Physical Activity in Daily Life in [Country]

COPD Patients During and After Exacerbation: A Review

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Summary: Patients with Chronic Obstructive Pulmonary Disease (COPD) do not engage in enough physical activity during their daily lives (PADL). One factor playing a role in this decrease in physical activity is hospitalization, although there are not many studies assessing this claim. This paper is a review of an article that is studying the effect of hospitalization during and after exacerbations on the PADL of COPD patients. To accomplish this, 3-axis accelerometers (activity monitor) were used on the second day of hospitalization as well as one month after release from the hospital, allowing the investigators to quantify the amount of physical activity each participant completed. They also took the six-minute walking distance, lower limb strength and pulmonary function into account. 76 consecutive patients were originally looked at in this longitudinal study with exclusion criteria making 44 patients ineligible on top of the 12 that dropped out. Therefore, 20 [Country] participants were assessed both on the second day as well as one month after release from the hospital. They found that while in the hospital, COPD patients spent a majority of their time lying (87%) or sitting. After one month, patients were found to have increased walking time (average of greater than 40 minutes per day). The researchers concluded that [Country] COPD patients are not active while in the hospital, but become more active after one month at home. They also found that those who have been hospitalized multiple times are more inactive during and after exacerbations.

Problem/Purpose: The purpose of this study is to quantify the effects of hospitalization on patients with a COPD exacerbation in regards to their PADL in [Country] patients. The primary focus is during and after the hospitalization. The study is also trying to find out the factors that determine the physical activity levels. The two variables that this study is looking at are PADL compared to hospitalization due to acute exacerbations. The relationship is that as patients are hospitalized, they will have a decrease in physical activity. The variables are testable using a

number of analyzable variables including: pulmonary function test, sub maximal physical capacity (six minute walking distance), peripheral muscle strength of the lower limbs, and use of a DynaPort moviemonitor accelerometer (monitored PADL). The population being studied in this particular article focused on [Country] patients with COPD. The significance of this problem, according to the investigators, is that exacerbations cause increased healthcare costs, increase the risk of mortality while decreasing health related quality of life, lung function, muscle strength and overall level of PADL.

Review of literature and theoretical framework: The literature review notes that declines in PADL during hospitalization in patients with COPD leads to a development of systemic consequences of COPD. Once a patient is hospitalized (independent variable), they show reductions in PADL (dependent variable) for at least one month after discharge when compared to stable COPD patients. The gaps in knowledge currently revolve around the fact that there is only one study evaluating the effects of hospitalization on PADL. This study was conducted in Belgium. Since there is evidence that level of physical activity depends on many factors (educational level, socioeconomic status, ethnicity), there is a strong belief that the results may be different in a population that has different qualities. This article uses mainly secondary sources with a few primary sources. An example of a secondary source used is, Pate et al. (1995) (1.) and an example of a primary source used is Pitta et al. (2006) (2.). The operational definition of the independent variable is the result of being admitted to the hospital due to an acute exacerbation [defined as “an event in the natural course of the disease characterized by a change in baseline dyspnea, cough and secretion” (Langer, 2009) (3.)]. The operational definition of the dependent variable is how the hospitalization affects PADL for these patients measured in the numerous ways stated above. These definitions reflect the conceptual definitions.

Hypotheses or research questions: The researchers hypothesized that patients with COPD in South America who have had an acute exacerbation of their disease and have to be hospitalized due to it will not have as significant of a reduction in PADL when compared to the Pitta et al. (2.) study. The independent variable is hospitalization and the dependent variable is the effect of hospitalization on PADL. The hypothesis is testable by measuring PADL during and after hospitalization.

Sample: The sample n = 20 was selected from a total of 76 consecutive patients with a clinical diagnosis of COPD who had experienced exacerbation of the disease at the University Hospital in [Country]. Patients were excluded from the sample for a number of reasons including: patients with respiratory failure (respiratory rate greater than 35 with worsening cyanosis), those with altered mental status, people with persistent and worsening hypoxemia with worsening respiratory acidosis (pH < 7.25), patients with hemodynamic instability and those requiring invasive mechanical ventilation. Also, patients with previous histories of lung diseases, with unstable cardiovascular, neurological or orthopedic diseases, and those that needed an intensive care unit due to declining status were also excluded. The type of sampling used was convenience sampling as the researchers only considered patients admitted to the University Hospital. This design is appropriate because the question being asked by the investigators is one that can be answered using a convenience sample. This sample also reflects the population as identified in the purpose statement. The sample size was appropriate when compared to a previous study (2.), but does have generalization limitations. This study can be generalized to COPD patients in [Country] that meet the criteria for Global Initiative for Chronic Obstructive Pulmonary Disease (GOLD) and who have similar education and socioeconomic statuses. Also, due to the sample size and sampling method, patients' activities were not monitored before their exacerbations due

to the cost and time that would be required to monitor large populations of stable patients before exacerbations occurred.

Research Design: The type of design used is a quasi-experimental design meaning that it is very similar to that of an experimental design without the availability to have random assignment. The type of data-collection techniques being used include six minute walk distance, peripheral muscle strength of lower limbs, C reactive protein and arterial blood gas tests on the second day of hospitalization and one month after discharge and pulmonary function tests. The patients were also monitored in their daily life using an accelerometer on the third and fourth day of hospitalization and one month after discharge on two consecutive week days. The rights of the patients were protected by giving them optimal pharmacological treatment and supplemental oxygen to maintain their oxygen saturation at or above 88%. They were all informed of the purpose of the study and agreed to sign the informed consent. This was approved by the Ethics and Research Committee of the University Hospital.

Instruments: The researchers chose to use accelerometers as their method for monitoring PADL because of their small size, weight and accuracy especially when considering the specific model chosen. They chose to do two consecutive days for both the in hospital analysis and one month post-discharge analysis so that they could have a larger set of data. The provision made to ensure accuracy when using this instrument was that they were positioned in the same spot on each participant (in the lower back near the second lumbar vertebrae). The validation of the activity monitor was conducted in a previous study (4.).

Analysis of data: The level of measurement used for all of the major variables is that of a ratio measurement. The descriptive statistics reported include mean age (68.6 +/- 10.7 years), and gender (majority male with 14 to only 6 females). The average length of stay was 8.9 days +/-

3.1 days. Other descriptive statistics include the co-morbidities. Out of these, hypertension (found in 60%), diabetes mellitus (found in 35%), and patients reporting hospitalization in the past year (35%) were the most rampant. The time spent walking during hospitalization was significantly explained by quadriceps strength ($p < .05$). One month later, time spent walking was significantly explained by the six minute walking distance ($p = .02$). During hospitalization, patients spent most of their time lying when compared to one month after hospitalization; they were walking greater than forty minutes per day on average.

Conclusions: The hypothesis was supported in that the results demonstrated that [Country] COPD patients are active one month after discharge. The researchers also found that patients with previous hospitalizations were more inactive and PADL was significantly explained by peripheral muscle strength (hospital) and sub maximal physical activity (at home). When compared to the Pitta et al. (2.) study, the results were similar in the patients during their stays in the hospital, but after one month, [Country] patients were found to be more active than their European counterparts (supported by increased six minute walk distance and lung capacity observed in the [Country] patients). The researchers suggested that the potential effects of immobility have not been addressed implying that further research needs to be conducted in this area. These conclusions are applicable to nursing practice only in the patient population studied, and even then there are many limitations. These results should not be applied to clinical practices due to the limitations of the study. It would be possible to replicate this study in another clinical practice setting as this is somewhat of a replica in itself. Many more studies need to be completed across the different cultures if this study is going to be used in the clinical practice setting.

References

1. Pate, R. R., Pratt, M., Blair, S. N., Haskell, W. L., Macera, C. A., Bouchard, C., et al. (1995). Physical activity and public health. A recommendation from the Centers for Disease Control and Prevention and the American College of Sports Medicine. *JAMA, 273*, 402-407.
2. Pitta, F., Troosters, T., Probst, V. S., et al. (2006). Physical activity and hospitalization for exacerbation of COPD. *Chest, 129,* 536-539.
3. Langer, D., Gosselink, R., Sena, R., et al. (2009). Validation of two activity monitors in patients with COPD. *Thorax. 64,* 641-642.
4. Borges, R. C., Carvalho, C. R. F. (2012). Physical activity in daily life in [Country] COPD patients during and after exacerbation. *COPD, 9,* 496-602.