

Exploring the Association Between Loneliness, Depression, and Heart Disease

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Assessing patients' risk of heart disease is critical given its significant impact on public health.

Both sociological and psychological factors influence heart disease risk. In this study, we examined two distinct yet interconnected experiences, loneliness and depression, that have been linked to cardiovascular disease. Although related, they remain separate constructs, and our findings suggest each may exert unique effects on heart health.

Introduction

- Heart disease is the leading cause of death in the United States of America.¹
- Depression and loneliness have each been linked to cardiovascular disease (CVD), but few studies have examined their combined impact.
- A 2022 study by the American Heart Association identified loneliness as an independent CVD risk factor.²
- Depression is tied to elevated 10-year and lifetime atherosclerotic cardiovascular disease (ASCVD) risk,³ commonly assessed with the PHQ-9 Depression Scale⁴ and the American College of Cardiology (ACC) ASCVD calculator.⁵
- This study investigated how UCLA loneliness and PHQ-9 depression scores relate to ASCVD risk in adults at a free clinic in Upstate South Carolina.

Methods

- We utilized a cross-sectional correlational study with three variables which were measured via surveys (UCLA loneliness scores, PHQ9 depression scores, and ASCVD heart disease risk scores).
- Thirty-one English-speaking patients ages 20–79 with a lipid panel drawn in the past year were recruited.
- Participants completed the PHQ-9, UCLA Loneliness Scale, and a brief health and demographic survey before or after their visit at the free clinic.
- A free pulse oximeter was offered as an incentive.
- PHQ9 and UCLA loneliness scores were calculated per standard guides.
- Ten-year and lifetime ASCVD risks were computed using the ACC ASCVD calculator.
- Data were de-identified and analyzed in Excel for correlations, scatter plots, and multiple linear regressions, and cross-verified using two online calculators.

Results

- Data from 30 participants were analyzed after excluding one outlier. Multiple linear regression revealed a moderate, significant collective effect of PHQ-9 and UCLA scores on total cholesterol ($R=0.51$, $p=0.017$).
- In a multiple linear regression model, higher PHQ-9 scores were associated with lower total cholesterol (Figure 1), while higher UCLA scores correlated with higher total cholesterol (Figure 2). The regression model predicts total cholesterol levels using PHQ-9 and UCLA Loneliness scores. The yellow predicted values show the model's estimated cholesterol at each score, while the blue observed values reflect the actual data. Stratification by statin use ($n=13$) and non-use ($n=17$) weakened these associations ($p=0.28$; $p=0.24$).
- No significant relationships emerged between PHQ-9, UCLA scores, and LDL levels overall ($p=0.27$), though subgroup trends suggested higher PHQ-9 scores linked to lower LDL and higher UCLA scores to higher LDL in statin users ($p=0.057$). Associations with HDL were weak and non-significant.
- A strong correlation was found between PHQ-9 and UCLA scores ($R=0.66$, $p<0.001$, Figure 3, Table 1). However, relationships with 10-year or lifetime ASCVD risk were weak and non-significant on both multiple and simple regressions (Figures 4 and 5, Table 1).

Discussion

- Implications/Successes:**
 - Notable correlations were found between loneliness and depression scores and total cholesterol. However, loneliness and depression may not affect heart disease risk uniformly.
 - Additionally, a non-significant positive correlation was seen between loneliness scores and LDL.
- Major Limitations/Challenges:**
 - We were only able to study patients under the age of 65 as the free medical clinic does not serve those who qualify for Medicare.
 - A large Spanish-speaking population in the clinic was excluded from our study due to the unavailability of a certified translator.
 - We had a small sample size due to study timeline limitations and a finite budget for pulse oximeters. This limited the statistical significance and power of our data.

Conclusion

- Take home points:**
 - We identified a significant correlation between loneliness, depression, and total cholesterol levels, which implies a potential impact on risk of cardiovascular disease.
 - No other significant correlations were found between loneliness, depression, and heart disease risk or risk factors, likely due to the small sample size.
- Future research and interventions:**
 - Future studies should be pursued with a larger sample size in a setting in which patients between the ages of 65 and 79 can be studied, with ample interpretation services available for those who do not speak English.

Figure 1

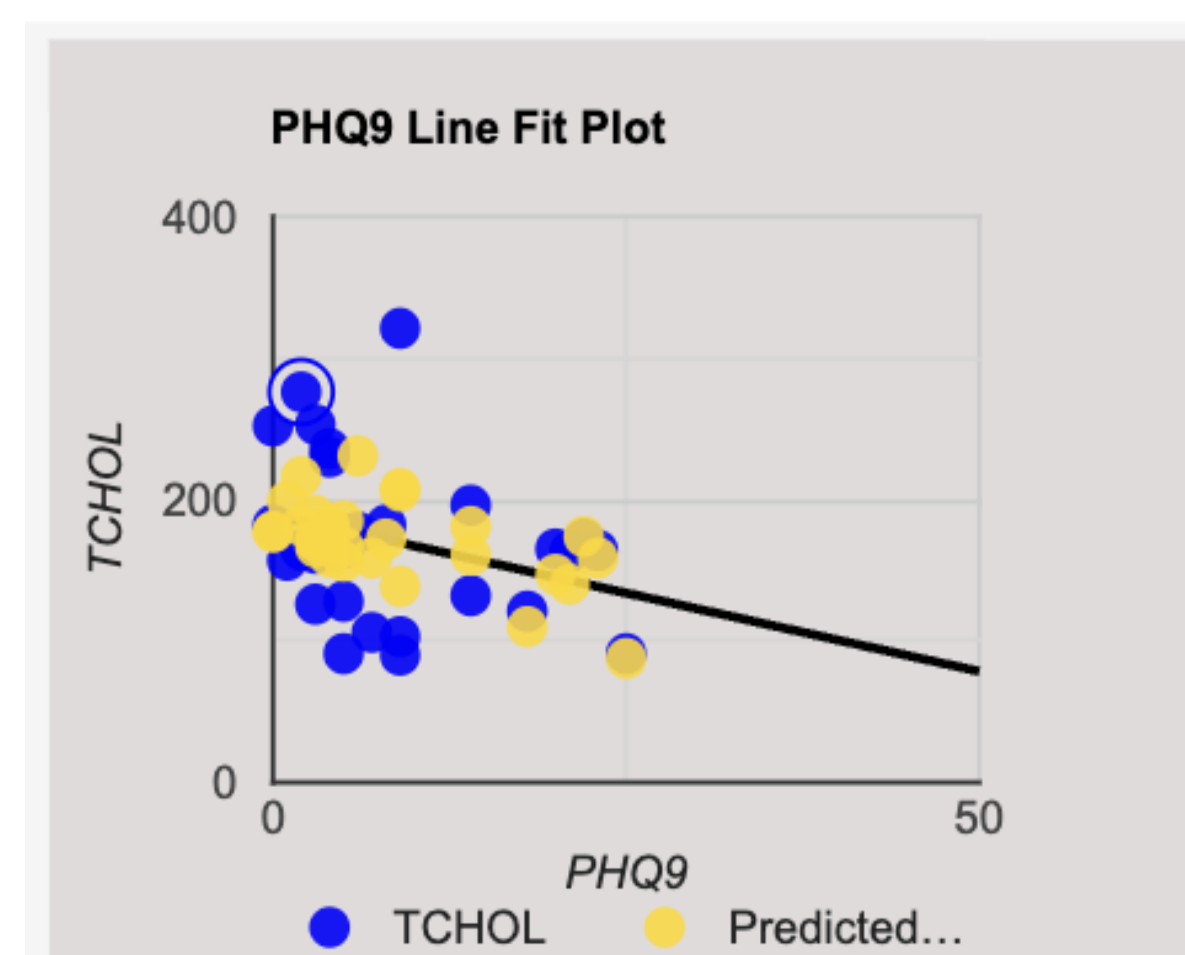


Figure 2

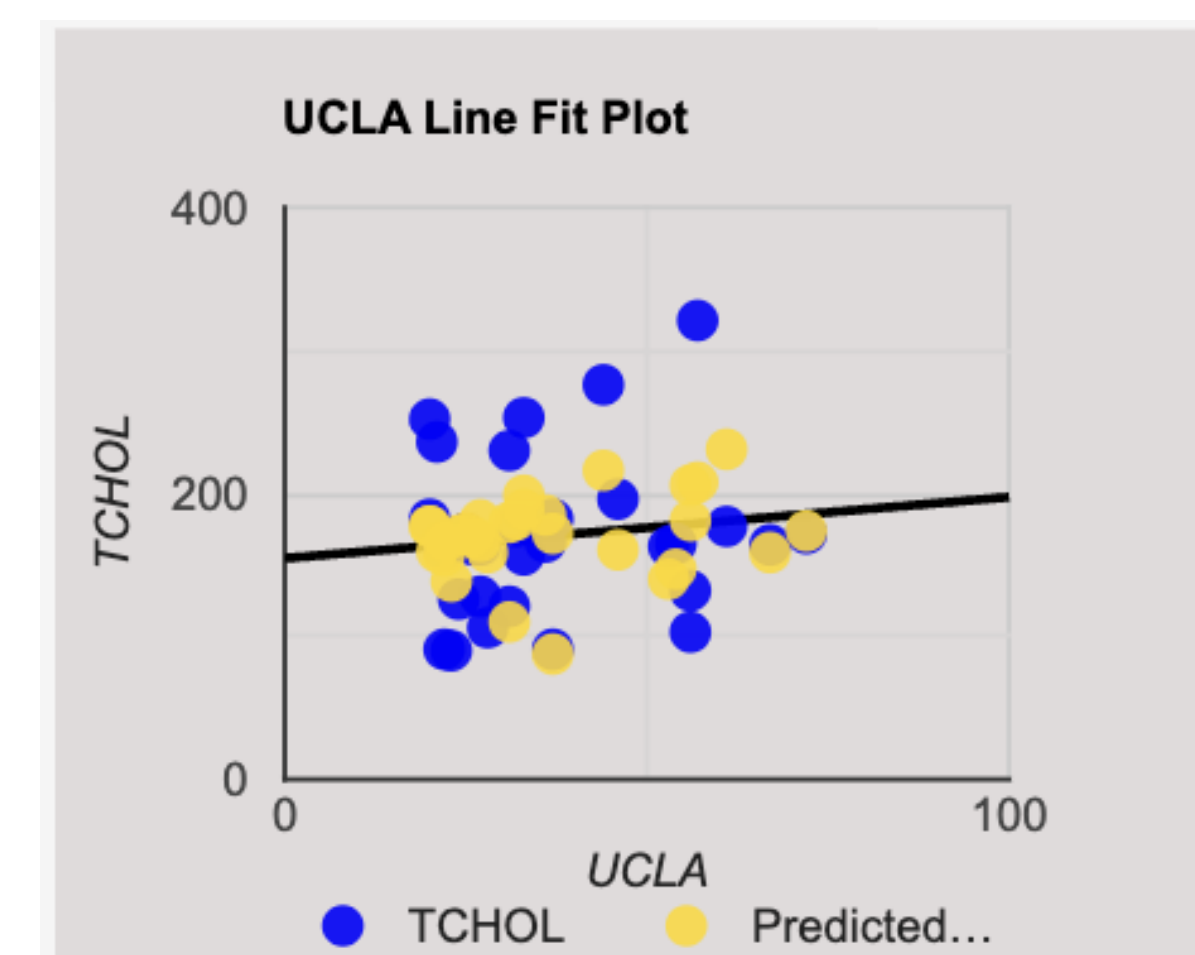


Figure 3

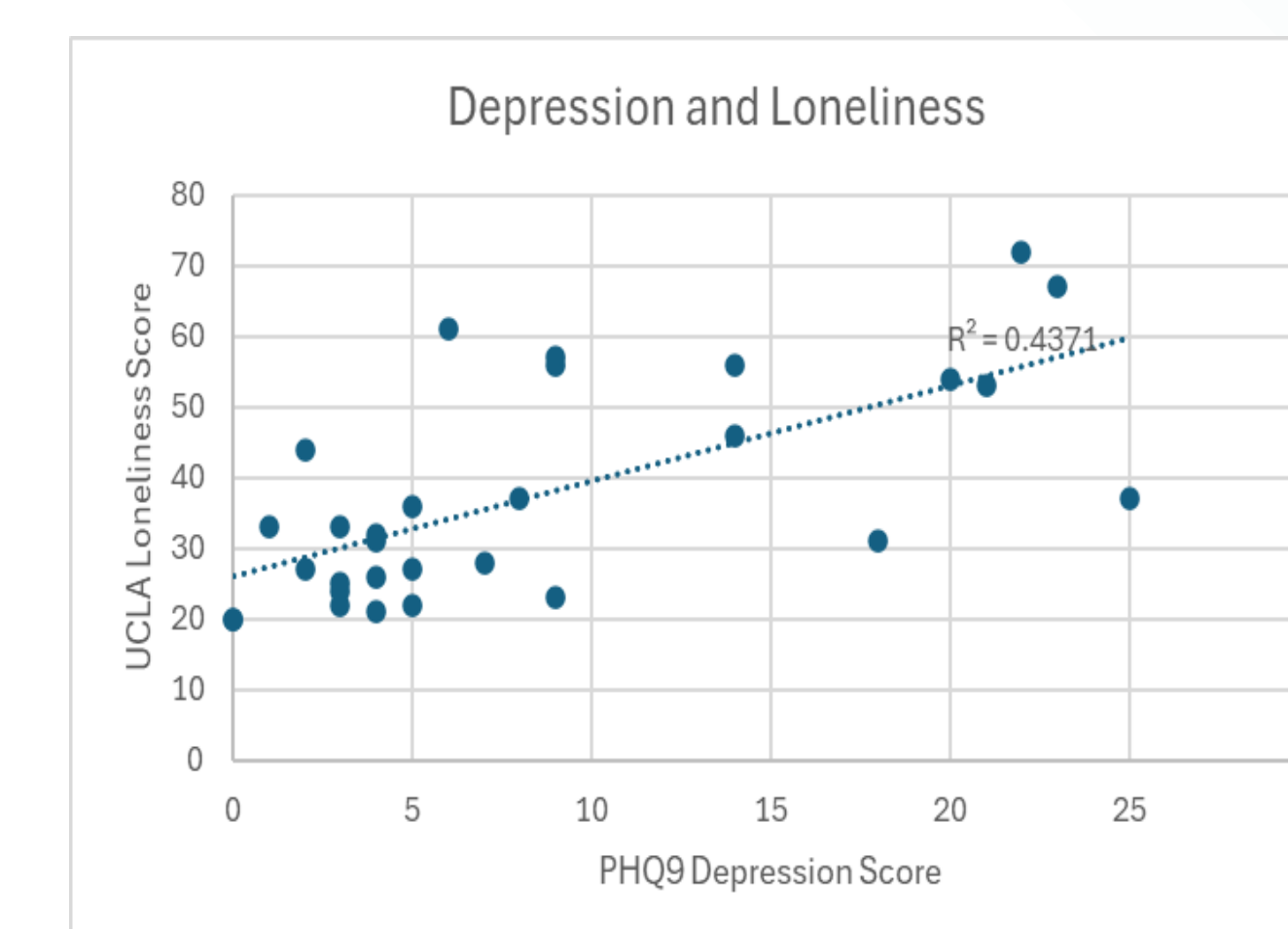


Figure 4

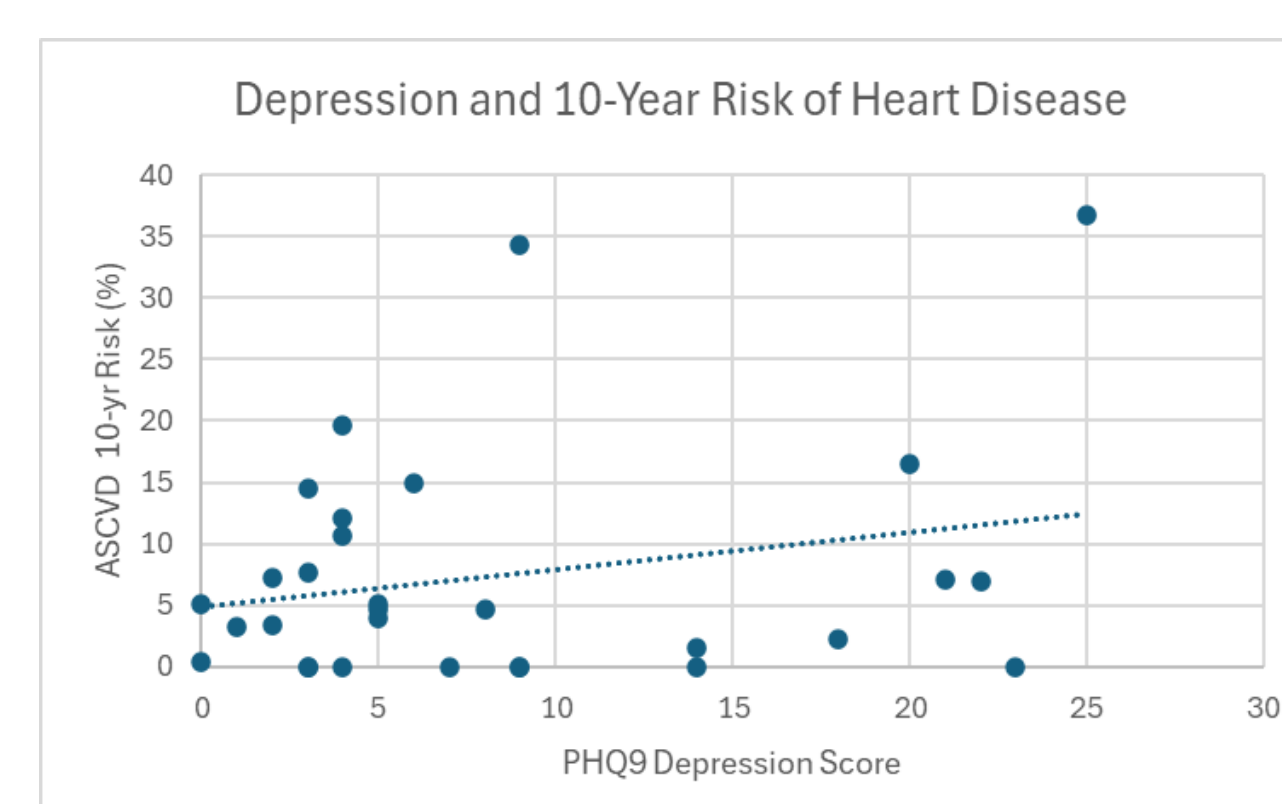


Figure 5

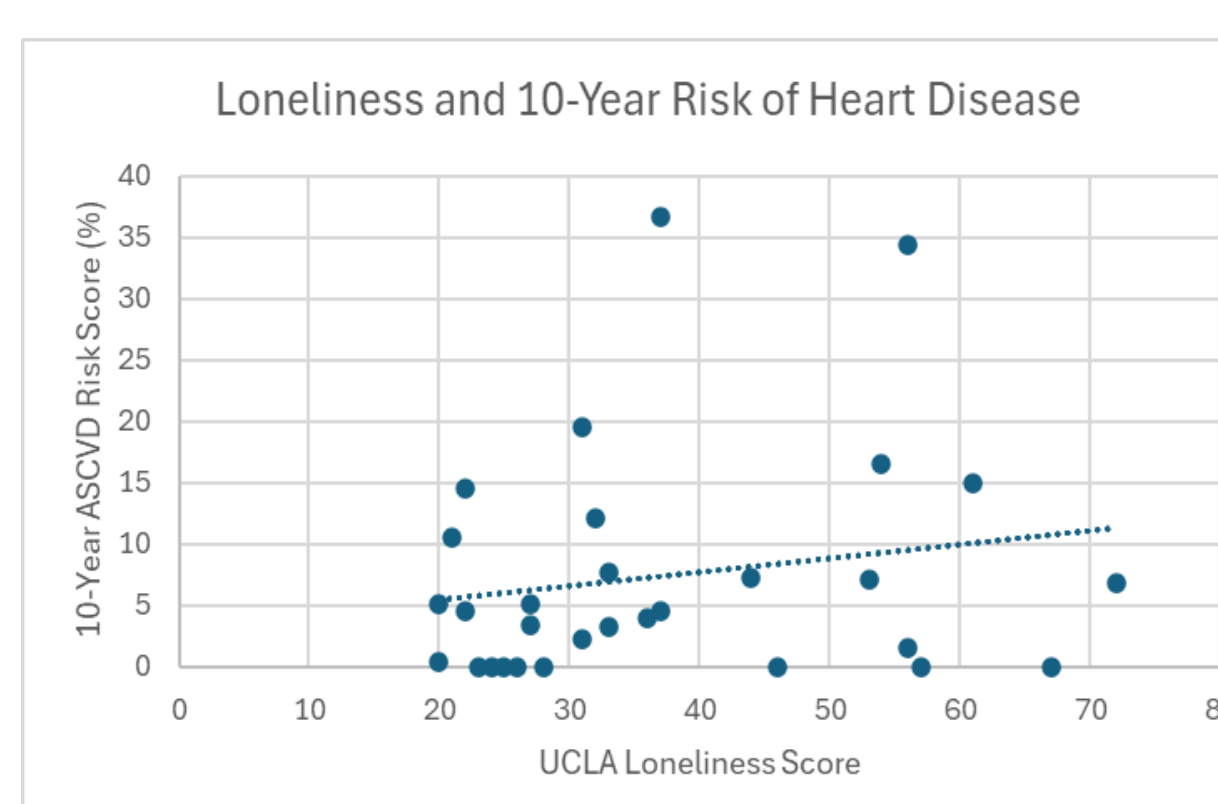


Table 1

Correlating Variables	Pearson's Coefficient	P-Value
Depression and Loneliness	0.661135387	< 0.0001
Loneliness and 10-Year Risk of CVD	0.2421569739	0.2776
Depression and 10-Year Risk of CVD	0.3386738844	0.1232

References

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