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“The Impact of Handheld Wireless Home Spirometry on Mental Health and Health Literacy in Patients with Cystic Fibrosis”

Background: During times of health crisis, such as that seen during Hurricane Katrina and the current COVID-19 pandemic, patients with chronic lung disease such as Cystic Fibrosis (CF) are incentivized to stay home in order to minimize exposure risk. Patients who have typically been seen every 3 months in clinic since birth may additionally have limited access to attending in-person clinic and performing routine procedures, such as spirometry, that assess lung health and disease progression. Decreased access to their healthcare center can have significant implications for not only disease progression, but also mental health in patients with chronic disease.

Handheld wireless spirometers can serve as a meaningful tool for healthcare providers to monitor lung health and detect pulmonary exacerbations in patients with CF when they are at home. This study aims to confirm the non-inferiority of the ZephyRx home spirometer in providing accurate measurements of FEV1 and FVC as compared to the in-clinic desktop spirometer. This study also investigates the implications of home spirometers and education on aspects of mental health, specifically anxiety and patient sense of empowerment, as well on health literacy regarding basic spirometry and lung function.

Methods: 40 adult patients over the age of 18 seen in the Tulane Adult Cystic Fibrosis clinic were enrolled in a prospective cohort study. Anticipating clinical closures causing delay or cancellations of in-person assessments, we designed a 9-month longitudinal study. At in-person visits, baseline, 3-month (if possible) and 9-month measurements of FEV-1 and FVC will be obtained using both ZephyRx and desktop spirometry in order to confirm reproducibility of results between both methods. Accuracy standards established by the American Thoracic Society are applied to both methods. In order to determine mental health at baseline, 3 months and 9 months, we will use a standardized Health Anxiety Inventory and Patient Enablement Instrument to assess specifically for anxiety and sense of satisfaction and empowerment. Lastly, the patients will complete pre- and post-testing questionnaires after being provided a spirometry education sheet in order to assess the potential impact on patient health literacy. Descriptive analytics will be used to compare the ZephyRx and desktop spirometer measurements, mental health, and spirometer education questionnaire results.

Conclusion: We anticipate that our results will support the feasibility of ZephyRx home spirometer in serving as a meaningful tool for providing objective information to healthcare providers when in-person assessments are not feasible. Furthermore, we anticipate that access and use of such devices, coupled with dedicated patient education, will support patient mental health and positively impact health literacy by empowering patients with cystic fibrosis to take a more active role in the monitoring of their chronic lung disease.