COVID-19 Illness Severity in People Living With HIV; A Pilot Study in the Rocky Mountain West

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I. Introduction

Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2) was first identified in Wuhan, China in December of 2019. On March 13th, 2020, COVID-19 was declared a pandemic by the World Health Organization.

At the start of this research, there had been over 110 million cases worldwide and 2.4 million deaths.[2] In Utah, there had been 369,433 confirmed cases, 14,597 hospitalizations, and 1,890 deaths.[3]

The severity of COVID-19 illness ranges from asymptomatic to death. Current research is investigating correlating factors of severity to acute and post-acute COVID-19 illness. Early research has shown that immunocompromised individuals are at greater risk for developing more severe illness.[4] This research is to investigate people living with Human Immunodeficiency Virus (HIV) and their immunocompromised states as it relates to their CD4 count and the presence of comorbid conditions to better predict severity of COVID-19 illness.

II. Methods

- University of Utah Infectious Disease Clinic identified and made initial contact with positive COVID-19 patients within their HIV clinic population.
- Study team members emailed IRB consent form to patients interested in participating.
- Patients contacted via phone, verbally consented to IRB study, survey administered.
- EMR data collected, survey results recorded, tallied, and analyzed by study team members.
- Inclusion Criteria: >18 years old, tested positive for SARS-CoV2 between 3/6/2020-3/6/2021, positive for HIV (any time in life), English or Spanish speaking.
- Exclusion Criteria: <18 years old, SARS-CoV2 negative or outside stated date range, deceased individuals, non-English or Spanish speaking.

III. Results

Chi-Square analysis comparing acute illness severity score against number of comorbidities resulted in a $x^2 = 2.4$, $p= 0.66$, $df=4$. Chi-Square analysis for the acute illness severity score compared to CD4 count resulting in a $x^2 =4.53$, $p=0.33$, $df=4$, $n=17$. Both p-values were greater than the desired p-value of less than 0.05.

Majority of participants (**70.6%**) experienced mild symptoms, **23.5%** reported moderate symptoms, and **5.9%** reported severe symptoms. **52.9%** of participants reported some type of post-acute symptom.
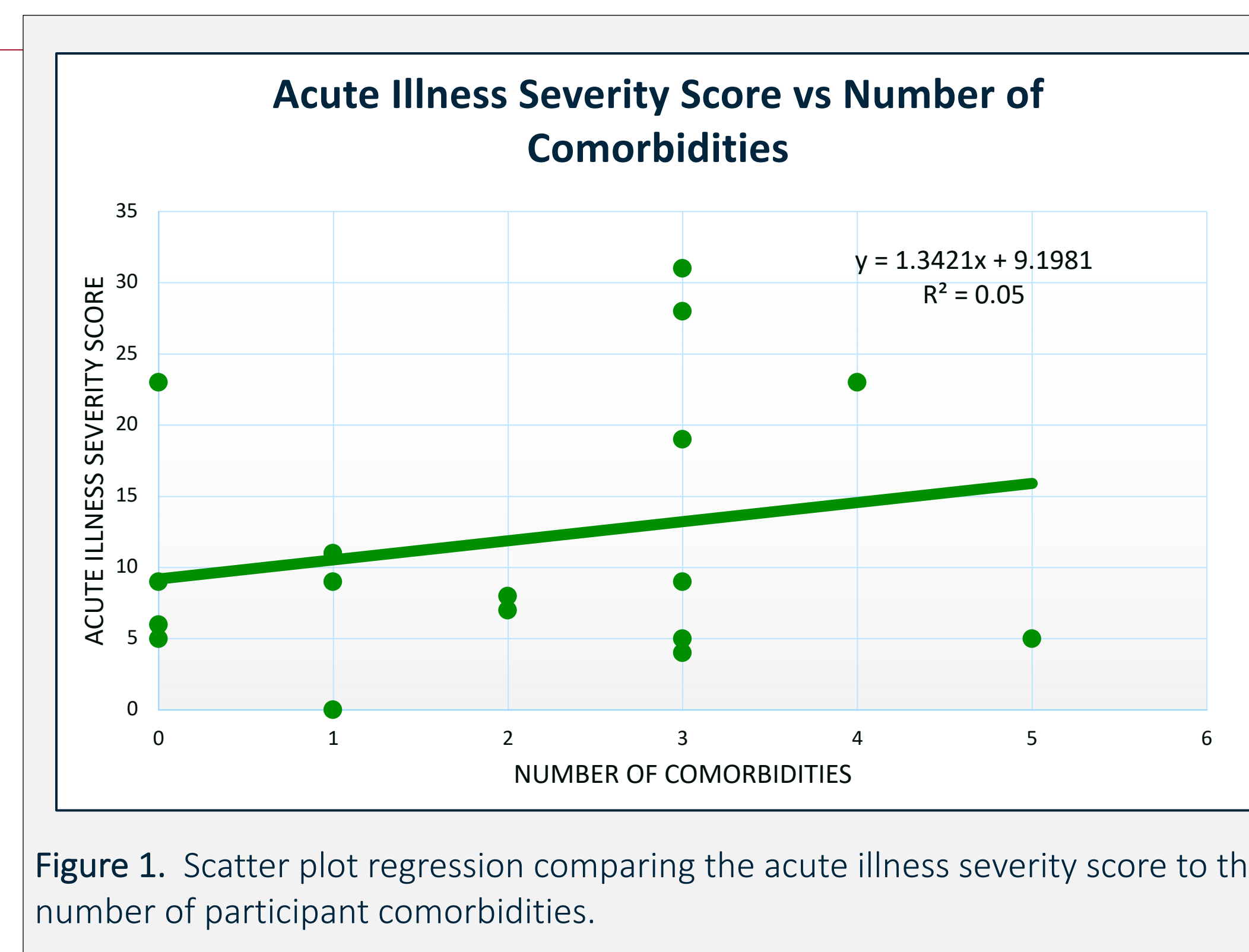

Figure 1. Scatter plot regression comparing the acute illness severity score to the number of participant comorbidities.
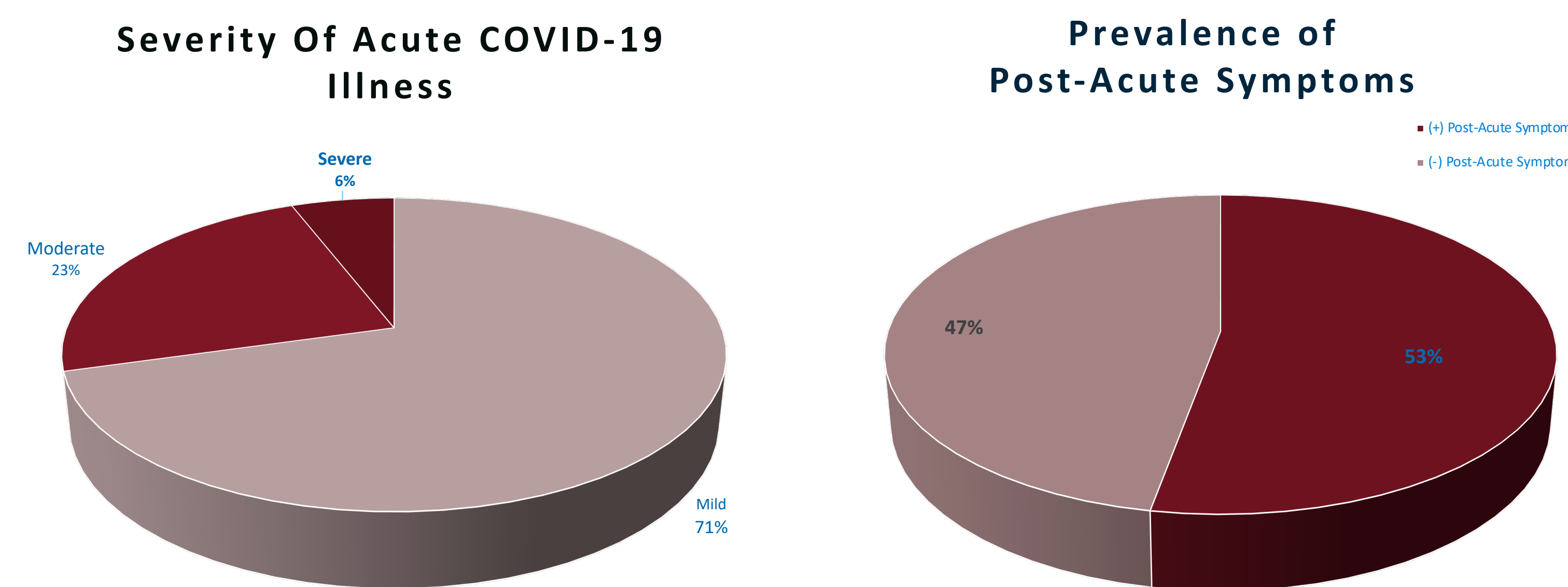

Figure 6. Percentages of participates reporting severity scores for acute illness.

Figure 5. Percentages of participants reporting any post-acute symptoms.
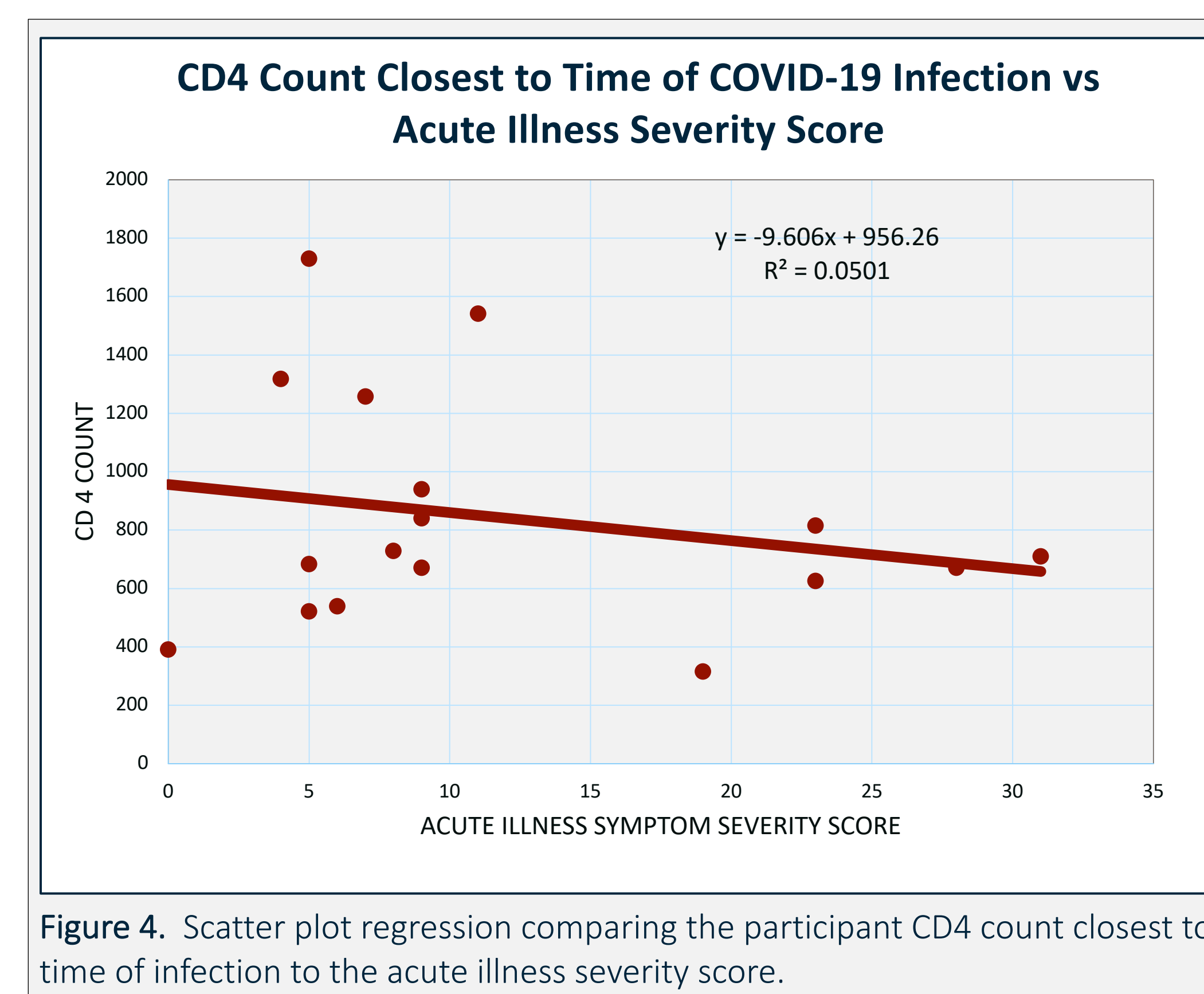

Figure 4. Scatter plot regression comparing the participant CD4 count closest to time of infection to the acute illness severity score.

IV. Discussion

The Chi-Square analysis suggests that there is no statistical significance between number of comorbidities and severity of acute illness or CD4 count. Scatter plot regression was performed between the variables and the R^2 suggests there is no correlation between severity of acute illness and number of comorbidities or CD4 closest to time of diagnosis of COVID-19.

70.6%, experienced mild disease. However, over half of all participants experienced some type of long-term symptom at time of survey completion. The current literature suggests that 11.4% of the general population experiences some post-acute symptoms[17]. The data suggests that people living with HIV report a higher percentage, however, further research should be conducted with a larger sample size to determine if there is a true difference.

Strengths:
- All surveys initiated were completed in full
- Methods outlined prior to collecting data were maintained

Limitations:
- Small sample size, n = 17
- Only English patients surveyed
- CD4 counts were outside one month window of COVID-19 diagnosis

V. Conclusions

In conclusion, the data set is limited decreasing the power of this study. The data collected thus far suggests that there is no difference between number of comorbidities and severity of COVID disease experienced by people living with HIV. The data also suggests that the severity of acute illness is not correlated with CD4 count nearest to the COVID-19 illness. Further research is required to determine if the preliminary data suggests statistical significance. Additional research could investigate more patients living with HIV who had a lower CD4 count and a more severe COVID-19 illness. This patient population also represents a small portion of the overall population of people living with HIV and should be broadened for more generalizability. Further research should investigate severity of post-acute illness rather than a binary presence or absence of symptoms.

VI. References

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