. 2017;8(1):1-7. PMID: 28160185 PMCID: PMC5306125 DOI: 10.1007/s13300-017-0231-1
8. Perrin NE, Davies MJ, Robertson N, Snoek FJ, Khunti K. The prevalence of diabetes-specific emotional distress in people with type 2 diabetes: A systematic review and meta-analysis. Diabet Med. 2017;34(11):1508-20. PMID: 28799294 DOI: 10.1111/dme.13448
9. Fisher L, Polonsky WH, Hessler DM, et al. Understanding the sources of diabetes distress in adults with type 1 diabetes. J Diabetes Complications. 2015;29(4):572-7. PMID: 25765489 PMCID: PMC4414881 DOI: 10.1016/j.jdiacomp.2015.01.012
10. Peyrot M, Egede LE, Campos C, et al. Ethnic differences in psychological outcomes among people with diabetes: USA results from the second Diabetes Attitudes, Wishes, and Needs (DAWN2) study. Curr Med Res Opin. 2014;30(11):2241-54. PMID: 25079662 DOI: 10.1185/03007995.2014.947023
11. Totesora D, Ramos-Rivera MI, Villegas-Florencio MQ, Reyes-Sia PN. Association of diabetes-related emotional distress with diabetes self-care and glycemic control among adult Filipinos with type 2 diabetes mellitus at a tertiary hospital in Manila, Philippines. J ASEAN Fed Endocr Soc. 2019;34(2):189-96. PMID: 33442155 PMCID: PMC7784174 DOI: 10.15605/jafes.034.02.10
12. Pintaudi B, Lucisano G, Gentile S, et al; BENCH-D Study Group. Correlates of diabetes-related distress in type 2 diabetes: Findings from the benchmarking network for clinical and humanistic outcomes in diabetes (BENCH-D) study. J Psychosom Res. 2015;79(5):348-54. PMID: 26526307 DOI: 10.1016/j.jpsychores.2015.08.010
13. Geleta BA, Dingata ST, Emanu MD, Eba LB, Abera KB, Tsegaye D. Prevalence of diabetes related distress and associated factors among type 2 diabetes patients attending hospitals, Southwest Ethiopia, 2020: A cross-sectional study. Patient Relat Outcome Meas. 2021;12:13-22. PMID: 33542669 PMCID: PMC7850978 DOI: 10.2147/PROM.S290412
14. Parsa S, Aghamohammadi M, Abazari M. Diabetes distress and its clinical determinants in patients with type II diabetes. Diabetes Metab Syndr. 2019;13(2):1275-9. PMID: 31336477 DOI: 10.1016/j.dsx.2019.02.007
15. Powers MA, Richter SA, Ackard DM, Craft C. Diabetes distress among persons with type 1 diabetes. Diabetes Educ. 2017;43(1):105-13. PMID: 27932687 DOI: 10.1177/0145721716680888
16. Perrin N, Bodicoat DH, Davies MJ, Robertson N, Snoek FJ, Khunti K. Effectiveness of psychoeducational interventions for the treatment of diabetes-specific emotional distress and glycaemic control in people with type 2 diabetes: A systematic review and meta-analysis. Prim Care Diabetes. 2019;13(6):556-67. PMID: 31040069 DOI: 10.1016/j.pcd.2019.04.001
17. American Diabetes Association. Standards of medical care in diabetes-2021 abridged for primary care providers. Clin Diabetes. 2021;39(1):14-43. PMID: 33551551 PMCID: PMC7839613 DOI: 10.2337/cd21-as01
18. Welch GW, Jacobson AM, Polonsky WH. The Problem Areas in Diabetes Scale: An evaluation of its clinical utility. Diabetes Care. 1997;20(5):760-6. PMID: 9135939 DOI: 10.2337/diacare.20.5.760
19. Schmitt A, Reimer A, Kulzer B, Haak T, Ehrmann D, Hermanns N. How to assess diabetes distress: Comparison of the Problem Areas in Diabetes Scale (PAID) and the Diabetes Distress Scale (DDS). Diabet Med. 2016;33(6):835-43. PMID: 26287511 DOI: 10.1111/dme.12887

20. Polit DF, Yang FM. Measurement and the measurement of change. Wolters Kluwer; 2016.
21. Fayers PM, Machin D. Quality of life: The assessment, analysis and interpretation of patient-reported outcomes. 2nd ed. Chichester: Wiley; 2007.
22. Peacock JL, Peacock PJ. Research design. In: Oxford handbook of medical statistics. United States: Oxford University Press; 2011.
23. Hsieh FY, Bloch DA, Larsen MD. A simple method of sample size calculation for linear and logistic regression. Stat Med. 1998;17(14): 1623-34. PMID: 9699234 DOI: 10.1002/(sici)1097-0258(19980730)17: 14<1623::aid-sim871>3.0.co;2-s
24. Sullivan GM, Feinn R. Using effect size—or why the P value is not enough. J Grad Med Educ. 2012;4(3):279-82. PMID: 23997866 PMCID: PMC3444174 DOI: 10.4300/JGME-D-12-00156.1
25. Bonett DG. Sample size requirements for testing and estimating coefficient alpha. J Educ Behav Stat. 2002;27(4), 335-40. DOI: 10.3102/ 10769986027004335
26. Fisher L, Hessler DM, Polonsky WH, Mullan J. When is diabetes distress clinically meaningful?: Establishing cut points for the Diabetes Distress Scale. Diabetes Care. 2012;35(2):259-64. PMID: 22228744 PMCID: PMC3263871 DOI: 10.2337/dc11-1572
27. Martinez-Vega IP, Doubova SV, Aguirre-Hernandez R, Infante-Castañeda C. Adaptation and validation of the Distress Scale for Mexican patients with type 2 diabetes and hypertension: A cross-sectional survey. BMJ Open. 2016;6(3):e009723. PMID: 26936903 PMCID: PMC4785307 DOI: 10.1136/bmjopen-2015-009723
28. Thanakwang K, Thinganjana W, Konggumnerd R. Psychometric properties of the Thai version of the Diabetes Distress Scale in diabetic seniors. Clin Interv Aging. 2014;9:1353-61. PMID: 25152617 PMCID: PMC4140395 DOI: 10.2147/CIA.S67200
29. Ting RZW, Nan H, Yu MWM, Kong APS, Ma RCW, Wong RYM, et al. Diabetes-related distress and physical and psychological health in Chinese type 2 diabetic patients. Diabetes Care. 2011;34(5):1094-6. PMID: 21398526 PMCID: PMC3114496 DOI: 10.2337/dc10-1612
30. Chew BH, Vos R, Mohd-Sidik S, Rutten GEHM. Diabetes-related distress, depression and distress-depression among adults with type 2 diabetes mellitus in Malaysia. PLoS One. 2016;11(3):e0152095. PMID: 27002728 PMCID: PMC4803274 DOI: 10.1371/journal.pone.0152095
31. Barker MM, Davies MJ, Zaccardi F, Brady EM, Hall AP, Henson JJ, et al. Age at diagnosis of type 2 diabetes and depressive symptoms, diabetes-specific distress, and self-compassion. Diabetes Care. 2023; 46(3):579-86. PMID: 36630531 PMCID: PMC10020022 DOI: 10.2337/ dc22-1237
32. Fayed A, AlRadini F, Alzuhairi RM, Aljuhani AE, Alrashid HR, Alwazae MM, et al. Relation between diabetes related distress and glycemic control: The mediating effect of adherence to treatment. Prim Care Diabetes. 2022;16(2):293-300. PMID: 34922848 DOI: 10.1016/j. pcd.2021.12.004
33. Li YH, Cheng YC, Liu HC, Wu J, Lee IT. Depressive symptoms associated with peripheral artery disease and predicting mortality in type 2 diabetes. Biomedicines. 2023;12(1):29. PMID: 38275390 PMCID: PMC10813585 DOI: 10.3390/biomedicines12010029
34. Correia MA, Silva GO, Longano P, Trombetta IC, Consolim-Colombo F, Puech-Leão P, et al. In peripheral artery disease, diabetes is associated with reduced physical activity level and physical function and impaired cardiac autonomic control: A cross-sectional study. Ann Phys Rehabil Med. 2021;64(2):101365. PMID: 32145411 DOI: 10.1016/j.rehab.2020.01.006
35. Saeed ZI, Ostrominski JW, Aroda VR. Polypharmacy in type 2 diabetes: Appropriate or cause for concern? Diabetes Care. 2024;47(12): 2104-6. PMID: 39602592 DOI: 10.2337/dci24-0035
36. Kretchy IA, Koduah A, Ohene-Agyei T, Boima V, Appiah B. The association between diabetes-related distress and medication adherence in adult patients with type 2 diabetes mellitus: A cross-sectional study. J Diabetes Res. 2020;2020:4760624. PMID: 32190697 PMCID: PMC7071811 DOI: 10.1155/2020/4760624
37. Nagabhushana A, Ramaiah M, Khan MA, Nijaguna S. A study to assess diabetic distress and other factors which affect glycemic control in patients with type 2 diabetes mellitus. APIK J Intern Med. 2021; 9(3):176-9. DOI: 10.4103/ajim.ajim_8_21
38. Aljuaid MO, Almutairi AM, Assiri MA, Almalki DM, Alswat K. Diabetes-related distress assessment among type 2 diabetes patients. J Diabetes Res. 2018;2018:7328128. PMID: 29770340 PMCID: PMC5892264 DOI: 10.1155/2018/7328128
39. Duka K, Onea C, Cernea S. Factors associated with diabetes-related distress in patients with type 2 diabetes mellitus. J Interdiscip Med. 2021;6(3):138-45.
40. Nguyen VB, Tran TT, Dang TL, Nguyen VVH, Tran BT, Le CV, et al. Diabetes-related distress and its associated factors among patients with diabetes in Vietnam. Psychol Res Behav Manag. 2020;13: 1181-9. PMID: 33363418 PMCID: PMC7754255 DOI: 10.2147/PRBM. S285291
41. Miller TA, Dimatteo MR. Importance of family/social support and impact on adherence to diabetic therapy. Diabetes Metab Syndr Obes. 2013;6:421-6. PMID: 24232691 PMCID: PMC3825688 DOI: 10.2147/ DMSO.S36368
42. Almubaid Z, Alhaj Z, Almosa O, Marikh M, Khan W. The impact of social support on health outcomes of diabetic patients: A systematic review. Cureus. 2024;16(8):e67842. PMID: 39323717 PMCID: PMC11424042 DOI: 10.7759/cureus.67842
43. Mesquita IMR, Araújo ACMC, Silva AP, Carneiro EM, Maria A, Dias CBD, et al. Religious and spiritual coping in patients with type 2 diabetes mellitus. Chronic Illn. 2025;21(3):426-35. PMID: 40356379 DOI: 10.1177/17423953251338542
44. Ravindran OS, Shanmugasundaram N, Madhusudhan S. Optimism, quality of life, and psychological distress in patients with type 2 diabetes mellitus: A case–control study. Indian J Psychiatr Nurs. 2022;19(1):35-42. DOI: 10.4103/iopn.iopn_50_21

APPENDICES

Appendix A. Cosmin criteria for content validity

Content validity

Date: _____
Name: _____
Position: _____

Dear experts,

We are currently developing a questionnaire that aims to determine the association of diabetes-related emotional distress with glycemic control and other related factors of adult Filipinos with type 2 diabetes mellitus at St. Luke's Medical Center, QC using a Filipino Diabetes Distress Scale. We intend to test the content validity of the questionnaire based on the following research elements.

Population: Filipino Adults 18 years old and above diagnosed with Type 2 Diabetes Mellitus
Exposure: Glycemic control
Outcome: Diabetes Related Emotional Distress

Instruction: We need your expert judgment on the degree of relevance of each item to the construct of interest and how the translated items are conceptually equivalent. Please be as objective and constructive as possible in your review and use the following as guide questions.

Relevance:
1. Are the items relevant for the construct of interest?
2. Are the items relevant for the target population of interest?
3. Are the items relevant for the context of use of interest?
4. Are the response options appropriate? _____
5. Are there other issues that need to be addressed? _____

For relevance kindly encircle the number depending on the following:

Degree of Relevance:
1 – the item is not relevant to the measured domain
2 – the item is somewhat relevant to the measured domain
3 – the item is quite relevant to the measured domain
4 – the item is highly relevant to the measured domain

Comprehensiveness:
6. Are there any missing key concepts on motivations and barriers for this research paper? _____
_____

Comprehensibility:
7. Are the instructions clear and understandable? _____
8. Are the questions clear and understood as intended? _____
9. Are the items appropriately worded (i.e., neutral and non-offensive)? _____
10. Do the response options match the questions? _____

Other comments: _____
_____
_____

Filipino Translation	Relevance (1-lowest, 4-highest)				English DDS	Conceptually equivalent (Y/N)	Comments
1. Pakiramdam ko ay kinukuha ng diabetes ang marami sa aking mental at pisikal na lakas araw-araw.	1	2	3	4	Feeling that diabetes is taking up too much of my mental and physical energy every day.		
2. Pakiramdam ko ay hindi sapat ang kaalaman ng aking doktor tungkol sa diabetes at pangangalaga sa diabetes.	1	2	3	4	Feeling that my doctor doesn't know enough about diabetes and diabetes care.		
3. Pakiramdam ko ay hindi ako kampante sa aking pang-araw-araw na kakayahan para mapangalagaan ang diabetes.	1	2	3	4	Not feeling confident in my day-to day ability to manage diabetes.		
4. Nakakaramdam ako ng galit, takot, at/o matinding lungkot kapag naiisip ko ang pamumuhay na may diabetes.	1	2	3	4	Feeling angry, scared and/or depressed when I think about living with diabetes.		
5. Pakiramdam ko ay hindi ako nabibigyan ng aking doktor ng malinaw na tuntunin kung paano pangangalagaan ang aking diabetes.	1	2	3	4	Feeling that my doctor doesn't give me clear enough directions on how to manage my diabetes.		
6. Pakiramdam ko ay hindi ko nasusuri nang madalas ang aking asukal sa dugo.	1	2	3	4	Feeling that I am not testing my blood sugars frequently enough.		
7. Pakiramdam ko ay magkakaroon ako ng seryosong pangmatagalang komplikasyon, kahit na ano ang gawin ko.	1	2	3	4	Feeling that I will end up with serious long-term complications, no matter what I do.		
8. Pakiramdam ko ay madalas na hindi ako nakakasunod sa aking pang-araw araw na gawain ng may diabetes.	1	2	3	4	Feeling that I am often failing with my diabetes routine.		
9. Pakiramdam ko ay hindi ako sinusuportahan ng aking mga kaibigan o pamilya sa mga pagsisikap kong maalagaan ang aking sarili (hal., nagpaplano sila ng mga aktibidad na hindi tugma sa aking iskedyul, hinihikayat akong kumain ng mga “bawal” na pagkain).	1	2	3	4	Feeling that friends or family are not supportive enough of self-care efforts (e.g. planning activities that conflict with my schedule, encouraging me to eat the "wrong" foods).		
10. Pakiramdam ko ay kinokontrol ng diabetes ang aking buhay.	1	2	3	4	Feeling that diabetes controls my life.		
11. Pakiramdam ko ay hindi sineseryoso ng aking doktor ang aking mga alalahanin.	1	2	3	4	Feeling that my doctor doesn't tak my concerns seriously enough.		
12. Pakiramdam ko ay hindi ako nakakasunod sa maayos na meal plan o plano sa pagkain.	1	2	3	4	Feeling that I am not sticking closely enough to a good meal plan.		
13. Pakiramdam ko ay hindi nakikita ng aking mga kaibigan o pamilya kung gaano kahirap mabuhay na may diabetes.	1	2	3	4	Feeling that friends or family don' appreciate how difficult living with diabetes can be.		
14. Pakiramdam ko ay nabibigatan ako sa mga dapat gawin ng taong nabubuhay na may diabetes.	1	2	3	4	Feeling overwhelmed by the demands of living with diabetes.		
15. Pakiramdam ko ay wala akong doktor na regular kong mapupuntahan tungkol sa aking diabetes.	1	2	3	4	Feeling that I don't have a doctor who I can see regularly enough about my diabetes.		
16. Hindi ako nakakaramdam ng motibasyon para mapanatili ko ang aking pangangalaga sa sarili ng may diabetes.	1	2	3	4	Not feeling motivated to keep up my diabetes self management.		
17. Pakiramdam ko ay hindi ako binibigyan ng aking mga kaibigan o pamilya ng ninanais kong emosyonal na suporta.	1	2	3	4	Feeling that friends or family don't give me the emotional support that I would like.		

Appendix B. Filipino Diabetes Distress Scale (DDS-17)

Panuto: Mahirap minsan ang mabuhay nang may diabetes. Maraming problema at abala kaugnay ng diabetes at maaaring mag-iba ang antas ng kalubhaan nito. Ang mga problema ay maaaring mga maliliit na abala lamang hanggang sa malalaking kahirapan sa buhay. Nakalista sa ibaba ang 17 potensyal na mga problem areas o lugar ng problema na maaaring maranasan ng mga taong may diabetes. Isaalang-alang ang antas kung saan ang bawat isa sa mga 17 item ay maaaring nagdulot ng pagkabahala o nakaabala sa inyo SA NAKARAANG BUWAN at bilugan ang angkop na numero.

Paalala lang na nais naming ipakita ninyo ang antas kung saan ang bawat item ay maaaring nakakaabala sa inyong buhay, at HINDI lamang kung totoo ang bawat item sa inyo. Kung sa tingin ninyo ay hindi nakakaabala ang isang partikular na item sa inyo o hindi ito problema para sa inyo, bilugan ang 1. Kung talagang nakakaabala ito sa inyo, maaaring bilugan ang 6.

	Hindi problema	Maliit na problema	Katamtamang problema	Medyo seryosong problema	Seryosong problema	Napakaseryosong problema
1. Pakiramdam ko ay kinukuha ng diabetes ang marami sa aking pag-iisip at pisikal na lakas araw-araw.	1	2	3	4	5	6
2. Pakiramdam ko ay hindi sapat ang kaalaman ng aking doktor tungkol sa diabetes at pangangalaga sa diabetes.	1	2	3	4	5	6
3. Pakiramdam ko ay hindi ako kampante sa aking pang-araw-araw na kakayahan para mapangalagaan ang diabetes.	1	2	3	4	5	6
4. Nakakaramdam ako ng galit, takot, at/o matinding lungkot kapag naiisip ko ang pamumuhay na may diabetes.	1	2	3	4	5	6
5. Pakiramdam ko ay hindi ako nabibigyan ng aking doktor ng malinaw na patakaran kung paano pangangalagaan ang aking diabetes.	1	2	3	4	5	6
6. Pakiramdam ko ay hindi ko nasusukat nang madalas ang aking asukal sa dugo.	1	2	3	4	5	6
7. Pakiramdam ko ay magkakaroon ako ng seryosong pangmatagalang komplikasyon, kahit na ano ang gawin ko.	1	2	3	4	5	6
8. Pakiramdam ko ay madalas na hindi ako nakakasunod sa aking pang-araw araw na gawain ng may diabetes.	1	2	3	4	5	6
9. Pakiramdam ko ay hindi ako sinusuportahan ng aking mga kaibigan o pamilya sa mga pagsisikap kong maalagaan ang aking sarili (hal., nagpaplano sila ng mga aktibidad na hindi tugma sa aking iskedyul, hinihikayat akong kumain ng mga “bawal” na pagkain).	1	2	3	4	5	6
10. Pakiramdam ko ay kinokontrol ng diabetes ang aking buhay.	1	2	3	4	5	6
11. Pakiramdam ko ay hindi sineseryoso ng aking doktor ang aking mga alalahanin.	1	2	3	4	5	6
12. Pakiramdam ko ay hindi ako nakakasunod sa tama or wastong pagkain	1	2	3	4	5	6
13. Pakiramdam ko ay hindi nauunawaan ng aking mga kaibigan o pamilya kung gaano kahirap mabuhay na may diabetes.	1	2	3	4	5	6
14. Pakiramdam ko ay nabibigatan ako sa mga dapat gawin ng taong may diabetes.	1	2	3	4	5	6
15. Pakiramdam ko ay wala akong doktor na regular kong mapupuntahan para sa aking diabetes.	1	2	3	4	5	6
16. Hindi ako nakakaramdam ng motibasyon o gana para sa pangangalaga ng aking diabetes.	1	2	3	4	5	6
17. Pakiramdam ko ay hindi ako binibigyan ng aking mga kaibigan o pamilya ng ninanais kong emosyonal na suporta.	1	2	3	4	5	6