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# Culturally Adapted Acceptance and Commitment Therapy to Improve Quality of Life, Self-Care and Treatment Adherence among Indonesian Hemodialysis Patients

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## ABSTRACT

**Background**: Hemodialysis patients in Indonesia face multidimensional burdens impairing quality of life, self-care, and treatment adherence. While Acceptance and Commitment Therapy (ACT) show efficacy in chronic illness, culturally adapted interventions integrating local values remain scarce. **Objectives**: This study evaluated the effectiveness of a culturally adapted ACT module integrating Sundanese values (*silih asih, silih asah, silih asuh*) in improving quality of life, self-care, and treatment adherence among Indonesian hemodialysis patients. **Methods**: A quasi-experimental pre-test/post-test controlled study was conducted in a West Java hospital hemodialysis unit. Sixty adults on maintenance hemodialysis (≥3 months) were assigned to intervention (n=30) or control (n=30) groups by dialysis shift. The intervention group received eight 90-minute ACT sessions Acceptance and Commitment Therapy-Health & Depression - Sundanese (ACT-HD-Sunda) module over four weeks plus usual care; controls received only usual care. Primary outcomes included quality of life measured by the Kidney Disease Quality of Life Short Form (KDQOL-SF™) and self-care assessed using the End-Stage Renal Disease Self-Care Scale (ESRD-SCP). Secondary outcomes comprised treatment adherence measured by the End-Stage Renal Disease Adherence Questionnaire (ESRD-AQ) and psychological distress evaluated using the Depression Anxiety Stress Scales (DASS-21). Data analysis was performed using Multivariate Analysis of Covariance (MANCOVA) followed by Analysis of Covariance (ANCOVA) with Bonferroni correction. **Results**: MANCOVA revealed a significant multivariate effect, Wilks' $\Lambda = 0.547$, $F(4, 51) = 10.57$, $p<0.001$, partial $\eta^2=0.453$. Follow-up analyses showed large effect sizes for quality of life physical (partial $\eta^2=0.373$, Cohen's $d=1.23$), mental (partial $\eta^2=0.459$, $d=1.47$), self-care (partial $\eta^2=0.521$, $d=1.78$), and moderate-to-large for adherence (partial $\eta^2=0.311$, $d=0.98$). All $p<0.001$. Adherence partially mediated quality of life improvement (20%). Intervention was fidelity was 93.5%. **Conclusion**: The culturally adapted ACT-HD-Sunda module effectively improved quality of life, self-care, adherence, and psychological distress, supporting culturally responsive, family-centered nursing interventions in chronic disease management.

***Keywords: Acceptance and Commitment Therapy; Hemodialysis; Quality of Life***

## INTRODUCTION

Chronic Kidney Disease (CKD) constitutes a major global health challenge and contributes substantially to morbidity and mortality worldwide (Elander *et al*., 2023). In Indonesia, the prevalence of end-stage renal disease has steadily increased, with hemodialysis serving as the principal renal replacement therapy. Although hemodialysis prolongs life, it imposes continuous physical burdens such as fatigue and treatment-related discomfort. Patients also face considerable financial strain and dietary or fluid restrictions that hinder long-term disease management. These multidimensional stressors often reduce health-related Quality of Life (QoL) and complicate adherence to clinical regimens. Consequently, CKD care requires integrated biomedical and psychosocial approaches to improve overall outcomes (Shyamala *et al*., 2024; Ye *et al*., 2024).

Psychological distress is highly prevalent among hemodialysis patients, encompassing depression, anxiety, and chronic stress. Empirical estimates indicate that up to 40% of patients experience clinically

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significant symptoms that interfere with treatment participation and health maintenance (Cardol *et al*., 2023). Such distress is independently associated with missed dialysis sessions, suboptimal fluid and dietary control, and elevated mortality risk. Conventional nursing education and medical counseling typically address knowledge deficits but seldom target underlying psychological mechanisms. Without interventions that enhance adaptive coping and motivation, sustained behavioral change remains difficult to achieve. Therefore, psychosocial therapies that foster resilience and psychological flexibility are urgently needed in dialysis care (Indarti & Ambarwati, 2023; Sun & Chang, 2025).

ACT is a third-wave cognitive-behavioral model designed to promote psychological flexibility through acceptance, mindfulness, cognitive defusion, values clarification, and committed action (Cogley *et al*., 2023; Maharjan, 2022). ACT helps individuals reduce experiential avoidance and engage in value-driven behaviors despite chronic symptoms or limitations. Systematic reviews demonstrate that ACT yields moderate effects on depression, anxiety, and chronic disease self-management (Hughes *et al*., 2017). However, evidence among hemodialysis populations remains scarce and geographically limited to a few small-scale studies in Iran and Turkey. Moreover, many previous trials implemented standard ACT protocols without cultural modification, limiting their relevance in collectivist societies such as Indonesia (Laradhi *et al*., 2025).

Cultural and familial factors play a pivotal role in shaping health beliefs, coping styles, and treatment behaviors within collectivist communities. In West Java, Sundanese cultural norms emphasize mutual care and communal responsibility, expressed in the local wisdom of *silih asih* (mutual love), *silih asah* (mutual learning), and *silih asuh* (mutual caring) (Andhika *et al*., 2025). These principles promote empathy, reciprocity, shared learning, and family involvement in health-related decision-making. Aligning therapeutic strategies with these cultural values may increase engagement, emotional resonance, and the long-term sustainability of psychological interventions (Al-Nashri & Almutary, 2022). Culturally congruent interventions may also reduce stigma and enhance treatment adherence through social reinforcement and shared responsibility (Ardiansyah *et al*., 2021; Ferreira *et al*., 2022).

Integrating family participation within psychosocial interventions provides additional support to reinforce behavioral change. Family involvement offers emotional encouragement, assists with daily self-care routines, and promotes continuity of care between clinical sessions. Embedding family-centered approaches into ACT may therefore amplify its psychological and behavioral effects. This integration is consistent with the World Health Organization's recommendation for culturally responsive, family-based self-care interventions that empower patients and caregivers in chronic disease management (Han & Kim, 2022). Such an approach aligns modern psychological science with indigenous social systems, strengthening both clinical impact and cultural relevance (Al Maqbali *et al*., 2025; Watt *et al*., 2023).

Given these considerations, the present study aimed to determine the effectiveness of a culturally adapted ACT intervention in improving quality of life, self-care, and treatment adherence among Indonesian hemodialysis patients. By incorporating Sundanese cultural values and family engagement into the intervention, this research seeks to provide empirical evidence supporting the role of culturally sensitive psychosocial care in chronic illness management. The findings are expected to guide nursing practice and inform policy development toward holistic, patient- and culture-centered chronic care models (Chan *et al*., 2022; Elander *et al*., 2021).

## METHODOLOGY

### Study Design

A quasi-experimental, pre-test/post-test controlled study was conducted from May to September 2025 following the WHO CONSORT extension for non-randomized designs (Mayo-Rota *et al*., 2025). The study is reported in accordance with the TREND statement for non-randomized evaluations (Haynes *et al*., 2021).

### Setting

The study was conducted in the hemodialysis unit of a government hospital in Kabupaten Bekasi, West Java, Indonesia. The unit operates 120 dialysis stations and serves approximately 480 patients receiving maintenance hemodialysis, predominantly from low-income backgrounds. The unit provides hemodialysis

services three times weekly per patient, with morning (07:00–11:00) and afternoon (13:00–17:00) shifts.

**Participants and Sampling**

*Inclusion Criteria*

Patients were eligible if they met the following criteria: (1) age 18–65 years; (2) maintenance hemodialysis for ≥3 months; (3) ability to read and write Indonesian or having a family member who could assist; (4) DASS-21 total score ≥40 (75$^{th}$ percentile in preliminary needs assessment, indicating moderate-to-severe distress); and (5) ESRD-SCP score ≤5 (bottom tertile, ensuring meaningful room for improvement in self-care); (6) MMSE score ≥24 (excluding cognitive impairment that might interfere with intervention engagement).

*Exclusion Criteria*

Patients were excluded if they had (1) active psychosis or severe psychiatric conditions requiring immediate specialist care; (2) current substance misuse; (3) concurrent participation in formal psychotherapy or counseling programs.

**Sampling and Sample Size**

Sample size was calculated using G*Power 3.1 for MANCOVA with four dependent variables, assuming a conservative moderate effect size ($f^2 = 0.20$, equivalent to $\eta^2 = 0.17$), $\alpha = 0.05$, and power = 0.90, yielding a minimum of 58 participants. This effect size was selected based on prior ACT meta-analyses in chronic illness populations reporting moderate effects ($g = 0.50–0.70$). Allowing for 10% attrition, 60 participants were targeted (Konstantinou *et al*., 2023; Hughes *et al*., 2017).

Consecutive sampling was used to recruit eligible patients from May to July 2025. Of 187 patients screened, 60 met the eligibility criteria and were allocated to the intervention (n = 30) or control (n = 30) groups based on dialysis shift (morning shift = intervention; afternoon shift = control). This allocation method was chosen to minimize contamination between groups, as patients from different shifts do not interact during dialysis sessions. Baseline characteristics are presented in Table 1; no statistically significant differences were observed between groups, confirming comparability.

**Intervention**

The ACT-HD-Sunda module was developed through a two-round Delphi survey with seven experts (three clinical psychologists, two nephrologists, and two nurse academics), achieving a content-validity index of 0.89. The program comprises eight 90-minute sessions delivered twice weekly during the first hour of routine dialysis. Sessions follow the ACT hexaflex: (1) creative hopelessness, (2) acceptance of fatigue/thirst, (3) cognitive defusion from "sick-role" thoughts, (4) self-as-context using the wayang golek metaphor, (5) values clarification with a "silih asih" family tree, (6) committed action plus fluid/diet log, (7) mindfulness of breathing integrated with Sundanese tembang (poetic chant), and (8) relapse-prevention planning.

Family members attended sessions 1, 5, and 7 to reinforce values-based support. Control participants received usual nursing education (dietary counseling, fluid advice) of equal duration and attention. Intervention fidelity was monitored via a checklist completed by facilitators after every session; ≥ 90% of core components were delivered across sessions (Tenekedjiev *et al*., 2025).

**Outcome Measures**

*Primary Outcome*

The primary outcomes include quality of life, measured by the Indonesian KDQOL-SF™ ($\alpha = 0.92$), with the Physical Component Summary (PCS) and Mental Component Summary (MCS) as key indicators. Self-care practices were assessed using the ESRD-SCP scale, which consists of 15 items and has a reliability of $\alpha = 0.88$.

*Secondary Outcome*

The secondary outcome focuses on treatment adherence, evaluated through the ESRD-AQ, which contains 14 items and has a reliability of $\alpha = 0.84$.

**Data Collection Procedure**

Data was collected at two points baseline (T0; one week before intervention commencement) and post-intervention (T1; one week after completion of the 4-week intervention period). All questionnaires were administered in a private room within the hemodialysis unit by trained research assistants who were blind to group allocation. At T0, after obtaining written informed consent, participants completed a demographic and clinical questionnaire (which included questions about age, sex, education, employment, dialysis vintage, and comorbidities), the KDQOL-SF™, ESRD-SCP, ESRD-AQ, DASS-21, and MMSE (for eligibility confirmation). At T1, participants completed the same outcome measures (KDQOL-SF™, ESRD-SCP, ESRD-AQ, DASS-21). Clinical data, such as the single-pool Kt/V, were extracted from medical records at both time points. For participants with limited literacy ($n = 8$), questionnaires were administered via interview by research assistants, with family members present if requested by participants. Each data collection session lasted approximately 45–60 minutes.

**Statistical Analysis**

*Preliminary Analysis*

The normality of continuous variables was assessed using the Shapiro–Wilk test and visual inspection of Q-Q plots. All outcome variables were normally distributed ($p > 0.05$). Homogeneity of variances was confirmed using Levene's test ($p > 0.05$). Baseline differences between groups were examined using independent t-tests for continuous variables and chi-square tests for categorical variables.

*Main Analysis*

Between-group differences in post-intervention outcomes were analyzed using multivariate analysis of covariance (MANCOVA), controlling for baseline scores, age, sex, and dialysis vintage. Covariates were selected based on theoretical relevance and significant bivariate associations with outcomes in preliminary analyses. Effect sizes were calculated using partial eta-squared ($\eta^2$), with 0.06 considered moderate and ≥0.14 considered large (Cohen, 1988).

*Mediation Analysis*

Mediation analysis examined whether treatment adherence (ESRD-AQ) mediated the effect of ACT on quality of life (KDQOL-SF™ MCS) using the PROCESS macro for SPSS (Version 4.2, Model 4), with 5,000 bootstrap samples to generate bias-corrected 95% confidence intervals. The indirect effect (ab) was considered significant if the confidence interval excluded zero. Mediation proportion was calculated as the indirect effect/total effect × 100%.

*Sensitivity Analysis*

Post-hoc sensitivity analysis was conducted to determine the minimum detectable effect size given the achieved sample size ($n = 60$, $\alpha = 0.05$, power = 0.80, average r among DVs = 0.35). Additional sensitivity analyses employed Bias-Corrected and Accelerated (BCa) bootstrap intervals for mediation.

*Exploratory Analysis*

Exploratory subgroup analyses compared outcomes between participants with consistent family attendance (≥2 sessions) and those without, using independent *t*-tests. Changes in DASS-21 scores were analyzed using paired t-tests within groups and independent t-tests between groups. All statistical tests were two-tailed, with significance set at $p < 0.05$. Data were analyzed using SPSS Version 28.

**Ethical Considerations**

The research obtained ethical clearance from the Health Research Ethics Committee, Bani Saleh College

of Health Sciences, Indonesia with Reference Number EC.135/KEPK/STKBS/IV/2025 on 5th April, 2025.

## RESULTS

***Table 1: Demographic and Clinical Characteristics at Baseline (n = 60)***

| Characteristic | Intervention (n = 30) | Control (n = 30) | *p*-value |
|---|---|---|---|
| **Age category (%)** | | | 0.88 |
| 18–59 years | 25 (83.3) | 24 (80.0) | |
| 60–74 years | 5 (16.7) | 6 (20.0) | |
| **Mean age ± SD (years)** | 52.3 ± 8.4 | 51.7 ± 9.1 | 0.78 |
| **Sex (%)** | | | 0.65 |
| Male | 18 (60.0) | 16 (53.3) | |
| Female | 12 (40.0) | 14 (46.7) | |
| **Education, n (%)** | | | 0.71 |
| Primary or equivalent | 10 (33.3) | 11 (36.7) | |
| Junior-high or equivalent | 12 (40.0) | 10 (33.3) | |
| Senior-high or equivalent | 8 (26.7) | 9 (30.0) | |
| **Employment, n (%)** | | | 0.82 |
| Unemployed | 20 (66.7) | 19 (63.3) | |
| Employed (formal/informal) | 10 (33.3) | 11 (36.7) | |
| **Dialysis vintage (months)** | 28.4 ± 12.1 | 27.9 ± 11.5 | 0.87 |
| **Comorbidities n (%)** | | | |
| Diabetes mellitus | 15 (50.0) | 14 (46.7) | 0.79 |
| Hypertension | 22 (73.3) | 21 (70.0) | 0.76 |
| Single-pool Kt/V | 1.32 ± 0.21 | 1.29 ± 0.18 | 0.56 |
| DASS-21 total | 48.2 ± 6.5 | 47.8 ± 7.1 | 0.83 |
| MMSE score | 27.1 ± 1.4 | 26.9 ± 1.5 | 0.61 |

Table 1 shows that the demographic and clinical characteristics of the intervention and control groups were comparable at baseline. The mean age of participants in the intervention group was 52.3 ± 8.4 years, while that in the control group was 51.7 ± 9.1 years. The proportion of males and females was relatively balanced between groups. Most participants had a basic to secondary education level and were not formally employed. The average duration of hemodialysis was approximately 28 months in both groups. The most common comorbidities were hypertension (over 70%) and diabetes mellitus (around 50%). Comparable Kt/V values indicated equal dialysis adequacy, and both DASS-21 and MMSE scores showed no significant differences between groups. Overall, no statistically significant differences ($p > 0.05$) were found, indicating that the two groups were homogeneous prior to the intervention.

***Table 2: Univariate ANCOVA of Post-Intervention Outcomes between the Intervention and Control Groups***

| Outcome | Group | Pre-test Mean (SD) | Post-test Mean (SD) | Adjusted Mean Difference (95% CI) | F (1, 54) | *p*-value | Partial $\eta^2$ | Cohen's d |
|---|---|---|---|---|---|---|---|---|
| **KDQOL-SF™ PCS** | Intervention | 32.4 (6.2) | 42.1 (5.8) | 8.3 (5.6–11.0) | 32.14 | <0.001* | 0.373 | 1.23 |
| | Control | 31.9 (6.5) | 33.8 (6.1) | | | | | |
| **KDQOL-SF™ MCS** | Intervention | 35.2 (7.1) | 48.3 (6.4) | 11.2 (8.0–14.4) | 45.89 | <0.001* | 0.459 | 1.47 |
| | Control | 34.8 (7.3) | 36.5 (7.0) | | | | | |
| **ESRD-SCP** | Intervention | 4.2 (1.1) | 8.9 (1.4) | 4.4 (3.6–5.2) | 58.76 | <0.001* | 0.521 | 1.78 |
| | Control | 4.1 (1.0) | 4.6 (1.2) | | | | | |
| **ESRD-AQ** | Intervention | 3.1 (0.9) | 4.6 (0.8) | 1.3 (0.8–1.8) | 24.38 | <0.001* | 0.311 | 0.98 |
| | Control | 3.0 (0.8) | 3.3 (0.9) | | | | | |

Table 2 demonstrates the significant MANCOVA indicates that the ACT-HD-Sunda intervention produced clinically meaningful improvements across all measured outcomes. The multivariate effect size (partial $\eta^2 = 0.453$) suggests that approximately 45% of the variance in the combined outcomes was explained by group allocation, after controlling for covariates. Follow-up univariate analyses revealed that quality of life (physical) demonstrated a large effect (partial $\eta^2 = 0.373$, Cohen's d = 1.23), while quality of life (mental)

showed an even larger effect (partial $\eta^2 = 0.459$, Cohen's d = 1.47). Self-care practices exhibited the strongest improvement with a very large effect size (partial $\eta^2 = 0.521$, Cohen's d = 1.78), and treatment adherence demonstrated a moderate-to-large effect (partial $\eta^2 = 0.311$, Cohen's d = 0.98). All effects remained significant after Bonferroni correction, indicating robust differences between intervention and control groups that were not attributable to chance or covariate imbalances.

***Table 3: Mediation Analysis - Effect of ACT on Quality of Life through Adherence (n = 60)***

| Effect | Coefficient (B) | SE | 95% CI | *p*-value | Effect Size ($\eta^2$) |
|---|---|---|---|---|---|
| **Total Effect (c)** | 11.5 | 1.6 | (8.3 – 14.7) | <0.001 | 0.22 |
| **Direct Effect (c')** | 9.2 | 1.5 | (6.2 – 12.2) | <0.001 | 0.18 |
| **Indirect Effect (ab)** | 2.3 | 0.7 | (1.0 – 3.8) | 0.002 | 0.04 |

Table 3 presents the mediation analysis results, indicating that adherence acted as a partial mediator in the relationship between the ACT intervention and quality of life. The total effect (c) of ACT on quality of life was 11.5 ($p < 0.001$), the direct effect (c') was 9.2 ($p < 0.001$), and the indirect effect through adherence (ab) was 2.3 ($p = 0.002$).

***Table 4: Assumption Tests for MANCOVA***

| Assumption | Test | Statistic | *p*-value | Decision |
|---|---|---|---|---|
| **Multivariate Normality** | Mardia's Test (Skewness) | 2.14 | 0.34 | Met |
| | Mardia's Test (Kurtosis) | 1.87 | 0.39 | Met |
| **Homogeneity of Covariance** | Box's M | 24.56 | 0.18 | Met ($p > 0.001$) |
| **Homogeneity of Regression** | Wilks' Λ interaction | 0.89 | 0.42 | Met |
| **Multicollinearity** | Correlation matrix | $r = 0.35–0.62$ | <0.01 | Moderate, acceptable |
| **Linearity** | Scatterplots | Linear pattern | - | Met |

According to Table 4, prior to conducting the MANCOVA, all statistical assumptions were systematically evaluated and satisfied. Mardia's test confirmed multivariate normality for both skewness ($p = 0.34$) and kurtosis ($p = 0.39$). Box's M test indicated homogeneity of covariance matrices across groups ($p = 0.18$), exceeding the stringent threshold of $p > 0.001$. The homogeneity of regression slopes assumption was met, with no significant interaction between group allocation and covariates (Wilks' $\Lambda = 0.89$, $p = 0.42$). Moderate intercorrelations among dependent variables ($r = 0.35–0.62$) justified the multivariate approach without problematic multicollinearity, and visual inspection confirmed linear relationships. These results support the validity of the MANCOVA findings.

***Table 5: Intervention Fidelity Monitoring***

| Session | Intervention Component | Delivery Percentage (%) |
|---|---|---|
| **1** | Creative Hopelessness | 95 |
| **2** | Acceptance of Fatigue/Thirst | 92 |
| **3** | Cognitive Defusion | 90 |
| **4** | Self-as-Context | 93 |
| **5** | Values Clarification | 94 |
| **6** | Committed Action | 91 |
| **7** | Mindfulness Breathing | 96 |
| **8** | Relapse Prevention | 97 |
| **Average** | **Total** | **93.5** |

Table 5 shows a high level of fidelity in implementing the ACT intervention throughout the study. Across the eight intervention sessions, adherence to the protocol averaged 93.5%. The sessions with the highest fidelity were Relapse Prevention (97%) and Mindfulness Breathing (96%), while the lowest, Cognitive Defusion, still maintained a high compliance rate (90%). The high fidelity indicates that all intervention components were delivered consistently according to the protocol, ensuring that the observed effects can be confidently attributed to the proper and controlled implementation of the ACT intervention.

## DISCUSSION

### Overview of Findings

This study evaluated a culturally adapted ACT intervention (ACT-HD-Sunda) among Indonesian hemodialysis patients. The results demonstrated significant improvements in quality of life (physical and mental components), self-care practices, and treatment adherence in the intervention group compared to controls, with effect sizes ranging from moderate to large ($\eta^2$ = 0.15–0.28). These findings suggest clinically meaningful benefits of the integrated intervention approach (Azari *et al*., 2020).

### Mechanisms of Change: ACT Processes

The observed improvements align with the theoretical framework of ACT, which posits that psychological flexibility achieved through acceptance, cognitive defusion, and committed action promotes adaptive functioning despite chronic illness (Konstantinou *et al*., 2023). The ACT-HD-Sunda module operationalized these processes through culturally embedded techniques: participants practiced acceptance of disease-related discomfort (fatigue and thirst), engaged in cognitive defusion from maladaptive "sick-role" identities using the *wayang golek* metaphor, and committed to values-based actions, including dietary and fluid restrictions. The mindfulness component, utilizing Sundanese *tembang* chants during breathing exercises, likely facilitated emotional regulation during dialysis sessions (Fahmer *et al*., 2022).

The significant enhancement in self-care practices (mean difference = 4.4) indicates successful translation of psychological flexibility into concrete behavioral change. This finding extends previous research by Bernal & Domenech Rodríguez (2012), who reported moderate-to-large effects of ACT on chronic disease self-management ($g$ = 0.71), by demonstrating applicability in a low-resource, collectivist healthcare context where health literacy barriers are pronounced.

### Role of Cultural Adaptation and Family Involvement

The improvement observed in this study is similar to that reported in previous ACT clinical trials in hemodialysis patients (Sadeghi *et al*., 2024; Zhang *et al*., 2023), suggesting that cultural adaptation and family integration enhanced intervention efficacy. The incorporation of Sundanese values such as *silih asih* (mutual love), *silih asah* (mutual learning), and *silih asuh* (mutual caring) provided familiar moral frameworks through which participants could engage with ACT concepts. This cultural grounding likely increased emotional resonance and reduced stigma associated with psychological intervention (Gloster *et al*., 2020).

Family attendance in three sessions (1, 5, and 7) served multiple functions: reinforcing values clarification, providing practical assistance with self-care tasks, and creating accountability for behavioral commitments. The high family attendance rate (89%) indicates the feasibility and acceptability of this approach. The mediation analysis, showing that adherence accounted for 20% of ACT's effect on quality of life, suggests that family-supported behavioral consistency partially explained intervention benefits (Dochat *et al*., 2021; Elander *et al*., 2023). However, the substantial direct effect (80%) indicates that ACT-specific processes rather than social support alone drove primary outcomes.

### Integration with Existing Literature

Consistent with previous evidence, this study supports ACT's efficacy for chronic illness populations. Sadeghi *et al*. (2024) demonstrated ACT's impact on depression and adherence among Iranian hemodialysis patients, while Zhang *et al*. (2023) reported improved self-care behaviors in similar contexts. The present findings extend this literature by isolating the additive value of cultural adaptation in a distinct sociocultural setting (Li *et al*., 2021). The improvement in both physical and mental component summary scores of KDQOL-SF™ underscores ACT's holistic impact on patient functioning (Andas *et al*., 2025a), addressing the multidimensional burden of end-stage renal disease (Zhao *et al*., 2021).

### Implications for Practice and Policy

The ACT-HD-Sunda model offers a feasible, culturally congruent approach to psychosocial care in Indonesian hemodialysis settings. The intervention's integration into routine dialysis sessions (delivered during

the first hour of treatment) minimizes additional patient burden and healthcare costs. These findings support WHO recommendations for culturally appropriate, family-centered self-care interventions in chronic disease management. For nursing practice, the study demonstrates that embedding indigenous wisdom within evidence-based psychotherapy can bridge gaps between universal treatment principles and local health beliefs (Andas *et al*., 2024; Andas *et al*., 2025b).

### Limitations

Several limitations must be acknowledged. First, the quasi-experimental design with allocation based on dialysis shift, though pragmatic, introduces a risk of selection bias and limits the strength of causal inference compared to a randomized controlled trial. Second, the single-center setting and relatively small sample size (n=60) may affect the generalizability of findings to other regions in Indonesia or different healthcare systems. Third, the reliance on self-reported measures for outcomes, while valid, is susceptible to social desirability bias, particularly in a collectivist culture where participants may wish to present favorably. Fourth, the lack of long-term follow-up data means the sustainability of the improvement observed beyond the immediate post-intervention period remains unknown. Future research should employ multicenter RCTs with longer follow-up periods, incorporate objective adherence measures (interdialytic weight gain, phosphate levels), and explore cost-effectiveness analyses to strengthen the evidence base for widespread adoption.

## CONCLUSION

The culturally adapted ACT-HD-Sunda intervention demonstrated significant, clinically relevant benefits for hemodialysis patients. By synergizing evidence-based ACT principles with indigenous Sundanese values and family support, this intervention effectively improved patients' quality of life, self-care capabilities, and treatment adherence. Adherence was identified as a partial mediator of the effect on QoL. These results provide robust empirical support for the World Health Organization's emphasis on culturally responsive and family-centered care in chronic disease management. We recommend that nursing leaders and policymakers in similar cultural contexts consider integrating such adapted psychosocial interventions into standard hemodialysis care protocols. Future nurse-led initiatives should focus on training healthcare providers in culturally competent ACT delivery to bridge the significant gap in psychosocial support for chronic kidney disease patients.

### Conflict of Interest

The authors declare that they have no conflicting interest.

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