Cross-cultural Visayan Translation and Validation of Beck's Depression Inventory Scale Among Ambulatory Maintenance Hemodialysis at a Tertiary Training Hospital in Southern Mindanao, Philippines (BDI-VISAYAN)

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ABSTRACT

Research Question: Is Beck's Depression Inventory Scale – Visayan (BDI-Visayan) an accurate and reliable depression screening tool among ambulatory hemodialysis patients validated against Semi-structured Clinical Interview for Depression for DSM IV?

Background: Depressed dialysis patients are twice likely to die or require hospitalization. Unfortunately, there is a lack of a depression screening tool validated for Filipino patients.

Objectives: Development and validation of Beck's Depression Inventory Scale -Visayan version as a depression screening tool for ambulatory maintenance hemodialysis Filipino patients.

General Study Design: This is a cross-cultural instrument translation and cross-sectional validation study.

Participants: Using non-probability convenient sampling, patients >18years old with eGFR <60mL/min/1.73m2 based on CKD-Epi equation and on hemodialysis for ≥3 months were enrolled. Patients with hearing, speech or cognitive deficits, acute kidney injury, dementia, delirium or psychiatric disorders were excluded.

Interventions: BDI Visayan was developed using combined translation technique with depression defined as a score of ≥14.

Outcome measures: Structured Clinical Interview for Depression (SCID) for DSM IV was used as the gold standard.

Analysis: Sensitivity, specificity, predictive values, and likelihood ratios of BDI-Visayan were compared to SCID. Cronbach's alpha, Receiver Operator Characteristics and Area Under the Curve were used to determine reliability, optimal cut-off score, and overall accuracy, respectively.

Results: BDI-Visayan has high reliability with Cronbach's alpha of 0.904 and an accuracy of 0.80 AUC. The optimal cut-off for BDI-Visayan for major depressive disorder for ambulatory hemodialysis patients is 20 with 75% sensitivity, 55% specificity, 22% positive predictive value, 93% negative predictive value, 3.92 positive likelihood ratio, and 0.31 negative likelihood ratio.

Conclusions: BDI Visayan is a reliable and accurate depression screening tool for ambulatory maintenance hemodialysis Filipino patients with higher specificity at an optimum cut-off score of 20.

INTRODUCTION

There is a marked increase in the incidence and prevalence of chronic kidney disease (CKD) worldwide.[1] In 2017, the prevalence of CKD was 9.1% (657 million cases) in the world's population and was ranked 12th leading cause of death (1.2 million cases) worldwide.[2] This is estimated to double by 2040.[2] In the Philippines, 9.3 million Filipinos suffer from CKD.

The chronicity and irreversibility of CKD greatly put these patients at risk for psychiatric disorders with depression being the most common.[3] Factors such as unemployment and low income are strongly associated with depression among these patients. Approximately 20% of patients with CKD suffer from depression with 45% of those on initiation hemodialysis experiencing depressive symptoms.[4]

There is a strong and statistically significant association between depression status and overall mortality rate in

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CKD patients.[5] Depressed patients on maintenance dialysis are twice likely to die or require further hospital management.[6,7] Moreover, those depressed CKD patients are less likely to adhere to treatment. Unfortunately, there is only one unpublished study on the prevalence of depression among Filipino CKD patients.[8] There is also a lack of a depression screening tool validated for the Filipino patient.[9,10] Most Western studies use the Beck Depression Inventory (BDI), Beck Depression Inventory-Short Form (BDI-SF), or the Hamilton Depression Rating Scale with no validated Filipino version.[3–5,11–15] Of these, BDI has been widely validated among CKD patients.[4,11–20]

Here, we report the cross-cultural translation to Visayan language and validation study of a Beck's Depression Inventory Scale as a screening tool for depression among ambulatory Filipino patients with end-stage renal disease on maintenance hemodialysis seen at a tertiary training hospital in Southern Mindanao Philippines. Specifically, the sensitivity, specificity, predictive values, likelihood ratios, reliability, optimal cut-off score, and overall accuracy were determined.

METHODS

Study Participants. This is a cross-cultural instrument translation and cross-sectional validation study.

Between August 2019 to May 2020 and using a non-probability purposive sampling, ambulatory hemodialysis patients at St. Elizabeth Hospital, Inc. were included in the study. Eligible patients were those: >18years old, with eGFR <60mL/min/1.73m^2 as measured using the Chronic Kidney Disease Epidemiology Collaboration (CKD-Epi) equation, and undergoing hemodialysis for at least 3 months. Patients who had a hearing, speech, or cognitive deficit that would impair their ability to understand the questionnaire were excluded. Additionally, those with psychiatric disorders were excluded from the study. The BDI Visayan instrument was read to the patients with the researcher recording the answers or it was answered by the patient. Within 2 weeks apart, enrolled patients were scheduled to answer the Visayan version of Beck's Depression Inventory Scale (BDI Visayan) and underwent the Structured Clinical Interview for Depression conducted by a psychiatrist who was blinded to the BDI Visayan score.

The study was approved by the Research and Ethics Committee of the St. Elizabeth Hospital, Inc. Department of Internal Medicine. All attending nephrologists gave verbal permission to have their patients approached for study enrolment. All participants gave their written informed consent.

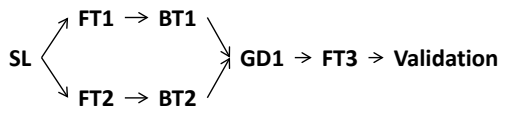

Figure 1. Modified Jones's combined translation technique. SL = source language; FT = forward translation; BT = back translation; GD = group discussion.

Index Test. The BDI is a 21-item self-administered questionnaire that is one of the most popular and sensitive screening tools for depression worldwide. It has been used in more than 9,000 studies, in both general and ESRD populations.[11,14,15] It was originally developed in 1966 and has undergone 2 revisions. The latest version, BDI-II, reflects the 9 core criteria for depression in both DSM IV and DSM V.[21–23] The BDI has both cognitive-affective aspects of depression (e.g. satisfaction with life and guilt) and somatic aspects (e.g. sleep disturbance and health concerns).[19] Each item is scored on a four-point scale of 0 to 3, with a total score of 0 to 63. A total score of 0 to 13 is considered minimal depression, 14 to 19 suggests mild depression, 20 to 28 suggests moderate depression and ≥29 suggests severe depression.[24]

Several validation studies of BDI on ESRD samples yielded different cut-off scores of 8,[25] 10,[11,20] 14,[14] and 18.[16]

Reference Test. The Structured Clinical Interview for DSM-4 (SCID) is a semi-structured interview created to make reliable psychiatric diagnoses in adults according to the Diagnostic and Statistical Manual, fourth edition (DSM-IV).[26] Researchers have developed and relied on these interviewers since the 1970s. These interviews have become the gold standard for all psychiatric research to increase the reliability of diagnostic assessment and minimize clinical judgment that could lead to unreliable diagnoses.[27] Inter-rater and test-retest reliability studies on SCID I for DSM 4 show fair-good to excellent reliabilities.[28] There are over 2,600 search results in PUBMED for "structured clinical interview for DSM IV depression."[29] In a review involving 118 articles on Beck's Depression for Inventory-II, SCID was widely used as the gold standard in determining the optimum cut-off score.[15] The average sensitivity and specificity were 85% and 92%, respectively for the Structured Clinical Interview for DSM-IV Axis-I Disorders (SCID-I).[26] DSM-IV SCID-I was selected instead of SCID-5 for two reasons: 1) most of the reliability studies of SCID were based on DSM-III and DSM-IV versions of SCID, and 2) DSM-5 field trials have yielded the lowest ever reported interrater agreement between clinicians for the MDD diagnosis.[22,30]

Tool Development. There are several combinations of translation techniques in cross-cultural research studies and there is no gold standard.[31,32] The process of translation and the differences in the combination depends on the research questions and availability of bilingual translators for each study.[33] This study followed a combined translation technique to maintain the content equivalences between original and translated screening tools.

In this study, we modified the combined translation technique proposed by Jones.[31] Here, the original English version of BDI-II was submitted to two bilingual translators of the Ateneo De Davao Language Center for

Table I. Languages of the translators and reviewers.

Role	Languages Spoken	Other relevant qualification
Translator 1	Cebuano (Davao)*, English, Tagalog	Ateneo De Davao University Language Center Faculty
Translator 2	Cebuano (Davao)*, English, Tagalog	Ateneo De Davao University Language Center Faculty
Translator 3	Cebuano (Davao),* English, Tagalog	Ateneo De Davao University Language Center Faculty
Translator 4	Hiligaynon (South Cotabato),* English, Tagalog	University of Mindanao Institute of Languages Faculty
Reviewer 1	Hiligaynon (South Cotabato),* English, Tagalog, Cebuano (South Cotabato)	Hematologist-Oncologist
Reviewer 2	Chavacano (Zamboanga),* English, Tagalog, Cebuano (South Cotabato)	Nephrologist
Reviewer 3	Cebuano (South Cotabato),* English, Tagalog	Psychiatrist
Reviewer 4	Hiligaynon (Iloilo),* English, Tagalog, Cebuano (South Cotabato)	Renal Nurse
Reviewer 5	Cebuano (Davao),* English, Tagalog, Hiligaynon (Iloilo and South Cotabato)	Medical Resident, studied in Iloilo City for 7 years
Reviewer 6	Cebuano (Davao),* English, Tagalog, Cebuano (Cebu)	Medical Resident, studied in Cebu City for 4 years

forward translation to the spoken Visayan language (*Figure 1*). These translations were then submitted to two different bilingual translators (one from the Ateneo De Davao Language Center, one from the Language Discipline of the University of Mindanao) who were not aware of the original English version for backward translation. All source language text and translated texts were then forwarded to a committee of bilingual persons who were also medical workers (1 hematologist-oncologist, 1 psychiatrist, 1 nephrologist, 1 renal nurse, and 2 internal medicine residents). This composition aimed to preserve the medical concepts related to depression as spoken in the Visayan language in Southern Mindanao Philippines. After discussing the differences in the terms and texts, a consensus version was arrived at and subjected to validation study.

Statistical Analysis. Participants were classified as depressed or not depressed using the SCID by a Fellow of the Philippine Psychiatric Association. The sensitivity, specificity, predictive values, and likelihood ratio of BDI-VISAYAN were compared to SCID. The reliability was determined using Cronbach's alpha. The optimal cut-off score for BDI-VISAYAN was determined using the

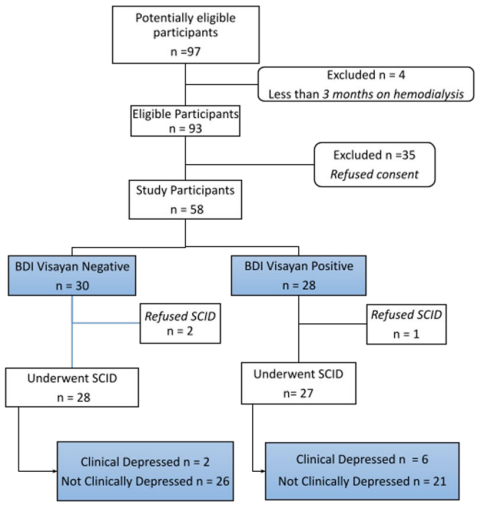

Figure 2. Study participant flow diagram at BDI cut-off score of 14 used for the non-psychiatric, non-medical population.[24]

Receiver Operator Characteristic (ROC) Curve. Optimal cut-off score was defined as that score with the highest true positive rate and lowest false positive rate.[34] The overall accuracy of the screening tool was determined by computing for Area Under the Curve (AUC) using the trapezoidal area formula. Statistical tests determining significant difference were analyzed as two-tailed with a p-value <0.05 at 95% confidence interval.

RESULTS

Qualification of Translators and Reviewers. The process of cross-cultural translation started with blinded bilingual translators who were all members of the academe and whose mother language was Visayan as spoken in the southern Mindanao region (*Table I*). All language professors teach English in their respective institutions and grew up in Davao or South Cotabato. The members of the review committee were bilingual medical experts. Both hematologist-oncologist and renal nurse had Hiligaynon as their mother tongue but could conveniently understand and speak Cebuano. The nephrologist had Chavacano as her mother tongue but could also speak Cebuano. The psychiatrist and 2 internal medicine residents have Cebuano as their mother tongue. One of the internal medicine residents studied medicine in Cebu City (place of origin of the Cebuano language) while the other one studied in Iloilo City (place of origin of Hiligaynon language). All 3 medical consultants (hematologist-oncologist, nephrologist, and psychiatrist) have been practicing for >10 years in General Santos area where the prevalent languages are Cebuano and Hiligaynon[35]. All members are fairly fluent in the use of the English language being the major medium of instruction in the Philippines.

The composition of the committee ensured that key medical and psychiatric concepts were not lost in the translation process. It also provided a means to arrive at

Table II. Key psychiatric concepts and English terms in BDI-II with equivalent Visayan terms used in BDI-VISAYAN.

Psychiatric Concept in BDI-II	Key English Term/Phrase	Visayas Term/Phrase
1. Depressed Mood	"sad" or "sadness"	"subo" or "kasubo"
2. Pessimism	"discouraged" or "hopeless"	"nawad-an ug paglaum", "nawad-an ug kadasig"
3. Past Failure	"failure"	"pakyas", "kapakyasan"
4. Loss of Pleasure	"I don't enjoy things" or "I get little pleasure"	"wala ko nalipay sa mga bagay" or "gamay lang na kalipay akong makuha"
5. Guilty Feelings	"guilty" or "I feel guilty"	"gibati nga sad-an"
6. Punishment Feelings	"punished" or "being punished"	"gisilotan" or "ginasilotan"
7. Self-dislike	"Loss of confidence", "disappointed", or "dislike myself"	"Nawala ang kumpiyansa sa sarili, "dismayado", kaugalingon" "wala ganahi sa kaugalingon
8. Self-criticalness	"Criticize or blame myself"	"sawayon o basolon ang akong kaugalingon"
9. Suicidal Thoughts or Wishes	"Thoughts of killing myself", "kill myself"	"mga huna-huna nga magpakamatay" or "magpakamatay ko"
10. Crying	"cry"	"nagahilak"
11. Agitation	"restless" or "wound up"	"langas (wala mahimutang)"
12. Loss of Interest	"Lost interest in other people or things"	"nawad-an na ko ug interes sa ubang mga tawo o bagay"
13. Indecisiveness	"Difficulty making decisions"	"maglisod og desisyon"
14. Worthlessness	"worthless" useful" or "not	"walay pulos or"di na kayo ko makatabang o mapuslan"
15. Loss of Energy	"I don't have enough energy"	"Wala koy igo na kusog/kalagsik"
16. Insomnia	"Changes in pattern" sleeping	"kabag-ohan sa akong pagtulog"
17. Irritability	"irritable"	"saputon"
18. Changes in Appetite	"Changes in appetite"	"kabag-ohan sa akong gana sa kaon"
19. Concentration Difficulty	"can't concentrate" or "hard to keep my mind on anything"	"dili nako makahuna-huna" or "lisod para nako ang maghuna-huna ug dugay sa mga bagay"
20. Tiredness or Fatigue	"tired" or "fatigued"	"kapoy" or "kapuyon"
21. Loss of Interest in Sex	"Less interest in sex"	"dili na kaayo ko interesado sa pakighilawas"

Table III. Demographic characteristics comparing depressed and non-depressed using SCID (N = 55).

General Characteristics	Number (%)	Depressed n = 8	Non-depressed n = 47	*p* Value
Age				0.439[a]
Young Adult (18-35years old)	4 (7.3)	1	3	
Middle Adult (36-45 years old)	6 (10.9)	0	6	
Late Adult (>45 years old)	45 (81.8)	7	38	
Mean (±SD)	59.04 (±15.04)			
Sex				0.718[a]
Male	31 (56.4)	4	27	
Female	24 (43.6)	4	20	
Marital Status				0.279[a]
Single	6 (10.9)	2	4	
Married	41 (74.5)	5	36	
Widow/er	8 (14.5)	1	7	
Level of Education				1.000[a]
Elementary	5 (9.1)	1	4	
High School	16 (29.1)	2	14	
Vocational	4 (7.3)	0	4	
College	30 (54.5)	5	25	
Employment				0.945[a]
Self-employed	10 (18.2)	2	8	
Unemployed	25 (45.5)	4	21	
Public/Privately Employed	5 (9.1)	0	5	
Retired/Disability Benefit	15 (27.3)	2	13	
Housing				0.477[a]
With family	51 (92.7)	7	44	
Alone	4 (7.3)	1	3	
Family Income (Pesos)				0.494[a]
Poor (<10,000)	2 (3.6)	1	1	
Low income (10,001 to 30,000)	12 (21.8)	2	10	
Lower Middle Income (30,0001 - 60,000)	27 (49.1)	3	24	
Middle/Upper Middle Income (>60,000)	14 (25.5)	2	12	

Visayan terms with common meaning across dialects of Cebuano and Hiligaynon. Having two or more translators (from different areas where the Visayan language is used) independently but simultaneously develop target versions for back-translation is a recommended approach in cross-cultural translation.[31]

The group's discussion mostly revolved in selecting the Visayan term or phrase that is understood similarly across the different regional origins of the Visayan language and still convey the psychiatric meaning of the terms. *Table II* shows these Visayan terms or phrases.

Subject Characteristics

The translated instrument BDI Visayan was then tested to ambulatory hemodialysis patients of St. Elizabeth Hospital, Inc. Hemodialysis Unit. Of the 97 ambulatory hemodialysis patients seen from August 2019 to May 2020, 4 were excluded since they were on hemodialysis for less than 3 months. Fifty-five (or 56%) of the 93 eligible patients consented to participate in the study (*Figure 2*).

Table IV. Clinical Characteristics of Patients

Clinical Characteristics	Mean (Std Dev)	Depressed	Non-Depressed	p Value
Creatine, mg/dL eGFR via CKD EPI (ml/mm/1.73 m2)	9.96 (± 4.36) 5.48 (± 2.57)	8.66 (± 6.18) 7.54 (± 3.80)	10.19 (± 4.01) 5.11 (± 2.14)	0.060[b] 0.080[b]
Hemoglobin, g/dL <100, g/dL	99.33 (± 15.11) 86.85 (± 8.62)	99.88 (± 17.03) 87.00 (± 5.16)	99.24 (± 14.96) 86.82 (± 9.19)	0.914[c] 0.970[c]
Months on hemodialysis	26.93 (± 31.60)	37.88 (± 45.52)	25.06 (± 28.85)	0.459[b]
No. of hospitalizations in past 6 months	0.40 (± 0.68)	0.25 (± 0.46)	0.43 (± 0.72)	0.699[b]
Personally-Consented to HD Initiation Yes No	Number (%) 32 (55.2) 26 (44.8)	 4 4	 27 20	0.492[b]
Actively Processing for Kidney Transplant Yes No	Number (%) 5 (9.1) 50 (90.9)	 2 6	 3 44	0.149[b]
Number of comorbidities 1-2 ≥3	Number (%) 41 (74.5) 14 (25.5)	 6 2	 35 12	1.000[b]
BDI Score	Mean (SD) 15.25 (±10.84)	26.13 (±11.07)	14.35 (±9.72)	*0.006[b]

[a] Fischer's Exact test, [b] Mann-Whitney U test, [c] Independent t-test, * statistically significant

Table V. Frequencies of comorbidities and impairment (N=55).

Comorbidities & Impairment	Number (%)	Depressed n = 8	Non-depressed, n = 47
Hypertension	35 (63.6)	5	30
Diabetes Mellitus 2	30 (54.5)	5	25
Visual Impairment	11 (20.0)	1	10
Cardiac Disease	4 (7.3)	0	4
Walking Impairment	3 (5.5)	1	2
CGN	6 (10.9)	1	5
Hep B Infection	3 (5.5)	0	3
PTB	2 (3.6)	1	1
Urate	3 (5.5)	0	3
Cerebrovascular Disease	2 (3.5)	0	2
Kidney mass	1 (1.8)	1	0
Liver Disease	1 (1.8)	0	1
Pulmonary Lobectomy	1 (1.8)	0	1
PCKD	1 (1.8)	0	1
TIN	1 (1.8)	0	1

Of these, 3 patients were excluded since they did not proceed with the interview by the psychiatrist. A total of 8 (or 18%) were identified to have major depression by the psychiatrist.

Forty-five (or 81.8%) of the 55 subjects were late adults (>45 years old) with a mean age of 59 years old (*Table III*). The youngest was 24 years old and the oldest was 84 years old. The majority were male (56.4%), married (74.5%), college-level (54.5%), middle-income earners (75.9%), and lived with their family (92.7%). A large proportion of them were unemployed (45.5%) or on disability/retirement benefits (27.3%).

Mean creatinine was 9.96 mg/dl with a mean eGFR of 5.48 ml/mm/1.73m2. Twenty-nine (or 50%) had a hemoglobin of less than 100g/dL. The average hemoglobin was 99.33 g/dL with a range of 66 g/dL to 134 g/dL (*Table IV*). All patients belong to CKD stage 5 and, on average, were on hemodialysis for 26 months with 1 hospitalization in the last 6 months. The majority of the patients personally consented to the initiation of hemodialysis (55.2%), were not actively processing for a kidney transplant (90.9%), and had 1-2 non-renal comorbidities (74.5%). Hypertension (63.8%) and diabetes mellitus type 2 (56.9%) were the most prevalent comorbidities (*Table V*).

Statistical analysis did not show a significant difference in the prevalence of depression based on a patient's sociodemographic and clinical characteristics. Depressed patients have a significantly higher mean BDI score of 26.13 (±11.07) compared to 14.35 (±9.72) of non-depressed patients.

Validation Parameters, Reliability, Accuracy, and Optimum Cut-off Score

The mean BDI-VISAYAN score was 15.25 (±10.84) with a lowest score of 0 and a maximum score of 54. Reliability was high with a Cronbach's alpha of 0.904. When using the original BDI cut-off score for the general population of 14, BDI-VISAYAN has 75% sensitivity, 55% specificity, 22% positive predictive value, 93% negative predictive value, 1.7 positive likelihood ratio, and 0.45 negative likelihood ratio (*Table VI*). Using the ROC Curve of this study (*Figure 3*), the optimum cut-off score is 20 with 75% sensitivity, 81% specificity, 40% positive predictive value, 95% negative predictive value, 3.92 positive likelihood ratio, and 0.31 negative likelihood ratio. (*Table 6*). The false-positive rate is reduced from 45% to 19%.

The accuracy based on the AUC is 0.80.

Acceptability and Response Burden

All participants completely answered the 21-item questionnaire with no question rated "difficult" for the subjective burden of answering it. Forty-one (or 75%) rated the burden of answering as "moderate".

DISCUSSION

To our knowledge, this is the first cross-cultural translation of BDI into the Visayan language as spoken in the Southern Mindanao area covering the provinces of South Cotabato, North Cotabato, Sarangani, and General Santos City, Philippines. A search on Acta Medica Philippina managed by the University of the Philippines

Table VI. Confusion (2x2) table of BDI-VISAYAN versus SCID using the original cut-off score of 14.[24]

BDI-VISAYAN Score	Depressed	Not Depressed	Total	Predictive Value	Likelihood Ratio
≥14	6	21	27	22%	1.70
<14	2	26	28	93%	0.45
Total	8	47	55		
	Sensitivity 75%	Specificity 55%			

Table VII. Confusion (2x2) table of BDI-VISAYAN versus SCID using the optimum cut-off score 20.

BDI-VISAYAN Score	Depressed	Not Depressed	Total	Predictive Value	Likelihood Ratio
≥20	6	9	15	40%	3.92
<20	2	38	40	95%	0.31
Total	8	47	55		
	Sensitivity 75%	Specificity 81%			

Manila did not return articles using the terms "depression AND hemodialysis" or "depression AND renal disease".[9]

An unpublished abstract done in Baguio General Hospital and Medical Center used Hospital Anxiety and Depression Scale (HADS) to screen depression among CKD patients.[8] It did not mention any cross-cultural translation or validation of said screening tool. A query from the Institute of Psychiatry and Behavioral Medicine of the Southern Philippines Medical Center, the largest training hospital in the Philippines[36], also confirmed the absence of a depression screening tool in the Visayan language.

Cross-Cultural Translation

The adaptation of a previously validated and widely accepted psychometric tool saves time and effort. This also allows cross-cultural comparison of the prevalence of the disease being measured (e.g. the depression being defined similarly across different cultures). For an instrument to be considered valid, these tools must be culturally acceptable and appropriately translated.[37] The process of translation aims to preserve content equivalence across cultures and relies heavily on conceptual definition and contextual meaning. Generally, a direct translation of an instrument from one language to another does not guarantee content equivalence.[31] Employing back-translation of an instrument, such as Brislin's classic back-translation model, has been regarded as an essential and well-known method to maintain equivalence.[33]

The major weakness of Brislin's translation model is that it cannot project the number of independent bilingual translators needed until a final translated tool with

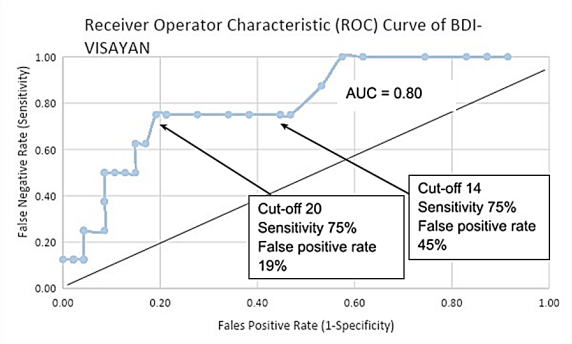

Figure 3. Receiver Operator Characteristic (ROC) Curve of BDI-VISAYAN.

content equivalence is achieved. This is problematic particularly in researches that require technical conceptual equivalence like in psychiatry. To address this, this study combined Brislin's translation model with the committee approach. In the committee approach, a group of bilinguals translates from the source language to the target language.[38] A group discussion takes place where concepts and terms were compared to arrive at a consensus term that best reflects the essential concepts of depression. This combined translation technique is an adaptation of the Jones translation model (*Figure 1*).

Conceptual Equivalence

Each of the 21 items in BDI-II corresponds to key psychiatric concepts of depression. These 21 concepts reflect the 9 core criteria of major depressive disorder found in DSM IV and DSM V (*Table VIII*).[22–24] Most of the English terms used in BDI-II have a direct translation in the Visayan language as shown in *Table II*.

Congruent to the time criteria for the diagnosis of major depressive disorder, the "Usage Directions" or "Direksyon sa Pag-gamit" of BDI-VISAYAN specifies a symptom duration over the past 2 weeks including the day of test administration ("Linginan ang statement nga mo-describe sa imong gibati o ginahuna-huna sa niaging duha ka-semana apil karong adlawa").

Prevalence and Risk Factors

This study noted an 18% prevalence of depression among ambulatory chronic hemodialysis patients. This is lower than previously reported prevalence rates of similar studies done in the United Kingdom (22%),[25] Taiwan (22.6%),[7] USA (22%[6] and 26%[4]), Brazil (41.6%),[12] and Iran (62%).[39] The lower prevalence rate can be attributed to a smaller sample size and lower event rate in this study. Also, some of the patients who participated in the study expressed concern in being prescribed another set of medications due to additional financial burdens. This economic aspect of depression, in addition to the inaccessibility of services, is an identified barrier to the help-seeking behavior of Filipinos in terms of mental health.[40] Other identified barriers include self and social stigma attached to mental health disorders, concern for the loss of face, sense of shame, and conformity to Asian

Table VIII. Diagnostic criteria for major depressive disorder by DSM V.

Criteria A–C represent a major depressive episode
A. Five (or more) of the following symptoms have been present during the same 2-week period and represent a change from previous functioning: at least one of the symptoms is either (1) depressed mood or (2) loss of interest or pleasure. 1. Depressed mood most of the day, nearly every day, as indicated by either subjective report (e.g., feels sad, empty, hopeless) or observation made by others (e.g., appears tearful) 2. Markedly diminished interest or pleasure in all, or almost all, activities most of the day, nearly every day (as indicated by either subjective account or observation) 3. Significant weight loss when not dieting or weight gain (e.g., a change of more than 5% of body weight in a month), or decrease or increase in appetite nearly every day 4. Insomnia or hypersomnia nearly every day 5. Psychomotor agitation or retardation nearly every day (observable by others, not merely subjective feelings of restlessness or being slowed down) 6. Fatigue or loss of energy nearly every day 7. Feelings of worthlessness or excessive or inappropriate guilt (which may be delusional) nearly every day (not merely self-reproach or guilt about being sick) 8. Diminished ability to think or concentrate, or indecisiveness, nearly every day (either by subjective account or as observed by others) 9. Recurrent thoughts of death (not just fear of dying), recurrent suicidal ideation without a specific plan, or a suicide attempt or a specific plan for committing suicide B. The symptoms cause clinically significant distress or impairment in social, occupational, or other important areas of functioning. C. The episode is not attributable to the physiological effects of a substance or to another medical condition. D. The occurrence of the major depressive episode is not better explained by schizoaffective disorder, schizophrenia, schizophreniform disorder, delusional disorder, or other specified and unspecified schizophrenia spectrum and other psychotic disorders. E. There has never been a manic episode or a hypomanic episode.

cultural norms where mental illness is not acceptable.[40] These barriers are also compounded by the sense of resilience and self-reliance of Filipinos.[40]

None of the sociodemographic and clinical characteristics showed a significant difference between depressed and non-depressed patients. This is supported by several other studies.[12,25,41] However, certain studies showed that unemployment, history of smoking, chronic obstructive pulmonary disease, history of psychiatric illness, and young age were more likely to have depressive symptoms.[4,41]

Performance, Reliability and Validity Parameters

The mean BDI-VISAYAN score of depressed patients is significantly higher than those who are not depressed. This higher score is attributed to the fact that uremic symptoms overlap with depressive symptoms. These overlapping symptoms include anorexia, insomnia, fatigue, and a lack of sexual interest. However, somatic symptoms of sleep disturbance, fatigue, concentration difficulty, and psychomotor retardation are more closely related to depression than with medical comorbidity.[15,41] Similarly, cognitive symptoms of guilt and suicidal ideation were more frequent with hemodialysis patients. The inclusive nature of BDI-II to cover both cognitive-affective and somatic aspects of depression[42] facilitates higher case detection, which is a good characteristic of a screening tool.

The reliability of BDI-VISAYAN based on internal consistency is high with Cronbach's alpha of 0.904. Simply, reliability is the extent to which a measure is the same each time it is performed and by whoever performs it.[43] Although reliability in itself is insufficient, validity is predicated upon reliability.[43] A highly reliable tool, therefore, is the first characteristic that must be considered in selecting psychometric tools.

The significantly higher BDI-VISAYAN score of depressed patients corresponded to a higher optimal cut-off score compared to the original BDI-II (i.e., cut-off score of 14) for the non-medical and non-psychiatric population.[15] The optimal cut-off for BDI-VISAYAN with the best diagnostic accuracy for major depressive disorder is 20 with 75% sensitivity, 55% specificity, 22% positive predictive value, and 93% negative predictive value (*Table VII*). Of all these performance parameters, sensitivity should be viewed as the most important indicator to minimize the chance of a false-negative diagnosis of depressive disorders.[15] Most validation studies of BDI have a sensitivity of ≥ 70%.[15,17] Only one of these involved hemodialysis patients and used SCID as a gold standard.[17] The cut-off score of 20 for BDI-VISAYAN offered a better performance compared to using the original cut-off score of 14 (*Table VI*). For the same level of sensitivity, the higher cut-off score offered 81% specificity and a positive likelihood ratio of 3.92; 55% and 1.7, respectively, when using the original cut-off score of 14. The higher cut-off score reduced the false positive rate to 19% from 45% (*Figure 3*)**.**

The accuracy of BDI-VISAYAN as reflected on AUC is 0.80. Previous validations of BDI on medical populations using SCID as the gold standard showed AUCs that are ≥0.83[15]. A similar validation on hemodialysis patients had an AUC of 0.937.[17] However, this study included into the depressed category all patients who had depressive disorder (i.e. dysthymia, minor depressive disorder). This present study only considered patients with major

depressive disorder as depressed. The lower prevalence of depression compounded by the small sample size also negatively affected the computed AUC.

Utility as an On-Dialysis Screening

BDI Visayan was used during a patient's dialysis session offering convenience to patients and caregivers. The concern that an on-dialysis depression screening could result in a high response burden is downplayed since none of the subjects considered answering BDI-VISAYAN difficult while 75% answered moderately burdened. A separate study also found high agreement between off-dialysis and on-dialysis BDI assessment.[25] The other advantages for on-dialysis screening are: (1) it captures more cases of depression; (2) it allows regular assessment at a time when patients are easily accessible; and (3) it addresses the limitation of clinical/psychiatric interviews not being done during on-dialysis, limiting the identification of depression.[25]

Limitations

The developed instrument BDI Visayan is not intended to be used for individuals who speak deep Cebuano as spoken in Cebu or Hiligaynon as spoken in Iloilo. The composition of the translators as well as the subjects involved in the study were selected with the goal of using the instrument to patients in Southern Mindanao particularly General Santos City and nearby localities. Also, the creation of this instrument does not preclude the use of the original English version for patients who are more comfortable with the English language. However, the availability of BDI Visayan simply allows reaching out to patients who prefer the prevalent language in Southern Mindanao.

CONCLUSION

This study was able to translate Beck's Depression Inventory-II (BDI-II) Scale for Depression into the Visayan language as spoken in the Southern Mindanao Philippines. An adaptation of Jones combined translation technique was used in the translation which included back-translation and committee approach.

The reliability of BDI-Visayan is high with good accuracy. The optimal cut-off for BDI-Visayan with the best diagnostic accuracy for major depressive disorder among ambulatory Filipino hemodialysis patients is 20. This corresponds to 75% sensitivity, 55% specificity, 22% positive predictive value, 93% negative predictive value, 3.92 positive likelihood ratio, and 0.31 negative likelihood ratio.

FUNDING SUPPORT

This study received funding from the Philippine Society of Nephrology Mindanao and St. Elizabeth Hospital, Incorporated.

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APPENDIX A

Beck's Depression Inventory Scale – Bisaya Version (BDI-VISAYAN)

DIREKSYON SA PAG-GAMIT

Mamahimong mahibaw-an kung naa kay depresyon paagi aning Beck's Depression Inventory. Kining pagbana-bana pedeng gitun-an gamit ang mga pasyenteng naga-hemodialysis na sa dili moubos 3 ka bulan. Linginan ang statement nga mo-describe sa imong gibati o ginahuna-huna sa niaging duha ka-semana apil karong adlawa. Makita ang basehan sa paggrado sa likod aning papel.

1. SADNESS
   - 0 Wala ko gibati ug kasubo.
   - 1. Gibati kog kasubo kasagaran.
   - 2. Masulub-on ko sa tanang panahon.
   - 3. Nasubo ko ug naguol pag-ayo ug dili na nako makaya.

2. PESSIMISM
   - 0 Wala ko nawad-an ug paglaum sa umaabot.
   - 1. Mas wala koy gibating paglaum para sa mga umaabot sa karon i-kumpara kaniadto.
   - 2. Wala ko galaum nga motarong pa ang mga bagay para nako.
   - 3. Gibati nako nga walay paglaum ang ugma ug mosamot pa kini.

3. PAST FAILURE
   - 0 Wala nako gibati nga usa ko ka kapakyasan.
   - 1. Napakyas ko makapila ka higayon labaw sa angay para nako.
   - 2. Kung motan-aw ko pagbalik ko sa akong kinabuhi, akong makit-an kay daghan kapakyasan.
   - 3. Akong nabati nga ako usa ka hingpit nga pakyas isip tawo

4. LOSS OF PLEASURE
   - 0 Wala magbag-o ang kalipay nga akong makuha sa mga bagay na akong gikalipayan kaniadto.
   - 1. Wala ko nalipay sa mga bagay sama sa akong naandan.
   - 2. Gamay lang na kalipay ang akong makuha sa mga bagay na akong naandan.
   - 3. Dili na ko makakuhag kalipay sa mga bagay na gikalingawan nako kaniadto.

5. GUILTY FEELINGS
   - 0 Wala nako gibati nga sad-an ko.
   - 1. Akong gibati nga sad-an ko sa daghang bagay nga akong nabuhat ug wala nabuhat.
   - 2. Akong gibati nga sad-an kaayo ko sa halos tanang panahon.
   - 3. Gibati nako nga sad-an ko sa tanang panahon.

6. PUNISHMENT FEELINGS
   - 0 Wala nako gibati nga ako gisilotan.
   - 1. Gibati nako nga mura kog gisilotan.
   - 2. Nagpaabot ko nga ako masilotan.
   - 3. Gibati nako nga ginasilotan ko.

7. SELF-DISLIKE
   - 0 Wala nako gibati ang pagkadismaya sa akong kaugalingon.
   - 1. Nawala akong kumpiyansa sa sarili.
   - 2. Dismayado ko sa akong kaugalingon.
   - 3. Wala ko ganahi sa akong kaugalingon.

8. SELF-CRITICALNESS
   - 0 Dili nako ginasaway o basol akong kaugalingon labaw sa naandan.
   - 1. Mas masinawayon ko sa akong kaugalingon labaw sa naandan.
   - 2. Kanunay nako sawayon o basolon ang akong kaugalingon tungod sa akong mga sayop.
   - 3. Akong basolon ang akong kaugalingon sa tanang dautan nga gakahitabo sa palibot.

9. SUICIDAL THOUGHTS
   - 0 Wala koy mga huna-huna nga magpakamatay.
   - 1. Duna koy mga hunahuna nga magpakamatay, pero dili nako ni buhaton.
   - 2. Gusto ko magpakamatay.
   - 3. Magpakamatay ko kung naa koy kahigayunan.

10. CRYING
    - 0 Dili ko nagahilak nga lapas sa kasagaran.
    - 1. Mas nagahilak ko karon kaysa naandan.
    - 2. Nagahilak ko maski sa gamay nga bagay.
    - 3. Gusto ko mohilak pero dili na ko makahilak.

11. AGITATION
    0 Dili ko mas langas (wala mahimutang) kumpara sa naandan.
    1. Mas langas ko (dili mahimutang) kumpara sa naandan.
    2. Langas o dili ko mahimutang nga halos dili ko maka-pundo sa isa ka lugar.
    3. Langas o dili ko mahimutang nga magkinahanglan nako mag-sigeg lihok o buhat ug mga bagay.

12. LOSS OF INTEREST
    0 Wala ko nawad-an ug interes sa ubang mga tawo o aktibidad.
    1. Dili na kaayo ko interesado sa ubang mga tawo o bagay sama kaniadto.
    2. Halos nawad-an na ko ug interes sa ubang mga tawo o bagay.
    3. Nawad-an na gyod ko ug interes sa ubang mga tawo o bagay.

13. INDECISIVENESS
    0 Muhimo ko ug desisyon kutob sa akong mahimo.
    1. Kasagaran kay maglisod ko ug desisyon
    2. Labaw nga lisod nako mag desisyon karon kumpara kaniadto
    3. Dili na gyod ko makahimo ug desisyon.

14. WORTHLESSNESS
    0 Wala nako gibati nga wala koy pulos.
    1. Kumpara kaniadto, di na kayo ko makatabang o mapuslan.
    2. Mas wala koy pulos kumpara sa uban.
    3. Wa la na jud koy pulos.

15. LOSS OF ENERGY
    0 Pareha ra akong kakusog/kalagsik kaniadto.
    1. Dili ko sama kakusog/kalagsik kaniadto.
    2. Wala koy kusog/kalagsik para maka-trabaho ug todo.
    3. Wala na koy kusog para makatrabaho ug masking unsa.

16. CHANGES IN SLEEPING PATTERN
    0 Walay kabag-ohan akong pagtulog
    1. Murag sige kog tulog sobra sa naandan. / Murag dili ko gatulog sama sa naandan.
    2. Mas sige kog tulog sobra sa naandan. / Mas dili ko gatulog sama sa naandan.
    3. Tulog ko halos tibuok adlaw. / Magmata ko 1-2 ka oras nga mas sayo ug dili nako makatulog balik.

17. IRRITABILTY
    0 Dili ko mas saputon kumpara kaniadto.
    1. Medyo mas dali ko masapot karon kay sa kasagaran.
    2. Kasagaran dali kaayo ko masapot o masuko.
    3. Gibati ko ug kasapot kanunay.

18. CHANGES IN APPETITE
    0 Wala ko kasinati ug kabag-ohan sa akong gana sa kaon.
    1. Murag mas wala koy gana ron. / Murag mas naa koy gana karon.
    2. Mas wala koy gana ron. / Mas kusog akong gana karon.
    3. Wala jud koy gana. / Sige ra kog pangita og makaon.

19. CONCENTRATION DIFFICULTY
    0 Makahuna-huna ra ko og klaro sama kaniadto.
    1. Dili nako makahuna-huna pareha ka klaro sama sa naandan.
    2. Lisod para nako ang maghuna-huna ug dugay sa mga bagay.
    3. Dili nako makahuna-huna ug dugay sa masking unsa.

20. FATIGUE
    0 Dili ko mas kapuyon kumpara sa naandan.
    1. Dali ko kapuyon kumpara sa akong naandan.
    2. Kapuyon ko sa halos tanang butang nga akong ginahimo.
    3. Gikapoy na kaayo ko para mubuhat pa ug maski unsa.

21. LOSS OF INTEREST IN SEX
    0 Wala ko nakamatikod ug kabag-ohan sa akong interes sa pakighilawas.
    1. Dili na kaayo ko interesado sa pakighilawas sama kaniadto.
    2. Wala nako halos gana sa pakighilawas.
    3. Nawad-an nako ug gana sa pakighilawas.

PAG-INTERPRET SA BDI-VISAYAN

Karon nga nakompleto na nimo ang mga pangutana, i-total ang imong puntos sa matag usa sa 21 ka pangutana pinaagi sa pag-ihap sa numero sa tuo sa matag pangutana. Ang puntos nga ≥20 nangahulogan na nay dakong posibilidad nga ikaw nay depression ug ginaawhag ang pag-konsulta sa doctor bahin niini.

Appendix B.

Validity characteristics of BDI-VISAYAN on selected cut-offs.

BDI-VISAYAN Cut-Off Scores	True Positive	False Positive	False Negative	True Negative	Sensitivity	Specificity	PPV	NPV	False Positive Rate (1-spec)
4	8	43	0	4	1.00	0.09	0.16	1.00	0.91
5	8	41	0	6	1.00	0.13	0.16	1.00	0.87
6	8	41	0	6	1.00	0.13	0.16	1.00	0.87
7	8	39	0	8	1.00	0.17	0.17	1.00	0.83
8	8	35	0	12	1.00	0.26	0.19	1.00	0.74
9	8	29	0	18	1.00	0.38	0.22	1.00	0.62
10	8	27	0	20	1.00	0.43	0.23	1.00	0.57
11	7	25	1	22	0.88	0.47	0.22	0.96	0.53
12	6	22	2	25	0.75	0.53	0.21	0.93	0.47
13	6	21	2	26	0.75	0.55	0.22	0.93	0.45
14	6	21	2	26	0.75	0.55	0.22	0.93	0.45
15	6	18	2	29	0.75	0.62	0.25	0.94	0.38
16	6	16	2	31	0.75	0.66	0.27	0.94	0.34
17	6	13	2	34	0.75	0.72	0.32	0.94	0.28
18	6	10	2	37	0.75	0.79	0.38	0.95	0.21
19	6	10	2	37	0.75	0.79	0.38	0.95	0.21
20	6	9	2	38	0.75	0.81	0.40	0.95	0.19
21	5	8	3	39	0.63	0.83	0.38	0.93	0.17
22	5	7	3	40	0.63	0.85	0.42	0.93	0.15
23	4	7	4	40	0.50	0.85	0.36	0.91	0.15
24	4	6	4	41	0.50	0.87	0.40	0.91	0.13
25	4	5	4	42	0.50	0.89	0.44	0.91	0.11
26	4	4	4	43	0.50	0.91	0.50	0.91	0.09
27	4	4	4	43	0.50	0.91	0.50	0.91	0.09
28	3	4	5	43	0.38	0.91	0.43	0.90	0.09
29	3	4	5	43	0.38	0.91	0.43	0.90	0.09
30	3	4	5	43	0.38	0.91	0.43	0.90	0.09
31	2	4	6	43	0.25	0.91	0.33	0.88	0.09
32	2	2	6	45	0.25	0.96	0.50	0.88	0.04
33	2	2	6	45	0.25	0.96	0.50	0.88	0.04
34	2	2	6	45	0.25	0.96	0.50	0.88	0.04
35	2	2	6	45	0.25	0.96	0.50	0.88	0.04
36	1	2	7	45	0.13	0.96	0.33	0.87	0.04
37	1	2	7	45	0.13	0.96	0.33	0.87	0.04