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**ORIGINAL ARTICLE**

# A Comparison of Psychiatric Rating Scales for the Assessment of Anxiety and Depression in ESRD Patients

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## ABSTRACT

**Background:** Depression and anxiety are among the most comorbid disorders in End stage renal disease (ESRD) patients. Most of the scales currently in use for screening of anxiety and depression are translated into Urdu language from English. Aga khan university anxiety and depression scales (AKUADS) ,a scale developed in Urdu language contains items that assess for psychological as well as somatic symptoms of anxiety and depression. The aim of the current study was to compare the AKUADS with two other commonly used scales for the detection of anxiety and depression in ESRD patients

**Materials and methods:** Current inpatients at Nephrology unit, Sheikh Zayed Hospital, Lahore who were on dialysis were invited to take part in the study. Patients who provided informed written consent were administered three psychiatric rating scales: AKUADS, patient health questionnaire 9 (PHQ-9) for assessment of depression and General anxiety disorder 7 (GAD-7) for assessment of anxiety.

**Results:** AKUADS was strongly related to both GAD-7 and PHQ-9. The prevalence rate of depression in our patients was 36.4% (Mild depression) as assessed by PHQ-9 and of anxiety was 24.6% as assessed by GAD-7. The prevalence of anxiety and depression as assessed by AKUADS was 33%. Female participants were significantly more likely to have higher scores on all the three scales as compared to male patients

**Conclusions:** AKUADS can be used for the screening of anxiety and depressive disorders in the local population and is well correlated with other more widely used and well validated psychiatric rating scales.

## INTRODUCTION

Depressive and anxiety disorders are among of the most common comorbid disorders in patients with end stage renal disease (ESRD) [1]. Depressive disorders commonly present with low mood, reduced energy, lack of pleasure in day to day activities, reduced self- esteem, hopelessness and suicidal thoughts. Anxiety disorders commonly present with worry or apprehension, restlessness, sweating, palpitations, muscle tension and fear of impending doom[2]. Chronic kidney disease (CKD) is subdivided into five stages: stages 1-4 are treated by pharmacotherapy and diet while stage 5 CKD, which is also known as end-stage renal failure is treated with renal replacement therapy (RRT) or renal transplantation. The prevalence of chronic kidney disease (CKD) globally is around 10-15% [3]. Studies from the South Asian region also report a similar prevalence of CKD. Chronic kidney disease prevalence is rising globally and it is forecasted that it will become the 5$^{th}$ leading cause of years of life lost by the year 2040 [4].

A systematic review and meta-analysis (with a total of more than 55,000 participants) found a 22.8% prevalence rate of depression for stage 5B CKD when assessed with diagnostic interviews. However the prevalence of depression was 39.3% when assessed by self-reporting scales [5]. Health related quality of life is found to be affected adversely in ESRD patients [6]. Quality of life as well as depressive symptoms are improved by psychosocial interventions in CKD patients [7].

Aga khan university anxiety and depression scale (AKUADS)[8] is a validated scale developed in Urdu language by researchers at Agha khan University hospital. The aim of the current study is to compare the AKUADS with validated Urdu translations of the patient health questionnaire 9 (PHQ-9) as well as the generalized anxiety disorder (GAD-7). AKUADS is a 25 items questionnaire that contains 13 items that assess psychological symptoms and 12 items that assess somatic symptoms of anxiety and depression. The other two questionnaires do not contain items that assess for somatic symptoms. To our knowledge, no study has previously attempted to compare these scales in ESRD patient from Pakistan.

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## MATERIALS AND METHODS

**Data Collection:** A total of 203 ESRD patients admitted at Nephrology wards at Sheikh Zayed Medical Complex were administered the AKUADS, PHQ-9 and GAD-7 questionnaires. Date were also collected for age, gender, primary diagnosis considered responsible for the development of ESRD, and hemodialysis duration (in months). All patients provided written informed consent to participate in the study. The researchers explained the nature of the study to patients and also advised them that refusal to take part in the study will not have an effect on their care in the hospital. All data gathered during the study were kept strictly confidential and were only accessible to researchers. The study duration was 3 months; from March to June 2022. The current study was formally approved by the Institutional review board of Sheikh Zayed Medical complex, Lahore.

**Instruments:** AKUADs is a 25 item psychiatric rating scale developed in Urdu language and consists of 25 items, of which 13 items enquire about psychological symptoms while 12 items enquire about the somatic symptoms of depression. Each item is scored from 0 to 3; the minimum score is 0 and maximum score is 75. The cut-off score used in most previous studies is 19. At this score, the sensitivity of AKUADS is 74%, the specificity is 81%,the positive predictive value is 61% and the negative predictive value is 88% [8]. It was developed from 487 male and female patients and a psychiatrist's interview according to DSM 3 was used as the gold standard for establishing concurrent validity. A systemic review of psychiatric rating scales in Urdu language examined 19 questionnaires that were developed either indigenously in Urdu or were translated to Urdu language and concluded that the three most thoroughly evaluated rating scales in Urdu language were Agha khan university anxiety and depression scale (AKUADS), Bradford somatic inventory (BSI), and self-reporting questionnaire (SRQ) [9]. Other studies have found AKUADS to have good internal consistency reliability and good levels of discrimination [10].

PHQ-9 [11] is a 9 item questionnaire that has been extensively used in the literature to screen for the presence of depressive symptoms as well as to rate the severity of depression. Each item is scored from 0 (not at all) to 3 (nearly every day), with a minimum score of 0 and a maximum score of 27. Scores are defined as mild ≥5, moderate ≥10 and severe ≥15 [12]. The most frequently used

cut-off score in the literature is 10, at which the scale has a sensitivity of 88% and a specificity of 85%. A cut-off score of 5 is used to detect mild as well as moderate/severe cases of depression and at this cutoff the PHQ-9 has a sensitivity of 98% and specificity of 55% [13]

GAD- 7 [14] is a 7 item questionnaire for the detection of anxiety symptoms as well as for the determination of their severity. The items are scored from 0 (not at all) to 3 (nearly every day), with a possible score ranges from 0 to 21. As for the PHQ-9, cutoff scores of 5 (mild anxiety), 10 (moderate anxiety) and 15 (severe anxiety) are used [12].

**Inclusion and Exclusion Criterion:** All patients admitted at Nephrology ward of Sheikh Zayed Medical Complex who had a diagnosis of ESRD and who provided informed consent to participate in the study were included. Patients who had a previously established diagnosis of anxiety or depressive disorder were excluded. Patients who were not well enough to understand and respond to the questionnaire were also excluded.

**Sample Size Calculation:** The sample size for the current planned study was calculated as 196 using a confidence limit of 5%, design effect of 1.0 and an anticipated frequency of 15% using the sample size calculator at openepi. com https://www.openepi.com/SampleSize/SSPropor.htm.

**Statistical Analysis:** Descriptive statistics (frequencies, means) were used to assess patient's scores on the three administered rating scales. Independent samples T-test was used to compare the study participants on gender. Bivariate correlation (Pearson's correlation so-efficient) was used to analyze the correlation between rating scale scores and duration of hemodialysis (in months).

## RESULTS

In total, 203 patients participated in the study; these included 81 (39.9%) female and 122 (60.1%) male patients. The mean age of study participants was 46.5 years (range from 13 to 80 years).

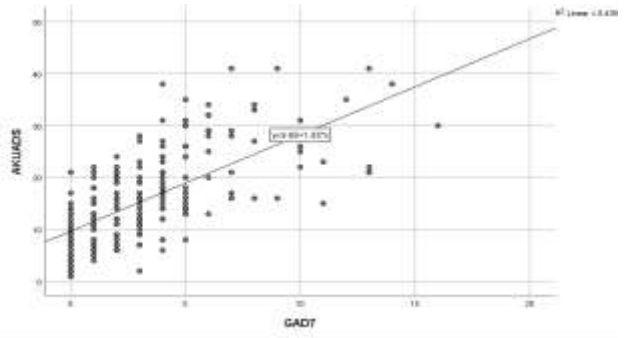


Figure 1: Scatterplot of the correlation between the scores of study participants on AKUADS and GAD-7

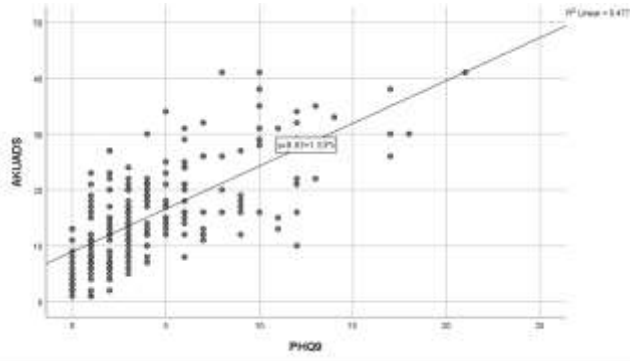


Figure 2: Scatterplot of the correlation between the scores of study participants on AKUADS and PHQ-9

Hypertension was the leading cause of ESRD among the study participants, as in 85 patients (41.9%) it was the main cause for progression to ESRD. Hypertension was also a contributing factor for development of ESRD in another 19 patients (9.3%). The second leading cause for the development was diabetic nephropathy (DNP): this was the sole cause in 54 patients (26.6%) and a contributory cause in 18 (8.8%) patients. Other causes of ESRD development (in order of reducing frequency) were Nephrolithiasis (7.4%), bilateral shrunken kidneys (3.9%) and autosomal dominant polycystic disease (3.4%). The mean duration of hemodialysis treatment in our study was 68.1 months, with a range from 2 to 204 months (SD= 51.5).

Table 1: Gender differences between the study participants on the three psychiatric rating scales used (AKUADS, PHQ-9, and GAD-7)

| Rating scale | Mean score of male participants (N=122) | Mean score of female participants (N= 81) | p-value | Confidence intervals |
|---|---|---|---|---|
| AKUADS | 13.69 | 18.95 | 0.000 | -7.654 to -2.870 |
| PHQ-9 | 3.60 | 5.80 | 0.000 | -3.290 to -1.118 |
| GAD-7 | 2.69 | 4.22 | 0.001 | -2.433 to -0.654 |

**PHQ-9:** At the cutoff score of 5, 74 patients (36.4%) were found to be depressed. However, when a cutoff score of 10 was used, 27 patients (13.3%) were found to be depressed. Thus more than a third of the patients had mild depression while slightly above 13% of the patients had moderate depression.

**GAD-7:** At a cutoff score of 5, 50 (24.6%) patients had anxiety while at a cutoff score of 10, 13 patients (6.4%) of the patients had anxiety.

**AKUADs:** At a cut-of score of 19, 67 patients (33.0%) of the patients had either anxiety or depression.

**Analysis by Gender:** Females had significantly higher scores as compared to males on all the three psychiatric rating scales: GAD (p= 0.01), PHQ-9 (p= 0.000), and AKUADS (p= 0.000).

Correlation of anxiety/depression scores with duration of hemodialysis

Pearson correlation coefficient was used to analyze the correlation between the duration of hemodialysis with rating scales (Table 2). There was no significant correlation between the duration of hemodialysis and scores obtained on GAD (p= 0.805), PHQ-9 (p= 0.710) or AKUADS (p= 0.393).

Correlations between the rating scales used in the study

Pearson correlation coefficient was used to analyze the correlation between AKUADS and GAD, as well as between AKUADS and PHQ-9. The correlation between the AKUADS and GAD was significant at 0.01 level (Figure 1) and the scales were found to be strongly correlated with each other (Pearson correlation coefficient 0.661). Similarly the correlation between AKUADs and PHQ-9 was also significant at 0.01 level (Figure 2) and the two scales were strongly correlated (Pearson correlation coefficient 0.691).

## DISCUSSION

In our study, a strong correlation was found between AKUADs and PHQ-9 for the screening of depression and between AKUADS and GAD-7 for the screening of anxiety. The prevalence of mild depression was 36.4% while of moderate depression was 13.3%. The prevalence of mild anxiety was 24.6% (GAD-7 score of 5) and of moderate anxiety (GAD-7 score of 10) was 6.4%. When assessed by AKUADS, the prevalence of depression and anxiety in our sample of ESRD patients was 33%. A study from Saudi Arabia reported very similar rates of anxiety and depression in ESRD patients (12 % for borderline anxiety, 4.31% for abnormal anxiety, 27% for borderline depression and 23% for abnormal depression) [15]. A multicenter population based study of 457 patients which used the hospital anxiety and depression scale (HADS) reported that the prevalence of depressive symptoms in ESRD patients was 21.7%[16]. However other studies from Lebanon[17], Singapore[18], Palestine[19] and Saudi Arabia[20] found

higher prevalence rates of depression and anxiety as compared to our patients.

AKUADS was strongly correlated with both PHQ-9 and GAD-7 in our study. The presence of items that enquire about the somatic symptoms of depression and anxiety does not result in detection of higher prevalence rates of depression and anxiety in ESRD patients. Ali and colleagues compared AKUADS with the Self Reporting questionnaire (SRQ) and reported that 70% of items were similar in both the questionnaires; 6 items were assessed in SRQ but not in AKUADS while 7 items were assessed by AKUADs but not by SRQ [21]. In another study, researchers administered AKUADS with the how I feel scales in 200 pregnant women in Hyderabad, Pakistan and compared them to psychiatrist's interview based on DSM 4. They reported that both scales had good internal consistency and a very similar level of discrimination for patients with anxiety and depression [10]. Loosman and colleagues compared Hospital anxiety and depression scale (which does not include somatic items) and Beck depression inventory (which includes somatic items) in ESRD patients and reported that both rating scales were valid and there was no statistical difference between the two scales [22]. Researchers in Turkey administered Hamilton Depression rating scales and Hamilton rating anxiety scales (along with other rating scales) in ESRD patients and found both scales to be internally consistent and reliable [23]. Hidayeti and colleagues compared self-rating scales for the assessment of depression (Beck Depression inventory, Centre for epidemiological study of depression) with the physician administered Structured Clinical Interview for Depression scale (SCID). They found a prevalence rate of 17.3% for major depression on the SCID scale and recommended that a higher threshold should be used for ESRD patients when screening for depression by self-rating scales as compared to non-ESRD patients [24].

## CONCLUSIONS

AKUADS has a strong correlation with two other commonly used rating scales (GAD-7 and PHQ-9) for screening of anxiety and depression. As AKUADS is developed originally in Urdu language, it may be more convenient to administer in our population. The presence of items that enquire about the somatic symptoms of depression and anxiety does not lead to increased prevalence of these disorders when compared to other rating scales which only have items that assess for psychological symptoms and anxiety.

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