

1.

1. First Name

Karen

2. Last Name

Barr

3. Academic Degree(s)

MD

4. Department/Institution

PM&R UPMC/University of Pittsburgh

5. Email Address

barrkp@upmc.edu

6. Co-author(s) names (first and last) and degrees

George Tankosich BS

Bryan Willey MS

7. Funding Source (if applicable)

University of Pittsburgh Dean's Summer Research Project

8. Manuscript Title

Implementation of structured frailty assessment and prehabilitation plan into lung transplantation process

9. Abstract (500 words maximum)

Background : Frailty in patients undergoing lung transplantation is a concern. In addition to affecting transplant listing decisions, there is the potential for frailty and other risk factors for poor outcomes to improve with prehabilitation. Despite research showing its importance, The feasibility of implementing a structured frailty assessment and prehabilitation plan for patients undergoing assessment for lung transplantation in a clinical setting is unknown. Integrating additional assessments into an already complex evaluation process, the wide variety of diagnoses, spectrum of severity and time urgency at time of presentation, and lack of data on prehabilitation needs are real world challenges not well addressed in the medical literature.

Objective: To describe the development, implementation, and evaluation of a structured frailty assessment and individualized prehabilitation plan for patients undergoing assessment for lung transplant using the RE-AIM framework at both the program and individual level.

Design: Retrospective cohort observational study at one US academic medical center

Participants: 186 patients seen for lung transplant evaluation between Jan 2021 and May 2022.

Intervention: Program level-- A process to include frailty assessment and a prehabilitation plan in the evaluation process.

Individual level-- Patients were assessed for frailty using physical function and self-reported measures and provided an individualized prehabilitation plan.

Outcome measures: Program reach, program and individual effectiveness, implementation of the frailty assessment and prescription of a prehabilitation program, and maintenance of the intervention were assessed

Results: Reach improved during the implementation process to 100% of patients receiving a prehabilitation plan and 98% completing frailty assessment. Analysis of program effectiveness in regards to identifying frailty found 29% were frail and 43% pre-frail, independent of pulmonary diagnosis and across various ages. Of the subset of patients in whom follow up data was available 43% had improvement in frailty measures and an additional 30% had no decline, despite the expectation of no

improvement in, and more likely progression of their primary disease process. Implementation of the core components of the multmodal program was evaluated. All patients received multiple recommendations. 85% were recommended to participate in pulmonary rehabilitation, 26% in physical and/or occupational therapy, and 80% in a home exercise program and increasing daily activities. 97% received some nutritional advice, including additional advice on weight loss for the 26% with obesity, and techniques to gain weight/reverse sarcopenia in the 7% with BMI less than 18. 74% received advice regarding enhancing resiliency and coping skills. 27% of patients assessed had elevated anxiety levels and 19% elevated depression levels that informed recommendations. Maintenance and refinement of the intervention continues, and it has now been two years since the program began.

Conclusions: A structured frailty assessment and a prehabilitation plan is a feasible intervention to include in the lung transplant assessment process in a non research setting. Patients undergoing assessment for lung transplantation have high prehabilitation needs. Addressing these areas can improve frailty measures during the listing process. RE-AIM is a useful framework to use during the development, implementation, and evaluation phase of a prehabilitation intervention

10. Key Words (must list at least 1 up to 6 maximum)

- 1 : prehabilitation
- 2 : RE-AIM
- 3 : frailty
- 4 : lung transplantation

11. Key Implementation theories or frameworks used in this manuscript

RE-AIM

RE-AIM is one of the most frequently applied implementation frameworks. It can be applied to both programs and individuals using the components Reach, Effectiveness, Adoption, Implementation, and Maintenance
