

Supplementary Table 1 Sensitivity analysis of PHQ-9 and LVEF correlation in patients with moderate-to-high medication adherence, mean \pm SD/%

Variable		Pearson Correlation with LVEF at 6 months (<i>r</i>)	<i>P</i> -value
Age	74.5 \pm 8.3		
Sex (male)	35		
Baseline LVEF	32.1 \pm 6.7		
PHQ-9 score	11.2 \pm 3.5	-0.22	0.034
MMAS-4 score	1.1 \pm 0.6	-0.05	0.612
Follow-up LVEF	33.2 \pm 6.2		

This sensitivity analysis included only patients with moderate-to-high adherence (Morisky Medication Adherence Scale < 3) to examine the independent association between depressive symptom severity (Patient Health Questionnaire-9) and left ventricular ejection fraction at 6-month follow-up. Pearson correlation coefficients (*r*) and corresponding *p*-values are presented. No significant correlation was observed between Morisky Medication Adherence Scale scores and follow-up left ventricular ejection fraction, indicating that depression may affect cardiac function independent of adherence behavior. LVEF: Left ventricular ejection fraction; PHQ-9: Patient Health Questionnaire-9; MMAS-4: Morisky Medication Adherence Scale.

Supplementary Table 2 Association of antidepressant use with medication adherence and LVEF recovery among depressed patients (Patient Health Questionnaire-9 \geq 10)

Group	<i>n</i>	Mean MMAS-4 (3 months)	Δ MMAS-4 <i>vs</i> control	LVEF at 6 months (%)	<i>P</i> -value (LVEF)
Antidepressant-treated	24	1.9	-0.6	29.3	0.372
Untreated depressed patients (control)	36	2.5	Reference	28.7	Reference

Depressed patients (Patient Health Questionnaire-9 \geq 10) who received antidepressant therapy demonstrated a statistically significant improvement in medication adherence at 3 months post-discharge ($P = 0.041$). However, no significant difference was observed in 6-month left ventricular ejection fraction recovery. These findings are exploratory and should be interpreted cautiously due to limited sample size and potential confounding. MMAS-4: Morisky Medication Adherence Scale; LVEF: Left ventricular ejection fraction.

Supplementary Table 3. Stratified Cox regression analysis of Patient Health Questionnaire-9 and one-year cardiovascular readmission risk by heart failure phenotype

Subgroup	<i>n</i>	PHQ-9 (HR)	95%CI	<i>P</i>-value
HFrEF (LVEF <50%)	112	1.068	1.027-1.111	0.001
HFpEF (LVEF ≥50%)	48	1.021	0.994-1.056	0.097

Hazard ratios represent the adjusted effect of Patient Health Questionnaire-9 score (per point increase) on the risk of cardiovascular readmission within one year, stratified by heart failure phenotype. Multivariable Cox regression models were adjusted for age, sex, ew York Heart Association class, N-terminal pro-B-type natriuretic peptide, and β -blocker use. The association between depression severity and readmission risk remained statistically significant in heart failure with reduced ejection fraction but not in heart failure with preserved ejection fraction, suggesting phenotype-specific prognostic relevance of depressive symptoms. HFrEF: Heart failure with reduced ejection fraction; LVEF: Left ventricular ejection fraction; HFpEF: Heart failure with preserved ejection fraction; PHQ-9: Patient Health Questionnaire-9; HR: Hazard ratio; CI: Confidence interval.

Supplementary Table 4 Demographic and clinical characteristics of heart failure patients stratified by depression status (Patient Health Questionnaire-9 ≥ 10 vs Patient Health Questionnaire-9 < 10), mean \pm SD/%

Variable	Depressed (PHQ-9 ≥ 10)	Non-depressed (PHQ-9 < 10)	P-value
Age (years)	78 \pm 9	73 \pm 5	0.045
Female	77	60	0.021
PHQ-9 score	13.2 \pm 2.1	6.1 \pm 1.9	< 0.001
CV readmission within 12 months	38.3	22.2	0.032

Data are presented as mean \pm SD or proportions, as appropriate. Cardiovascular readmission refers to cardiovascular event-related rehospitalization within 12 months of discharge. Patients with moderate-to-severe depressive symptoms (Patient Health Questionnaire-9 ≥ 10) were significantly older and more likely to be female, consistent with known epidemiological patterns in heart failure populations. Depression was also associated with higher cardiovascular readmission rates. These findings support targeted psychosocial screening in high-risk subgroups. PHQ-9: Patient Health Questionnaire-9; CV: Cardiovascular