

**REDUCTION OF HOSPITAL READMISSIONS IN PATIENTS WITH A DIAGNOSIS
OF COPD: AN INTEGRATIVE REVIEW**

A Scholarly Project

Submitted to the

Faculty of Liberty University

In partial fulfillment of

The requirements for the degree

Of Doctor of Nursing Practice

By

Guerline Norbrun

Liberty University

Lynchburg, VA

February, 2021

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ABSTRACT

Chronic obstructive pulmonary disease (COPD) is a progressive lung disease with potential to interfere with breathing ability. It is the third leading cause of 30-day readmission and death in the US, and the leading cause of mortality and morbidity worldwide. It constitutes a societal burden and poor disease management leads to major health consequences such as acute COPD exacerbation resulting in frequent costly readmissions, add to its massive direct healthcare costs. Over \$50 billion are spent annually in direct care alone in addition to \$15 billion in hospital readmissions; with 12 million adults are being affected in the United States as of 2018. This amount in direct cost is likely to increase in the future because of co-morbid diseases, and numerous indirect costs such as absenteeism. The Centers for Medicare and Medicaid Services (CMS) as a result initiated the hospital readmission reduction program (HRRP) by imposing financial penalties on hospitals with excess readmission rates to press them on finding effective strategies to improve this population's care quality to reduce readmissions rates affecting healthcare expenditures. Evidence-based research demonstrates that intervention programs can reduce readmission, especially those who deploy an interdisciplinary team approach, with various care interventions that were successful at enhancing the quality of healthcare. Several intervention programs had a varying success rate as depicted by different studies. This integrative review aimed at researching intervention programs supporting reduction of hospital readmissions in patients with a COPD diagnosis.

Keywords: COPD, chronic obstructive pulmonary disease, readmission, re-hospitalization, reduction, decrease, lowering, prevention.

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Dedication

You must be certain I am very grateful of this day but I must say it would not be possible without my Lord Jesus Christ and my biggest fan and cheerleader, my wonderful mother Marie Norbrun, whom I wish could be here celebrating with me, savoring the fruits of her life efforts today. Unfortunately this opportunity was robbed from her as her life was cut short by corona virus on April 27, 2020. I have great honor to dedicate this work to her memory for her continuous encouragement, persistence, constant reminder of the value of education as the biggest weapon of life success and her undeniable hard work for me to have a taste of it. I am shattered by her loss then and today with hope we will meet again one day. "I was lucky to have you mom and I will always be grateful of everything you have done and the biggest gift you have left me with, EDUCATION." Sleep in peace mother while I will continue to make you always proud. Special thanks to my family and cheerleaders including my sister Fanite Nobrun and my uncle Wilfrid Edmond. I am truly grateful to Dr. Cynthia Goodrich my project chair for her patience and dedication to get me through this day, Dr. Eno Mondesir, and Dr. Cesaire Corneille for their advice. To those who cheered me throughout the process including Mrs Marie Crowley, Philippe Geneus, Nadine Cadichon, Patricia Passos, Carline François, Patricia Dabel, Galianie Veillard, Mesidor Jean Edouard and cycle friends from Lorenzo Walker Technical College, Georges Marc College, Infotronic and everyone else who landed me a hand along the way, but also those who did not believe I would make it, my heart sincerely and gracefully says thank you.

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Lastly, I would like to extend my special thanks to the university librarian for her assistance with the research and those from my previous education years for preparing me to get this far. I will always acknowledge your sacrifices and your contributions that make who I become today. I hope I make you proud and I promise I will give back. The ride was challenging but the overall experience was enjoyable because of all of you at Liberty University. To my classmates, you rock! Thanks for your determination and contributions which influenced me in many ways. I feel truly blessed of God's guidance in the process. I will always be humbled and grateful. Glory to the above!

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List of Abbreviations

American Association of Colleges of Nursing (AACN)

Acute COPD Exacerbation (AECOPD)

American Psychology Association (APA)

Center for Medicare and Medicaid Services (CMS)

Chronic Heart Failure (CHF)

Chronic Obstructive Pulmonary Disease (COPD)

Collaborative Institutional Training Initiative (CITI)

Diabetes Mellitus (DM)

Doctor of Nursing Practice (DNP)

Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS)

Hospital Readmission Reduction Program (HRRP)

Institute of Medicine (IOM)

Integrative Review (IR)

Institutional Review Board (IRB)

Plan-To-Do-Act (PDSA)

Quality improvement (QI)

Quality of life (QOL)

SECTION ONE: FORMULATING THE REVIEW QUESTION

It is in all patients' expectations when entering a healthcare facility for any health complaint to receive optimal patient-centered care to effectively control their symptoms with minimal side effects from treatments. This type of care is highly valued and encouraged by all healthcare organizations promoting quality improvement (QI) in the healthcare continuum since it is being supported by well documented evidence in the literature among major contributing factors to best health outcomes and patient satisfaction. Despite these beneficial impacts with patient satisfaction known among key quality performance measures hospitals so desperately need, COPD patients' discharge care coordination planning seems to be lacking (Alshabanat et al., 2017), resulting in poor health and increasing risk for hospital readmissions.

COPD affects 12 million adults in the United States estimated at almost \$50 billion in direct cost annually. Acute COPD exacerbation (AECOPD) is responsible for up to 70% of all COPD healthcare cost with \$15 billion per year in readmissions alone (Press et al., 2018). The following year, nearly 6.4% of Americans are reported to be diagnosed, which number is believed to be underestimated due to more than 50% adults with low pulmonary function reported being unaware they had COPD. The prevalence of COPD is expected to increase in the next 30 years because of the aging population (Mcgurran et al., 2019). Although not curable, it is a manageable disease with potential to become debilitating if left untreated with increase in risk for morbidity and mortality. COPD is the leading cause of morbidity and mortality worldwide and the third leading cause of both hospital readmission and death in the United States (Alshabanat et al., 2017; Press et al., 2018). Resulting excess health consequences from acute exacerbations (AECOPD) represent a major public health concern and high degree of burden on patients, their families, and society. Its direct economic cost is already alarming in addition to

high readmission rates causing healthcare costs to rise significantly. This was concerning enough for the Centers for Medicare and Medicaid Services (CMS) to make it part of their Hospital Readmission Reduction Program (HRRP) designed to financially penalize hospitals with excess readmissions. Such imposed financial pressure left those hospitals with no choice other than change their course on ways they provide care to this patient population by finding new strategies through programs or interventions designed to improve their quality care and reduce their readmission risks for them to remain well and stable in their respective communities. Those financial and health data are frightening and must be concerning to all healthcare professionals who are becoming aware of them to find best strategies through evidence-based research for best clinical care practices to improve this population health. Inpatient COPD management is documented to have significant care gaps particularly with discharge planning and appropriate maintenance treatment in the community for these patients (Alshabanat et al., 2017). There was lack of follow up within the community and poor adherence with regard to prescribed medications (Alshabanat et al., 2017). These are troubling evidences triggering high degree of curiosity to conduct this integrative review (IR) with objective to find effective intervention programs addressing readmission risk factors to reduce this population readmission rates.

Defining Concepts and Variables

Concepts and variables are important in literature reviews because of the role they play in conducting the study. It is important to minimize any ambiguity in the IR by clearly describing what is meant by the variables and how they will be used in the review (Toronto & Remington, 2020). For this reason, concepts and variables for this study were being identified and well defined by the project leader prior to even start the review. They lead the researcher's focus of what they have already known of the problem and what they are looking to accomplish in their

project. Additionally, they assist readers in having a broader understanding of what the research is about. The identified concept for this integrative review is any tailored intervention program, pharmacologic or non-pharmacologic designed to decrease potential risk factors to the problem of interests such as COPD readmissions, mortality, morbidity rates, and healthcare costs. The intervention program can be operationalized to be measured through the use of indicators including increase in self-care management, patient engagement, improve discharge care coordination, health outcomes, medications adherence and patient satisfaction. The identified variables are the problem of interests being manipulated by the concept or the intervention program. In other words, identified intervention also known as concept has full potential to influence the variables which can be easily measured for level of success achieved through reduction of readmission, mortality and morbidity rates, and decrease healthcare costs for quality improvement.

Rationale for Conducting the Review

The serious health and financial threats this condition poses on this patient population and the society are highly concerning. Previously documented evidence-based research on this paper has demonstrated COPD causes serious health and financial consequences from frequent and/or severe COPD complications such as AECOPD resulting in costly subsequent readmissions. AECOPD related-hospitalizations account for the highest portion of the economic costs for this disease (Alshabanat et al, 2017, p. 961). Early readmission following a hospitalization for AECOPD remains an important clinical problem (Adamson et al., 2016). These should not be continued norms for this population since the condition is manageable. Substantial efforts should be made by DNP prepared nurses, the leaders in the field to reduce potential factors associated to recurrent AECOPD known as main factor in COPD readmissions

to improve patients' clinical outcomes and reduce the societal burden. For these reasons, it is worth conducting this review to find best evidence effective in reducing readmission rates in COPD patients to be implemented in clinical care practice for quality improvement. Intervention strategies to reduce readmissions may need to expand beyond COPD specific treatments alone but also should include improvements in patients' education, behavior modification through health coaching, and facilitation of prompt access to outpatient health care expertise when needed to impact overall health and quality (Press et al., 2018).

Purpose and/or Review Question(s)

Quality of care delivered to patients with COPD is known to be lacking across the care continuum, and may contribute to high rates of readmissions (Press et al., 2018). The authors further said readmissions may be the proxy for other important health factors or outcomes, including quality of life, social determinants of health, adherence deficit, or multi-morbidity. This project aimed at determining the best intervention support programs offering services to eliminate or reduce pertinent care gaps interfering with transitional discharge quality, increased disease knowledge, treatment adherence, early discharge follow up and management of COPD exacerbations primarily for reduction of readmission or re-hospitalization rates in COPD patients with excess readmissions rates.

The Institute of Medicine (IOM) (2005) has a straightforward definition of patient safety: "the prevention of harm to patients (p. 1011)." Since readmissions are costly and many are believed to be preventable, there have been recent federal efforts targeting reductions. In 2014 the Center for Medicare and Medicaid Services (CMS) initiated the Hospitals Readmissions Reduction program (HRRP) changing the financial incentives for COPD care for hospitals with more readmissions than expected, within 30 days of index AECOPD hospitalizations (Press et

al., 2018). This indicated more should be done to improve this population quality care, reduce readmission rates to prevent those financial penalties. This as a result, leading the project leader to this clinical question:

“In patients with a diagnosis of Chronic Obstructive Pulmonary Disease, what interventions support the reduction of hospital readmissions?”

The question was better approached as goals were established to be followed methodically by the project leader for best result outcomes. First, through review of clinical research, the project leader has identified if there were existing evidence base intervention programs effective to significantly reduce COPD readmission or re-hospitalization rates. Moreover, the project leader assessed the findings to evaluate its worth to be replicated in future healthcare organizations or clinical practices experiencing excess readmissions within this population for QI.

Second, the leader assessed if study results would be worth disseminating and implementing in the near future at a healthcare organization for concrete assessment of its level of success. The leader examined this can be done through the use of the Plan-Do-Study-Act (PDSA) cycle and Hospital Consumer Assessment of Healthcare Providers and Systems (HCAPS) for identification of area of strengths and weaknesses for continuous quality improvement (CQI).

The leader analyzed these goals can be achieved through the development of a well structured plan containing fundamental elements pertinent to the process of a successful project completion. This plan was comprised of Whittmore & Knafl framework, a comprehensive description of eligibility criteria for selection of articles focusing on the problem question, and

the process of search strategies including keywords to search databases for best available evidence addressing the problem topic followed by method of appraisal

COPD readmission or re-hospitalization is the phenomenon of interest. While it appears to be focused, in reality when it is analyzed in its proper context, it is found to be broader. The associated readmission factors are numerous and any of them being considered within a research study will generate overwhelming information.

It is imperative clear knowledge and understanding are established to best approach this topic. A comprehensive search of the literature is a practical strategy to move toward that path followed by critique and analysis of retrieved articles for selection of latest relevant clinical evidence addressing the problem question for result findings to be worth implementing in future healthcare organizations experiencing similar issue.

Formulate Inclusion and Exclusion Criteria

There is no greater driver to this integrative review than the problem question: “In patients with a diagnosis of Chronic Obstructive Pulmonary Disease, what interventions support the reduction of hospital readmissions?” The topic had become a priority after thoughtful consideration following a systematic search revealing grave consequences associated with this population and the high demands for effective intervention programs addressing related risk factors for patients’ well-being and the need to contain healthcare costs. To thoroughly answer this question, a comprehensive systematic search was inevitable but not before standard for search inclusion and exclusion criteria was formally and clearly developed. Establishing inclusion and exclusion criteria for study participants is standard, required practice when designing high quality research protocol (Patino & Ferreira, 2018). With designing this study, it was very important the inclusion and exclusion criteria were well and carefully defined,

considering the major impact they have on research outcomes in relationship to the search question for validity and accuracy. Per Patino and Ferreira (2018), inclusion criteria are key features of the target population that will be used by the project leader to address the research problem. In contrast, exclusion criteria are key features of potential study participants who meet inclusion criteria but present additional traits that could interfere with best study outcomes (Patino & Ferreira, 2018).

Inclusion criteria for conducting this integrative review took into account a series of methodological issues specific to COPD readmissions research. Included articles should be peer-reviewed from worldwide, written in English language, males or females adults diagnosed with COPD, published within 10 years span from 2010 to 2020; and involved intervention services for COPD readmissions reduction. The excluded articles were those non research articles (editorials, commentaries), written in foreign language, older than 10 years span, non adults without a COPD diagnosis, and articles with interventions not pertaining to COPD readmission reduction. This, also represented in table 1 below allowed a well planned method to search the literature for collection of most relevant articles for the review.

Table 1***Inclusion and Exclusion Criteria***

Inclusion	Exclusion
Peer-reviewed articles from worldwide	Non research articles (editorials, commentaries, Abstract only articles)
English language	Written in foreign language
Published within 10 years span from 2010 to 2020	Older than 10 years span
Has a COPD diagnosis	Do not have a COPD diagnosis
Adults males or females of all age	Non adults
Involved COPD readmissions and intervention services for reduction	Intervention not pertaining to COPD readmission reduction

Conceptual Framework

A well structured research is built on a framework, necessary to guide its path and enhance its credibility. There are the theoretical and the conceptual frameworks. The project leader should have profound knowledge and understanding of them to validate which one is best suited for this research project to be constructed on, for optimal results. The purpose of the two frameworks is to make research findings more meaningful, acceptable to the theoretical construct in the research field and ensures generalizability (Adom, Hussein & Agyem, 2018). A conceptual framework, Whitemore and Knaf's 2005 updated methodology was found to be the most suitable to guide this integrative review.

The topic problem is a deeply concerning subject. It is of great importance and should be addressed promptly and effectively through a systematic review of the literature to lessen the associated heightened consequences. Its research should be expanded beyond regular review

method to one which includes diverse approaches such as the integrative review (IR), facilitating access a wide range of clinical evidences to enhance the understanding of the research problem.

The integrative review is described as the only method that allows for the combination of diverse methodologies (i.e., experimental and non-experimental research) and has the potential to play a greater role in evidence-base practice for nursing (Whittemore & Knafl, 2005, p. 547).

According to Broome (1993), integrative review is a specific review method that summarizes past empirical or theoretical literature to provide a more comprehensive understanding of a particular phenomenon or healthcare problem (Whittemore & Knafl, 2005, p. 546). Despite these benefits of integrative study, the management of combined diverse methodologies is complex and can contribute to lack of rigour, inaccuracy and bias (Beck, 1999; O'Mathuna, 2000, as cited in Whittemore & Knafl, 2005).

These potential consequences can be prevented to increase study credibility through the use of the updated Whittemore and Knafl's framework derived from Cooper's (1998) aligned with systematic review or meta-analysis method. Referring to Cooper's framework, issues specific to integrative study and challenges of organizing various data sources have not been addressed. Thus, this framework will be updated to meet IR criteria (Whittemore & Knafl, 2005). As a result, this integrative review analysis was guided by the five steps of the updated framework which include problem identification, literature search, data evaluation, data analysis (data reduction, data display, data comparison, conclusion and drawing) and presentation to understand the problem question in a broader perspective. This framework allowed systematic and rigorous review and synthesis of the literature.

The first step of the integrative review was begun with clearly identifying the problem question to be addressed and the related concepts facilitating data reduction from the primary

sources as well as motive behind conducting the review. The literature search stage was focused on key areas pertinent to find relevant sources for the review including the search terms, the different accredited databases, and the inclusion and exclusion criteria. The evaluation and interpretation phase was done at the project leader's best judgment while leveling of the articles for best evidence was done through use of Melnyk hierarchy table known to be effective for grading in research study particularly where diverse primary sources are involved as in this integrative review. A level of evidence pyramid places evidence into different hierarchical categories based upon the strength of the evidence to answer clinical practice questions from strongest to weakest evidence (Melnyk, 2016). The process of data analysis presents data from the primary sources into one well synthesized conclusion, and the presentation phase which can be summarized through different strategies including a graph or table.

SECTION TWO: COMPREHENSIVE AND SYSTEMATIC SEARCH

Search Organization and Reporting Strategies

When conducting a review, methods have to be established and followed to ensure its validity. It was ensured that all criteria pertinent to the process were met including the use of Whittemoore & Knafl updated methodology to properly guide the project, its approval from the Institutional Review Board (IRB), and the completion of Collaborative Institutional Training Initiative (CITI). The problem question is to be answered with the most recent and relevant articles. Therefore, the use of proper databases such as CINAHL, Health Source, MEDLINE and PubMed; appropriate limiters, search techniques, and terms were made priority by the project leader in charge of collecting the articles from the literature.

COPD readmissions are known to cause a major health and financial burden. This is so concerning that the Center for Medicare and Medicaid Services (CMS) initiate the HRRP for hospitals to find best strategies to reduce readmission rates. Certainly, the gravity of this persistent issue among this population did not go unnoticed in the research world. For decades attempts have been made in search for solutions and, an overwhelming amount of published articles seeking for potential effective interventions, risks factors and implications are being made available through the literature. Within the search strategy process, there was no hand searching. A systematic search of published papers within the past ten years was carried out from four electronic databases: CINAHL, Health Source, MEDLINE full text, and Pubmed. For accuracy of the search, the project leader has sought the university librarian assistance for identification of accredited databases, best search techniques and key terms to search articles corresponding to the phenomenon of interest from the latest literature available. The topic question had to be modified by the project's chair suggestion to make it broader and for chosen key searched terms to be specific to generate as many relevant articles. Within the problem question, "COPD 30 day readmissions" was replaced by "COPD readmissions" to be more general. Several search terms were depicted from the problem question to form key terms combination as follow (COPD or Chronic obstructive pulmonary disease) and (readmission or re-hospitalization) and (reduction or decrease or lowering or prevention) which were replaced from (Chronic obstructive pulmonary disease) and (30 readmission rates) and (community intervention programs) for generating unsatisfied results. Within the search process, very few limiters were used to enhance access to as many relevant articles possible. The first set of keywords was used on each database, limited to English language and within five to 10 years span. 1037 articles combined were obtained with (177) from CINAHL, (40) from Health Source,

(250) from MEDLINE full text, and (570) from PubMed respectively. The search was determined as saturated when many of the same articles kept on reappearing with new searches or modifications within the searched terms. These collected articles were later reviewed for selection of the most relevant ones to conduct the study. Screening in study selection process is an essential step which involves reviewing the citations resulting from a search and selecting those deemed relevant for full text retrieval, and critical appraisal of the retrieved studies (Toronto & Remington, 2020). Although peer review articles were not among the set limiters, however, they were largely used for the review with exception of one report. The selection process was taking place, taking into account defined set of inclusion and exclusion criteria or eligibility criteria as previously defined.

Terminology

Because of its importance in research, terminology should be described accurately to avoid all potential confusion. The project leader should be ascertained terms used in her narrative reflect exactly what they are meant to be based on their respective field of research. The terms including database, search engine, platform and interface are generally used in research and in many cases some make the mistake by using them interchangeably. Having a clear understanding of their individual meaning was a wise step to take by the project leader prior to approach the study. The ability to differentiate them from each other helped greatly when they had to be used in the process, keeping in mind what they meant to be referred to, and those who may be interested in replicating the search based on documented information. Any misinterpretation of those terms or using them interchangeably may influence the study credibility and validity, and has the potential to mislead readers following written instructions within the project in attempt to replicate the search for quality improvement. For the purpose of this project, the term “database”

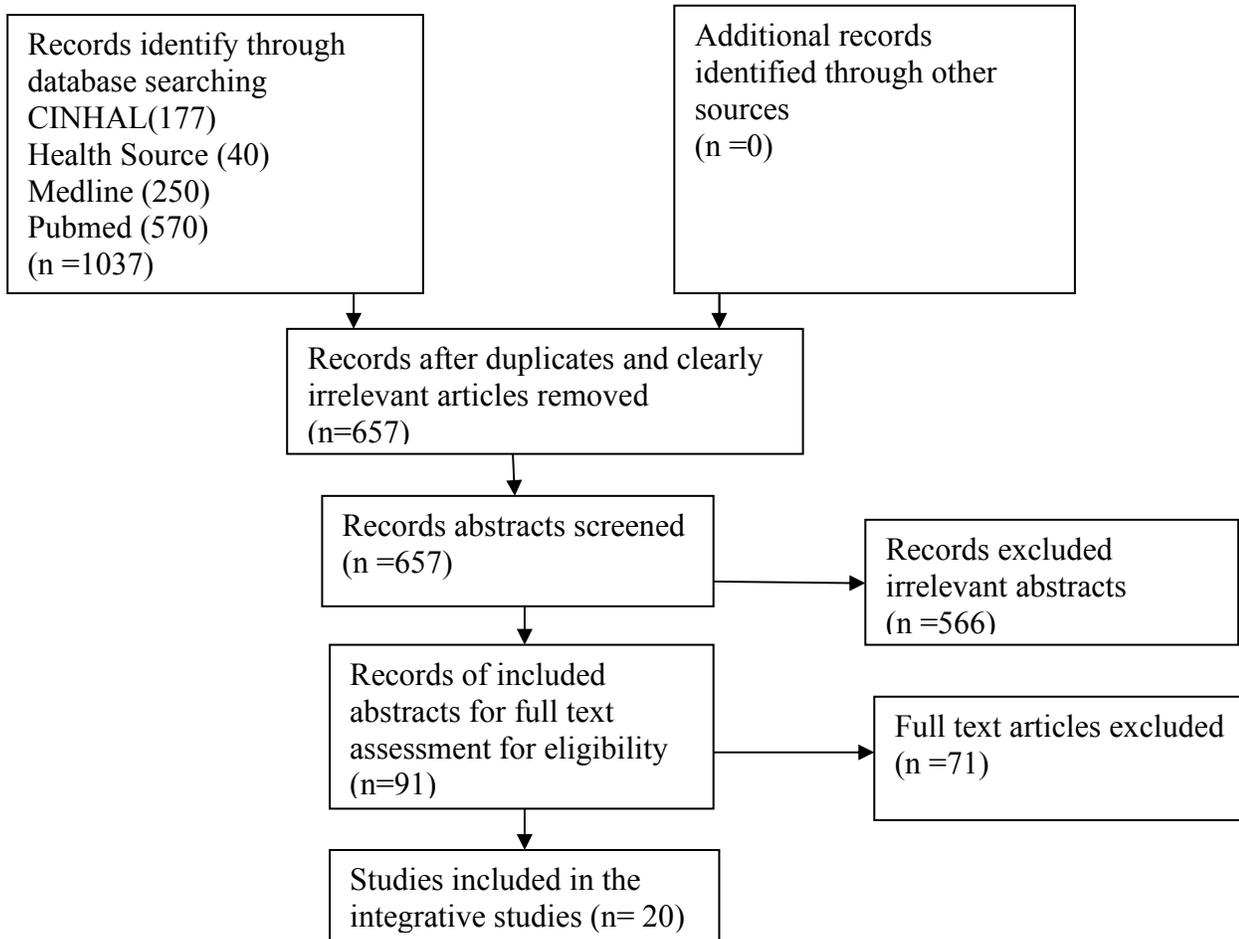
was used across the process not by choice but rather due to its appropriateness considering it was meant to be used for searching articles to be selected for the study. The articles were searched electronically through different databases from Jerry Falwell Library of Liberty University with each database indexes' diverse resources along with information pertinent to them such as titles, publishers, and dates among others.

SECTION THREE: MANAGING THE COLLECTED DATA

The selected studies were recent, and appropriate for the conduction of this integrative study objective to find intervention supporting reduction of COPD readmission rates. They were prioritized following a robust review protocol of the collected literature which includes the use of a literature matrix to review, critique and analyze them thoroughly with focus strictly on set eligibility criteria, rigor and relevance for inclusion determination.

The collection management strategy was based on the three steps recommended guideline by Toronto and Remington (2020) who noted when sorting the collected citations, there are three processes: screening by relevance, then selecting by full text, and finally sorting into studies. First, the retrieved combined 1037 articles were saved, which titles were examined for duplicates and clearly irrelevant studies for exclusion totaled at 380. This step was followed by screening abstracts of the remaining 657 articles found to be doubtful for relevance based on their titles or difficulty to determine relevance from the title alone. At this stage, two factors were considered for inclusion and exclusion. It was divided into two categories including: 1) the record of excluded irrelevant abstracts (566) and 2) those with citations determined to be relevant (91) considered for full text review. As those potential relevant articles were identified, their full text versions were obtained for deeper screening. At this step in the process, numerous articles were found to be relevant to the search problem from which twenty (20) were selected as the most

relevant per the inclusion criteria and their level of evidence. In the selection process, included articles from the included full text articles record category were those at the highest level in Melnyk table of evidence. The use of the Melnyk hierarchy table has lead in sorting most relevant articles to the research problem to conduct the review to increase its finding validity, and reliability. Of the 20 articles selected, there were 3 level Is (systematic review), 16 level IIs (randomized control trials), and one level VII (report). The remaining 71 were excluded in part either for possible bias including addressing readmissions caused by combined AECOPD and other comorbidities, or intervention not prioritizing reducing COPD readmissions, or for being at the lowest level in the hierarchy table of evidence despite they were found to be relevant to the phenomenon of interest. This process is represented below using the PRISMA Flow Chart (Moher et al, 2009).

Figure 1*Literature PRISMA Flow Chart*

Note: PRISMA Flow Chart representing process of data management

Moher, D., Liberati, A., Tetzlaff, J., Altman, G. D. The PRISMA Group (2009). Preferred Reporting Items for Items for Systematic Reviews and Meta-analyses: The PRISMA Statement. PLoS Med 6(6): e1000097. <https://doi.org/10.1371/journal.pmed.1000097>

SECTION FOUR: QUALITY APPRAISAL

Sources of Bias

All studies including integrative review are susceptible to biases that must be rigorously planned and/or accounted for by researchers (Almeida & Goulard, 2017). Per them, bias is defined as any and all distortions during the investigation process, which can occur in any type

of design. However, some are susceptible to systematic reviews classified in three categories including: selection bias, information bias, and confounding bias (Almeida & Goulard, 2017). It is well documented bias results from systematic alteration from the truth. Although we do not know the exact truth, different conclusions lead readers to believe that alternate inclusion and exclusion criteria result in biased conclusions (McDonagh et al., 2013). False result outcomes may result in major consequences from implementation of under or overestimate guidelines and/or interventions findings influencing clinical treatments. Efforts were made for these potential consequences to be at least limited as complete elimination of risk for bias in research is unrealistic.

In integrative review where evidence from varied studies is combined, considering the risk for bias in individual studies is imperative or results may be influenced. Therefore, in conducting this review it was ensured its methodological rigor was maintained by taking crucial steps to minimize all potential risk for bias by defining the project study, using appropriate methods and framework, and developing set of inclusion/exclusion criteria to influence its result. Methods used should be adequate to prevent bias from occurring, and it is vital studies included in the review have comparable methodological quality and the necessary information to allow the identification of selection, gauging, and confounding biases were avoided (Almeida & Goulard, 2017, p. 554). In the process of articles collection, it was ensured every article retained for full text review was thoroughly evaluated for methodological strengths and weaknesses prior to make final selection of those in direct relationship with the problem question to enhance study rigor. As per Whitemore and Knafl (2005), reviewers retain the responsibility to make judgments about the methodological strengths and weaknesses of included studies prior drawing conclusion about the phenomenon of interest (Jackson, 1980), in order to achieve rigor in the IR.

Internal Validity

By combining the evidence from several studies, it is important to consider the risk of bias in each study. If study methods are not adequate, results from observational studies may be biased (Almeida & Goulard, 2017). Knowing what is known; all susceptible biases were rigorously planned and/or accounted for by the project leader. Study validity was enhanced through the use of strategies to avoid all potential sources of all types of bias such as selection, information or confounding, while the wide range of factors influencing validity and reliability were reinforced at every step in the research process. Close attention was paid to these key factors within the studies including authors' affiliations, researcher's own bias, objectivity and honesty, sample selection, sample size, design of research tools, and statistical analysis of the data. Bias may exclusively impact study results to be completely inaccurate or far from the truth. Throughout the process strong measures were taken to limit factors capable of contributing to any unfortunate circumstance of bias by ensuring the quality, methodological strengths and weaknesses of included studies prior drawing conclusion about COPD readmissions reduction to strengthen review validity. Collected studies were thoroughly examined by the project leader for bias prior making it to the inclusion list. Sets of inclusion and exclusion criteria were clearly defined to prevent ambiguity. One of the primary focuses of developing inclusion criteria is to minimize ambiguity. Greater ambiguity in inclusion criteria increases the possibilities of poor reproducibility due to many subjective decisions regarding what to include, potentially resulting in at least random error in study selection (McDonagh, et al., 2013).

Appraisal Tools

Providers are expected to provide patients with the highest quality care based on the best existing evidence research. As we anticipate this review finding is likely be used for that

purpose, to meet that threshold we critically appraised all included articles to carefully assess their levels of validity, reliability, quality, value, and relevance for best results to influence healthcare professionals' clinical decision in clinical care practice to improve healthcare outcomes. It is essential to combat information overload, identify papers that are critically relevant and continuing professional development (Al-Jundi & Sakka, 2017). Critical steps to appraise those articles involved primarily the assessment of research methods used for every individual study through the use of checklists specific to the study design. Standard set of common questions in relationship to the phenomenon of interest, study design, selection issues, outcomes and how they are measures among others were completed followed by review of main study sections such as (1) study overview (author (s) and their affiliation(s), articles title, key objective, publishing journal and the year and potential conflict of interest); (2) abstract which summarizes clear details of the study such as a clear written study aim, the study design, demographic data, type of groups, type of interventions and measuring tools;(3) introduction in which is presented a clear picture of previous work addressing the problem, their limitations and why is this review is necessary; (4) methods outline details of how the study was carried out, (5) results reveal what actually occur and (6) discussion describing an absolute comparison of current findings with what have already known. This process ensures included articles are relevant for this study credibility (Al-Jundi & Sakka, 2017).

In the appraisal process of the final selection of those included articles, the Melnyk table of evidence was used for leveling them to ensure those with the highest level of evidence were prioritized to enhance rigor of research finding. The use of this tool has contributed in sorting the relevant articles with the highest level of evidence. Petrisor and Bhandari (2007) judged it is necessary to place the available literature into a hierarchy as this allows a clearer communication

when discussing studies, both in day-to-day activities such as teaching rounds or discussions with colleagues, but especially when conducting a systematic review so as to establish a recommendation to practice. The avoidance of bias is one more benefit offered by using the hierarchy table of evidence necessary to enhance study rigor. The understanding behind placing studies into a hierarchy is that those in the highest position are considered as “best evidence.” In the case of therapeutic trials this is known as randomized controlled trial (RCT) and meta-analyses of RCTs. RCTs have an ability to help control bias. Bias which exists in many forms can interfere with a study outcome in ways that may over or underestimate what the true treatment effect is (Petrisor & Bhandari, 2007).

This literature matrix contained pertinent information of reviewed selected studies highlighting among them diverse intervention strategies that have been tested within different healthcare settings to be evaluated for effectiveness in reducing COPD readmissions. This tool not only strengthens quality and relevance of the review, increases confidence if results should be replicated in clinical settings for best practice, but as well will influence healthcare professionals’ decisions making in clinical practice and in creating policies that define and integrate appropriate standards addressing COPD population health care needs and conditions for that level care to occur to reduce readmissions.

Applicability of Results

In research study, taking into account strengths and weaknesses of designs, sampling, results, and discussion among others are critical to ensure its validity and reliability but yet not enough for a study to be categorized as useful. Regardless of the level of strengths and weaknesses, one important factor that can affect this IR usefulness is the applicability of results to broader population or situations. The broader the study results are applicable to different

population or situations; the stronger is its generalizability level. This is one more important task the project leader had made priority to enhance study usefulness. Generalizability is important to measure of how useful the results of this IR are for larger group of COPD patient population or others and/or situations. It is anticipated results of this IR will have good generalizability due to the fact they are applicable to a wide range of chronic illnesses apart from COPD population with excess readmissions. They include chronic heart failure (CHF), diabetes mellitus (DM), pneumonia and other chronic lung diseases, not limited to decrease in costs of healthcare. In the process of reviewing the selected articles, some key considerations have been made to analyze them for applicability. Close attention was paid on whom and what from the study group were included and excluded, in addition to the details and timing of every intervention. Knowledge obtained was used to balance if the characteristics of the group studied are similar to specifics of COPD patients with increased readmissions and beyond, which as a result will increase confidence for review finding to be replicated in future clinical practice.

Reporting Guidelines (Whittemore & Knafl)

Systematic bias and error can occur at any stage of the review (Oxman, 1994; Dunkin, 1996, as cited in Whittemore & Knafl, 2005 p. 548). When conducting research; all measures should be in place to avoid all potential deficiencies in the reporting process. In the absence of this standard, avoidable errors capable to negatively influence study findings are likely to occur. As a result, all efforts were made for this to be prevented. This study is guided by Whittemore and Knafl (2005) updated methodology to make finding more meaningful, acceptable to enhance its validity and credibility. A research study without a guideline will lack appropriate direction, increases potential for deviation in the study and ultimately interferes with study end results. Growing evidence demonstrates widespread deficiencies in the reporting of health research

studies. Problematic issues include (but are not limited to): non reporting or delayed reporting of whole studies; omission of crucial information in the description of research methods and interventions; selective reporting of only some outcomes; inadequate reporting of harms; presenting data and graphs in confusing and misleading ways; and omissions from or misinterpretation of results in abstracts (Simera et al., 2010, p. 35). The absence of important primary sources is subject to make the literature search stage incomplete, increases potential for error to occur in extracting and interpreting data from the primary sources. Most particularly, data analysis may be incomplete or lack of an accurate synthesis of data from primary sources. Analyzing and synthesizing varied primary sources is a challenging process in integrative review. Therefore, developing data analysis strategies in the updated methodology is a priority (Whittemore & Knafl, 2005, p. 548).

According to the literature, adherence to the guidelines that provide structured advice on how to report research studies can lead to dramatic improvement. It can decrease honest errors and omissions in scientific reports, and improve the accuracy and transparency of publications which will allow reliable appraisal of presented research (Simera et al., 2010). This was the exact purpose of using Whittemore and Knafl (2005) updated methodology framework with being aware Cooper's (1998) framework falls short by not addressing issues specific to integrative review method as the challenges of combining diverse areas of data sources are not being considered. Therefore, this framework will be modified to address issues specific to integrative review method (Whittemore & Knafl, 2005). The updated framework served as foundation for this integrative study. It ensured all necessary paths including the stages of data analysis. The stages were chronologically followed for the basis of reaching project's objective by preventing all potential deviations, error, and bias in the process; allowing the project to be properly written

and honestly reported in a manner that can be easily understood by readers and facilitating its replication by healthcare professionals in clinical practices accurately.

SECTION FIVE: DATA ANALYSIS AND SYNTHESIS

Although integrative review allows different views of the problem question and its use suggests in nursing science, its concept of allowing the combination of diverse methodologies increases risk for lack of rigour, inaccuracy and bias. This concept is also problematic for data collection process from primary sources. Whitemore and Knafl (2005), note methods of analysis, synthesis, and conclusion are poorly formulated. This is a considerable issue, as data extracted from primary articles of diverse methodologies generally consist of a large repertoire of varied data. The sheer size and complexity of the data set sometimes makes the analysis daunting, but a large data set may also yield richer and more useful information (Namey, 2007, p. 137). Listing and defining variables was an inevitable step for seeking data but a challenging process that can be eased through method of constant comparison. The application of the constant comparison method used in broad array of qualitative designs that converts extracted data into systematic categories, facilitating the distinction of patterns, themes, variations and relationships (Glaser 1978; Miles & Huberman 1994; Patton 2002, as cited in Whitemore & Knafl, 2005) was greatly beneficial to this review at this point. The method consists of data reduction, data display, data comparison, conclusion drawing and verification in which extracted data are compared item by item so that similar data are categorized and grouped together. Subsequently these coded categories are compared which further the analysis and synthesis process (Whitemore & Knafl, 2005).

Data reduction

In this very initial phase is involved the determination of an overall classification system for data management. As the relevant studies were collected, they were classified into subgroups to facilitate data extraction and reduction. The initial subgroup classification of collected primary sources were organized from the highest to the lowest level of evidence and analyzed sequentially. The second subgroup, data reduction involved the process of extracting and coding data from primary sources to simplify, abstract, focus and organize data into a manageable framework (Whittemore and Knafl, 2005, p. 550). A predefined matrix divided into sub-sections was developed for each primary source to keep extracted relevant data, presented on a simplified form in a single page with contents similar to the primary sources. The sub-sections were made of study details; author, study objective, design, level of evidence, interventions, results strengths and limitations. This approach provides succinct organization of the literature which facilitates the ability to systematically compare primary sources on specific issues, variables or sample characteristics (Whittemore & Knafl, 2005, p. 550).

Data Display

Display of data collected in the initial stage is critical. Whittemore and Knafl (2005) described data display as the next step in data analysis which involves converting the extracted data from individual sources into a display that assembles the data from multiple primary sources around particular variables or subgroups. At this phase in the process the coded extracted data from matrices in the initial phase were displayed into one matrix setting the stage for comparison. This is a strategy to summarize data characteristics individually and arranged in ways that are highly comprehensible and meaningful as in the primary sources. These displays strengthen the visualizations of patterns and relationships within and across primary data sources

and serve as a starting point for interpretation (Knafl & Webster 1988; Sandelowski 1995 cited in Whitemore and Knafl, 2005, p. 551).

Data Comparison

This phase of data comparison is the process where data that have been displayed in the matrix on data display were examined to identify patterns, themes, or relationships. Variables or themes identified as similar were placed near on a matrix and displayed in chronological order so that relationships can be depicted between them to facilitate the comparison process. According to Whitemore & Knafl (2005), creativity and critical analysis of data displays are key elements in data comparison and the identification of important and accurate patterns and themes (p. 551). This process of data visualization and comparison facilitates early interpreting efforts and highly strengthen review end results (Whitemore & Knafl, 2005).

Conclusion drawing and Verification

This last phase of data analysis is conclusion drawing and verification which moves the interpretive efforts from the description of patterns and relationships to higher level of abstracts, subsuming the particulars into the general (Whitemore and Knafl 2005, p. 551). In this phase, generalization from each subgroup became apparent, patterns and processes were isolated, similarities and differences among included sources were identified. There took place a transition from sub-groupings to a comprehensible summing or synthesis of important elements following data analysis of each subgroup. This upheld the development of a new conceptualization of primary sources, which involved all subgroups into a comprehensive representation of the phenomenon of interest, completing the review process as per Whitemore and knafl (2005).

Descriptive Results

For this integrative review, search of databases generated 1037 articles. Following the process of inclusion and exclusion criteria, 20 articles identified as the most relevant to the search objective focusing on finding intervention supporting the reduction of hospital readmissions among COPD population were collected for this integrative study. Systematic review and data analysis of those articles revealed diverse intervention methods were studied to evaluate their level of effectiveness in reducing readmissions among COPD patients with excess readmission rates. Comprehensive disease management interventions services varied. They include services such as education, case management, discharge follow ups and many others. The interventions were conducted by multidisciplinary team, general and specialist physicians, nurses and pharmacist in clinics by telephone, community home visit, and inpatient. Interventions concentrated on reviewing discharge medication reconciliation, addressing anxiety issues, assessing financial difficulties related to buying medication, teaching correct inhaler use via the teach-back method, self management education and initiation of action plan have largely shown promising results in COPD readmissions reduction in addition to improve quality of life, decrease length of stay, emergency visits, morbidity and mortality (Alshabanat et al., 2017, Euceda et al., 2018; Health Quality Ontario, 2017; Hegelund et al., 2019; & Van Eeden, 2017). Other researchers (Benzo et al., 2016; Johnson-Warrington et al., 2016; Ko et al., 2017; McGurran et al., 2019; Ngyen et al., 2014; Plishka et al., 2019; & Vanhaecht et al., 2016) in their studies such as individualized care plan or clinical pathway which include some service components already mentioned above adding to physiotherapy or pulmonary rehabilitation; pharmacy led comprehensive therapeutic interchange program (CTIP) used as a method of pharmaceutical cost management and a way to standardize hospital therapy; health coaching with

initiation of motivational interviewing, and moderate to vigorous physical activity interventions echoed similar optimism findings.

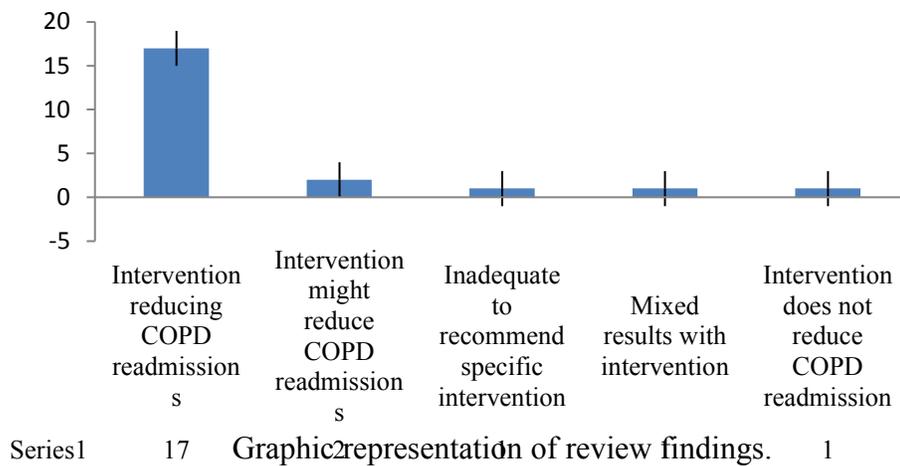
Adamson et al (2016), in contrast to Ko and his colleagues combined comprehensive individualized care with bundled care and their findings cannot be more different, concluding comprehensive individualized care for subjects admitted to hospital for AECOPD did not reduce 30 and 90-day readmission rates but did reduce 90-day total mortality. Interestingly, it reduced 90-day readmission rate in females. On the other hand, Press et al. (2018) study has drawn mixed results with combined interdisciplinary teams with bundled care in reducing readmission although effective at improving other areas beneficial to COPD patients' wellbeing. The interdisciplinary teams with bundled care assessing impact of post hospital reduction readmission program (HRRP), aimed at reducing readmission were uniformly successful at improving quality of care provided and demonstrating improved process measures. However, success at reducing readmissions and cost varied with interventions. Early home monitoring interventions did not decrease rates of readmissions in COPD patients and evidence is lacking to recommend specific intervention (Prieto-Centurion et al., 2014., Jurado-Gamez et al., 2012; 2013).

Of the interventions reviewed in the literature, 75% have shown to be highly effective in correlation to the phenomenon of interest although time period among them varied with intervention type; 7, 30, 60, 90, 180 day, or mixed in some cases. Others have raised some level of doubts with 10% concluded they may have an impact on readmissions reduction, 5% have shown varied results, and 5% have found it inadequate to recommend any specific intervention. The remaining 5% dismissed all claim intervention has an impact on COPD readmission rates. Some among those with promising results on COPD readmissions are as well effective in their

secondary objectives in reducing all cause readmissions, length of stay (LOS), emergency (ER) visits, mortality, morbidity, depression, improve quality of life (QOL) and health care costs which believed to have close relationships with the issue of concern. Some offer potential benefits in the management of other chronic diseases such as asthma, chronic heart failure (CHF), diabetes, and pneumonia. These additional benefits were also varied with intervention type.

Figure 2

Descriptive results



Note: This graph shows most of the studies are effective in reducing readmission rates and healthcare related costs.

Synthesis

Careful review of data extracted from the primary sources in the process of data analysis has revealed relevant information in relationship to the phenomenon of interest. It is shown handful researchers are in agreement of the magnitude of COPD readmission rates on health and healthcare expenditures and in no doubt should be addressed without delay by focusing on

associated risk factors. As priority in their research, diverse intervention methods tested on COPD patient population with excess readmissions have generated promising results. Their detailed and comprehensive conclusions of their findings cover factors far beyond interventions' effectiveness on reducing readmissions. Clinical evidence drawn from the literature has overwhelmingly shown evidence-based interventions designed to reduce readmissions within the COPD population are being largely effective.

Regardless of the patients' age group, those with poorly managed COPD were likely to be readmitted for COPD complications such as AECOPD. It is found admitted patients need additional care besides hospital treatment that addresses issues far beyond COPD management. The adoption of a healthcare plan that not only addresses the COPD condition was successful in improving the overall quality of health. 75% of this review findings show patients who received well tailored multidisciplinary transitional discharge care plan, comprehensive case management, care pathway, pulmonary rehabilitation and health coaching among others either inpatient, by home visits or telephonic have a significant decrease in their readmission rates. Those who did not adopt the intervention program showed severe ailment and other COPD- related complications.

Pharmaceutical intervention shows that the use of new drugs also played a significant role in reducing COPD readmission rates. Those patients who received the new drugs responded positively and got discharged quickly from the hospital. For instance, Albuterol, Ipratropium, and Levalbuterol are among the short-acting bronchodilators. Additionally, the long-acting bronchodilators include Brovana, Tiotropium, Salmeterol, and Acclidinium. These drugs help to make breathing easier. They can be administered in the community for better disease management.

These designed interventions go far beyond reducing readmissions by improving other chronic diseases such as asthma, chronic heart failure (CHF), diabetes, and pneumonia, as well as mortality and morbidity rates, length of stay, emergency visits, and decrease care costs. However, these findings varied with type of interventions and their duration. Intervention programs are believed to be less costly compare to the price tag associated to readmissions.

Ethical Considerations

Integrative review is known as research of research. Ethics is considered as a critical and an integral part of any research project but may require unique considerations depend on the focus population. In the healthcare field researchers are obligated to adhere to ethical standards to ensure data protection, privacy, confidentiality and human rights are respected as they hold responsibilities to their profession, and clients. Therefore, it was a priority as the leader in charge of this research project to thoroughly examine all included articles for ethical issues that may have been involved with potential to affect this review end results meant to be implemented in future clinical settings where humans will be involved. Strict standard measures were followed to prevent potential bias that may occur by critically and systematically screened all included articles for ethical concerns, clearly define the project study and use of adequate methods to enhance review accuracy and transparency. Other ethical requirements for this study were met by completing the 15 hour Collaborative Institutional Training Initiative (CITI). Request was submitted to the Institutional Review Board (IRB) for project approval but was deemed unnecessary as per the board for not involving human subject. As a result, inform consent usually a key priority in research project involving human participants became irrelevant.

TIMELINE

Complete a final project is standard academic requirement for graduation at a doctoral level. This is a challenging task to take on and requires strict discipline in time management to meet this expectation. An established timeline created based on the University's DNP handbook kept the project leader organized to timely complete the research study by graduation set date. This was a teamwork effort, working collaboratively with the chair every step of way for constructive criticism for corrections to be made as necessary and support from others as the university librarian with the search strategy for studies selections for timely progress. Below is an overview highlighting the process of the timeline development, its importance and contents leading to the project timely completion.

The development of this timeline was based on the project stages as classified by Toronto and Remington in their book titled "*A step-by-step guide to conducting and integrative review.*" Initially, a rough draft of the timeline was drawn at the beginning of the first practicum course, displayed a breakdown of the research project major sections and sub-sections with expected time to be covered individually, along with set time for routine draft submission to the chair for constructive criticism in order to stay on path. This established timeline was reviewed every 8 week term following a thorough examination of weekly class expectations and demands in parallel to professional and personal lifestyles for modification to be made accordingly within it. The timeline initiative taken as the only pathway for the project to be completed by the time of graduation did not disappoint. It was helpful and was used as an effective guide in addition to strong support from the project chair, hard work and determination leading to a smooth process of project completion.

SECTION SIX: DISCUSSION

Preliminary review findings for this research study highlighted the extent of health and financial consequences associated with COPD disease. To date, millions of Americans are being affected with billions of dollars spent yearly in direct care. This population is living a poor quality of life while their providers in charge to help improve it are continuously failing them. Appropriate care coordination is lacking leading to severe health complications resulting in frequent hospital readmissions increasing their health risks, ER visit; increase mortality, morbidity rates, and care costs. The billions of dollars spent for care are likely to increase as this population is expected to grow in the future because of the aging population. These results lead to a comprehensive systematic review which findings revealed interesting intervention strategies to reduce COPD readmissions.

The COPD intervention methods tested although they were tailored differently, they were used for one common goal of finding effective interventions supporting reduction of COPD readmissions. The interventions managed to target known risk factors to readmissions by integrating intervention plan services designed to encounter them to improve this population's health outcomes.

Evidence-based findings for this research study demonstrate intervention programs can reduce readmission, especially those who deploy an interdisciplinary team approach, with various care interventions that were successful at enhancing the quality of healthcare outcomes. Several intervention programs had a varying success rate as depicted by different studies. The implementation of a comprehensive intervention program for COPD patients in clinical practice facilitates successful management of COPD disease from lifestyle changes to self-care management, medications adherence , improve discharge care coordination for prompt post

discharge follow ups with general and/or specialist physicians critical to prevent COPD related complications and readmissions. Early discharge follow up or action based type intervention facilitate patient access to much needed support they need to remain well and stable in their respective community.

Implications for Practice/ Future Work

Recent literature findings have demonstrated readmission in COPD patients is serious health threats and a societal burden considering its weight on healthcare expenditures. The resulting health and financial consequences are enormous from poor quality of life, morbidity, mortality, and in severe case scenario deaths. Those consequences are deeply concerning to patients, their health providers and payers for measures to be initiated toward identifying potential risk factors and effective intervention strategies to improve COPD quality care to reduce readmission rates. The conclusion drawn from this integrative review in relation to the research question has overwhelmingly shown potential benefits for future practice. The implementation of a comprehensive intervention program for COPD patients will facilitate successful management of COPD disease through lifestyle changes, self-care management education, medications adherence, and prompt post discharge follow ups with general and/or specialist physicians. Comprehensive intervention program for COPD patients, including education, case management, and follow up were associated with significant reduction of hospital readmission and length stay (Alshabanat et al, 2017., Benzo et al., 2016). A CCMP can reduce readmissions through attention to social variables, optimization of in-hospital care, improved coordination of pre- and post-discharge, a system to better identify problems after discharge, and an office setup that accommodates same-day visits (Euceda et al., 2018, p. 185). These interventions in turn will prevent all potential factors leading to readmissions, decrease

morbidity, and mortality. Furthermore, a successful COPD management intervention program is believed to decrease emergency visits, hospital length of stay, and improve quality of life.

Additionally, some offer potential benefits in the management of other chronic diseases such as asthma, chronic heart failure (CHF), diabetes, and pneumonia. Chronic illnesses highly contribute to the financial costs of healthcare with AECOPD makes for up to 70% of all related COPD healthcare costs. The combined cost of direct COPD care and readmission is overwhelming and deeply concerning with millions of Americans are already being affected by the disease with the prevalence expected to rise.

An effective translation of this evidence-based finding in clinical practice will influence this population health as well the cost of healthcare by reducing readmission rates. Those in position of leadership have the potential to make this study finding part of their organization's standard policy for clinical care provided to be evidence-based to improve patients' health outcomes and health care costs. Because of these potential health and financial benefits, it is to be promoted by developing new policies or updating existing ones locally, nationally and internationally as an effective strategy to transform the delivery of healthcare and improve health outcomes.

Despite review result is shown to be overwhelmingly promising, limitations within the study are worth being highlighted for suggestions. With almost all included studies being strictly limited to the highest level of evidence, relevant clinical researches may have been missed influencing the end results. Interventions such as early home monitoring, comprehensive individualized care, comprehensive care management program, and interdisciplinary teams with bundled are either ineffective in reducing COPD readmissions, provide mixed results, possibly effective or the evidence is somehow inadequate to recommend specific interventions to reduce

readmissions although they still provide some other health benefits for this population. Further research including articles with more diverse level of evidence, and larger samples should be conducted for certainty.

Dissemination

Evidence-based practice is well known to improve care outcomes when successfully translated into clinical practice. However, despite mounting of available evidence promoting its benefits, healthcare providers have yet to make it part of their daily clinical care routine. This review results will be disseminated appropriately using effective strategies to reach intended goals. The reason behind the project and the target audience will be thoroughly evaluated to base the dissemination process strategy for successful distribution of clinical findings. The evidence-based use and health outcome benefits will be effectively and rigorously promoted through presentation of results to colleagues in clinical practice and other peers in the field to enhance their routine practice and care outcomes. There are multiple strategies through which findings from this review can be shared. Publication, particularly online is one of the most effective ways considering these days technology is at the center of every healthcare organization as an effective strategy for quality improvement. Different types of technology such as computers, iphones, ipads must be readily available to all clinical staff to facilitate them instant and unlimited access to vast clinical researches pertaining to improve clinical care practices. It can also be promoted through presentation of abstract in different venues pertaining to influence policy, enhance healthcare quality improvement, patient safety, and evidence base use in clinical practice. Other ways include through presentation at local, national conferences and meetings of professional associations, social media or on an organization's website, and through grassroots advocacy to influence lawmakers and/or policy makers in their decisions. At this level, it is identified

effective and well structured communication is imperative so that the message reaches the intended audience. For that to occur, the project leader must do some work by identifying the what, why, where, who, and how. These are key questions deserved to be answered for proper and successful dissemination of this research finding. Through this dissemination strategy, finding will likely be put to use by providers, enhance health outcomes, patients' safety and reduce healthcare utilization as reflected by readmissions.

A successful dissemination can be achieved collaboratively starting from the implementation phase. It is a shared responsibility of all potential stakeholders which task should be promoted among them. This is presumably done from the beginning by the project leader to avoid potential resistance while convincing them to be an integrative part of the process to achieve the intending goal and enhance health outcomes for readmissions reduction. The change agent should use strong leadership in his or her role to educate the target audience of the project's objective, seeks to know their concerns to be addressed and get them actively involved in the process. Being in a leadership position requires leaders to have standard skills to succeed in their roles including having listening ears, ability to communicate clearly and effectively. These skills, in addition to routine meetings for updates, questions, and feedbacks are necessary to keep everyone in line with project's goals for best outcomes to be achieved.

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Appendices

Literature matrix

Article	Purpose	Sample	Method	Major Findings	Limitations	Gaps
Impact of individualized care on readmissions after a hospitalization for acute exacerbation of COPD.	Examined how individualized comprehensive care influences readmissions following an index hospital admission for AECOPD.	Two inner-city teaching hospitals control group consisted of 271 patients whose index AECOPD occurred the year before the comprehensive program, and the experimental group consisted of 191 patients who received the comprehensive care.	Level 2 retrospective study.	Comprehensive individualized care for subjects admitted to hospital for AECOPD did not reduce 30- and 90-day readmission rates but did reduce 90-day total mortality. Interestingly, it reduced 90-day readmission rate in females.	The population low average socioeconomic status and unusually high rates of SA and mental illness. The results of the study may therefore have reduced generalizability. The care delivered to each patient was purposely unique	Not all variables could be collected for every patient, preventing the inclusion of parameters such as FEV1, body mass index, pack-years of smoking history, and socioeconomic factors into the analysis.
Impact of a COPD comprehensive case management program on hospital length of stay and readmission	To determine the efficacy of a comprehensive case management program (CCMP) in reducing	Five large hospitals in Vancouver, BC, Canada	Level 2 retrospective study	A comprehensive disease management program for COPD patients, including education,	The lack of medical history and pulmonary function data as an assessment of severity, and the lack of risk	There was no individual consent of the patients. Therefore, issues on confidentiality.

rates	length of stay (LOS) and risk of hospital admissions and readmissions in patients with COPD	case management, and follow-up, was associated with significant reduction in hospital admissions and LOS	factor/exposure information (eg, smoking status) for individuals	The study is prone to bias when selecting data because it depends on the identification of the patients by the multidisciplinary case management teams.
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Health Coaching and Chronic Obstructive Pulmonary Disease Re-hospitalization. A Randomized Study	To determine the effect of comprehensive health coaching on the rate of COPD readmissions	Total of 215 patients hospitalized for a COPD exacerbation were randomized at hospital discharge to receive either (1) motivational interviewing–based health coaching plus a written action plan for exacerbations (the use of antibiotics and oral steroids) and brief exercise advice or(2) usual care.	Level 2 randomized controlled trial	-Health Coaching may represent a feasible and possibly effective intervention designed to reduce COPD readmissions	In this study, we found significant differences in the rates of COPD hospitalizations at 1, 3, and 6 months post discharge. The study was powered to find a difference in the rate of hospitalization at 12 months, which was not found.	COPD-related hospitalizations at 1, 3, and 6 months after hospital discharge were considered, but not at 1 year after discharge. The results may suggest a negative study result if only hospitalization at 12 months is
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						considered
The effects of a comprehensive care management program CCMP on readmission rates after acute exacerbation of COPD at a community-based academic hospital. Chronic Obstructive Pulmonary Diseases	To address readmission issues as part of an overall quality improvement program	A COPD readmission reduction initiative was implemented in September 2014 at Danbury Hospital, a community teaching hospital in Connecticut. 272 patients were included	Level 2 retrospective study	Results from the hospital and previous studies have suggested that there might be benefit in a COPD CCMP	Few limitations. First, single center study, selection bias can be a concern. Second, the small sample size in the readmission group might have limited our power to show statistical significance	There have not been well accepted management modalities and guidelines that address psychosocial risk factors for the prevention of COPD readmissions.
Effect of early follow-up after hospital discharge on outcomes in patients with heart failure or chronic obstructive pulmonary disease: A systematic review.	Evaluated the clinical effectiveness of early follow-up, within either 7 days or 30 days after hospital discharge, compared with usual care or a different time to follow-up,	10 eligible studies: one randomized controlled trial, two nonrandomized controlled trials, and seven observational studies. Four studies were specifically on 7-day follow-up and 30-day health outcomes.	Level 1 systematic Review	Based on low- and very low-quality evidence, follow-up within 7 days and within 30 days of discharge from hospitalization for heart failure or COPD	Included studies were limited to RTCs and cohort studies. Patients who were readmitted to the hospital within 30-days of discharge had follow ups options either	Overall, there is a lack of large, methodologically robust studies specifically focusing on the effectiveness of 7-day follow-up after discharge

in reducing readmissions, emergency department visits, and mortality in patients with heart failure or COPD.

The other six studies were on 30-day follow-up and more variable time to health outcomes.

compared with usual care or no follow-up were both associated with a reduced risk of all-cause readmission, emergency department visits, and mortality.

1) clinic visits with internal medicine, family medicine, or cardiology physicians who typically had had previous contact with the patient, or 2) telephone calls by nurses or pharmacists who may not have been familiar with the patient.

in improving patient outcomes.

The impact of a personalized action plan delivered at discharge to patients with COPD on readmissions: A pilot study.

This pilot study aimed to test whether a personalized, stepwise action plan supported with a short instruction provided at or post-discharge after an acute exacerbatio

Participants were recruited between August 2016 and forward until 100 patients were identified. Last patient was included on 22 February 2017.

Randomized controlled trial

Compared to the control group, the action plan group significantly reduced the incidence of readmissions. The action plan group showed a trend

Performed a small, two-centre study with limited power, and screened almost 400 patients to recruit 100 patients, and thus, patients represent a selected group.

The absence of a large group of patients within the study. This hampers external validity, so results may not be reproduced in other COPD cohorts.

n in chronic obstructive pulmonary disease admission as an addition to usual care reduces readmissions and symptom burden, including anxiety and depression levels at 3-month follow-up.

towards a significant decrease in HADS-depression, but none in HADS-anxiety.

Can a supported self-management program for COPD upon hospital discharge reduce readmissions? A randomized controlled trial.

To investigate if SPACE for COPD employed upon hospital discharge would reduce readmission rates at 3 months, compared with usual care.

Seventy-eight patients were recruited (n=39 to both groups). Participants were recruited from University Hospitals Coventry and Warwickshire and University Hospitals of Leicester NHS Trusts.

Level 2 randomized controlled trial

SPACE for COPD did not reduce readmission rates at 3 months above that of usual care. However, encouraging results were seen in secondary outcomes for those receiving the intervention.

Limitations to this study include recruitment constraints. Due to available resources, there was not complete coverage to recruit during peak admission periods on both sites. In addition, some inpatient stays were

The inclusion criteria were limited to patients with COPD diagnosis and grade 2 to 5 dyspnea. The follow-up period was short 3 months. The sample size was insufficient

				<p>Importantly, SPACE for COPD appears to be safe and may help prevent readmission with 30 days</p>	<p>so brief that being able to perform all research procedures within a busy, acute clinical setting was difficult.</p>	<p>t, with 78 patients. There was no mention of whether the intention-to-treat analysis was done.</p>
<p>Home intervention and predictor variables for re-hospitalization in chronic obstructive pulmonary disease exacerbations.</p>	<p>To determine, first of all, whether home follow-up of patients by a nurse and telephone support with a pulmonologist could reduce the rate of re-admittance in the 4 weeks following hospital discharge. Secondly, we aimed to determine whether at the time of hospital discharge it</p>	<p>During The study period between October 2010 and November 2011, a total of 211 patients were hospitalized due to severe COPD exacerbation. 71 included, 35 controlled group and 36 intervention group</p>	<p>Level 2 prospective non-randomized controlled study</p>	<p>Early home monitoring did not decrease the readmission rate during the first month. Older age and high PaCO₂ are factors that identify the group with a high risk for re-hospitalization.</p>	<p>Some limitations. Among these is the impossibility to randomize the patients due to the difficulties entailed in visiting patients' homes. Nevertheless, we opted for a quasi-experimental assignment as the patients were only assigned depending on the possibility of making a home visit.</p>	<p>The researchers did not analyze the conventional care provided by Primary Care teams due to the difficulty to determine this care reliably in each of the patients of the control group.</p>

is possible to determine clinical variables that could help predict re-admittance.

<p>Comprehensive care programme for patients with chronic obstructive pulmonary disease: A randomized controlled trial.</p>	<p>Assess whether a comprehensive care programme would decrease hospital readmissions and length of hospital stay (LOS) for patients with COPD</p>	<p>180 patients were recruited (IG, N=90; UG, N=90. Patients discharged from hospital after an episode of AECOPD were randomized to an intervention group (IG) or usual care group (UG).</p>	<p>Level 2 randomized controlled trial</p>	<p>A comprehensive COPD programme can reduce hospital readmissions for COPD and LOS, in addition to improving symptoms and quality of life of the patients</p>	<p>One major limitation of this study is that it was a single tertiary centre study and involved patients with severe COPD who had just experienced an episode of AECOPD.</p>	<p>There was no mention of blinding of the control group. Sample of 180 patients were insufficient and There was no generalizability of the data as it used one hospital only, Prince of Wales Hospital.</p>
<p>Outcomes after early and delayed rehabilitation for exacerbation of chronic obstructive</p>	<p>To compare the outcomes between early and delayed PR</p>	<p>Among all of the patients hospitalized owing to COPD exacerbation during the study period</p>	<p>Level 2 retrospective cohort study</p>	<p>In this national database study, early PR was associated with</p>	<p>Patients who did not receive PR were excluded. This may be limiting the</p>	<p>Retrieved data did not contain post-discharge long-term</p>

<p>pulmonary disease: A nationwide retrospective cohort study in Japan.</p>	<p>for exacerbation of COPD, using a national inpatient database.</p>	<p>(n = 45,899), we excluded those who did not receive rehabilitation, those with LOS >180 days, and those who were discharged to a place other than home. Finally, we identified 12,572 including 8459 patients with delayed PR and 4113 with early PR eligible patients during the study period. After exclusion of patients with missing data, there were 6955 patients</p>	<p>reduced 90-day readmission and shortened LOS in patients with exacerbation of COPD.</p>	<p>generalizability of the study. Because of data limitations, they could not analyze the details of the PR program and the Barthel index, one of the secondary outcomes, may not be the most appropriate measure to evaluate the effect of PR.</p>	<p>outcomes. Therefore, they cannot completely detect post-discharge readmission and deaths.</p>
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<p>Impact of a Comprehensive COPD therapeutic interchange program on 30-day readmission rates in hospitalized patients. P&T (Lawrencev</p>	<p>Evaluate the clinical and financial impact of a comprehensive therapeutic interchange program (CTIP) in</p>	<p>This study was a multi-center, electronic chart review of patients with a diagnosis of COPD admitted to two hospitals.</p>	<p>Level 2 retrospective study</p>	<p>This study demonstrates that the use of pharmacist-led CTIP of COPD inhalers does not worsen patient</p>	<p>There are several limitations to this study, which was conducted at a single health care system and was</p>	<p>The researcher relied on the use of ICD-10 codes for the diagnosis of COPD, as opposed</p>
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ille, N.J.), 44(4), 185-191

hospitalized patients with COPD. The primary outcome was a 30-day readmission rate, with the following secondary outcomes: 30-day mortality and pharmacy-inhaled medication cost per patient.

2,885 hospitalized patients with a diagnosis of COPD were included in the analysis (1,350 in the intervention group and 1,535 in the control group).

outcomes and may provide pharmacy cost savings. The cohort managed with a CTIP was statistically associated with a lower 30-day readmission rate and lower pharmacy-inhaled medication costs without any difference in 30-day mortality.

retrospective in nature.

to clinical diagnosis. An additional limitation is that patients' discharge medication lists were not evaluated to see if patients were returned to their home inhaler.

Effect of an integrated care programme on re-hospitalization of patients with chronic obstructive pulmonary disease.

To evaluate the effectiveness of an integrated care programme with two components (patient-centered education+ case management) in preventing

Data were retrieved both from an administrative database in the province of Quebec (Canada), and from the medical records at two hospitals in Montreal. One hundred and eighty-nine (189)

Level 2 retrospective study

An IC programme combining self management education and case-management can decrease rates of COPD-related hospitalizat

There are several limitations to this study, in addition to its design. Sampling was from inpatient clinics, than in the general population of COPD

Selection bias was possible, patients randomized to the intervention and UC groups were not recruited at the same hospital

	COPD-related hospitalizations, and whether this was comparable for men and women.	COPD patients were randomly selected from registers at these centers, from 2004 to 2006.		ions, particularly among women.	patients; limit the generalizability of the findings.	
Associations between physical activity and 30-day readmission risk in chronic obstructive pulmonary disease.	To examine whether or not a potentially modifiable factor such as regular physical activity at baseline was associated with lower risk of 30-day readmission in patients with chronic obstructive pulmonary disease (COPD).	The Sample included a total of 4,596 patients from a large integrated health care system with 14 medical centers located in southern California	Level 2 retrospective study	Participation in Any level of regular moderate to vigorous physical activity captured as part of routine clinical care was associated with a significantly lower risk of all-cause 30-day readmission in a large cohort of pts with COPD	There are several limitations to this study. First, study was relied on administrative and clinical records, specifically, use of the EVS, which is routinely collected by frontline clinical staff during all outpatient. Second, physical inactivity could merely be another marker of disease severity.	The cohort was drawn from an insured population within a financially aligned and integrated health system, and thus the findings may not be generalizable to patients with COPD who are uninsured or have fee-for-service public insurance.
A comprehensive care	To evaluate AECOPD admissions	Wake Forest Baptist Medical	Level 2 retrospective	A comprehensive care	Intervention was an integrative	Unlike a true randomize

plan that reduces readmissions after acute exacerbations of COPD. between 5/12/2014 to 6/28/2016. Center (WFBMC) initiated a comprehensive AECOPD care plan on May 12, 2014. A total of 1274 AECOPD index admissions were identified within the study period admissions occurring between May 12, 2014 through June 28, 2016, with inpatient/observation status and length of stay equal to or greater than one day among patients aged 40 years or older.

e study plan includes 1) transitions of care, 2) diagnosis and treatment of COPD and 3) its common co-morbidities as well as 4) hospice and palliative services that reduces readmissions after acute exacerbations of COPD.

care plan, so they were unable to determine the magnitude of specific components on respective outcomes. Limiting enrollment to only those with pre-hospitalization spirometry would introduce its own bias based on differences in the population of patients with pre-hospital spirometry and those without, thus evaluating a skewed population.

d trial, the propensity weighting method used in this study can only adjust for differences between the treatment groups of which we have knowledge. The authors chose a large number of independent variables from a diverse group of data domains (e.g. demographics, severity of illness, comorbidities, health care utilization, test results, medications, socio-economic

						<p>status, and social history) in order to decrease the likelihood that an important unmeasured variable would confound the results.</p>
<p>Effects of clinical pathways for COPD on patient, professional, and systems outcomes: A systematic review.</p>	<p>The primary aim of the review was to address the following question: What are the effects of CPWs for COPD on patient-, professional-, and systems-level outcomes?</p>	<p>The search strategy identified 497 potentially relevant titles. Of these, 13 studies were included in the review.</p>	<p>Level 1 systematic review</p>	<p>This systematic review reveals evidence to suggest that CPWs for COPD have the potential to reduce complications, readmissions, and length of stay without negatively influencing mortality or quality of life.</p>	<p>Quality of evidence was generally low. The authors therefore acknowledge that results should be interpreted with caution and note the need for additional</p>	<p>The searches were re-run in December 2017 and therefore do not end in 2015 as originally suggested. This study was not informative. It did not investigate resource use, also take into account cost of initial and maintenance implementation.</p>
<p>Reducing chronic</p>	<p>This review aims to describe</p>	<p>Insights about the economic</p>	<p>Level VII expert</p>	<p>Interventions,</p>	<p>The literature is limited to factors that</p>	<p>The 30-day readmission</p>

<p>obstructive pulmonary disease hospital readmissions. an official american thoracic society workshop report.</p>	<p>best practices and models for addressing and reducing AECOPD readmissions across diverse hospitals and health systems informed by critical stakeholders.</p>	<p>impact of COPD readmissions post HRRP based on papers published between January 2016 and August 2017 that provide insight into the economic impact of COPD readmissions in the United States.</p>	<p>opinion.</p>	<p>particularly interdisciplinary teams with bundled care, aimed at reducing readmissions were uniformly successful at improving quality of care provided and demonstrating improved process measures. However, success at reducing readmissions and cost savings based on these interventions varied across the studies.</p>	<p>lead to higher readmission risks in patients.</p>	<p>n metric may not be the most salient measure; the timeframe may need to be adjusted and additional metrics needed to show whether hospital-based interventions improve COPD care and impact patient-centered outcomes, such as mortality, patient satisfaction, adherence, self-efficacy, symptom, and exercise tolerance.</p>
<p>Interventions to reduce</p>	<p>To report the results of a</p>	<p>Multiple electronic databases</p>	<p>Level 1 Systematic</p>	<p>The evidence</p>	<p>This Systematic</p>	<p>This study did not</p>

<p>re-hospitalizations after chronic obstructive pulmonary disease exacerbations. A systematic review.</p>	<p>systematic review of randomized clinical trials evaluating interventions to reduce the re-hospitalizations after COPD exacerbation</p>	<p>were systematically searched to identify relevant studies published between January 1966 and June, 2013. Among 913 titles and abstracts screened, 5 studies (1,393 participants) met eligibility criteria.</p>	<p>review</p>	<p>base is inadequate to recommend specific interventions to reduce re-hospitalizations in this population and does not justify penalizing hospitals for high 30-day re-hospitalization rates after COPD exacerbations.</p>	<p>review has potential limitations. They may have missed some effective interventions because we restricted their review to randomized clinical trials. Another potential limitation involves availability of data.</p>	<p>include evidence from other study designs. Also, this review did not include studies that focused exclusively on pharmacological interventions, and we may have missed identifying pharmacological agents effective in reducing re-hospitalizations.</p>
<p>Outpatient Follow-up Visit and 30-Day Emergency Department Visit and Readmission in Hospitalized Patients</p>	<p>We examined the effect of early follow-up visit with patient's primary care physician (PCP) or pulmonologist</p>	<p>62 746 admissions (Medicare beneficiaries 66 years or older hospitalized for COPD) was considered for study</p>	<p>Level 2 retrospective study.</p>	<p>Continuity with patient's PCP or pulmonologist after an acute hospitalization may lower rates of ER visits</p>	<p>This study included only veterans who did not have a PCP.</p>	<p>Chronically ill patients were assigned to a PCP with no prior relationship may not translate into immediate reduction in</p>

Chronic Obstructive Pulmonary Disease.	gist following acute hospitalization on the 30-day risk of an emergency department (ER) visit and readmission	analysis. Of these admissions based on COPD-DRG, 87.6% had a COPD-related International Classification of Diseases, Ninth Revision(<i>ICD-9</i>) code (491.xx, 492.xx, and 496) listed as the primary diagnosis. Asthma (<i>ICD-9</i> code 493.xx) was listed as the primary diagnosis in an additional 11.2% of these admissions.		and readmission in patients with COPD.		hospitalizations.
Effectiveness of case management in the prevention of COPD re-admissions: a pilot study.	This pilot study investigates the use of case management to reduce re-admissions due to COPD.	This is 10 participants pilot study within the NAACL [5] was performed between 2012 and 2014 in the Dutch MC Zuiderzee hospital in Lelystad.	Level 2 pilot study.	This pilot study shows that the number of COPD hospital re-admissions decreased significantly after the introduction of a case manager. Moreover,	This pilot study with one case manager was designed as a proof of concept and included only 10 participants. The results need to be interpreted	Regression to the mean was not taken into account. Therefore, future studies should include a control group.

<p>Impact of a care pathway for COPD on adherence to guidelines and hospital readmission : A cluster randomized trial.</p>	<p>The primary aim of this study was to evaluate whether implementation of a care pathway (CP) for COPD improves the 6 months readmission rate. Secondary outcomes were the 30 days readmission rate, mortality, length of stay and adherence to guidelines.</p>	<p>Initially, 65 hospitals were eligible for inclusion. After receiving the detailed study protocol, 22 hospitals decided to participate in the study, whereof 11 hospitals (n=174 patients) were randomized to the intervention group and 11 hospitals (n=168 patients) to the control group.</p>	<p>Level 2 cluster randomized trial.</p>	<p>The implementation of this in-hospital CP for COPD exacerbation has no impact on the 6 months readmission rate, but it significantly reduces the 30 days readmission rate.</p>	<p>A weakness of the study is that 43 hospitals withdrew after randomization, which resulted in a smaller sample size than initially targeted. Limited statistical analysis and weak study design, the internal validity of results is limited.</p>	<p>An economic evaluation was not included to evaluate whether CPs also impact efficiency of care. Finally, in the context of the rising prevalence of COPD, CPs did not include transmural management and community-based treatment of COPD.</p>
				<p>there was an improvement in patient-reported health-related quality of life.</p>	<p>with caution.</p>	

Collaborative Institutional Training Initiative (CITI)



Completion Date 13-May-2020
Expiration Date 13-May-2023
Record ID 36615902

This is to certify that:

Guerline Norbrun

Has completed the following CITI Program course:

Social & Behavioral Research - Basic/Refresher (Curriculum Group)
Social & Behavioral Researchers (Course Learner Group)
1 - Basic Course (Stage)

Under requirements set by:

Liberty University

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IRB Approval letter

