COPD DISCHARGE CARE BUNDLES: AN INTEGRATIVE REVIEW

An Integrative Review

Submitted to the

Faculty of Liberty University

In partial fulfillment of

The requirements for the degree

Of Doctor of Nursing Practice

By

Leigh Wingo

Liberty University

Lynchburg, VA

December 3rd, 2021

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Scholarly Project Chair Approval:

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Dr. Kenneth Thompson, PharmD

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List of Abbreviations

COPD (Chronic Obstructive Pulmonary Disease)

AECOPD (Acute Exacerbation of Chronic Obstructive Pulmonary Disease)

QoL (Quality of Life)

ED (Emergency Department)

CMS (Centers of Medicare/Medicaid Services)

RTC (Randomized Controlled Trial)

HQA (Health Quality Alliance)

Abstract

Chronic obstructive pulmonary disease (COPD) is one of the leading causes of death in the United States. It is the reason for millions of emergency room and hospitalizations, increasing healthcare costs, morbidity, and mortality. Many studies have evaluated the effects of COPD patient care bundles to help reduce the risk of 30-60-90-day readmissions post discharge from the hospital for COPD exacerbation. A comprehensive search was conducted on articles dated between February 2015 to January 2020 in the MEDLINE, EMBASE, and CINAHL, OVID, internet search, and Liberty University online library. This review included articles based on the effectiveness of COPD discharge bundles on 30-day hospital readmissions. Results varied showing variance between statistical evidence versus clinical outcomes. It is concluded that COPD discharge care bundles can in fact have significance in reduction of 30-day hospital readmissions for AECOPD to reduce 30-day hospital admissions. The studies that showed insignificance still revealed best practice and clinically significant data.

Keywords: Chronic obstructive pulmonary disease, discharge care bundles, reduction in 30-day hospital readmissions

SECTION ONE: FORMULATING THE REVIEW QUESTION

Introduction

Acute exacerbations of chronic obstructive pulmonary disease (AECOPD) account for many emergency room (ED) and hospital admissions across the United States every year. Chronic Obstructive Pulmonary Disease (COPD) is the second leading cause of emergency room visits with millions of dollars being spent on trying to reduce these rates. With health improvements leading to longer life expectancy, chronic respiratory disease has become an increasing health problem and a leading cause of morbidity and mortality worldwide (Ospina et al., 2016). AECOPD is a major health burden and effects not only the patient, but the organization itself.

To improve clinical outcomes and control rising healthcare costs, the Centers for Medicare, and Medicaid Services (CMS) developed the Hospital Readmission Reduction Program (HRRP), which imposes financial penalties on hospitals with excessively high readmission rates for specific conditions, one of which is COPD (Rinne et al., 2017). In the best interest of high-quality, patient-centered care and accountability, CMS and Hospital Quality Alliance (HQA) began publicly reporting 30-day mortality measures to include 30-day readmission complications, one of which includes public reporting of 30-day risk mortality measures and 30-day risk standardized readmission measures for COPD (CMS.gov, 2020).

Many interventions have been assessed over the years, helping to isolate common causes of AECOPD and working to help treat and reduce exposure to reduce the incidence of COPD complications as well as cost related initiatives. In terms of non-pharmacological methods, reduction in smoking, early follow up post discharge, referral to pulmonologist, and proper

inhaler education has been well studied to try and reduce AECOPD. Pulmonary rehabilitation, alongside curbing activities to not tax the body's respiratory system that can cause symptoms such as dyspnea are further interventions noted to assist with reduction of AECOPD. Self-management of AECOPD can play a large factor in patients returning to the ED for their symptoms as well, primarily in the adherence to medications and minimizing harmful habits like smoking. Other studies have suggested use of pharmacological agents in small doses, such as the initiation of corticosteroids, and antibiotics to deter onset of AECOPD symptoms causing ED and hospital admissions.

Despite a large body of evidence supporting both pharmacological and non-pharmacological interventions to improve health outcomes and reduce future AECOPD, there have been gaps in care (Ospina et al., 2016). To combat the growing exacerbation rate, alongside preventing readmissions shortly after discharge, new methods were examined in hopes of providing significant reduction in AECOPD cases. One method involved implementing a care bundle for COPD, alongside a protocol to support these bundles that combined both nonpharmacological and pharmacological interventions. The use evidence-based medicine including integration of multiple disciplines involved with combatting the problem, optimizing a solution that was simplistic for caregivers and patients to understand was integrated to assist with designing care bundles. These care bundles offered a solution to improve clinical outcomes, reduce mortality, reduce ED and hospital readmissions, and reduce healthcare costs (Ospina et al., 2016). Throughout the last five years, multiple studies have found implementation of discharge care bundles to significantly reduce readmissions rates, decrease the number of days spent in the hospital, reduce mortality associated with AECOPD, and overall provided security to those with symptoms of COPD.

Defining Concepts and Variables

For this review, several concepts and variables are being evaluated for the effectiveness of COPD discharge care bundles on patient care outcomes. The first concept is to look at the magnitude of reducing 30-day hospital readmissions with the use of the discharge care bundles. This is the primary outcome to study in this review, alongside the variables that design the COPD bundles and how they are applied during a COPD exacerbation. Some of these variables that are common in the literature reviewed for this project include: smoking cessation education, referral to pulmonary rehabilitation, appropriate inhaler education, medication adherence, alongside if telephone follow ups were seen in the effective use of the COPD rescue kits, and self-management techniques.

Rationales for Conducting the Review

COPD continues to be a major disease that causes a huge impact on both patient and hospital lifestyles. With the threat of COVID-19 existing in this world, the importance of controlling COPD is now more important than ever to reduce the detrimental effects respiratory conditions continue to plague patients with COPD. Several studies have found that nearly a third of COPD admissions could be avoided though the implementation of evidence-based care interventions (Gomez-Angelats and Sanchez, 2018). With this knowledge, the Institute for Health Care Improvement developed the concept of these care bundles, with the high level of reliability, and organize them to optimize the outcomes of the patient (Resar, Griffin, and Harden, 2012).

While each individual variable has proven to assist with reduction of COPD exacerbations, randomized controlled trials began to combine aspects of them together,

developing systems that started a whole care approach with increasing success. Eventually, discharge bundles were designed, utilizing trials with smaller numbers to evaluate the success and develop an all-encompassing approach. As Morton and his colleagues found, these kits and protocols had succeeded in reducing the readmissions rates significantly by addressing not just one source of COPD exacerbations, but multiple causes for exacerbations that were leading to hospitalizations. The costs savings and improvement on quality of life for both hospital and patients were astonishing when addressed and helped further illustrate the potential these bundles could provide in the moderate era of COPD treatment (Morton et al., 2019).

However, though the studies had illustrated a good benefit, more evidence was needed to determine the exact application of these bundles, and thus multiple studies arose to further evaluate the work Morton's cohort had found. Yet as the world changes, especially with the onset of COVID-19 and its variants, the population of the world continues to change, requiring further study to show how these bundles work with the changing of biology of the times. More studies have been provided over the last two years, but there are few articles pulling them together to gain further insight into the collective effect these discharge care bundles have on 30-day hospital readmissions. The rationale for conducting this review is to evaluate the effectiveness of COPD discharge care bundles have on care to reduce 30-day hospital readmissions. With this information, alongside other studies currently being performed, the results will hopefully be used by various health organizations to continue the goals defined by the Health Readmission Reduction Program (HRRP) and improving clinical outcomes by reduction of COPD exacerbations.

Purpose

The purpose of this integrative review is to evaluate the use of COPD discharge care bundles in different aspects at the patient and organizational level. This review will investigate literature that involves the effectiveness of patient discharge bundles on 30-day hospital readmission rates. It will evaluate different variations of patient discharge bundles. This review will not look at COPD patient care bundles and the effect on quality of life (QoL).

Problem

As defined above, COPD can be life threatening and cause millions of ED visits, hospital admissions, and readmissions every year. This is burdensome to the patient and can cause increased costs and use of resources in the healthcare system. It has been suggested that nearly a third of COPD admissions could be avoided through the implementation of evidence-based care interventions (Gomez-Angelates and Sanchez, 2018). There has been evidence from multiple studies that the implementation of a COPD discharge bundles has an impact on to reduce 30-day readmissions, reduce length of hospital stay, and have a greater impact on mortality.

Clinical Questions

1. Does the initiation of COPD discharge bundle at time of hospital discharge have effect on 30-day hospital readmissions for COPD?
2. What are the effects of rescue medications, self-management plan and telephone call follow ups have one reduction of 30-day hospital readmissions?

Formulate Inclusion and Exclusion Criteria

Inclusion data is any qualitative and quantitative studies or internet articles that evaluate the effectiveness of COPD care bundles. Randomized controlled trials, controlled clinical trials, controlled before and after, peer reviewed articles, meta-analysis, and interrupted times series were assessed for the effectiveness on reduction of 30-day hospital readmissions. Other studies included in analysis were effectiveness of interventions of COPD rescue medications, self-management programs, and telephone call follow up. Inclusion criteria also were articles published between 2015-2020. Articles selected were full text articles and in English language.

Exclusion criteria will be any article that is older than 5 years that did not relate to COPD patient care bundles and the effects on 30-day hospital readmissions. Articles were excluded that were non-research-based articles, prior to 2015 and articles that were not in English language. Exclusion criteria included information related to effects on QoL, mortality, patient satisfaction or economic outcomes.

Conceptual Framework

Whittemore and Knalf's (2005) methodological framework was used to synthesize data. This method was chosen to review and synthesize data on the outcomes of patient care with the addition of COPD care patient care bundles appropriately systematically. This methodology first identified the problem or topic of interest or topic, which in this case was COPD patient care bundles effects on hospital readmissions. Search strategies were used to analyze and summarize past empirical and theoretical literature on COPD patient care bundles. Data extraction was performed, and articles were pulled based on inclusion and exclusion criteria. This method allows for the inclusion of diverse methodologies and has the potential to play a greater role in

evidence-based practice for nursing (Whittemore and Knalf, 2005), which can further allow to build a foundation for nursing research and future studies involving COPD patient care bundles and the reduction on 30-day hospital readmissions.

Cooper's (1998) conceptual framework was used for synthesizing the research. It involved a systematic approach on how to carry out the integration of research according the scientific principles and rules. Basic tenets of sound data gathering were applied to the task of producing a comprehensive integration of past search on the topic (Cooper, 1998). There are two major concepts in this methodology which included: integrating separate research projects into a coherent whole. To accomplish this, the process involved inferences being reviewed to be central to the validity and knowledge as the inferences involved in drawing conclusions from primary data analysis. Therefore, the validity of conclusions was based on research integrations that cannot be taken for granted; and validity was evaluated against scientific standards (Cooper, 1998). The second concept for this methodology is that social science knowledge contained research syntheses to be believable. Research synthesis was required to meet the same rigorous methodological standards that were applied to this data (Cooper, 1998).

SECTION TWO: COMPREHENSIVE AND SYSTEMATIC SEARCH

Search Organization and Reporting Strategies

A comprehensive search strategy was conducted on articles dated between February 2015 to January 2020 in the MEDLINE, EMBASE, CINAHL, OVID, internet search, and Liberty University online library. Search words consisted of COPD, AECOPD, COPD patient care bundles, telephone follow up COPD discharge, effects of COPD patient care bundles, outcomes of care, COPD rescue kits, COPD care bundles, hospital readmission. Data was entered into the database and was saved within some of the vendor sites such as Ovid to provide a way to update

searches to use later. Detail of the search strategy can be depicted with the Preferred Reporting Items for Systematic Review and Meta-Analyses (PRISMA) diagram.

Terminology

Certain terminology is used throughout this integrative review. First is defining what a COPD patient care bundle is. Care bundles are defined as a set of three to five evidence-informed practices performed collectively and reliably to improve the quality of care (Lavallee et al., 2017). Care bundles are used to prevent and manage different health conditions. Morton et al. (2019) further defines a care bundle as a set of evidence-based clinical interventions or actions which when performed reliability improve patient outcomes (Morton et al., 2019).

For this integrative review when speaking of care bundles, it is in the context regarding to COPD discharge care bundles. A COPD discharge care bundle is a set of evidence-based practices aimed at improving patient outcomes after discharge from AECOPD. a body of evidence supports that usefulness of discharge care bundles after AECOPD, although there is a lack of consensus of what interventions should be implemented (Gomez-Angelats and Sanchez, 2018). This integrative review will evaluate each study in the effectiveness versus what elements of the bundle were used. Some studies suggested the following elements of the care bundle: smoking cessation, referral to pulmonary rehabilitation, appropriate education, assessment of patients understanding medication and use of inhalers, telephone call follow up, a prescription for a COPD rescue kit.

Other terms related to this integrative review are COPD rescue kit. A COPD rescue kit is defined as medications prescribed to patients for the self-treatment of an AECOPD. Rescue kits can consist of medications to use in the event of an acute exacerbation such as oral steroid, antibiotic and/or an expectorant. Out of the articles reviewed, the evidence has remained

inconclusive in regard to implementation of early rescue medications, self-management plans, and telephone call follow-ups in the reduction of COPD exacerbation to reduce 30-day readmissions. However, literature has suggested that if implemented correctly, a decrease in AECOPD complications may be dramatically lowered alongside costs.

SECTION THREE: MANAGING DATA COLLECTION

After a comprehensive review of literature, all articles were saved in an electronic database. All citations from articles were uploaded into a citation manager, in which they were easy to retrieve in time of need and review. The process of sorting and selecting data was challenging and time-consuming. The use of The PRISMA flowchart (Pannucci and Wilkins, 2010) was one way to display the flow of the records through the review process (Toronto and Remington, 2020).

The PRISMA flowchart shown in Table 1 depicts the process of the data collection process in a clear and readable diagram. The idea is to provide the information about the flow and the process and the numbers, not that it must match the template exactly (Toronto & Remington, 2020).

The number of articles initially searched was 976 articles which were allocated in the following manner: 756 were journal articles, 106 book chapters, 62 dissertations/thesis, 17 newspaper articles, 4 books/Ebook from the Jerry Falwell Library at Liberty University. Of the reviewed literature, 712 articles were removed based on inclusion/exclusion criteria. 44 were assessed for eligibility, and out of those 34 were removed further based in criteria. That left with 10 well vetted articles for review, 5 of which were qualitative studies, and 5 of which were quantitative studies.

SECTION FOUR: QUALITY APPRAISAL

Sources of Bias

The articles selected were based on moderate risk bias, and credible literature. Most the articles that were reviewed were based on inclusion criteria and context matter. Articles reviewed were qualitative and quantitative studies that were logical, and clearly documented to show trustworthiness and dependability. Some articles selected were of lower level of evidence, therefore there was a greater risk for bias. There was a great deal of the ability to transfer conceptual findings to other settings and research, such as the realization of clinical significance from statistical significance. Therefore, these articles were considered for applicability to the review.

Internal Validity

Several of the larger qualitative studies revealed results that were different from others. The hopes are that all these studies reveal that COPD patient care bundles had significant effects on the outcomes of care in patients with COPD and potential complications involving the disease state. Some of the data may not have shown statistical or clinical significance on the effect of the reduction on hospital readmissions or improve clinical outcomes to care. However, this data was relevant to the review and was taken into consideration for determining the true impact on COPD.

Appraisal Tools (Literature Matrix)

The Melynk Level of Evidence was implemented to evaluate and appraise the literature reviewed. The review was designed to choose higher levels of evidence, although if limited research findings, the other lower-level evidence was used in this integrative review.

Applicability of Results

Some of the results differed from others to look at the outcomes data of the effects of COPD care bundles on reduction of 30-day hospital readmissions. Results can be applied to the utilization of COPD discharge patient care bundles to reduce hospital readmission. Data can be applied to future studies for review of effectiveness of COPD care bundles, use for the evaluation of telephone follow up calls, early referral for pulmonary follow up, COPD rescue medication use, proper inhaler education, and applied to supporting self-care management in the face of COPD exacerbations.

Reporting Guidelines (Whitemore and Knalf)

Whitemore and Knalf's (2005) guide to reporting guidelines made the review transparent to report any set of characteristics.

SECTION FIVE: DATA ANALYSIS AND SYNTHESIS

Data Analysis Methods

An integrative literature review was conducted to explore the effectiveness of COPD patient care bundles in the setting to reduce 30-day hospital readmissions. Articles were based on both qualitative and quantitative studies. This integrative review evaluated a total of ten studies (3 systematic reviews, 2 retrospective chart reviews, 2 peer reviews, 2 prospective cohort studies, and 1 interrupted time series). Articles were reviewed using Melnyk levels of Evidence matrix.

Articles were selected based on inclusion criteria, where some lower levels of evidence were used based on inclusive evidence-based information. All articles were evaluated using comparison and contrasting data elements and discerning common and unusual patterns found in the data. Elements were reviewed for likability and variability between intervening factors related to the implementation of COPD discharge care bundles.

Descriptive Results

Five studies (Moira et al. (2018); Ospina et al. (2017); Parik et al. (2016); Rivera (2019); Zafar et al. (2017), revealed statistical significance in reduction in 30-day hospital readmissions for COPD after implementation of COPD care bundles. These studies all found that implementation of COPD patient care bundle led to shift producing a sustained decrease in all-cause 30-day COPD readmissions with Zafar et al. (2017) found a reduction from 22.7% to 14.7%.

Although most studies found impact on 30-day hospital readmissions, five studies (Crouse et al. (2019); Crawford et al.; (2016), Laverty et al; (2015); Lloyd and Garside (2017); Morton et al. (2017)), found little to no statistically significant impact on all cause 30-day readmissions after bundle implementation. Morton et al., (2019) quantitative study conducted a mixed-method evaluation using controlled before-and-after design with nested qualitative case studies to examine the effects of implementing care bundles. Although (Morton et al., 2019) showed little impact on hospital readmissions using COPD care bundles, patient outcomes did appear to be associated with reduced numbers of subsequent ED attendances (Morton et al., 2019). Even though no statistical significance was found, that is not to say that it did now show improved clinical outcomes that are desired with use of the bundles.

Does the provision of a rescue pack keep patients with COPD at home?

According to the European Respiratory Journal, it is recommended that early use of oral corticosteroid and antibiotic therapy, home-based management and early pulmonary rehabilitation in patients experience COPD exacerbation (Sukkar, 2017). Exacerbations are episodes of increasing respiratory symptoms- such as dyspnea, cough and sputum production- which can have a negative impact on quality of life for COPD patients and can result in admissions to hospital for further treatment of severe respiratory disorders (Sukkar, 2017).

Strong evidence from the Global Initiative for Chronic Obstructive Lung Disease (GOLD) 2021 report, suggests early systemic corticosteroids can improve lung function (FEV1), oxygenation and have shorter recovery time and hospitalization duration. Alongside the use of proper antibiotics, recovery time can be shortened alongside minimizing the risk of early relapse, treatment failure, and hospitalization duration (GOLD, 2021).

GOLD guidelines touch on patient discharge bundles to reduce risk of COPD exacerbation, stating that there has been some evidence from systematic reviews that suggests interventions such as: education, optimization of medication, supervision, and correction of inhale technique, assessment and optimal management of comorbidities, early rehabilitation, and telemonitoring aide in reduction of 30-day readmissions. However, the GOLD standard found insufficient evidence to support the use of these agents, requiring more time and studying to assist with determining the place in therapy. Nevertheless, they report that it is good clinical practice to provide coverage for respiratory exacerbations and suggest using these bundles/kits to assist with treatment.

Self-management of COPD

There is also conflicting evidence of self-management plans in for patients with COPD. One randomized clinical trial by Dr. Aboumatar and colleagues, demonstrated that the combination of transitional care support and long-term self-management resulted in more hospitalizations and emergency room department visits for patients with COPD (Steurer-Stey, 2019). In contrast to the study by Fan et al, a recent Cochrane review showed statistically significant and clinically meaningful improvements in patient outcomes with interventions including self-management and medications for exacerbation treatment (Steurer-Stey, 2019). As reported by Fan et al, patients in the comprehensive self-management program waited almost a week before taking medications, as recommended by the action plan (Steurer-Stey, 2019). In this time frame, resistant organisms can potentially cause a recurrence, and the hyper responsive respiratory system may cause another exacerbation. Thus, proper intervention/education for when to start therapy was encouraged in this study.

Multiple other trials reviewed suggest that multiple factors play a role in self-management programs for COPD. Obunbayo et al. (2017) revealed multiple factors at the patient, practitioner, and organization level. Patient-level factors included: knowledge and understanding, personal life circumstances, motivation and taking responsibility, social/support network, and specific self-management skills, emotional and psychological issues (Obunbayo et al., 2017). The authors concluded that self-management of COPD is an essential component but stated it was essential for the practitioner to understand the barriers and enabling factors that can affect self-management intervention to be successful.

Telephone call follow-up

The effectiveness of early telephone call follow-up has been studied in three trials (Jolly et al. (2018); Jayakody et al. (2016); and Fors et al. (2018). The larger systematic review

(Jayakody et al.) and one randomized control trial (Jolly et al. (2018) concluded that telephone call follow-up in reduction of COPD readmissions remains inconclusive. One of the randomized controlled concluded that in patients with COPD, person-centered telephone support reduced the risk of decreased self-efficacy without increasing the clinical events up to six months post discharge (Fors et al., 2018).

Ethical Considerations

Ethical considerations were considered prior to during and after the review was completed. CITI training was completed through Liberty University with certificate shown in appendices. This integrative review was approved by the Internal Review Board (IRB) at Liberty University.

TIMELINE

A structured timeline was completed throughout the review. This initial completion of the project started 12 months prior with the initiation of the initial search. Cooper (1998) and Toronto and Remington (2020) methodologies were used to conduct initial search and guidance throughout completion of project. In the first three months, a PICO question was formulated then the rationale for conducting the review, identifying the purpose of the project and formulating inclusion/exclusion criteria. The initial research topic was approved by Dr. Kopis and staff. At that point CITI training and IRB approval was completed.

The next three months focused on analyzing and synthesizing data which included managing the collected data and critically appraising the literature, which included the data analysis and descriptive results. This initial review was approved for the scholarly project proposal in which was approved by Dr. Thompson.

During six to nine months the focus was on completing the proposal project final, and development of dissemination of results. Dissemination was determined to be presented in PowerPoint presentation and poster presentation based on course curriculum. The project will also be submitted to scholarly crossing at Liberty University.

SECTION SIX: DISCUSSION

It appears from the articles reviewed that there is mixed evidence in the effect that COPD discharge care bundles have on significant reduction of 30-day hospital readmissions for AECOPD. Five of the studies found that there was significant reduction in the readmissions, with up to a 10 percent reduction in readmission rates with initiation of care bundle. Reviewing the studies, most of these bundles involved the importance of smoking cessation, and early pulmonary rehabilitation referral proper to the patient being discharged from the hospital. This concurs with evidence found in other literature and in established COPD guidelines that reduction in smoking cessation can greatly reduce the risk of another COPD exacerbation.

In addition, the use of inhalers and proper education on how to properly administer, schedule and combine inhalers seems to have had a substantial impact on the outcomes of the patients. Many of the studies reviewed found reports of inhaler usage helping to ease symptoms, and with proper administration was believed to significantly reduce the impact of an exacerbation on a patient. Again, this agrees with studies, finding that proper maintenance and self-management therapy often leads to reduction in progression and stabilization of COPD compared to those who do not use inhalers. Education about inhaler use is was critically researched, evaluated, and detailed in the studies, with several handouts and resources given to the patients in order to assist with technique. As many of the treatments require coordination and

multiple steps to obtain adequate therapeutic administration, it's important to provide this education and achieve the maximum benefit that inhalers can provide.

As COPD discharge bundles include extensive education materials to help with control, it seems a large part of the bundles that is consistent with making sure proper care coordination with the patient and their family. Hospital discharge involves a lot of transitions of care, requiring people to successfully take charge of their medications and do it without supervision of trained medical professionals. Thus, these studies reviewed in this article continue to show the importance of educating patients to handle the responsibilities and potentially provide further support to help them establish new habits that will promote healthier living.

Another component that has been discussed, in the use for both pre- and post-hospitalization visits, is the development of the COPD rescue kits mentioned earlier. A COPD rescue kit is a small collection of medications use commonly in the treatment of exacerbations that can be successful administered at the onset of exacerbation. These kits are designed for short course use, and unsuccessful or incomplete response suggests admissions to the hospital. Many of the studies revealed positive decrease in hospital readmissions and found that these kits were often a key factor in preventing worsening of disease, primarily in the length of therapy, and if other medications are needed in the kit design.

Implications for Practice/Future Work

This study is a small article comparison, using a finite number of variables to monitor the impact of COPD discharge care bundles. For the article assessments, the foundation for discharge care bundles has been established, but the true impact and protocols are still requiring further evaluation to fully assess the use of this approach to care. As more studies continue to

come out, it is imperative that the literature be compacted together to assess what other implications the use of these bundles will provide alongside the potential risks they may provide if misused by the patient. In the next five years, it is predicted the COPD will be an even more studied condition, especially given the potential impacts of COVID-19 is projected to have on patients with this disorder. Thus, the evidence found in this integrative review on 30-day hospital readmissions may be different compared to five years down the road.

What future trials need assessing, is the impact on other areas of healthcare outside of just a 30-day readmission rate. Some limitations to this study include a limited primary outcome that reduced the number of articles by hundred during the initial inclusion/exclusion criteria establishment. Areas like reduction in anxiety about the condition, the number of exacerbations in a year, and the number of days in hospitalization, are key factors that can be studied in the future to further determine the place of COPD bundles in care. The use of this integrative review can be applied to further studies on COPD patient discharge care bundles. It can be used for organizations to evaluate whether they feel COPD patient care bundles will be effective for their organization to use to reduce 30-day hospital readmissions.

Future trials and reviews should report the effects of discharge patient care bundles for cost-effective analyses. Furthermore, many different COPD discharge bundles are using a wide variety of interventions and have been reported in the literature with varying degrees of success (Zafar et al., 2017). Poor reporting of bundle component selection and implementation methods limit the ability to reach conclusions and translate successful bundles into practice (Zafar et al., 2017). There is also a need for mitigating system failures such a system design or redesign for future studies.

Furthermore, another major limitation that will need to be addressed is the inconsistent transitions of care that were seen between trials in this review. Transitions of care has acquired lots of evidence about the importance of successful coordination, communication, and consideration for discharging a patient back home. When lacking, the patients often return to the hospital for relapses for potential other complications, often due to the patient misunderstanding on how to take their medication, diet, and lifestyle changes that were needed, and even making sure resources were available to the patient prior to discharge. Standardizing these protocols is rather impossible to fully include every patient case but continuing to study a baseline approach would further help eliminate confounding factors that could affect the results of the study. By helping establish baseline transitions of care, the COPD discharge care bundle could further be applied to multiple people to help further reduce the impact of readmissions.

Dissemination

Dissemination of this literature review will be shown in a poster presentation and a podium (PowerPoint) presentation. Explicit details from primary sources and evidence to support conclusions will be provided to demonstrate a logical chain of evidence, allowing the reader of the review to ascertain that the conclusions of the review did not exceed the evidence (Whitemore & Knalf, 2005).

References

Ansari, S., Hosseinzadeh, H., Dennis, S., & Zwar, N. (2020). Activating primary care COPD patients with multi-morbidity through tailored self-management support. *NPJ Primary Care Respiratory Medicine*, 30(12).

Cooper, H. (1998). *Synthesizing research: A Guide for Literature Reviews*. (3rd ed.). Sage Publishing.

Cousse, S., Gillibert, A., Salaun, M., Thiberville, L., Cuvelier, A., & Patout, M. (2019). Efficacy of a home discharge care bundle after acute exacerbation of COPD. *International Journal of COPD*, 14, 289-296.

Crawford, E., Leech, K., Bailey, J., Lynch, C., Owen, G., Rickard, B., Evans, I., Mustfa, N., Hussain, I., & Stone, H. (2016). COPD discharge care bundles- Do they reduce hospital readmission rates? *European Respiratory Journal*, 48.

Fors, A., Blanck, E., Ali, L., Ekberg-Janson, A., Fu, M., Kjellberg, I., Makitalo, A., Swedberg, K., Taft, C., & Ekman, I. Effects on a person-centered telephone-support in patients with chronic obstructive pulmonary disease and/or chronic heart failure- A randomized controlled trial. *PLOS ONE*, 13(8).

Global Initiative of Chronic Obstructive Pulmonary Disease (GOLD) (2020*). Global Strategy for the Diagnosis, Management, and Prevention of Chronic Obstructive Pulmonary Disease*. Available at https://goldcopd.org/wp-content/uploads/2020/03/GOLD-2020-POCKET-GUIDE-ver1.0_FINAL-WMV.pdf.

Gomez-Angelats, E., & Sanchez, C. (2018). Care bundles after discharging patients with chronic obstructive pulmonary disease exacerbation from the emergency department. *Med Sci*, 6(3), 63.

Harrison, J., Auerbach, A., Quinn, K., Kynoch, E., Mourad, M. (2014). Assessing the impact of nurse post-discharge telephone calls on 30-day hospital readmission rates. *Journal of General Internal Medicine*, 29(11): 1519-1525.

Jayakody, A., Bryant, J., Carey, M., Hobden, B., Dodd, N., & Sanson-Fisher, R. Effectiveness of interventions utilizing telephone follow up in reducing hospital readmission within 30 days for individuals with chronic disease: a systematic review. *BMC Health Services Res*, 16: 403.

Kate, J., Sidhu, M., Hewitt, C., Coventry, P., Daley, A., Jordan, R, et al. (2018). Self-management of patients with mild COPD in primary care: randomized controlled trial. *British Medical Journal*, 361.

Lavallee, J., Gray, T., Dumville, J., Russell, W., & Cullum, N. (2017). The effects of care bundles on patient outcomes: a systematic review and meta-analysis. *Implementation Science*, 12, 142.

Laverty, A., Elkin, S., Watt, H., Millett, C., Restrick, L., Williams, S., Bell, D., Hopkinson, N. (2015). Impact of a COPD discharge care bundle on readmissions following admission with acute exacerbation: Interrupted time series analysis. *PLOS ONE*, 10(2).

Lloyd, C., & Garside, J. (2017). Care bundles in the management of COPD exacerbation. *British*

Journal of Nursing.

Moira, K., Shah, C., Landry, L., Fitzpatrick, K., Reyes, N., Cerrone F., Natale, B., Chiu, S., & Corasaniti, J. (2018). A discharge care bundle reduces readmissions in patients with acute exacerbation of COPD. *Chest*, 154(4), 1118-1119.

Morton, K., Sanderson, E., Purdy, S. (2020). Observational cost-effectiveness analysis using routine data: Admission and discharge care bundles for patients with chronic obstructive pulmonary disease. *PharmacoEconomics*, 4: 657-667.

Morton, K., MacNeil, S., Sanderson, E., Dixon, P., King, A., Jenkins, S., Metcalfe, C., Shaw, A., Chalder, M., Benger, J., Hollingworth, W., Calvert, J. & Purdy, S. (2019). Evaluate of 'care bundles' for patients with chronic obstructive pulmonary disease (COPD): a multisite study in the UK. *BMJ Open Respir Res*, 6(1).

Ospina, M., Mrklas, K., Deuchar, L., Rowe, B., Leigh, R., Bhutani, M., Stickland, M. (2017). A systematic review of the effectiveness of discharge care bundles for patients with COPD. *Thorax,* 72: 31-39

Parikh, R., Shah, T., & Randon, R. (2016). COPD exacerbation care bundle improves standard of care, length of stay, and readmission rates. *International Journal of Chronic Obstructive Pulmonary Disease,* 11, 677-683.

Punekar, Y., Sharma, S., Pahwa, A., Takyar, J., Naya, I., & Jones, P. Rescue medication use as a patient-reported outcome in COPD: a systematic review and regression analysis. *Respiratory Research*, 18(86).

Rivera, M. (2019). Effect of a COPD discharge bundle on readmission outcomes: A Preliminary cohort study in a private tertiary hospital in the Philippines. *Respirology*, 24 (S2), 36-36.

Robinson, F. (2018). The appropriate use of rescue packs. *Primary Care Respiratory Update*, 5(1).

Russell, S., Ogunbayo, O., Newham, J., Heslop-Marshall, K., Netts, P., Hanratty, B., Beyer, F., & Kaner, E. (2018). Qualitative systematic review of barriers and facilitators to self-management of chronic obstructive pulmonary disease: views of patients and healthcare professionals. *NPJ Primary Care Respiratory Medicine*, 28(2).

Schomberg, L., Porter, J., Bahadur, K., Ross, L., Kosky, C., & Davidson, A. Does the provision of a rescue pack keep patients with chronic obstructive pulmonary disease (COPD) at home? COPD and drugs: New and old concepts. Poster Presentation. *British Medical Journal*.

Sneath, E., Bunting, D., Hazell, W., Tippett, V., & Yang, I. (2019). Pre-hospital and emergency department pathways of care exacerbations of chronic obstructive pulmonary disease (COPD). *Journal of Thoracic Disease*, 11, 221-229.

Steurer-Stey, C (2019). Self-medication as a part of self-management plans for patients with COPD. *JAMA*, 321(19).

Sukkar, E. (2017). Experts draw up new guidelines for treatment COPD attacks. *The Pharmaceutical Journal*.

Toronto, C. & Remington, R. (2020). *A Step-by-Step Guide to Conducting an Integrative*

Review. Springer.

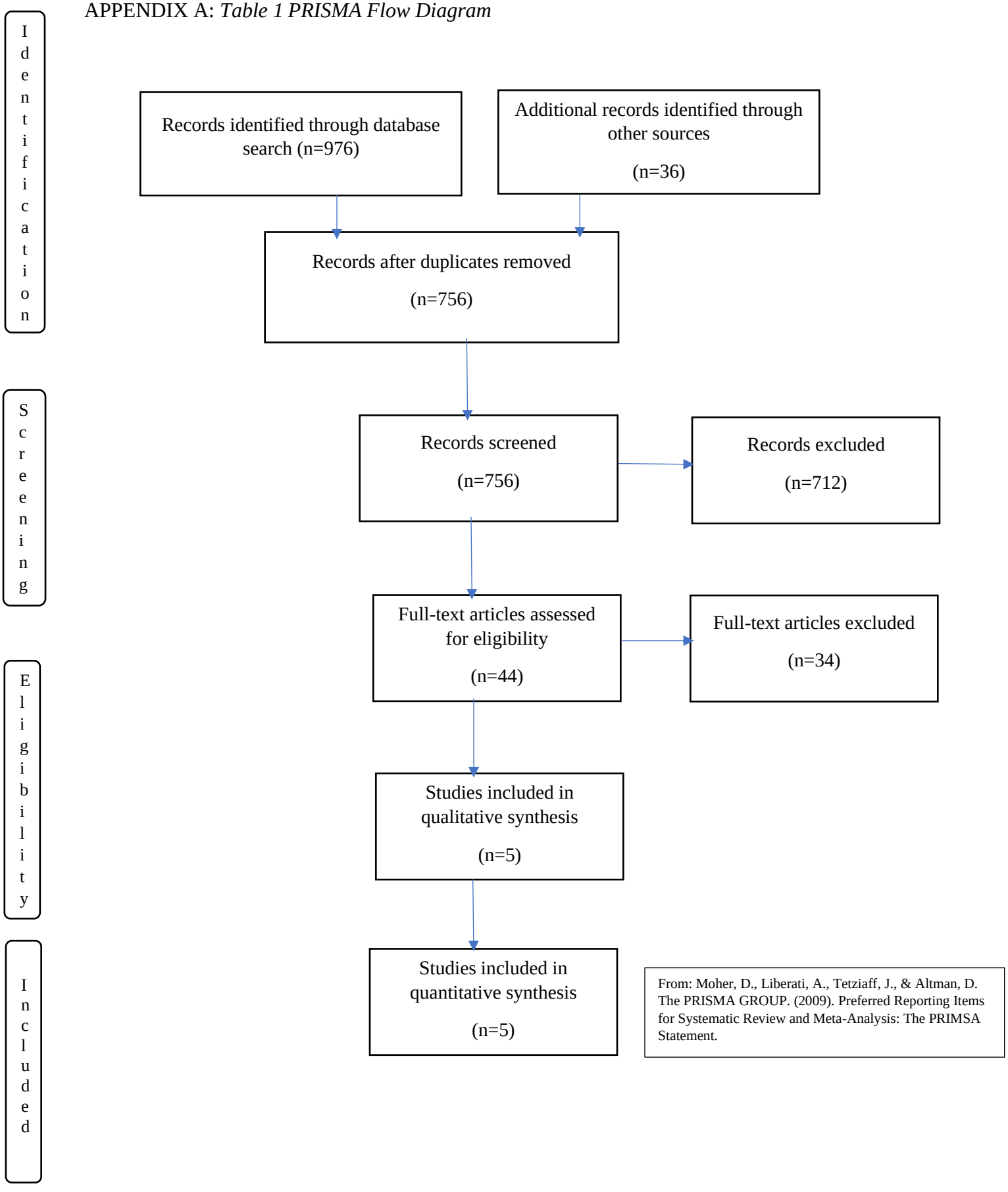
Whittemore, R., & Knalf, K. (2006). The integrative review: updated methodology. *Journal of Advanced Nursing*, 52(5), 546-553.

Williams, V., Price, J., Hardinge, M., Tarassenko, L., & Farmer, A. (2014). Using a mobile health application to support self-management in COPD: a qualitative study. *British Journal of General Practice*, 64 (624), 392-400.

Zafar, M., Panos, R., Ko, J., Otten, L., Gentene, A., et al. (2017). Reliable adherence to a COPD care bundle mitigates system-level failures and reduces COPD readmissions: A system redesign using implementation science, *BMJ*, 26, 11.

Appendices

APPENDIX A: *Table 1 PRISMA Flow Diagram*



APPENDIX B: Table 2 *Inclusion and Exclusion Criteria*

Inclusion	Exclusion
Publications from 2015-2020	Articles prior to 2015
Articles related to effectiveness of COPD discharge care bundles on 30-day hospital readmissions	Articles related to quality of life, mortality, patient satisfaction, and economic outcomes
Peer-reviewed, qualitive and quantitative studies	Non-research studies
English language	Publications written in foreign language
Full-text articles	Abstract only articles

APPENDIX C: *CITI Training Certificate*

COLLABORATIVE INSTITUTIONAL TRAINING INITIATIVE (CITI PROGRAM)
COMPLETION REPORT - PART 1 OF 2
COURSEWORK REQUIREMENTS*

* NOTE: Scores on this Requirements Report reflect quiz completions at the time all requirements for the course were met. See list below for details. See separate Transcript Report for more recent quiz scores, including those on optional (supplemental) course elements.

- **Name:** Leigh Wingo (ID: 9826273)
- **Institution Affiliation:** Liberty University (ID: 2446)
- **Institution Email:** lbgoodwin@liberty.edu
- **Institution Unit:** DNP student

- **Curriculum Group:** Biomedical Research - Basic/Refresher
- **Course Learner Group:** Biomedical & Health Science Researchers
- **Stage:** Stage 1 - Basic Course
- **Description:** Choose this group to satisfy CITI training requirements for investigators and staff involved primarily in biomedical research with human subjects.

- **Record ID:** 40661721
- **Completion Date:** 29-Jan-2021
- **Expiration Date:** 29-Jan-2024
- **Minimum Passing:** 80
- **Reported Score*:** 82

REQUIRED AND ELECTIVE MODULES ONLY	DATE COMPLETED	SCORE
Belmont Report and its Principles (ID: 1127)	29-Jan-2021	3/3 (100%)
Recognizing and Reporting Unanticipated Problems Involving Risks to Subjects or Others in Biomedical Research (ID: 14777)	29-Jan-2021	5/5 (100%)
Liberty University (ID: 15111)	29-Jan-2021	No Quiz
Populations in Research Requiring Additional Considerations and/or Protections (ID: 16680)	29-Jan-2021	4/5 (80%)
History and Ethics of Human Subjects Research (ID: 498)	29-Jan-2021	4/5 (80%)
Basic Institutional Review Board (IRB) Regulations and Review Process (ID: 2)	29-Jan-2021	5/5 (100%)
Informed Consent (ID: 3)	29-Jan-2021	4/5 (80%)
Social and Behavioral Research (SBR) for Biomedical Researchers (ID: 4)	29-Jan-2021	4/4 (100%)
Records-Based Research (ID: 5)	29-Jan-2021	3/3 (100%)
Genetic Research in Human Populations (ID: 6)	29-Jan-2021	4/5 (80%)
Research and HIPAA Privacy Protections (ID: 14)	29-Jan-2021	1/5 (20%)
Conflicts of Interest in Human Subjects Research (ID: 17464)	29-Jan-2021	4/5 (80%)

For this Report to be valid, the learner identified above must have had a valid affiliation with the CITI Program subscribing institution identified above or have been a paid Independent Learner.

Verify at: www.citiprogram.org/verify/?k7147aaef-7d9a-4e22-a2c2-b0c097398d2d-40661721

Collaborative Institutional Training Initiative (CITI Program)
Email: support@citiprogram.org
Phone: 888-529-5929
Web: https://www.citiprogram.org

APPENDIX D: *IRB Approval Letter*

July 16, 2021

Leigh Wingo

Kenneth Thompson

Re: IRB Application - IRB-FY21-22-43 COPD Patient Care Bundles: An Integrative Review

Dear Leigh Wingo and Kenneth Thompson,

The Liberty University Institutional Review Board (IRB) has reviewed your application in accordance with the Office for Human Research Protections (OHRP) and Food and Drug Administration (FDA) regulations and finds your study does not classify as human subjects research. This means you may begin your project with the data safeguarding methods mentioned in your IRB application.

Decision: No Human Subjects Research

Explanation: Your study is not considered human subjects research for the following reason:

It will not involve the collection of identifiable, private information.

Please note that this decision only applies to your current application, and any modifications to your protocol must be reported to the Liberty University IRB for verification of continued non-human subjects research status. You may report these changes by completing a modification submission through your Cayuse IRB account.

Also, although you are welcome to use our recruitment and consent templates, you are not required to do so. If you choose to use our documents, please replace the word research with the word project throughout both documents.

If you have any questions about this determination or need assistance in determining whether possible modifications to your protocol would change your application's status, please email us at irb@liberty.edu.

Sincerely,

G. Michele Baker, MA, CIP

Administrative Chair of Institutional Research

Research Ethics Office

APPENDIX E Table 3: *Melnyk Level of Evidence Matrix*

Article Title, Author, etc. (Current APA Format)	**Study Purpose**	**Sample (Characteristics of the Sample: Demographics, etc.)**	**Methods**	**Study Results**	**Level of Evidence (Use Melnyk Framework)**	**Study Limitations**	**Would Use as Evidence to Support a Change? (Yes or No) Provide Rationale.**
Cousse, S., Gillibert, A., Salaun, M., Thiberville, L., Cuvelier, A., & Patout, M. (2019). Efficacy of a home discharge care bundle after acute exacerbation of COPD. *International Journal of COPD*, 14, 289-296.	Efficacy of COPD discharge care bundles	62 patients in non-bundle group, 101 in control (bundle) group	Retrospective cohort study	Care bundle failed to prove benefit at the 28-day readmission rate when compared to standard care (p=0.034). Readmission rate were similar in both groups	Level II	Small sample	No

Crawford, E., Leech, K., Bailey, J., Lynch, C., Owen, G., Rickard, B., Evans, I., Mustfa, N., Hussain, I., & Stone, H. (2016). COPD discharge care bundles- Do they reduce hospital readmission rates? *European Respiratory Journal*, 48.	Effectiveness of COPD discharge care bundles to reduce readmission rates	118 patients	Retrospective chart audit	Care bundles had no impact on readmission rates	Level II	Small sample	No
Laverty, A., Elkin, S., Watt, H., Millett, C., Restrick, L., Williams, S., Bell, D., Hopkinson, N. (2015). Impact of a COPD discharge care bundle on	Impact of COPD discharge care bundles on readmission rates	Aged 45 years or older to an acute hospital from April 2002 to April 2011	Interrupted Time Series Analysis	Readmissions rates fell but were not statistically significant (28 days - 4.6% pa vs -3.2% pa, p=0.44)	Level VI	Study did not include patients with secondary COPD diagnosis, no measure of the number of comorbid conditions	Yes

readmissions following admission with acute exacerbation: Interrupted time series analysis. *PLOS ONE* 10(2).							
Lloyd, C., & Garside, J. (2017). Care bundles in the management of COPD exacerbation. *British Journal of Nursing*,	Care bundles in management of COPD	6 research articles	Integrative literature review	3 articles showed no significant difference in hospital readmissions at 30 days; 3 articles showed effective in decreasing hospital admissions following COPD exacerbation	Level V	Effectiveness may relay on which type of bundle is implemented	Yes
Moira, K., Shah, C., Landry, L., Fitzpatrick, K., Reyes, N., Cerrone F., Natale, B., Chiu, S., &	Evaluate effectiveness of COPD discharge care bundles	150 patients in pre-intervention non bundle, and 221 patients in post-intervention bundle group	Prospective cohort study	30-day readmission rates were lower in the post-intervention (bundle) group, 22.2%	Level II	Small sample size	Yes

Corasaniti, J. (2018). A discharge care bundle reduces readmissions in patients with acute exacerbation of COPD. *Chest*, 154(4), 1118-1119				vs 32.7% (p=0.024)			
Morton, K., MacNeill, S., Sanderson, E., Dixon, P., King, A. et al. (2017). Evaluate of 'care bundles' for patients with chronic obstructive pulmonary disease. *BMJ*, 72.	Evaluation of care bundles for patients with COPD	31 hospital (19 sites introduced care bundles, 12 sites with usual care)	Controlled study before and after design	Absolute difference in the COPD readmissions at 28 days (-1.31 (-5.37 to 2.75) (p=0.513)	Level II	Patient recruitment posed and data collection posed a challenge in terms of data availability and completeness; potential bias, differences in patient populations at different sites	Yes
Ospina, M., Mrklas, K., Deuchar, L., Rowe, B., Leigh, R., Bhutani, M., Stickland, M. (2017). A	Effectiveness of discharge care bundles for patients with COPD	14 studies (5 clinical trials, 7 uncontrolled trials, and 2 interrupted time series)	Meta-analysis	Hospital readmissions – 4 clinical trials showed care bundles significantly reduced hospital	Level 1	Most articles had methodological limitations and the reporting of the risk of bias variables was frequently	Yes

systematic review of the effectiveness of discharge care bundles for patients with COPD. *Thorax*, 72: 31-39				readmissions (RR: 0.08; 95% CI 0.65 to 0.99)		inadequate. Most common risk of bias lack similarity at baseline and lack of blinding in outcome assessment	
Parikh, R., Shah, T., & Randon, R. (2016). COPD exacerbation care bundle improves standard of care, length of stay, and readmission rates. *International Journal of Chronic Obstructive Pulmonary Disease*, 11, 677-683.	Evaluate COPD care bundles to improve length of stay, readmission rates	44 patients admitted with COPD exacerbation	Prospective cohort	30-day readmission rates (9.1% vs 54.4%; p=0.001) decrease in bundle group	Level VI	Small sample size in a single tertiary hospital, possibility of selection bias where potentially stable patients received the COPD module more than acutely ill patients	Yes
Rivera, M. (2019). Effect of a COPD discharge	Effect of COPD discharge bundles on	30 patients in non-bundle group vs 32	Retrospective cohort	Statistically significant difference in the rate of re-	Level II	Small cohort study	Yes

bundle on readmission outcomes: A Prelimary cohort study in a private tertiary hospital in the Philippines. *Respirology*, 24 (S2), 36-36.	readmission outcomes Study investigated readmission rates at 30-60-90 days post discharge, pre and post implementation	patients in bundle group		admission on the 30th day follow-up. Those who received discharge care bundle had a higher chance of not being readmitted within 30 days with a relative risk (RR) 1.17 (p=0.042)			
Zafar, M., Panos, R., Ko, J., Otten, L., Gentene, A., et al. (2017). Reliable adherence to a COPD care bundle mitigates system-level failures and reduces COPD readmissions: A system redesign using implementation	Implement use of COPD discharge care bundle to reduce 30-day readmission rates	800 bed academic health care center; patients admitted with COPD exacerbations	Interrupted time series analysis	After initiation of care bundles, COPD all-cause 30-day readmissions reduced from 22.7% to 14.7%	Level II	No control population for comparison	Yes

science, *BMJ*, 26, 11.							
This table represents review of the literature for this project and grades the evidence based on quality of study. The primary studies polled were evaluating the COPD bundles effect on COPD all cause in 30-day readmissions.							