Factors Associated with Medication Adherence among a High-Risk Hepatitis C Birth Cohort

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Background

- The majority of individuals infected with Hepatitis C virus (HCV) are born between 1945-1965, but many were not previously tested due to harsh side effects of drug therapy prior to 2011.[1]
- Since 2012, the CDC has recommended that all individuals in this birth cohort should be screened one time for HCV.
- 90% of HCV patients treated with 2nd and 3rd generation DAAs achieve a sustained virologic response (SVR) at 12 months, a curable state.[1] Failure to achieve SVR is associated with lower medication adherence rates.[2,3,4]
- Intravenous drug use (IVDU) is a primary risk factor for HCV, and those with a history of IVDU may be less likely to adhere to medication treatment.[9]
- The Adherence to Refills and Medication Scale (ARMS) tool is effective in predicting adherence to treatment among patients with cardiovascular disease and diabetes.[5,6,7,8]

Study Aim

The primary aim of this study is to elucidate which risk factors are significantly associated with the ARMS score among the birth cohort at higher risk for HCV to inform future interventions to improve HCV treatment protocol adherence.

Methods

Sampling Methods and Population

This study recruited patients (n=82) born between 1945-1965 and accessing care at the OU-Physicians-Tulsa Family Medicine clinic between March-July 2019. This study was approved by the Institutional Review Board of the University of Oklahoma Health Sciences Center.

Prescreening survey

Data collected using the prescreening survey included the following:

Outcome:

- ARMS score measured using 12 questions on a scale of 1-4, with a minimum score of 12 and a maximum score of 48. Higher score indicates less likely to adhere to current medication.

Independent variables:

- Demographics: age and gender.
- HCV Risk factors:
  – Intravenous drug use
  – Tattoos
  – Blood transfusions before 1992
- Depression measured by the PHQ9 score from the standardized 10-question survey on a scale of 0-3, with a minimum score of 0 and a maximum score of 30. PHQ9 scores were categorized into groups: minimal (0-4), mild (5-9), and severe (10-30).
- Adverse childhood experiences (ACEs) measured using the standardized 10 question survey, with a score of 1 given for each ACE present. ACE scores were categorized into groups: 0, 1-3, and 4 or more.

Statistical Analyses

Mean ARMS scores were compared using independent t-tests for variables with two categories and analysis of variance for variables with three or more categories ($\alpha = 0.05$). All statistical analyses were performed in SAS, version 9.4.

Results

- Among the 82 participants in the study through July 2019, about half were women (56%) and the mean age was 63 (SD=5.66) years.
- The mean ARMS score was 16.33 (SD=3.43).
- About half reported at least mild (PHQ 5+) depression (48%) and about one-third reported four or more ACEs (35%).
- Mean ARMS scores did not differ for any other variables, including blood transfusions, tattoos, and intravenous drug use.

Results: Depression and ARMS

- Mean ARMS scores were 2.93 points (95% CI: 0.67-5.19) higher among those with mild depression (PHQ 5-9) than those with minimal depression (PHQ 0-4)
- Mean ARMS scores were 2.64 points (95% CI: 0.61-4.68) higher among those with severe depression (PHQ 10-30) than those with a minimal depression (PHQ 0-4)
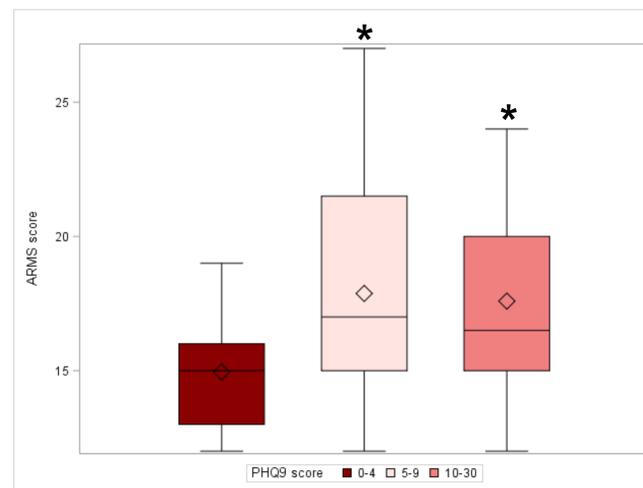
Note: (*) indicates significant difference in ARMS scores compared to those with minimal depression ($\alpha = 0.05$)

Results: ACEs and ARMS

- Mean ARMS score was 2.61 points (95% CI: 0.49-4.73) higher among those with at least four ACEs compared to those with three ACEs or less.
- Mean ARMS score did not increase significantly among those with ACEs until there were at least four ACEs
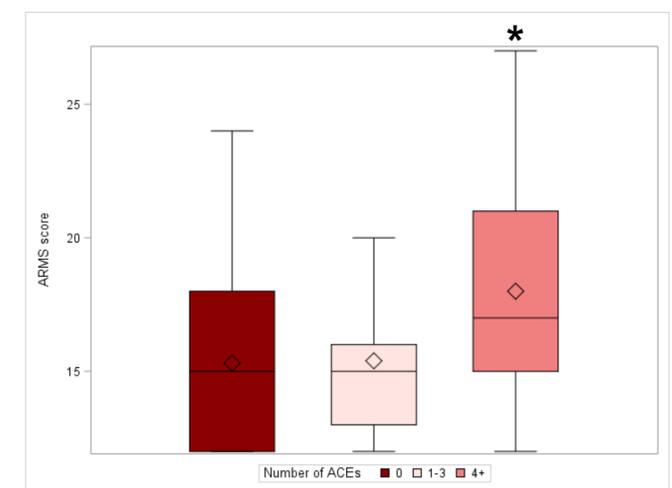
Note: (*) indicates significant difference in ARMS scores than those with three or less ACEs ($\alpha = 0.05$)

Conclusion

- This is the first study to assess the ARMS score as a predictor of medication adherence among a birth cohort at high risk for HCV infection, and to assess risk factors associated with high ARMS scores, indicating likely low medication adherence.
- Limitations include sample size and due to the cross-sectional nature of the study, a temporal sequence between depression and ARMS score cannot be established.
- This study indicates that depression and ACEs may be risk factors for poor medication adherence in this population.
- Adverse childhood experiences influence adherence significantly when they are accumulated (> 4).
- Depression is significantly associated with increased ARMS score, but this trend stays at a similar level even at the highest PHQ9 scores, suggesting that depression level beyond minimal could be a risk factor for poor adherence.
- Further research is needed to identify confounding factors and other variables that may contribute to increased ARMS scores.

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