

Abstract

Pulmonary rehabilitation referral for patients with chronic respiratory disease is underutilized in the US, and those beginning the program do not always complete it. One factor affecting completion of pulmonary rehabilitation is socioeconomic status (SES) [1]. To further evaluate this relationship, we reviewed records of patients referred to the St Francis Hospital pulmonary rehabilitation program, comparing completion rates in those with and without our surrogate markers for low SES: Medicaid coverage or no insurance. Age, sex, race/ethnicity, distance to the rehab center, six-minute walk distance, supplemental oxygen requirement, and selected comorbid conditions were tested as covariates. Our preliminary results indicate that low SES and Black race are markers for non-completion, a relationship not significantly affected by the above-listed variables. Since patients with low SES or of Black race are less likely to complete pulmonary rehabilitation, interventions targeted at completion of pulmonary rehabilitation appears warranted.

Background

- Participation and completion of pulmonary rehabilitation of patients with COPD in the US are associated with positive outcomes such as decreased dyspnea, improved health status, increased exercise capacity, reductions in hospitalizations and increased survival [2]
- Despite these benefits, pulmonary rehabilitation remains underutilized in the US
- Social determinants of adherence and completion of pulmonary rehabilitation include functional capacity, current smoking, and socioeconomic disadvantage [1]
- We seek to determine the effect of low SES on completion of pulmonary rehabilitation in a retrospective record review of a single pulmonary rehabilitation center

Objectives

1. Compare completion rates of pulmonary rehabilitation in patients with and without low SES
2. Evaluate other factors, including demographics, distance to the center, race/ethnicity, disease severity, and selected comorbidities as potential confounders of this relationship

Methods

Primary endpoint:

- Completion of pulmonary rehabilitation, defined as 16 sessions

Other variables tested:

- Age, sex, race/ethnicity, distance to the center, six-minute walk distance, oxygen requirement, selected comorbid conditions: anxiety, depression, cancer, CHF history, smoking status, diabetes, ischemia, OSA

Inclusion/exclusion criteria:

- Male or female adults, age range 40 to 90, referred to St Francis PR program
- Having at least one rehabilitation encounter at St Francis between January 1, 2004 and December 31, 2018 (15 years)
- With the following diagnoses: COPD, respiratory diseases other than COPD
- Available medical record data for at least one year following completion of PR

Retrospective Chart Review (N = 220)

- Analyze completion rate for each cohort
- Descriptive statistics to summarize baseline demographics and characteristics of each cohort

Results: Demographics and PR Completion

- N = 220
- 39% of patients participating in at least one PR session did not complete the program

| Variable | | Incomplete PR | Completed PR |
|------------------------|----------|---------------|--------------|
| Sex n (%) | Female | 29 (51) | 28 (49) |
| | Male | 55 (34) | 105 (66) |
| Mean age, years | | 65.24 | 70.69 |
| Race / Ethnicity n (%) | Asian | 3 (75) | 1 (25) |
| | Black | 26 (58) | 19 (42) |
| | Hispanic | 7 (35) | 13 (65) |
| | White | 48 (32) | 100 (68) |

Results: SES and Non-Completion of PR

- Twenty-six percent had the low SES marker (Medicaid or no insurance)
- Those with low SES marker were younger (63 vs. 70 years, $p < 0.0001$), had lower Chronic Respiratory Questionnaire total health status scores (3.6 vs. 4.0, $p = 0.03$), and lived *closer* to the rehabilitation center (6.9 vs. 11.1 miles, $p = 0.0001$).
- In univariate analyses evaluating all the above predictor variables, the following variables predicted non-completion of PR:
 - Age <70 years (odds ratio (OR) 2.04, 95% confidence interval (CI) 1.17 to 3.56)
 - Black race OR 2.26, 95% CI 1.18 to 4.34
 - Low SES (OR 1.98, 95% CI 1.07 to 3.65)
 - In stepwise forward logistic regression including the above significant univariate predictors, age < 70 and Black race remained in the model, but SES lost significance.

Summary and Conclusion

- Non-completion of PR was high (39%)
- While there are undoubtedly multiple factors related to non-completion, younger age, Black race, and low SES were prominent in our population
- In multivariate analysis, Black race was a more robust predictor than low SES
- Better knowledge of non-completion of PR may help target interventions to improve adherence with this beneficial treatment

References

1. Oates GR, Hamby BW, Stepanikova I, Knight SJ, Bhatt SP, Hitchcock J, Schumann C, Dransfield MT. Social Determinants of Adherence to Pulmonary Rehabilitation for Chronic Obstructive Pulmonary Disease. *COPD*. 2017 Dec;14(6):610-617. doi: 10.1080/15412555.2017.1379070. Epub 2017 Oct 11.
2. Lindenaue PK, Stefan MS, Pekow PS, Mazor KM, Priya A, Spitzer KA, et al. Association Between Initiation of Pulmonary Rehabilitation After Hospitalization for COPD and 1-Year Survival Among Medicare Beneficiaries. *Jama*. 2020;323(18):1813-23. Epub 2020/05/13.