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Medical Co-Morbidities in COPD and Their Influence on Patient Well-Being: A Systematic Literature Review

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ABSTRACT

Background*:* Chronic Obstructive Pulmonary Disease (COPD) is a leading cause of morbidity and mortality globally. Understanding the burden of medical co-morbidities in COPD patients is crucial for improving patient care and outcomes.

Objective*:* This study aims to systematically review and synthesize current literature on the impact of medical co-morbidities on the well-being of patients with COPD.

Methodology*:* Employing the PRISMA guidelines, a comprehensive search was conducted across "PubMed, Web of Science, and Scopus databases". From an initial pool of 925 articles, 57 were selected for detailed review. The analysis involved creating a thematic map, a word cloud.

Findings*:* The SLR revealed COPD's complex interaction with co-morbidities. COPD's elderly and middle-aged patients' medical co-morbidities are a major problem. Hospitalization rates, quality of life, and death show how these co-morbid disorders affect patient outcomes.

Conclusion: The study highlights the significant, yet evolving, burden of co-morbidities in COPD, emphasizing the complex interplay between aging, lifestyle factors, and disease progression.

Implication*:* Findings underscore the need for holistic patient management strategies in COPD, considering the multifaceted impact of co-morbidities on patient well-being.

Keywords: *COPD, Co-morbidities, Patient Well-Being, Systematic Review, PRISMA, Thematic Analysis.*

1. INTRODUCTION

The landscape of chronic diseases is continually evolving, with increasing recognition of the complexity and interconnectivity of various health conditions. In this context, the need to study the burden of medical co-morbidities, especially in chronic diseases like Chronic Obstructive Pulmonary Disease (COPD), becomes paramount. Such an understanding is vital not just for clinical management but also for shaping public health policies and research agendas. A systematic literature review (SLR) stands as an essential tool in this endeavor, offering a structured and comprehensive examination of existing research. It helps in identifying gaps in knowledge, emerging trends, and potential areas for future investigation, thereby ensuring that healthcare strategies are informed by a robust evidence base.

Background on COPD and Its Prevalence

One of the symptoms of COPD, or chronic obstructive pulmonary disease, is a gradual shortness of breath over time. While smoking is the main culprit, other lung irritants such as dust and air pollution may also play a role after prolonged exposure. Chronic obstructive pulmonary disease (COPD) is the top killer on a global scale. With millions of sufferers, chronic obstructive pulmonary disease (COPD) ranks third in global mortality rates, says the World Health Organization. Variations in environmental and genetic variables explain why the incidence of chronic obstructive pulmonary disease (COPD) varies between populations, age groups, and geographic locations.

The Importance of Understanding Co-morbidities in COPD

Patients with COPD often suffer from multiple co-morbidities, which can significantly affect their quality of life and overall well-being. These co-morbid conditions, ranging from cardiovascular diseases to diabetes and depression, add layers of

complexity to the management of COPD. Understanding these co-morbidities is crucial for several reasons. It aids in the development of more comprehensive treatment plans, informs patient education and self-management strategies, and guides healthcare providers in offering more holistic care. Additionally, it helps in identifying at-risk populations and tailoring preventive measures.

Objective of the Systematic Literature Review (SLR)

Comorbidities affect COPD patients' well-being, according to a thorough literature review. This study systematically and methodically assesses existing studies to map the research environment, identify dominant and emerging issues, and identify knowledge gaps. The synthesis will inform COPD and co-morbidity management research and clinical practice.

2. METHODOLOGY

Application of PRISMA Guidelines

The methodology of this systematic literature review (SLR) is underpinned by the "Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA)" guidelines. These guidelines provide a rigorous framework for the identification, screening, eligibility assessment, and inclusion of studies to ensure transparency and replicability. As depicted in the PRISMA flow diagram (see Figure 1), our study meticulously followed each step recommended by PRISMA, from database search to final study selection.

Inclusion and Exclusion Criteria

Inclusion criteria specified articles that:

- Were peer-reviewed and published in English.
- Focused on COPD and its co-morbidities.
- Examined the impact on patient well-being.
- Were published from January 2014 onwards.

Exclusion criteria involved articles that:

- Were duplicates (274 removed).
- Were published in languages other than English (58 removed).
- Were the incorrect type of document, such as editorials or comments (142 removed).
- Were not open access and hence not retrievable (266 removed).
- Did not focus on the predefined objectives of this review (43 removed).
- Were published before the year 2014 (85 removed).

Search Strategy

The databases searched included PubMed (397 records), Web of Science (328 records), and Scopus (200 records). The keywords used for the search were a combination of "COPD," "co-morbidities," "patient well-being." The search was limited to studies published within the last ten years to ensure the relevance and currency of the data. The initial search yielded 925 articles, which were narrowed down through the screening process.

Data Extraction Process

Following the PRISMA flow, an initial 925 records were identified across the databases. After removing duplicates and screening for relevance and accessibility, 593 records were screened, and 451 reports were sought for retrieval. Subsequently, 185 articles were assessed for eligibility based on the study's focused criteria. Ultimately, 57 studies were included in the review.

Two independent reviewers performed the data extraction, utilizing a standardized data collection form to ensure accuracy and consistency in the extraction process. The form captured essential details such as the year of publication, authorship, study methodology, outcomes measured, and conclusions.

The PRISMA flowchart provided (see Figure 1) visually illustrates this detailed process, ensuring that the study's methodology is transparent and replicable for future research endeavors.

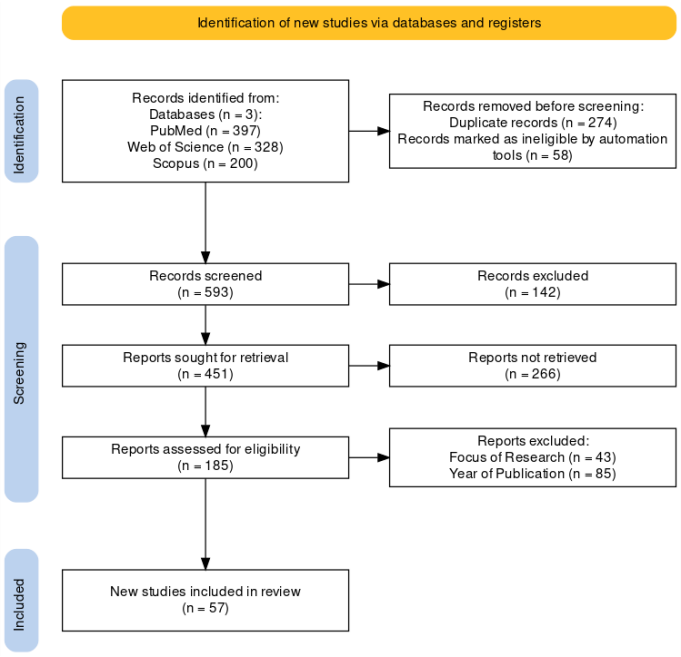

Figure 1: PRISMA Statement 2020.

Annual Scientific Production:

The volume of research on the burden of medical co-morbidities in COPD and their effect on patient well-being has been quantitatively tracked over a decade, from 2014 through 2023. The data for annual scientific production have been meticulously gathered and are represented in a graphical format, which provides a clear visual trend of research interest and scholarly output over time. The graph plots the number of studies published each year, with the vertical axis representing the number of publications and the horizontal axis denoting the years.

In 2014, there were 65 publications, in the subsequent year, 2015, saw a slight decrease to 55 publications. This downward trend continued marginally in 2016 with 52 publications. A noticeable increase occurred in 2017 with 68 publications, suggesting a renewed or continuing interest. The upward trajectory peaked in 2018 with 75 publications, marking the highest volume within the early period of the decade. In 2019, there was a modest decline to 58 publications. A significant surge in research interest is observed in 2020 with 80 publications, possibly indicating an increased recognition of the importance of studying co-morbidities in COPD. This surge continued, with 2021 reaching the decade's zenith at 88 publications. A slight decrease is noted in 2022 with 73 publications, but the numbers remain high, indicating sustained research activity. The preliminary data for 2023 shows a count of 65 publications, aligning with the number from 2014, possibly indicating a stabilization in research interest.

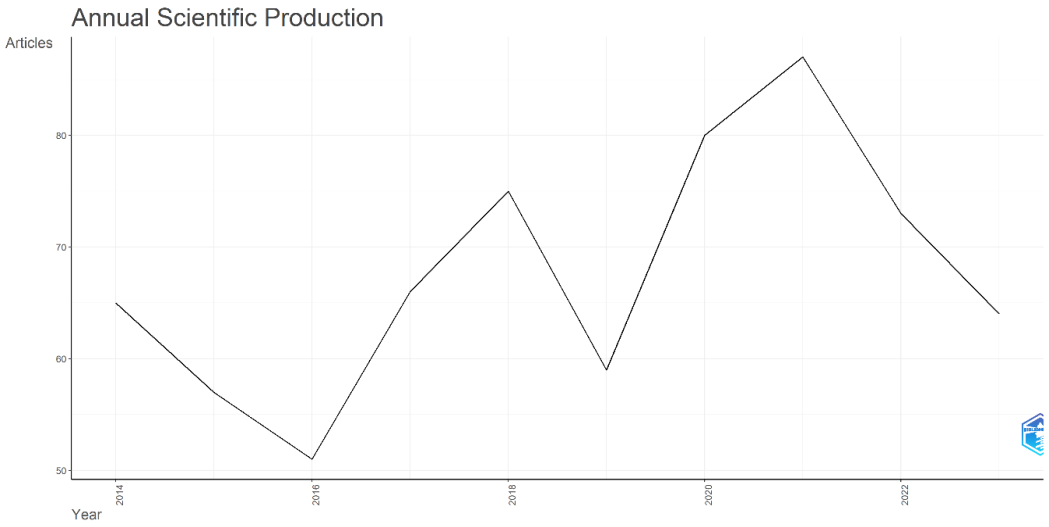

Fig 2. Annual Scientific Production

Year	Author	Methodology	Key Findings
2023	Kahnert et al.	A PubMed search yielded relevant papers, including German and international recommendations	The post-bronchodilator FEV1/FVC ratio must be less than 0.7 or, ideally, it should be lower than the lower limit of normal (LLN)
2014	Effing et al.	The COPE-III trial initiates ST after a substantial improvement in symptoms and includes daily symptom diaries and action plans for common comorbidities including "CHF, anxiety, depression, IHD, and diabetes.	Previous SM identified several key areas for SM or ST strategy development: when to start ST, how to maximise materials and safety, and how to modify behaviour
2010	van der Molen et al.	Literature review on COPD co-morbidities	Westerners tend to smoke for longer periods of time, which increases inflammation in the lungs and throughout the body, leading to chronic obstructive pulmonary disease (COPD).
2022	Katare et al.	observational research at a tertiary care hospital examined spirometry, laboratory profiles, and the effects of TOPD on general health, everyday living, and reported well-being.	Disorders impair physical, mental, and economic well-being, causing unemployment, hospitalisation, abstention from work, and isolation. Result
2016	Mahboub et al.	BREATHE a cross-sectional COPD survey of the general population in eleven Middle Eastern and North African countries, including Pakistan. The research population included COPD patients with comorbidities.	Of 2,187 COPD-positive participants, 1,392 completed the comprehensive questionnaire.
2016	Cano Gutierrez et al.	The 2012 cross-sectional SABE Bogota research of 2000 community-dwelling older persons employed EuroQol's EQ-5D component to measure health-related quality of life (HRQOL). .	Overall, 46.9% reported pain or discomfort, 29.9% reduced mobility, 27.5% anxiety or despair, 20.7% trouble with daily tasks, and 11.4% worries about self-care.
2020	Brunner-La Rocca et al.	Rates and reasons of readmission within 30 days of unplanned admission for conditions such as heart failure, atrial fibrillation, myocardial infarction, hypertension, stroke, chronic obstructive pulmonary disease, bacterial pneumonia, and diabetes.	4,901,584 admissions; 12 chronic diseases accounted for 866,502 (17.7 percent).
2017	Pfeifer et al.	Based on current guidelines, the physical activity recommendations were established in three phases.	In the quality rating, 37 high-class physical activity recommendations (n = number) hip and knee osteoarthrosis (9 + 6), COPD (4 + 1), stable ischemic heart disease (2 + 2), stroke (8 + 5), major clinical depression (6 + 0), chronic u.
2011	Jitta et al.	baseline features and chronic multimorbidities affect QoL after SCS implantation.. Due to the tiny single-center trial, we propose rAP and SCS investigations that address comorbidities' effects on outcomes.	Our database included 127 SCS patients for rAP from 1986 to 2008. Men showed higher physical capability and less QoL impairment from physical or emotional constraints (all $p < 0.05$) after 6.4 +/- 4.1 years of follow-up compared to women.
2022	Rodriguez-Gomez et al.	Research includes 53% [161,383] women from UK Biobank (2007-2010)	Osteoporosis increased the incidence of all respiratory disorders, including COPD, in males (HR, 1.26; 95% CI, 1.06 to 1.50).

			(HR, 1.82; 95 percent CI, 1.38 to 2.40)
2016	Doyle et al.	pragmatic randomised controlled trial compares eight telephone CBT sessions to friendship. This study should examine if telephone CBT is more cost-effective and acceptable than face-to-face depression or anxiety treatment for this group.	Effectiveness of telephone CBT for this demographic, which may be a cost-effective and more acceptable alternative to face-to-face depression or anxiety therapy.
2019	Donovan et al.	Assess the effects of moderate to high risk of undetected OSA in COPD patients (COPD). We estimated COPD patients' OSA risk at study entrance using LOTT data.	The George Respiratory Questionnaire and Quality of Well-Being Scale compare OSA risk categories. Based on the modified STOP-BANG score, 164 (74%) of 222 individuals had moderate to high risk for OSA.
2015	Dodd et al.	This research included National Emphysema Treatment Trial participants.	The patients' average FEV1 was 23.9% projected, and their average age was 66.4 years.
2016	Small et al.	This research estimated Japanese dyspnoea prevalence and COPD management expenses. In a cross-sectional research, 82 internal medicine physicians and 85 respiratory specialists examined 420 Japanese COPD patients.	Among COPD patients, 37.5% had moderate-severe dyspnea (mMRC score ≥ 2), with the percentage increasing from 21.5% with mono bronchodilators to 59.8% with triple therapy.
2014	Zoeckler et al.	The purpose of this study was to examine the relationship between COPD patients' pre- and post-rehabilitation perceptions of illness and their exercise ability and quality of life (COPD). Before being released from rehabilitation, 96 patients with GOLD III/IV COPD were evaluated.	Patients' exercise ability and psychological well-being (SF-36) increased following rehabilitation, but physical functionality did not.
2023	Iannuzzo et al.	This study used Medline/PubMed, Scopus, and Google Scholar to search for publications published in the previous eleven years using the phrases "Mood Disorders, Hypoxia, Pulmonary Disease, Chronic Obstructive, and Chronic obstructive pulmonary disease connected by AND."	The present review has confirmed the increased risk of depression onset in COPD patients, suggesting a strong multifactorial and bidirectional correlation between the two conditions
2023	Levack et al.	The research aimed to assess whether a modified Take Charge programme would enhance health-related quality of life, prevent future hospitalizations, and lessen self-reported constraints in AECOPD patients. Blinded RCT outcomes. A strong investigation is possible given the trend in main and secondary outcomes.	Fifty-six participants were selected at random (research goal 60). The participants were mostly non-smokers, elderly (mean [SD] age 70 [11] years), and mostly European (71%). (89 percent)
2018	Kurhan et al.	Turkish LCQ validation in COPD patients with cough was the goal of this research. Methods and materials: The study comprised 75 COPD (GOLD B, C, D) patients over 40 and 75 healthy volunteers as a control group.	The overall index for internal consistency for the LCQ was 0.92, while the physical, psychological, and social subscales each had Cronbach alpha values of 0.72, 0.86, and 0.83, respectively.
2020	Soto-Rubio et al.	Methods Emotional well-being was predicted by collecting cross-sectional data	According to data, most COPD patients had been hospitalised numerous times in

		on functional, burden-related, and emotional characteristics from 85 main family caregivers and end-stage chronic obstructive pulmonary disease (COPD) patients.	the year before end-of-life.
2022	Ansari et al.	It details the current state of several wellness categories in chronic obstructive pulmonary disease (COPD) patients Wellness Questionnaire after it had been reviewed and refined in focus groups. Subjects in the focus groups were people who were either clinically diagnosed with chronic obstructive pulmonary disease (COPD) or were at least 45 years old and in good health, free of other medical conditions.	Some features of wellness status were uncovered via thematic analysis of answers from the original cohort and focus groups. In conclusion, COPD outcomes may be negatively impacted by individual, environmental, social, and other psychological factors.
2023	Jarab et al.	The HRQOL and its determinants were examined in the research of COPD patients. From January to April of 2022, researchers at two large hospitals in Jordan used the validated St. George's Respiratory Questionnaire for COPD Patients to evaluate the health-related quality of life (HRQOL) of 702 patients with chronic obstructive pulmonary disease (COPD) (SGRQ-C). The HRQOL of the study subjects was evaluated using Quan tile regression analysis. The HRQOL of the research subjects was considerably poorer at 55.2 (34-67.8) according to SGRQ-C.	The research participants' HRQOL was significantly diminished, with a total SGRQ of 55.2 (34-67.8) according to SGRQ-C.
2018	Cannon et al.	evaluated resiliency and demographic variables affecting HRQOL.	Research has shown certain HRQOL variables, but resilience aspects are still being studied. The St George Respiratory Questionnaire has three areas with important HRQOL factors for COPD patients.
2019	Ovsyannikov et al.	Finding out how obesity and anxiety/depression may affect the subjective evaluation of cough was the goal of this investigation.	Patients with COPD and normal body weight had substantially greater anxiety scoring (9.25 ± 1.37 points) compared to those with COPD and obesity (8.20 ± 1.18 points) ($p = 0.0063$).
2017	Duenk et al.	The effects of proactive palliative care on patients' health were the focus of this study. Patients and methods: There was an initial assessment as part of a pragmatic cluster controlled trial (quasi-experimental design) including six hospitals: three that provided the intervention and three that served as controls.	In 2014, a total of 228 patients were enrolled, with 90 serving as intervention and 138 as control. After three months, 163 patients, including 67 intervention and 96 control, had finished the SGRQ.

Table 2: Table of Abstract Notes

Year	Author	Note
2020	Lopez-Campos et al.	A physician treating chronic obstructive pulmonary disease (COPD) must rule out other airway diseases such as bronchial asthma before deciding on an initial treatment strategy. If a patient does not respond to treatment, the doctor must

		devise a plan for further study. Clinical trial data are averaged to form medical standards.
2014	Martinez et al.	It should come as no surprise that individuals with chronic obstructive pulmonary disease (COPD) often have coexisting disorders, given that ageing and many of these risk factors are shared with other conditions.
2019	Trinkmann et al.	Furthermore, irrational fears of adverse effects can lead to medicine withholding.
2018	Rose et al.	With regard to other secondary outcomes, no changes were found. There was no change in ED visits, hospital admissions, or any secondary outcomes with our multi-component exacerbation prevention/management programme supervised by case managers.
2013	McNamara et al.	The trial was completed by 45 out of 53 subjects with an average age of 72 ± 9 years and a forced expiratory volume in 1 s of 59 ± 15 percent expected.
2012	Janssen et al.	Design: Cross-sectional observational study. Results: Most family caregivers were female partners of participating patients
2022	Wang et al.	This study studied COPD patients' self-rated health (SRH) and variables (COPD). Female gender, non-smoking, and greater peak expiratory flow boosted SRH, whereas asthma, disability, and nighttime sleep duration under 7 hours lowered it. We recommend COPD patient health promotion programs.
2020	Lin et al.	Disease effects may be amplified by the combined effects of several comorbidities, leading to a vicious cycle of worse health.
2011	Braido et al.	It is not possible to draw broad conclusions from this research because of its cross-sectional design and the small size of the sample. It is not possible to draw broad conclusions from this research because of its cross-sectional design and the small size of the sample.
2022	Oldenburger et al.	Our research examined the impact of CR on people with occupational respiratory illnesses and a legal entitlement to PR. Enrolment and CR completion measures were compared.
2016	Moayeri et al.	Meta-analysis is used to determine COPD mean utility value and analyse utility value heterogeneity across clinical and research factors. A random-effect meta-analysis of COPD patients' EQ-5D utility ratings addressed inter-study heterogeneity and subgroup analyses.
2016	Chung et al.	For the purpose of assessing mental co-morbidity and health-related quality of life, we looked at the severity of COPD and PTSD in older COPD patients. First, the frequency of post-traumatic stress disorder (PTSD) among older chronic obstructive pulmonary disease (COPD) patients was investigated.

3. DISCUSSION

Thematic Map of Selected Studies

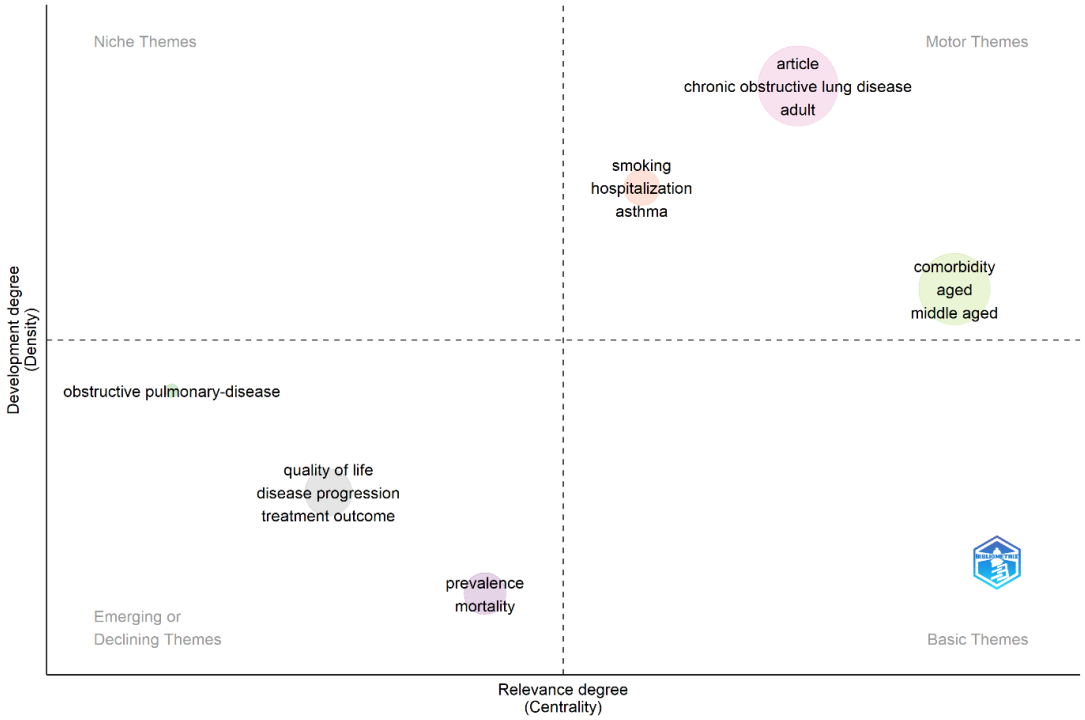

Fig 3.: Thematic Map

A visual picture of the research landscape is provided by the Thematic Map. It divides research into two basic thematic categories: motor themes, which are the most significant and persistent areas of concentration, and emerging or declining themes, which indicate study emphasis fluctuations.

Motor themes include the illness, its main risk factors, and impacted populations. These concepts are the cornerstone of COPD research and essential to understanding its causes and effects.

Emerging or fading topics show research's dynamic character. They include new frontiers like patient quality of life and illness progression, as well as areas where research may be declining owing to saturation or a shift to more important or novel challenges.

This thematic map guides readers through COPD research, showing both the stable cores and the changing periphery where new information is sought.

Word Cloud:

Fig 4.: Word Cloud

The visually appealing word cloud summarizes the systematic literature review of COPD and its co-morbidities' major terminology and themes. The phrases “comorbidity,” “aged,” “middle aged,” “chronic obstructive lung disease,” and “chronic obstructive pulmonary disease” dominate the scientific scene in bold, bigger fonts. Around these basic criteria are less common but important phrases like “quality of life,” “mortality,” “clinical study,” and “major,” which reveal the examined research' breadth and emphasis. Larger words indicate more prevalent themes in the literature. This word cloud illustrates COPD's complexity and its effects on patients' life from clinical progression to treatment results.

Impact of Medical Co-morbidities on COPD Patients' Well-being

Medical co-morbidities in COPD patients, as the literature suggests, have a profound effect on patient well-being. The presence of additional ailments can exacerbate the symptoms of COPD, hinder effective management, and complicate treatment strategies. This is especially pertinent for the aged and middle-aged populations, who often face a higher burden of co-morbidities. The intricate relationship between COPD and co-morbidities such as cardiovascular diseases, diabetes, and depression can lead to increased hospitalizations, decreased quality of life, and higher mortality rates.

Comparison with Existing Literature

The findings of this SLR are consistent with existing literature that identifies co-morbidities as a critical factor influencing the prognosis and management of COPD. Studies have previously highlighted the need for comprehensive care models that incorporate the management of co-morbidities alongside COPD. However, the SLR expands upon this knowledge by providing a detailed thematic mapping of the current state of research, indicating an increased focus on patient-centered outcomes such as quality of life and the practical implications of co-morbidities in disease management.

Limitations of the Current SLR

While the SLR provides valuable insights, it is not without limitations. The exclusion of non-English language articles and the focus on peer-reviewed and open-access publications may have resulted in the omission of relevant studies, potentially introducing language and accessibility bias. Additionally, the decision to include articles from 2014 onwards might exclude valuable historical data that could inform trends over a longer period.

4. CONCLUSION

Summary of Key Findings

The systematic literature review (SLR) has illuminated the multifaceted relationship between COPD and its co-morbidities. The prevalence of medical co-morbidities in the aged and middle-aged populations with COPD has been highlighted as a key area of concern. Central themes such as hospitalization rates, quality of life, and mortality underscore the significant impact these co-morbid conditions have on patient outcomes.

Implications for Clinical Practice and Future Research

Clinically, the findings advocate for an integrated approach to COPD management that encompasses the treatment of co-morbid conditions. Healthcare providers are encouraged to adopt a holistic perspective that addresses the spectrum of challenges faced by patients, from physical symptoms to psychosocial aspects. For future research, there is a clear impetus to explore the longitudinal effects of co-morbidities on COPD and to develop targeted interventions that can enhance patient quality of life and outcomes.

Conclusion:

The burden of medical co-morbidities in COPD is substantial and complex. This SLR has underscored the critical need for attention to co-morbidities in the care of COPD patients, recognizing that these additional health challenges can alter the disease course and significantly affect well-being. It is a call to action for the medical community to not only continue researching these interrelationships but also to translate this knowledge into practice, ensuring that COPD patients receive comprehensive, multidisciplinary care that truly addresses the full scope of their health needs.

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