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Comparison of the SF-36 Five-item Mental Health Inventory and Beck Depression Inventory for the screening of depressive symptoms in chronic dialysis patients

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ABSTRACT

Background The Beck Depression Inventory (BDI) is a standard and validated questionnaire to screen for depressive symptoms in chronic dialysis patients, but is relatively extensive to use repeatedly in clinical practice. We investigated whether the five-item Mental Health Inventory (MHI-5) of the 36-item Short-Form Health Survey Questionnaire (SF-36) could be applied to screen for depressive symptoms in dialysis patients. Moreover, we determined the optimal MHI-5 cut-off score to assess depressive symptoms.

Methods Chronic dialysis patients from three centres filled out the SF-36 and the BDI. A Receiver Operating Characteristic (ROC) curve was constructed for the MHI-5 score with BDI ≥ 16 as reference standard to (1) calculate the area under the curve to determine whether the MHI-5 could be considered as a useful screening instrument for depressive symptoms and (2) proxy the optimal cut-off score of the MHI-5 to assess depressive symptoms. The optimal cut-off score was determined by the value for which the sum of sensitivity and specificity had an optimum.

Results Of 133 included patients, 23% had depressive symptoms as determined with BDI ≥ 16 . The correlation of the BDI with MHI-5 was -0.64. The area under the ROC curve was 0.82 (95% confidence interval 0.74-0.90). The optimal cut-off point of the MHI-5 was 70. MHI-5 ≤ 70 had 77% sensitivity, 72% specificity, 44% positive predicting value and 91% negative predicting value with the presence of depressive symptoms determined with BDI ≥ 16 .

Conclusion The MHI-5 may help clinicians to screen for depressive symptoms in dialysis patients without using an additional depression screening questionnaire once the SF-36 is completed. A cut-off value of 70 can be used safely for the purposes of screening applications.

INTRODUCTION

Depression is the most common psychiatric disorder among chronic dialysis patients.¹ It is of great importance that depressive symptoms are successfully recognized and treated. Depressive symptoms diminish patient's quality of life and are independently associated with an increased risk of hospitalization.^{2;3} In addition, depressive symptoms pose a risk factor for both cardiovascular and non-cardiovascular mortality.⁴⁻⁶ Hence, the National Kidney Foundation, Disease Outcomes Quality Initiative (NKF KDOQI) guideline for cardiovascular disease in dialysis patients recommends that the patient's psychological state should be assessed at least biannually with specific focus on the presence of depressive symptoms.⁷

The assessment of depressive symptoms is frequently performed using self-reported depression screening tools, whereupon patients who are screened positive are commonly examined more closely using diagnostic psychiatric interviews. A standard questionnaire to screen for depressive symptoms in chronic dialysis patients is the 21-item Beck Depression Inventory (BDI).⁸⁻¹¹ The BDI has been validated in chronic dialysis patients and is therefore a reliable instrument to assess depressive symptoms in the dialysis population.⁹⁻¹² Although the BDI is frequently used, it is a relatively extensive screening tool to use repeatedly in clinical practice. It might be useful to identify brief and easy administered screening instruments that possess screening performances for depressive symptoms comparable to the BDI.

The five-item Mental Health Inventory (MHI-5) has been established as a simple and valid tool for detecting depressive symptoms in the general population and in different chronically ill patient populations.¹³⁻¹⁷ The MHI-5 consists of five items and is known as the mental health subscale of the 36-item Short-Form Health Survey Questionnaire (SF-36).¹⁸ Among dialysis patients the SF-36 is frequently administered and consequently MHI-5 scores are widely available. Although the MHI-5 has been used before to indicate the presence of depressive symptoms in epidemiological studies among dialysis patients¹⁹⁻²³, to our knowledge the MHI-5 has not been validated as a screening tool for depressive symptoms in the dialysis population. This poses a problem for implementing the MHI-5 in clinical care. It is essential that measures are specifically evaluated to screen for depressive symptoms in dialysis patients since somatic symptoms of uraemia may overlap with depressive symptoms.²⁴

In the present study, we assessed the usefulness of the MHI-5 as a screening instrument for depressive symptoms in dialysis patients by comparing the MHI-5 with the standard, but relatively extensive, BDI questionnaire. In addition, we examined the optimal cut-off score of the MHI-5 for screening of depressive symptoms and investigated the usefulness of MHI-5 cut-off points that have been used so far in epidemiological studies among dialysis patients to indicate the presence of depressive symptoms.

MATERIALS AND METHODS

Patients

This cross-sectional study was performed among all end-stage renal disease (ESRD) patients treated with chronic haemodialysis or peritoneal dialysis in three dialysis centres: Sint Lucas Andreas Hospital, VU University Medical Center and Dialysis Center Diapriwa, in Amsterdam, the Netherlands. Patients were eligible for study participation if they were at least 18 years of age, had ESRD for at least 30 days, were able to read the Dutch language and had no significant visual, physical or cognitive impairment that would prevent completion of the questionnaires. Patients gave written informed consent before inclusion. Patients who did not want to participate were asked to give written informed consent to obtain patient characteristics from medical records. The study was approved by the ethical committees of the participating centres.

Measures

All dialysis patients who fulfilled the inclusion criteria were invited to complete the validated Dutch translations of the BDI¹² and subsequently the SF-36²⁵ during haemodialysis treatment or during a visit to the outpatient peritoneal dialysis clinic. The BDI consists of 21-items with four possible answers, measuring symptoms of depression over the previous week. The sum of the items results in a final score ranging from 0 to 63, with higher scores indicating more severe depressive symptoms. The MHI-5 consists of the following five questions: over the last four weeks, how often: (i) 'Have you felt so down in the dumps that nothing could cheer you up?', (ii) 'Have you felt downhearted and blue?', (iii) 'Have you been a happy person?', (iv) 'Have you been a very nervous person?' and (v) 'Have you felt calm and peaceful?'. Each item has six possible responses ranging from 'all the time' (1 point) to 'none of the time' (6 points). The answers of the third and fifth question need to be reversed. The final MHI-5 score is calculated by summing up the item scores and transforming this score to a scale

varying from 0 to 100, with lower scores indicating more severe depressive symptoms. For both the BDI and the MHI-5, the missing items were substituted by the mean score of the non-missing items.

Statistical analyses

Differences in patient characteristics between the participating and non-participating patients were analysed with *t*-tests for continuous variables and chi-square tests for categorical variables. We calculated the Pearson's *r* correlation for the BDI score in relation to the MHI-5 score. R^2 was calculated to determine the explained variance. A BDI score ≥ 16 was chosen to indicate the presence of depressive symptoms which has 91 sensitivity and 86% specificity in dialysis patients with the Structured Clinical Interview for Diagnostic and Statistical Manual of Mental Disorders Fourth Edition (DSM-IV).¹¹ A receiver operating characteristic (ROC) curve for the MHI-5 score with BDI ≥ 16 as reference standard was constructed to calculate the area under the curve (AUC) with 95% confidence interval (CI).²⁶ The AUC could be observed as the probability that a randomly selected patient with a BDI score ≥ 16 has a higher MHI-5 score than a randomly selected patient with a BDI score < 16 . If the AUC exceeds 0.80, the MHI-5 was considered as a useful screening instrument for depressive symptoms. Furthermore, the ROC curve was constructed to proxy the optimal cut-off score of the MHI-5 to assess depressive symptoms in dialysis patients.^{27,28} The optimal cut-off score was determined by the value for which the sum of sensitivity and specificity had an optimum. In this method, the sensitivity and specificity are considered equally important. However, the relative importance of the sensitivity and specificity depends largely on the purpose of use. Therefore, we depicted all cut-off values with corresponding sensitivities and specificities. Finally, we calculated sensitivity, specificity, positive predicting value (PPV) and negative predicting value (NPV) for BDI ≥ 16 compared with the optimal MHI-5 cut-off score determined in the ROC curve and several MHI-5 cut-off points previously used among dialysis patients. Cut-off points previously used included (i) MHI-5 cut-off score ≤ 52 (MHI-5 ≤ 52)^{19,23}, (ii) a score of ≤ 3 to one of the items 'Have you felt so down in the dumps that nothing could cheer you up?' and 'Have you felt downhearted and blue?' ('dumps or blue')²⁰⁻²² and (iii) a score of ≤ 3 to both of these items ('dumps and blue').²¹ Significance levels were determined at P-value ≤ 0.05 . The Statistical Package for Social Sciences (SPSS) version 18.0 was used for statistical analyses.

Sensitivity analysis

To test the robustness of our findings, two sensitivity analyses were performed. Firstly, a BDI cut-off score of ≥ 13 (BDI ≥ 13) was used to indicate the presence of depressive symptoms, since this value was found to be the optimal indicator of depressive symptoms among dialysis patients in the Netherlands (sensitivity 75 and specificity 90% for diagnosing depression).¹² Secondly, we performed a sensitivity analysis using the Cognitive Depression Inventory (CDI) instead of the BDI. Six of 21 items of the BDI are related to somatic symptoms of depression, whereas the MHI-5 does not include somatic items. The CDI is a subset of the BDI, in which the six somatic items of the BDI are excluded. We used a CDI cut-off value of 10 (CDI ≥ 10), as this has been proposed to be a good predictor of depressive symptoms in dialysis patients (sensitivity 78 and specificity 81% for diagnosing depression in dialysis patients).^{29;30}

RESULTS

Patient characteristics

Of the 170 patients eligible for study participation, 133 patients agreed to participate (78%). The patients responded to all MHI-5 items and BDI items, except for one patient who missed one MHI-5 item and two BDI items, one patient who missed two BDI items and one patient who missed one BDI item. Characteristics of the study sample are described in Table 1. The included patients were on average 62 years of age, were more often male (61%); 66% of the included patients were native Dutch and 72% were treated with haemodialysis. Nine percent had previously been diagnosed with a depressive disorder and 6% of the patients were using an antidepressant during completion of the questionnaires. No statistically significant difference in characteristics presented in Table 1 was found between the participating and non-participating patients (data not shown).

Table 1. Characteristics of 133 chronic dialysis patients who completed the BDI and SF-36 questionnaires.

Characteristics	Participants (n = 133)	
Demographic		
Age <i>years</i>	62	(16)
Sex % <i>men</i>	61	
Ethnicity % <i>native Dutch</i>	66	
Clinical		
Duration on RRT <i>months</i>	54	(65)
Treatment modality % <i>HD</i>	72	
BMI <i>kg/m²</i>	27	(6)
Primary kidney disease %		
Diabetic nephropathy	16	
Glomerulonephritis	13	
Renal vascular disease	24	
Comorbidity %		
Diabetes Mellitus	29	
Cardiovascular disease *	44	
Laboratory investigations		
Haemoglobin <i>mmol/L</i>	7.2	(0.9)
Albumin <i>g/L</i>	37.0	(5.6)
Psychiatric %		
(Previous) diagnosed depressive disorder	9	
(Previous) psychiatric disease †	13	
Use of antidepressants	6	

Abbreviations: RRT = renal replacement therapy; HD = haemodialysis; BMI = body mass index; BDI = Beck Depression Inventory; MHI-5 = five-item Mental Health Inventory.

Values are presented as mean (SD) or percentage.

* Myocardial infarction and/or angina pectoris and/or PTCA and/or CABG and/or congestive heart failure and/or peripheral vascular disease and/or CVA.

† Psychosis and/or tentamen suicidii and/or drug or alcohol abuse and/or other psychiatric disease.

MHI-5 versus BDI

The Pearson's *r* correlation coefficient for the BDI score compared with the MHI-5 score was -0.64, indicating that 41% of the variance of the MHI-5 is explained by the BDI. Using BDI scores ≥ 16 as measure of the presence of depressive symptoms, 23% of the patients were found to have depressive symptoms (n=30). Figure 1 shows the ROC curve for the MHI-5 score compared with BDI ≥ 16 , with an AUC of 0.82 (95% CI 0.74 – 0.90). The maximum sum of sensitivity and specificity corresponds to the MHI-5 cut-off score of 70 (MHI-5 ≤ 70) (Table 2). Using this cut-off score, 39% of the patients were found to have depressive symptoms (n=52).

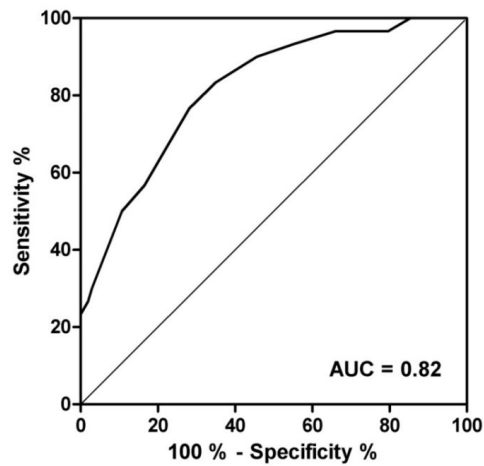


Figure 1. Receiver operating characteristic curve for MHI-5 score against the BDI score cut-off ≥ 16 .

Table 2. Optimal cut-off points for the MHI-5 with BDI ≥ 16 as reference standard.

Score on MHI-5	Sensitivity	Specificity	Score on MHI-5	Sensitivity	Specificity
7	0.00	1.00	66	0.67	0.78
18	0.03	1.00	70	0.77	0.72
30	0.07	1.00	74	0.83	0.65
34	0.13	1.00	78	0.90	0.54
38	0.17	1.00	82	0.93	0.45
42	0.23	1.00	84	0.97	0.34
46	0.27	0.98	86	0.97	0.33
50	0.30	0.97	90	0.97	0.20
54	0.40	0.93	94	1.00	0.15
58	0.50	0.89	98	1.00	0.09
62	0.57	0.84	100	1.00	0.00

Abbreviations: BDI = Beck Depression Inventory; MHI-5 = five-item Mental Health Inventory.

Table 3 demonstrates sensitivities, specificities, PPVs and NPVs for the presence of depressive symptoms assessed with BDI ≥ 16 as reference standard compared with MHI-5 ≤ 70 and previously used MHI-5 related cut-off points. MHI ≤ 70 had 77 sensitivity, 72 specificity, 44 PPV and 91% NPV. The previously used cut-off points of the MHI-5 had lower sensitivities and NPVs, but higher specificities and PPVs.

Table 3. The sensitivity, specificity, positive predicting value and negative predicting value for the presence of depressive symptoms assessed with BDI score ≥ 16 as reference standard compared with different MHI-5 assessments.

	MHI-5 ≤ 70 * (n=52; 39%)	MHI-5 ≤ 52 † (n=19; 14%)	'Dumps or blue' ‡ (n=20; 15%)	'Dumps and blue' § (n=9; 7%)
Sensitivity	0.77	0.40	0.37	0.23
Specificity	0.72	0.93	0.91	0.98
Positive predicting value	0.44	0.63	0.55	0.78
Negative predicting value	0.91	0.84	0.83	0.81

Prior chance of having depressive symptoms (BDI ≥ 16) = 23%.

Abbreviations: BDI = Beck Depression Inventory; MHI-5 = five-item Mental Health Inventory.

The presence of depressive symptoms assessed with:

* MHI-5 cut-off score of ≤ 70 .

† MHI-5 cut-off score of ≤ 52 .

‡ a score of ≤ 3 to one of the MHI-5 items 'down in the dumps' and 'downhearted and blue'.

§ a score of ≤ 3 to both of the MHI-5 items 'down in the dumps' and 'downhearted and blue'.

Sensitivity analyses

Firstly, we used BDI scores ≥ 13 instead of BDI scores ≥ 16 to indicate the presence of depressive symptoms. The results did not materially differ compared with the primary analysis, although 33% instead of 23% of the patients were shown to have depressive symptoms (n=44). The AUC for the MHI-5 score compared with BDI ≥ 13 was approximately the same [0.80 (95% CI 0.72-0.88)]. The optimal MHI-5 cut-off score was 74, with corresponding sensitivity of 75 and specificity of 69%. Secondly, we repeated the analysis using CDI scores ≥ 10 as the indicator of depressive symptoms. The results obtained in this analysis did not reveal different results: 23% of the patients were shown to have depressive symptoms (n=31), the Pearson's *r* correlation coefficient for the CDI score compared with the MHI-5 score was -0.62 and the AUC for the MHI-5 score compared with CDI ≥ 10 was 0.81 (95% CI 0.73-0.90). The optimal MHI-5 cut-off score was found to be 74 (sensitivity 0.81, specificity 0.65).

DISCUSSION

To screen easily and effectively for depressive symptoms in dialysis patients brief, simple and well-accepted tools are asked for. In the present study, we investigated whether the widely administered MHI-5 questionnaire could be used to assess depressive symptoms in dialysis patients; therefore, we compared the MHI-5 with the standard BDI questionnaire. We found that the MHI-5 has high discrimination in screening for depressive symptoms and may, therefore, be considered as a useful screening tool for depressive symptoms in dialysis patients. This finding persisted in two sensitivity analyses.

The MHI-5 is frequently administered among dialysis patients because of its incorporation in the SF-36. The MHI-5 is originally designed to assess anxiety, depression, loss of behavioural or emotional control and psychological well-being.³¹ Our finding that the MHI-5 may also be considered as helpful screening instrument for depressive symptoms is in line with studies among other populations¹³⁻¹⁷ and may be important for clinical practice. In clinical practice, the patient's psychological state needs to be assessed at least twice a year.⁷ The MHI-5 might assist clinicians to screen for depressive symptoms without administering an additional questionnaire once the SF-36 is completed.

The optimal MHI-5 cut-off score to screen for depressive symptoms was found to be 70. In epidemiological studies among dialysis patients, a cut-off score of 52 has been used to assess the presence of depressive symptoms.^{19;23} This cut-off value was found to be the optimal value for detecting depressive symptoms in a study among the general population³¹ and in a small study among HIV-seropositive outpatients.³² Furthermore, scores of ≤ 3 to one or both of the MHI-5 items 'down in the dumps' and 'downhearted and blue' have been used as measures of depressive symptoms. In a previous study among 97 dialysis patients, it is found that each of these items has high sensitivity and specificity with BDI scores ≥ 12 .³³ In the present study, however, the MHI-5 cut-off point of 52 and the two-item-based cut-off points appeared not to be fit for purpose as screening applications in dialysis patients because of a low sensitivity.

The selection of a cut-off score depends largely on the purpose of use and the consequence of correct and incorrect identification.³⁴ If the aim is to identify potential cases of depressive disorder, then a high sensitivity measure is asked for. If the goal is to correctly identify patients without a depressive disorder, then a high specificity of measure is needed. In

epidemiological research focussing on, for instance understanding the association between depressive symptoms and mortality, sensitivity is not *per se* more important than specificity. In clinical-screening practice, however, high sensitivity is of great importance to correctly identify patients who deserve further attention. Our data suggest that a cut-off value of 70 of MHI-5 can be used safely to discriminate people with and without depressive symptoms. Subsequently, diagnostic psychiatric tools are needed to correctly identify patients with a depressive disorder.

The strength of the present multicentre study is the inclusion of a heterogeneous population, which is a good reflection of clinical practice. A possible limitation is that the BDI and MHI-5 refer to different time frames. The BDI asks for depressive symptoms in the previous 7 days⁸, while the MHI-5 queries the duration of feelings in the previous 4 weeks.¹⁸ Therefore, the MHI-5 may underestimate depressive symptoms reported in the BDI if depressive symptoms were only present in the previous week; and may overestimate if depressive symptoms were absent in the previous week but present in the preceding weeks. A second limitation might be the use of the BDI as reference standard. In the present study, we validated the MHI-5 using the BDI, which is a frequently used and valid instrument to measure depressive symptoms but of course not identical to an instrument which ascertains the presence of a depressive disorder. The 'gold' standard measure for a depressive disorder is the structured diagnostic psychiatric interview.³⁵ However, the BDI has high sensitivity and specificity for the structured diagnostic psychiatric interview.¹¹

CONCLUSION

The MHI-5 may be considered as a useful screening instrument for depressive symptoms in dialysis patients. The MHI-5 cut-off scores used in epidemiological studies among dialysis patients, however, appear not to be fit for purpose as screening applications because of its low sensitivity. Our study suggests a cut-off of 70 of MHI-5 can be used safely for these purposes. Future research is needed to study the psychometric properties of the MHI-5 in dialysis patients in relation to a structured diagnostic psychiatric interview.

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REFERENCES

1. Cohen SD, Norris L, Acquaviva K, Peterson RA, Kimmel PL: Screening, diagnosis, and treatment of depression in patients with end-stage renal disease. *Clin J Am Soc Nephrol* 2:1332-1342, 2007
2. Hedayati SS, Grambow SC, Szczech LA, Stechuchak KM, Allen AS, Bosworth HB: Physician-diagnosed depression as a correlate of hospitalizations in patients receiving long-term hemodialysis. *Am J Kidney Dis* 46:642-649, 2005
3. Martin CR, Thompson DR: Prediction of quality of life in patients with end-stage renal disease. *British Journal of Health Psychology* 5:41-55, 2000
4. Chilcot J, Wellsted D, Farrington K: Depression in end-stage renal disease: current advances and research. *Semin Dial* 23:74-82, 2010
5. Cukor D, Cohen SD, Peterson RA, Kimmel PL: Psychosocial aspects of chronic disease: ESRD as a paradigmatic illness. *J Am Soc Nephrol* 18:3042-3055, 2007
6. Riezebos RK, Nauta KJ, Honig A, Dekker FW, Siegert CE: The association of depressive symptoms with survival in a Dutch cohort of patients with end-stage renal disease. *Nephrol Dial Transplant* 25:231-236, 2010
7. K/DOQI clinical practice guidelines for cardiovascular disease in dialysis patients. *Am J Kidney Dis* 45:S1-153, 2005
8. Beck AT, Ward CH, Mendelson M, Mock J, Erbaugh J: An inventory for measuring depression. *Arch Gen Psychiatry* 4:561-571, 1961
9. Craven JL, Rodin GM, Littlefield C: The Beck Depression Inventory as a screening device for major depression in renal dialysis patients. *Int J Psychiatry Med* 18:365-374, 1988
10. Hedayati SS, Bosworth HB, Kuchibhatla M, Kimmel PL, Szczech LA: The predictive value of self-report scales compared with physician diagnosis of depression in hemodialysis patients. *Kidney Int* 69:1662-1668, 2006
11. Watnick S, Wang PL, Demadura T, Ganzini L: Validation of 2 depression screening tools in dialysis patients. *Am J Kidney Dis* 46:919-924, 2005
12. Loosman WL, Siegert CE, Korzec A, Honig A: Validity of the Hospital Anxiety and Depression Scale and the Beck Depression Inventory for use in end-stage renal disease patients. *Br J Clin Psychol* 49:507-516, 2010
13. Cuijpers P, Smits N, Donker T, ten Have M, de Graaf R: Screening for mood and anxiety disorders with the five-item, the three-item, and the two-item Mental Health Inventory. *Psychiatry Res* 168:250-255, 2009
14. Friedman B, Heisel M, Delavan R: Validity of the SF-36 five-item Mental Health Index for major depression in functionally impaired, community-dwelling elderly patients. *J Am Geriatr Soc* 53:1978-1985, 2005

15. Means-Christensen AJ, Arnau RC, Tonidandel AM, Bramson R, Meagher MW: An efficient method of identifying major depression and panic disorder in primary care. *J Behav Med* 28:565-572, 2005
16. Stoll T, Kauer Y, Buchi S, Klaghofer R, Sensky T, Villiger PM: Prediction of depression in systemic lupus erythematosus patients using SF-36 Mental Health scores. *Rheumatology (Oxford)* 40:695-698, 2001
17. Yamazaki S, Fukuhara S, Green J: Usefulness of five-item and three-item Mental Health Inventories to screen for depressive symptoms in the general population of Japan. *Health Qual Life Outcomes* 3:48, 2005
18. Ware JE, Jr., Sherbourne CD: The MOS 36-item short-form health survey (SF-36). I. Conceptual framework and item selection. *Med Care* 30:473-483, 1992
19. Boulware LE, Liu Y, Fink NE, Coresh J, Ford DE, Klag MJ, Powe NR: Temporal relation among depression symptoms, cardiovascular disease events, and mortality in end-stage renal disease: contribution of reverse causality. *Clin J Am Soc Nephrol* 1:496-504, 2006
20. Lacson E Jr, Li NC, Guerra-Dean S, Lazarus M, Hakim R, Finkelstein FO: Depressive symptoms associate with high mortality risk and dialysis withdrawal in incident hemodialysis patients. *Nephrol Dial Transplant* 2012
21. Lopes AA, Bragg J, Young E, Goodkin D, Mapes D, Combe C, Piera L, Held P, Gillespie B, Port FK: Depression as a predictor of mortality and hospitalization among hemodialysis patients in the United States and Europe. *Kidney Int* 62:199-207, 2002
22. Thong MS, Kaptein AA, Krediet RT, Boeschoten EW, Dekker FW: Social support predicts survival in dialysis patients. *Nephrol Dial Transplant* 22:845-850, 2007
23. Yamamoto Y, Hayashino Y, Yamazaki S, Akiba T, Akizawa T, Asano Y, Saito A, Kurokawa K, Miyachi Y, Fukuhara S: Depressive symptoms predict the future risk of severe pruritus in haemodialysis patients: Japan Dialysis Outcomes and Practice Patterns Study. *Br J Dermatol* 161:384-389, 2009
24. Cukor D, Peterson RA, Cohen SD, Kimmel PL: Depression in end-stage renal disease hemodialysis patients. *Nat Clin Pract Nephrol* 2:678-687, 2006
25. Aaronson NK, Muller M, Cohen PD, Essink-Bot ML, Fekkes M, Sanderman R, Sprangers MA, te Velde A, Verrips E: Translation, validation, and norming of the Dutch language version of the SF-36 Health Survey in community and chronic disease populations. *J Clin Epidemiol* 51:1055-1068, 1998
26. Tripepi G, Jager KJ, Dekker FW, Zoccali C: Diagnostic methods 2: receiver operating characteristic (ROC) curves. *Kidney Int* 76:252-256, 2009
27. Smits N, Smit F, Cuijpers P, de Graaf R: Using decision theory to derive optimal cut-off scores of screening instruments: an illustration explicating costs and benefits of mental health screening. *Int J Methods Psychiatr Res* 16:219-229, 2007

28. Zweig MH, Campbell G: Receiver-operating characteristic (ROC) plots: a fundamental evaluation tool in clinical medicine. *Clin Chem* 39:561-577, 1993
29. Chilcot J, Wellsted D, Farrington K: Screening for depression while patients dialyse: an evaluation. *Nephrol Dial Transplant* 23:2653-2659, 2008
30. Sacks CR, Peterson RA, Kimmel PL: Perception of illness and depression in chronic renal disease. *Am J Kidney Dis* 15:31-39, 1990
31. Ware JE, Jr.: SF-36 Physical & Mental Health Summary Scales: A User's Manual, The Health Institute, New England Medical Center Boston Massachusetts, 1994
32. Holmes WC: A short, psychiatric, case-finding measure for HIV seropositive outpatients: performance characteristics of the 5-item mental health subscale of the SF-20 in a male, seropositive sample. *Med Care* 36:237-243, 1998
33. Troidle L, Wuertth D, Finkelstein S, Kliger A, Finkelstein F: The BDI and the SF36: which tool to use to screen for depression? *Adv Perit Dial* 19:159-162, 2003
34. Zarin DA, Earls F: Diagnostic decision making in psychiatry. *Am J Psychiatry* 150:197-206, 1993
35. Sheehan DV, Lecrubier Y, Sheehan KH, Amorim P, Janavs J, Weiller E, Hergueta T, Baker R, Dunbar GC: The Mini-International Neuropsychiatric Interview (M.I.N.I.): the development and validation of a structured diagnostic psychiatric interview for DSM-IV and ICD-10. *J Clin Psychiatry* 59 Suppl 20:22-33, 1998