The Role and Scope of Practice of Nurse Practitioners in the Care of Adults with Chronic Respiratory Diseases in Primary Health Care – A Scoping Review

Master's thesis
CARING SCIENCE
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ABSTRACT

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Master's thesis CARING SCIENCE	The role and scope of practice of nurse practitioners in the care of adults with chronic respiratory diseases in primary health care
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Globally, chronic respiratory diseases pose a significant burden on people's health and primary healthcare systems. In primary healthcare, nurse practitioners have become essential health care professionals in the management of chronic diseases. The aim of this scoping review was to explore the nurse practitioners' role and scope of practice in the care of adults with chronic respiratory diseases in primary health care settings in a global context with a review question of what the roles and scope of practice of nurse practitioners in the care of adult patients with chronic respiratory diseases in primary health care are. A scoping review methodology was utilized in this study. The scoping review identified seven relevant studies published in English between January 2010 and March 2023 through a comprehensive search of databases CINAHL, PubMed, JBI Ebp, Medline, Cochrane Library, and Google Scholar.

Studies focusing on nurse practitioners in primary healthcare, chronic respiratory diseases in the adult population, and the role and scope of practice of nurse practitioners in the treatment of these conditions were all included in the inclusion criteria. The included studies were summarized based on their relevancy to the scoping review question. The major results obtained from the studies were: 1) Nurse practitioners' role as a provider of clinical care, 2) Nurse practitioners' role as a collaborator, 3) Nurse practitioners' role as a prescriber, and 4) Nurse practitioners' role in non-pharmacological management and patient education. In conclusion, nurse practitioners working in primary health care play a critical role in the management of chronic respiratory diseases. The role and scope of practice of NPs go beyond those of registered nurses and include coordination of services, holistic care, and prescription authority. This scoping review highlights the need to better understand the role and scope of practice of NPs in the care of adults with chronic respiratory diseases in primary health care settings.

Foreword

I would like to express my sincere gratitude to Åbo Akademi University for giving me the opportunity to study Master's Degree of Advanced Practice Nursing. This journey I have embarked upon to be an advanced practice nurse in Finland transitioning from a registered nurse with master's degree from university of applied science has not been an easy and ordinary one. The whole process demanded time, energy, and sacrifice, pushing the boundaries of my knowledge and endurance. I have overcome countless obstacles, faced moments of self-doubt, and navigated through the depths of uncertainty. Yet, I am inspired by many of my university professors and supervisors who serve as role models for me in the development of APN practices in primary healthcare in my home country Nepal. While completing this master's thesis, I have not received any financial grants or scholarships.

I would like to say thank you to my first thesis supervisor Johanna Heikkilä, along with another supervisor Heli Vaartio-Rajalin for their unwavering support, guidance, and mentorship throughout the thesis writing process. Their expertise, encouragement, and feedback have been invaluable in shaping this thesis and my research skills. I would also like to sincerely thank my dearest classmates, sisters, and friends for their support. They inspired me, were patient with me when I missed all social gatherings, and never wavered in their emotional support during this study period. Lastly, I would like to say thank you to everyone for the encouragement and support throughout these years whom I met in this APN student journey.

Binu Acharya

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12.06.2023

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1 Introduction

Chronic respiratory diseases (CRDs) are defined as long-term respiratory conditions that affect the lungs and airways resulting in symptoms such as wheezing, shortness of breath, dyspnea, coughing phlegm, and breathlessness. CRDs are characterized by airflow limitation, bronchospasm, and airway hyper responsiveness, and are not entirely treatable (Global Initiative for Chronic Obstructive Lung Disease [GOLD], 2021; Public Health Ontario [PHO], 2023; World Health Organization [WHO], 2021). CRDs are a significant cause of death and disability worldwide among the adult population (Burney et al., 2015). They are estimated to be the third most common cause of death globally, affecting more than twelve million adults by the year 2030 (Global Initiative for Chronic Obstructive Lung Disease [GOLD], 2020). The primary risk factors for CRDs include smoking, tobacco use, indoor and outdoor air pollution, occupational toxins, and dust (World Health Organization [WHO], 2022). Respiratory allergies, interstitial, occupational lung diseases, sleep apnea, pulmonary hypertension, asthma, and chronic obstructive pulmonary disease (COPD) are major chronic respiratory diseases (GOLD, 2021; Navarro-Torné et al., 2015; WHO, 2021). Among these, asthma and COPD are the most prevalent forms of respiratory disease among adults and contribute to the majority of morbidity and mortality (Bachmann et al., 2018; Navarro-Torné et al., 2015); they have a negative influence on the quality of life of a person (Viegi et al., 2020).

The management of chronic respiratory diseases requires complex care, particularly in primary health care settings. By enhancing access to care and providing treatment at the primary care level, adult patients' hospitalizations and mortality from chronic respiratory disease can be significantly decreased (Viegi et al., 2020). Nurse practitioners (NPs) are crucial in the management of chronic respiratory diseases given their position at the forefront of primary health care (Mileski et al., 2020). In primary care settings, health promotion, and disease prevention are also essential strategies for managing the health needs of the population (McIlfatrick et al., 2014). NPs are found to meet these increasing needs and demands of preventive and promotive health care (Donald et al., 2013).

However, the current burden of CRDs globally, coupled with an increasing number of pulmonary patients, have created an emerging gap in care delivery at the primary level due to the shortage of health care professionals and an under-resourced health care system (Global Initiative for Chronic Obstructive

Lung Disease [GOLD], 2022). Utilizing nurse practitioners with advanced skills, knowledge, competence, and scope of practice could be an innovative and cost-effective solution to solving the gaps in care delivery in primary health care (Briggs et al., 2018).

Internationally, many scholars have already explored and defined advanced practice nursing, but there are still no clear perspectives on titles, roles, the range of practice, education, and legislation on the implementation of advanced practice nursing practices in countries where advanced practice nursing practices are implemented or in the process of implementation (Maier & Aiken, 2016; Wheeler et al., 2022). The International Council of Nurses captures the global perspective of advanced practice nurses' and Nurse practitioners' by providing definitions and characteristics globally (Schober et al., 2020). However, there is a lack of published literature on the role and scope of nurse practitioner in the care of adults with chronic respiratory diseases in primary health care settings. Hence, there is a need to study this topic further in the primary care context.

Therefore, this scoping review aims to provide a comprehensive understanding of the current evidence regarding the roles and scope of practice of nurse practitioners in the care of adults with chronic respiratory diseases in primary health care. The review will identify, and map the existing literature on this topic, synthesize the evidence, and highlight research gaps. By doing so, this review will provide valuable insights into NPs' role and scope of practice in primary health care, and how they provide care to the adult patients with chronic respiratory disease in the primary health care settings.

2 Background

The background section of this scoping review describes a comprehensive overview of advanced practice nursing and the various terminologies used to describe nurse practitioners in real practice followed by a detailed exploration of roles, responsibilties and scope of practice associated with nurse practitioners' in primary health care settings.

2.1 Advanced practice nursing

The historical development of advanced practice nursing (APN) began in the United States in 1960, it then spread to other countries such as Canada, Australia, and the UK (Savrin, 2009). The Nursing and Midwifery Board of Ireland (NMBI) defines advanced practice nursing as "a career pathway for registered nurse, commited to professional development and clinical supervision, to practice at a higher level of capability as independent, autonomous and expert practitioners" (Nursing and Midwifery Board of Ireland [NMBI], 2017). Advanced practice nursing stands for advanced nursing initiatives, which have an impact on the clinical outcomes of health care for people, families, and other communities. The foundation of advanced practice nursing is rooted in the advanced education i.e, a graduate degree or a postgraduate degree obtained by registered nurses (Alexandrov et al., 2019; International Council of Nurses [ICN], 2020).

Utilization of advanced practice nursing roles could play a major part in improving different aspects of health care services provided at different levels. Advanced practice nursing roles are viewed as important in delivering high-quality patient-centered care from the patients perspective. In primary health care, these roles can improve the access to quality care, reduce emergency visits, prevent unnecessary hospitalization, promote preventive health measures and improve management of chronic disease (Htay & Whitehead, 2021; Rutchanagul & Sangnimitchaikul, 2020; Schober et al., 2020). However, from the health care organization viewpoint, APNs are utilized in such areas where physician shortage is prevalent (Htay & Whitehead, 2021).

Under the umbrella term advanced practice nursing roles, there are four commonly accepted roles: clinical nurse specialist, nurse practitioner, nurse midwife and nurse anesthetist (Alexandrov et al., 2019; ICN, 2020). The nurse practitioner is one commonly identified role of advanced practice nursing role

among others (ICN, 2020; King et al., 2012) and in this scoping review, the focus will be on nurse practitioners' role and scope of practice.

2.2 Description on nurse practitioner

The International Council of Nurses describes an NP/APN as "a registered nurse who has an expert knowledge base, complex decision-making skills, and clinical competencies for expanded practice, the characteristics of which are shaped by the context and/or the country in which s/he is credentialed to practice". A master's degree is recommended for entry-level for advanced practice nursing roles (Alexandrov et al., 2019, p. 39; International Council of Nurses [ICN], 2018). "An NP is an advanced practitioner who integrates clinical knowledge and skills associated with nursing and medicine to assess, diagnose, and manage patients in primary healthcare" (Schober et al., 2020, p. 6). NPs are advanced practice registered nurses (APRNs) who provide comprehensive healthcare services to patients across their lifespans. They have additional clinical training and advanced study beyond their initial nursing education. The American Association of Nurse Practitioners also states that NPs can "assess, diagnose, treat patients, order and interpret diagnostic tests, prescribe medications, and initiate and manage treatment plans, including prescribing or recommending non-pharmacological therapies" (American Association of Nurse Practitioners [AANP], 2021).

3 Conceptual Framework

The essential concepts associated with the thesis topic will be defined and discussed in this section of the scoping review. The concepts here include NPs' roles, their scope of practice, and the respiratory patient care in the primary health care settings.

3.1 Nurse practitioner role

The NPs' role was first introduced in the United States in 1965 as part of a public health initiative to provide primary healthcare to children who did not have access to it. At the time, the role was based on a person-centered, holistic approach to care with the addition of diagnostic, therapeutic, and managerial duties previously reserved for doctors. Later, other countries such as Canada, the UK, and Australia introduced NP roles (ICN, 2020; Maier et al., 2017). In Norway, the NPs' roles are developed to expand access to care due to an anticipated shortage of physicians, and their roles have been adopted as an alternative or improvement to the care provided by medical professionals (Holm Hansen et al., 2020). NPs bring a holistic perspective to healthcare services through their clinical expertise in disease prevention and health management (AANP, 2021; King et al., 2012; Nursing and Midwifery board of Ireland, 2017; Nursing and Midwifery Board of Australia [NMBA], 2021).

Roles are the specific duties and responsibilities that NPs are trained to perform (Canadian Nurse Association [CNA], 2010; ICN 2020; NMBI, 2017). As the NPs' role extends beyond the usual scope of nursing practice, their general roles are listed here as a baseline role for the conduction of this scoping review. The NPs roles within the scope of practice listed here are:

1. Advanced clinical assessment of patients
2. Ordering and interpretation of diagnostic test including diagnostic imaging
3. Preparation of comprehensive care plan
4. Prescribing pharmacological and non-pharmacological interventions
5. Implementation of the care plan, monitor and follow up.
6. Initiate appropriate referrals, care priorities.
7. Communication between patients, family, and other health care providers
8. Collaboration, research development, evidence-based practice.

NPs are trained to provide both primary and specialty care in a variety of health care settings, including hospitals, clinics, private practices, and community health centers. Their roles and responsibilities may vary depending on the area of specialization in which they practice. The examination, diagnosis, and treatment of both acute and chronic disorders are all part of the comprehensive health care services that NPs are trained to offer. In the United States, depending on the state's regulation and NPs' level of experience and expertise, NPs increase access to care and reduce health care costs (American Association of Nurse Practitioners [AANP], 2020; American Association of Nurse Practitioners [AANP], 2021). In addition to their clinical roles and responsibilities, they function as the advocates for patients, interdisciplinary consultants, and health care researchers (American Association of Nurse Practitioners [AANP], 2022b; Nursing and Midwifery Board of Australia, 2021).

NPs' roles have been developing in the sphere of chronic disease under specialties such as cardiovascular, respiratory, diabetes, mental health care, and gerontological care in primary care or general practice (Boman et al., 2019a). In such specialty care settings, NPs work alongside physicians and other health care providers to provide specialized care to patients with specific health conditions such as chronic heart failure, diabetes, or hypertension. Their role is to provide pre-and post-operative care, manage medications, and provide education to patients and families on the treatment plan (AANP, 2021).

NPs in primary health care can prescribe medicine within their scope of practice in various countries. According to Maier (2019), the United States, the United Kingdom, Canada, Australia, and Ireland, NPs have full prescription authority. In these nations, NPs are qualified to prescribe drugs as part of their scope of practice since they have completed advanced education and training in pharmacology. By the year 2019, thirteen nations in Europe have nurse prescribing legislation, twelve of which are applicable on a national level (Cyprus, Denmark, Estonia, Finland, France, Ireland, Netherlands, Norway, Poland, Spain, Sweden, United Kingdom, and one that only applies locally to the Canton Vaud (Switzerland). The scope of prescribing authority varies among these countries, with some allowing NPs to prescribe nearly all medicines within their specialties, while others limit the set of medicines that can be prescribed. All countries have established regulatory and educational requirements to ensure patient safety, with most requiring physician oversight in some form (Maier, 2019). NPs in Singapore do not have authority to prescribe, and they need doctors to approve the proposed prescriptions at the end of APN consultations (Woo et al., 2019). In Norway too, NPs must consult with physician before prescribing or they work only upon the delegation from a general physician (Holm Hansen et al., 2020).

3.2 Nurse practitioner scope of practice

The scope of practice are the full range of activities that healthcare professionals are authorized to perform within their profession, as established through legislated definitions of nursing practice, standard guidelines, and policy positions issued by professional nursing bodies (Canadian Nursing Association [CNA], 2010). Based on the level of education, training, and experience, the scope of practice of all health care professionals are influenced by the wider environment and specific care settings. The health care professionals are legally authorized to perform their duties (NMBI, 2017).

The scope of practice of NPs describe the "who," "what," "where," "when," "why," and "how" of the NPs' practice. It includes the range of clinical activities, functions, and responsibilities that NPs are authorized to perform within the legal and regulatory framework of their country or jurisdiction (Australian College of Nurse Practitioners [ACNP], 2021; Wiesen, 2021). Hence, the scope of practice defines the roles and responsibilities of NPs and outlines the activities they are permitted to engage based on their level of education, training, and certification (Australian College of Nurse Practitioners, 2021).

NPs' clinical care activities such as health assessment, diagnosis and treatment, patient education, collaboration, and referral to other health care providers are within their scope of practice. These aspects of the NPs' work are marked within the law, ethics, and professionalism as well as the knowledge, abilities, and skills necessary to carry out safely and efficiently (Alexandrov et al., 2019, p. 27). The skills, knowledge and competencies offer a holistic approach to patient care (Schlunegger et al., 2021). These competencies of NPs' are directly tied to their scope of practice and roles. NPs develop competencies through their education and training as they are guided by the scope of practice that is defined by the jurisdiction in which they practice. Competencies are the knowledge, skills, and abilities that NPs require to successfully carry out their tasks and obligations. So, the NPs' scope of practice and competencies enable them to promote the care approach, educate, empower, and counsel the patient and families in direct clinical care with a focus on health promotion and disease prevention while diagnosing, treating, and managing both acute and chronic conditions (AANP, 2022b; AANP, 2022c).

3.3 Respiratory patient care in primary health care

NPs are increasingly being utilized in primary health care settings to address the growing burden of chronic disease conditions and aging populations (Boman et al., 2019b; Craswell & Dwyer, 2019;

Laurant et al., 2018). In the US, 88% of licensed NPs are educated and trained in primary health care, and 70% are clinically practicing to provide primary care services (American Association of Nurse Practitioners [AANP], 2022a). Primary health care is often the first point of contact for patients with chronic diseases (Grant et al., 2017; Poghosyan et al., 2018), and requires a high level of care coordination among health care professionals in implementation of various clinical interventions (World Health Organization [WHO], 2018). Shorter hospital stays of patients also results in early discharge from the hospital causing higher demands on the primary health care system (Maier et al., 2017). NPs are playing a key role in primary health care spectrum working with interdisciplinary teams to enhance the health care resources and provide better access to patients (Grant et al., 2017).

World Health Organization defines Primary Healthcare (PHC) as "a whole-of-society approach to health that aims at guaranteeing the best possible level of health and well-being and their fair distribution by focusing on peoples' needs and as early as possible along the continuum from health promotion and disease prevention to treatment, rehabilitation, and palliative care, and as close as feasible to peoples' daily environments" (WHO, 2021a). Their principle of primary health care accentuate the importance of accessibility, public engagement, health promotion, technology, and intersectoral collaboration in establishing a robust relationship between nurse practitioners and primary health care (Adams et al., 2017).

As the NPs are set out to be the primary care provider in the primary health care context, NPs have a varied role within their scope of practice, which includes physical health assessment, diagnosis, ordering diagnostic tests, prescribing medicines or therapeutic interventions, teaching, consultations and counseling patients (Barratt & Thomas, 2018; Doody et al., 2022; Winger et al., 2020). NPs' crucial role in providing holistic, comprehensive, and collaborative care are often discussed in the literature (Melnyk et al., 2014; Kaasalainen et al., 2015; Woo et al., 2017). They offer a patient-centered approach to nursing care that promotes health and disease prevention (NMBI, 2017; World Health Organization [WHO], 2022) where a comprehensive primary healthcare remains a common focus with the foundation for practice that continues to be based on nursing principles (ICN, 2020).

In the context of CRDs in primary health care, according to AANP (2022), COPD prevalence and disease burden are expected to increase. Care for COPD patients are provided by physician, physician assistants, and NPs however the COPD care are reported to be under or undiagnosed. Reported reasons for the gaps

in care include limited awareness of COPD guidelines, time constraints, and lack of easy access to care and ability to interpret results of spirometry testing (Yawn et al., 2016). Pharmacological treatments are available but there are still challenges in the proper management of COPD (Spencer & Hanania, 2013). A notable problem is in poor patient adherence to therapy because of worries about adverse effects. NPs are in a good position to inform patients on the efficacy and safety of COPD drugs as well as to spot any potential side effects. NPs can significantly influence patient outcomes and adherence by educating patients and assisting them in understanding the relative benefits and hazards of various treatments targeted to CRDs. Patients visiting to NPs receive recommended smoking cessation counseling and health education (Kurtzman & Barnow, 2017). By helping patients to understand the balance of benefits and risks of treatment as well as modifiable risk factors of CRDs, NPs improve treatment adherence and patient outcomes in COPD care in primary health care (Spencer & Hanania, 2013). In primary care, NPs rountinely evaluates symptoms, follows up with pulmonary function tests and modifies treatment regimens as needed for the patients (Smith et al., 2021).

In conclusion, NPs are becoming a rapidly rising profession in primary health care (Holm Hansen et al., 2020), and their roles and scopes of practice are constantly evolving to meet the care needs of the population with long term complex diseases (Ljungbeck & Sjögren, 2017). While the number of chronic respiratory patients are increasing in the primary health care, these patient need advanced nursing care as well as they need long-term management and monitoring (Poghosyan et al., 2022). The early diagnosis, treatment, education, management of chronic respiratory disease are particularly important (Sun, 2020). In managing chronic respiratory diseases, NPs' scope of practice could encompasses diagnosis, prescription, patient monitoring, continuing assessment of therapy efficacy, and treatment change as needed in primary health care. They work together emphasizing the holistic wellbeing, promote health, prevent disease and encourage healthy behavior (Judge-Ellish & wilson, 2017; Meyer & O'Brien-Pallas 2010; Maijala et al., 2015) among the patients.

4 Aim and Research Question

This scoping review aims to explore the nurse practitioners' role and scope of practice in the care of adults with chronic respiratory diseases in primary healthcare in a global context. The research question is listed below.

1. What are the roles and scope of practice of nurse practitioners in the care of adult patients with chronic respiratory diseases in primary healthcare?

5 Methodology

The scoping review methodology comprehensively assesses the existing literature pertinent to the research topic. It highlights the knowledge gaps and provides recommendations for future research and policy (Pollock et al., 2021). Utilizing a scoping review has the benefit of addressing a larger research subject as it includes studies that reflect a range of research designs and gray literature compared to systematic reviews (Arksey & O'Malley, 2005). This scoping review follows the Joanna Briggs Institute (JBI) approach, as it is to date, the most rigorous and defined methodology for conducting a scoping review. The JBI approach are based on the expansion work of Arksey and O'Malley (2005) and Levac et al. (2010) guidelines for conducting a scoping review.

A scoping review offers a systematic synthesis in a particular field based on an exploratory research topic to map significant ideas, support data, and research gaps (Tricco et al., 2018; Peters et al., 2020). The quality of the research is not the main emphasis of the evaluation because scoping reviews are valuable for summarizing and describing data from a wider range of fields, disciplines and for finding out the gaps in literature (Colquhoun et al., 2014). The concept explanation and definitions are clarified to enhance the quality and understanding of the scoping review (Pollock et al., 2021). The sequential stages of this scoping review process are 1. developing research questions, 2. identifying potentially relevant studies, 3. selecting relevant studies, 4. data extraction and charting of the results, 5. summarizing and presenting the findings (Pollock et al., 2021) which are described below.

5.1 Developing research questions

When formulating a review question, the PCC mnemonic, which described the Population, Concept, and Context (Peters et al., 2020) is used in the scoping review. The aim indicated what the author seeks to accomplish through the study and there was a direct relationship between the review question and the aim of the study (Pollock et al., 2021). The following Table 1 shows the aim and the development of the review question of this scoping review.

Table 1

Aim and Development of Review Question

Study Title	Aim	Review Question	Population/Participants	Concept	Context
The role and scope of practice of nurse practitioners in the care of adults with chronic respiratory diseases in primary health care – a scoping review	to explore the nurse practitioner 's roles and scope of practice in the care of adults with chronic respiratory diseases in primary care in a global context.	What are the roles and scope of practice of NPs in the care of adults with chronic respiratory diseases in primary health care?	adults with chronic respiratory disease adult patients over 19 years of age (adults > 19 years of age) Note: Chronic respiratory disease broadly includes asthma, COPD, sleep apnea, sarcoidosis, bronchiectasis, and other occupational lung diseases.	APN/NP Roles and Scope of practice Literature on PHC settings	Primary Health Care

As the review question was guided by the PCC mnemonic, a well-defined review question and the inclusion criteria further provided the foundation for developing an information search strategy. A complete understanding of the review question and what information is needed to address the review question should be in mind before starting a data search (Aromataris & Riitano, 2014).

5.2 Identifying potentially relevant studies

Once the research question was formulated, the next step was the identification of relevant studies and gray literature. The data search was done by the author alone initially in the month of January 2023 to the first week of February 2023 after the research plan was approved. It was done to check what kind of resources were available in the databases and what kind of index terms or keywords have been used about the scoping review theme including abstracts. The final data search to identify the potential relevant studies was repeated again in the last two weeks of February 2023.

A range of multiple databases were looked to gather a vast pool of evidence (Pollock et al., 2021) such as Cumulative Index to Nursing and Allied Health Literature (CINAHL), Medline, PubMed, Joanna Briggs Institute JBI Ebp, and Cochrane Library Databases. The search query was created by exploding the subject headings and Medical subject heading (Mesh) terms. The example of key search words with subject heading used for Cinahl database were “Advanced Practice Nurses” OR “Advanced Nursing Practice” AND “Pulmonary Disease”, OR “Chronic Obstructive” OR “Lung Disease” AND “Scope of Practice” OR “Scope of Nursing Practice” OR “Professional Role” AND “Primary Health Care” OR “Community Health centers” OR “Tertiary Health care”. The other key search string used for Pubmed was (((advanced practice nurse OR advanced practice nursing OR nurse practitioners) AND (roles OR scope of practice)) AND (chronic respiratory disease OR lung disease OR COPD OR Asthma)) AND (primary healthcare OR primary care OR community health center OR Community care).

Database search using the Mesh terms resulted in very few numbers of actual search results. Additional studies were located through Google Scholar and citation search. Publications related to the nurse practitioner, primary health care, chronic respiratory disease, and disease management written in the English language published during 01/01/2010-05/03/2023 were observed in the search results. A gray literature search was also done. Gray literatures are a broad spectrum of studies and materials that have been produced outside of the traditional channels for academic publishing and distribution. Despite the fact that these are unpublished or unofficially published reports that have not undergone a peer review process, the information they contain is still useful to researchers. Reports, conference materials, clinical trials are a few of them (Tampere University Library, 2023). The guidelines of the Canadian Agency for Drugs and Technologies in Health approach were also checked for the retrieval of gray literature but no relevant reports were found on nurse practitioner roles and scope of practice in primary health care. The other gray literature search was done by searching through website agencies and national policies webpages as well as public health sites such as Current Care Guidelines on chronic respiratory diseases. The search did not yield results on the NPs’ role and scope of practice rather than respiratory disease pathophysiology and management of such.

5.3 Selecting relevant studies

This step involved selection of relevant studies to be included in the scoping review. A total number of (n=60) studies were obtained from database search in CINAHL, Medline, PubMed, JBI Ebp, and

Cochrane Library Database. A total of (n=11) studies were identified form Google Scholar search in the final search. The number of duplicated records based on the title was (n=7) and were removed. The records via database search were then subjected to general title and abstract screening as a first-level screening. Then the relevant records were retained for full-text review in second-level testing in the process of data screening (Peters et al., 2015).

The level one testing was the title and abstract screening where a total of 53 records were screened based on the title and abstract. The inclusion criteria included publications related to APN/NP, Primary Health Care, Scope of practice, roles, chronic respiratory disease, and adult population as well as publications published in English within the time range of 1/1/2010-05/03/2023 regardless of the geographical location. Studies included in the scoping review could be a primary study or qualitative, quantitative, systematic, mixed, or integrative literature review or gray literature. After checking the inclusion exclusion criteria, (n=44) records were removed after reading the titles and abstract for not fulfilling the inclusion criteria. There should be a rationale for exclusion criteria (Tricco et al., 2018). Commentaries, discussion papers, and editorials were excluded. Other exclusion criteria included the studies dealing with pediatric patients and the studies conducted in a hospital or specialized care setting. These similar inclusion and exclusion criteria were applied to both title and abstract and the full text review process.

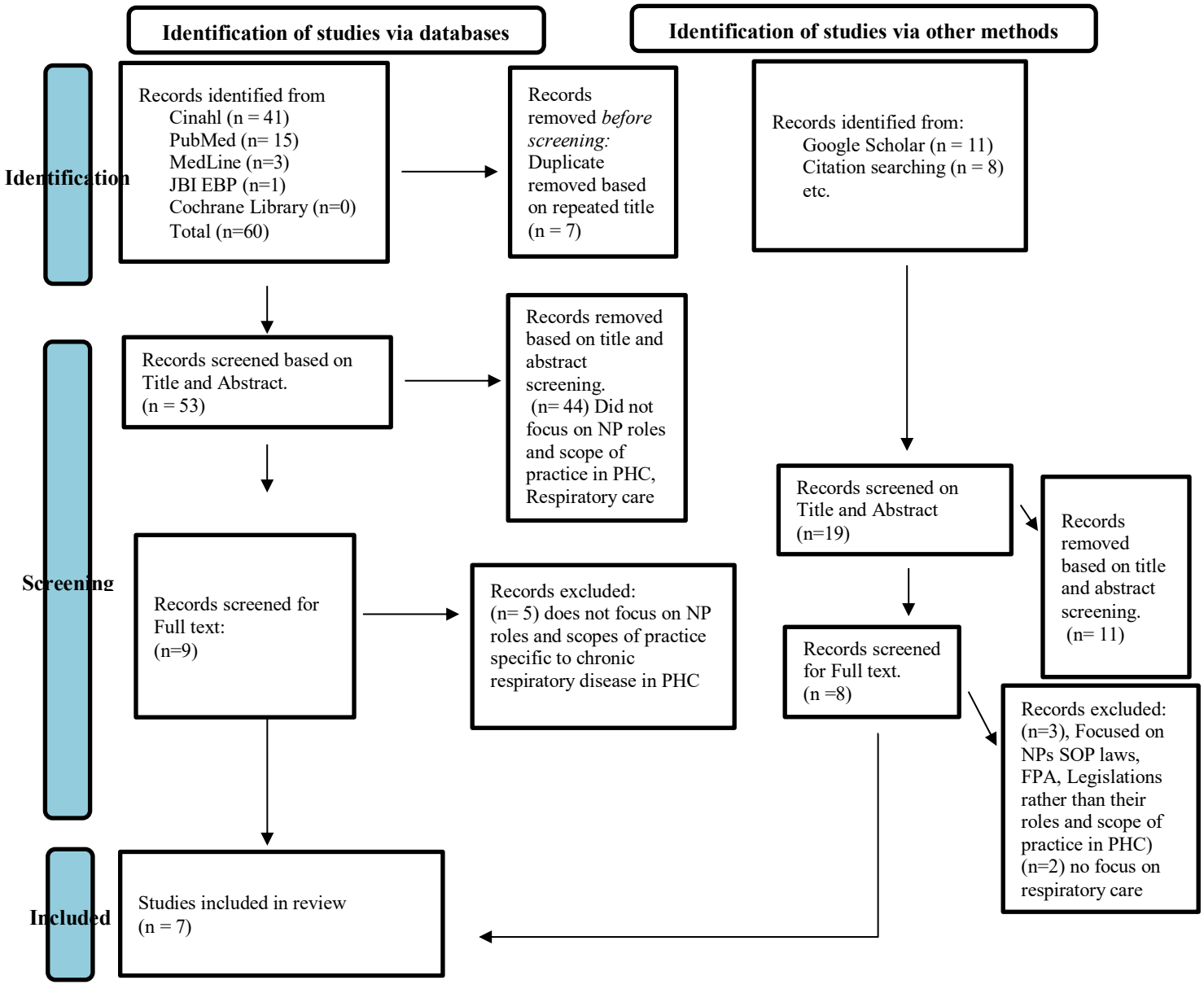
Subsequently, the remaining (n=9) records from the database search as well as other (n=8) from the other sources underwent full-text review after the title and abstract screening to determine the eligibility criteria. Altogether (n=5) from the database search and other sources (n=5) records were excluded after doing a full-text review. For instance, one article focused solely on the role of physician assistants in the management of respiratory diseases, whereas another article focused on the pediatric population, development and implementation of an inpatient asthma education program for children with asthma even though the article mostly talked about the role and scope of practice in asthma care in primary health care. Another article focused on the implementation of NPs' scope of practice laws and legislations rather than their roles and scope of practice in primary health care. These articles were excluded as they did not fully address the research question of the current scoping review. All the references of the possible inclusion items were also identified through the electronic database search. The citation search of the articles that meet the inclusion criteria was also included in the first and second-level testing.

After the screening, altogether (n=7) search results were relevant for the scoping review. During the review, it was also noted that there were very few numbers of the article that demonstrates the roles and

scope of practice of nurse practitioners in the care of adults with chronic respiratory disease in primary healthcare. Many search results were excluded in the title and abstract screening phase due to the various aspects of inclusion criteria. Those excluded articles either talked about NPs' role and scope of practice in a hospital setting or NPs' role focused in pediatric respiratory patients or chronic disease management such as cardiovascular diseases or diabetes or hypertension, and NPs providing respiratory care across the country without any care settings mentioned separately. The Prisma Flow diagram in Figure 1 depicts the different phases of data selection process of this scoping review.

Figure 1

Prisma flow diagram of the study selection



Note. Source: (Page et al., 2021).

5.4 Data extraction and charting of the results

After the development of the research aims, research question, and the implementation of the search strategy, inclusion exclusion criteria, the author identified the potential data to be included in the study that met the eligibility criteria. Then the author started screening the relevant papers. After the screening, the data extraction process began. The data extraction process is referred as charting the results (The Joanna Briggs Institute Reviwers' Manual, 2015) in a scoping review. Charting the result gives a logical and descriptive overview of the findings that is in line with the scoping reviews objective and research question (Aromatis & Munn, 2020; Peters et al., 2020).

The data extraction table recorded key information of the source, such as author, year, country of publication i.e., citation details, research context, aims and objectives, research methodologies, methods of data collection, research outcomes, and key findings pertinent to the scoping review (Peters et al., 2020). This technique was used to gain a better understanding of the major results and conclusions of the studies (Levac, et al., 2010; Peters et al., 2015). Several adjustments were made since data extraction is an iterative process and the extraction was done by the author alone. The data extraction table can be seen in Appendix 1 with all included studies. The data charting is presented in Appendix 2 in alphabetical order which was done to extract the relevant data systematically and comprehensively from the each included studies.

5.5 Summarizing and presenting the findings

According to Peters et al. (2015), data charting can be especially helpful in scoping reviews, which try to map the literature on a subject and identify research needs. They pointed out that to give a thorough and nuanced examination of the data, data charting should be used in conjunction with other techniques like thematic analysis or narrative synthesis. In the protocol, it was mentioned that a thematic analysis will be done to describe the common prevalent themes of the included studies, however, in this scoping review a proper thematic analysis was not done but the results are presented as a summary in the charting table where the author got familiarized with the extracted data materials from the screening and extraction phase. Then get a general sense of the content and identify the potential issues that meet the aim and the research question of the scoping review.

The data were summarized to answer the scoping review question (Levac et al., 2010; Peters et al., 2015) related to the roles and scope of practice of nurse practitioners in the care of adults with chronic respiratory diseases in primary healthcare. Data charting summary evident to the scoping review is presented in Appendix 2. The findings of the scoping review are presented here as a descriptive summary. Discrepancies were resolved through discussion with the thesis supervisor at the beginning of the data extraction process and during the writing process.

6 Ethical Consideration

In this master's thesis, a scoping review methodology was used which did not involve any physical human participation as a test objects and there was no violation of human subject protocols (Finnish National Board on Research Integrity Guidelines [TENK], 2023). While writing this scoping review no permission was needed from the ethical board due to the absence of human participation (Åbo Akademi University, 2023). The author was responsible for creating the research ideas with the help of research mentors and was bound by institutional and ethical obligations, as well as the code of conduct (All European Academies [ALLEA], 2017).

Data related misconduct includes not preserving the primary data or poor data management (Organization for economic cooperation and development global science forum [OECD], n.d.) but in this scoping review, all the data search procedures from the very beginning from all used databases were kept in a separate file for future reference. The information specialist from Åbo Akademi library was accessed in the beginning of the data search process. Methodological guidance and frameworks for conducting scoping reviews were followed based on different scoping review writing guidelines (Arksey & O´Malley, 2005; Levac et al., 2010; Peters et al., 2015; Tricco et al., 2018 & The Joanna Briggs Institute Reviewers' Manual, 2015).

The fundamental principles of the research integrity assisted the author in ensuring the quality of the research, research design and its methodology. The author developed, undertook, reviewed, reported and communicated the results in an unbiased, fair, and transparent way (ALLEA, 2017). The use of peer reviewed research studies, implementation of inclusion and exclusion criteria helped to ensure the quality, consistency and transparency in the data search process (TENK, 2023). In the data collection process of this scoping review, being author as a sole data collector may result in bias.

Keeping track of the resources, paraphrasing, by giving the credit to the original authors in an in-text citation and organizing proper reference lists were maintained to avoid plagiarism based on the instructions and guidelines (American Psychological Association [APA], 2020). Fabrication, falsification of research data, and plagiarism are avoided with the best possible knowledge of the author. A quality assessment is typically used to assess the risk of bias in the included studies. However, in this

scoping review quality assessment is not done because the idea of the review was to map the existing literature rather than to synthesize or evaluate the quality of the evidence used in the review. The focus was on identifying the breadth and depth of the available evidence from the included studies (Peters et al., 2020; Tricco et al., 2018).

7 Results

This scoping review aimed to explore the roles and scope of practice of NPs in the care of adults with chronic respiratory disease in primary health care. A total of seven relevant studies were identified and screened after applying the inclusion and exclusion criteria in the final data analysis. These identified studies highlighted various aspects of NPs' roles and scope of practice in primary healthcare settings among the respiratory patients. The study materials were majorly published in recognized journals. The included studies represented different countries such as the US (n=2), Canada (n=3), Switzerland (n=1), and the UK (n=1). These studies were published between 2015 and 2022. The common research design among the included studies were mixed methods (n=2). Other included studies were qualitative study (n=1), systematic review (n=1), review article (n=2) and instrumental case study (n=1) with interpretive descriptive method. The respiratory diseases described in these included studies had lung conditions such as COPD, asthma, and lung cancer. The role of NPs identified from these seven studies (Côté et al., 2019; Housden et al., 2017; Jarell, 2022; Martin-Misener et al., 2015; McDonell et al., 2019; Schmid-Mohler et al., 2020 and Scullion, 2018) are described below.

7.1 Nurse practitioners' role as a provider of clinical care

The NPs in the primary health care identify the care needs of a respiratory patient (Schmid-Mohler et al., 2020). As a provider of comprehensive clinical care, NPs within their scope of practice, they utilize experience, skills, and knowledge (Côté et al., 2019). NPs assess the patient, develop, implement care plans, and evaluate the care for patients presenting undifferentiated diagnosis (Scullion, 2018). Other roles of NPs mentioned in the studies were they prescribe, refer respiratory patients to specialists, admit patients to the hospital, provide consultation times, and schedule follow up at interval, which allows them to provide patient-centered care (Martin-Misener et al., 2015). In other study conducted by McDonell et al. (2019) NPs utilized low-dose computed tomography (LDCT) within their scope of practice to screen for lung cancer among adult patients. Through screening as a diagnostic tool allowed NPs in early detection of cancer and referral of patients for further evaluation if needed. The study conducted by Jarell (2022) also showed that NPs have skills to diagnose and initially manage the patients with asthma, copd, and asthma-copd overlap by ordering and evaluating appropriate diagnostic test such as spirometry and alpha-1 antitrypsin deficiency testing. NPs make use of healthcare technologies in treating respiratory

patients (Housden et al., 2017). Furthermore, they assessed the responsiveness of patients airways to broncodilators, which assist in differentiating between asthma, copd and astma-copd overlap syndroms (Jarell, 2022).

The NPs offer and gurantee access to COPD specific care in the primary health care (Schmid-Mohler et al., 2020). In the same study, the identified needs in COPD care were coordination of care, self-management support, screening, and management of emotional burden of COPD patients' visiting primary health care (Schmid-Mohler et al., 2020). As care coordinators and provider of clinical care, NPs ensure that patients receive appropriate care, treatment, and communicate with other providers to ensure the continuity of care. Fear, anxiety and depression were other burdensome aspects associated with COPD and were often underdiagnosed. NPs work within symptom management while providing clinical care to the respiratory patients.

7.2 Nurse practitioners' role as a collaborator

NPs work collaboratively with physicians and other healthcare professionals to provide comprehensive care to patients (Scullion, 2018). They work with general practitioners as part of a primary care team, providing patient care (Martin-Misener et al., 2015). Working with other multi professional teams such as pulmonologist, respiratory therapist help them to improve the standard of care, patient outcomes, and to promote better health outcomes for the chronic respiratory patient (Côté et al., 2019).

The collaboration with other healthcare provider and engagement in interdisciplinary teamwork lead to increased leadership and professional agency among NPs (Housden et al, 2017). They act as a link between professions through collaborating, networking, consulting, and working as part of a team. The role of NPs in primary healthcare settings included improving organizational culture and communication, providing ongoing professional development opportunities, and enhancing interprofessional collaboration (Côté et al., 2019). Their role was to assist primary healthcare teams to effectively integrate, utilize resources, and deliver quality care to the respiratory patients (Scullion, 2018). In the context of lung cancer, NPs engaged in shared decision-making with patients about LDCT screening. NPs facilitated communication between patients and other healthcare providers regarding screening and management of lung diseases (McDonell et al., 2019).

7.3 Nurse practitioners' role as a prescriber

NPs are essential prescribers in the pharmacotherapy of asthma and COPD patients ensuring optimal management and symptom control for those respiratory patients in primary health care (Jarell, 2022). They prescribe inhalers and collaborate with other healthcare professionals to develop comprehensive treatment plans for pulmonary patients (Scullion, 2018). In the prescription regimen for asthma patients, NPs prescribe inhaled corticosteroids as a key component of treatment along with addition of long-acting beta-agonists (LABAs) and long-acting anti-muscarinic drugs (LAMAs) as necessary to achieve better control of symptoms and prevent further complications.

In COPD treatment, NPs prescribe short-acting beta-agonists (SABAs) as needed to relieve symptoms in COPD patients. NPs may also prescribe long-acting beta-agonists (LABAs) and antimuscarinic drugs to provide sustained bronchodilation and improve lung function. These medications are typically added to the treatment regimen to enhance long-term management and symptom control (Jarell, 2022; Scullion, 2018) of asthma and COPD. They also assist patient adhere to their treatment plans by being the main point of contact and ensuring that medication is delivered to the lungs as effectively as possible. NPs assess patients for other comorbidities that may affect pulmonary medication delivery, evaluate disease severity, and monitor patients for any changes in medication or inhaler use. This helps in adjusting treatment plans and ensuring optimal outcomes by effectively managing the symptoms and enhance the quality of life (Scullion, 2018).

7.4 Nurse practitioners' role in non-pharmacological management and patient education

The role and scope of NPs in the care of adults with CRDs in primary health care was not limited to asthma and COPD only. The study conducted by McDonell et al. (2019) showed that NPs can provide primary prevention of lung cancer through smoking cessation educations, assessment of patients participating in secondary prevention through screening, early detection of lung cancer, and engaging in shared decision-making with patients about low dose computed tomography screening. Other study of Jarell (2022) also presented that patients with chronic respiratory diseases need frequent follow up and smoking cessation should be discussed with patients at each visits. NPs provide guidance and support smokers with nicotine replacement therapy. They educate patients about vaccine recommendations, encourage active lifestyles and facilitate access to pulmonary rehabilitation to optimize the functional

capacity and quality of life. Patient education on smoking cessation effort and behavioral support are also seen among NP roles (Jarell, 2022).

NPs support and educate patients about their health condition, relieving symptoms, and instructing them on what to do if symptoms persist or in managing minor exacerbations of COPD or asthma (Martin-Misener et al., 2015). NPs provide counseling on self management strategies of respiratory disease, provide patient education on lifestyle modification, and disease prevention (Housden et al., 2017) in a way they support patients to adopt health promotive strategies that promotes healthy lifestyle and apply principle of self care. NPs provide patient coaching and assistance regarding patient's daily self-management by encouraging healthy behavior (Schmid-Mohler et al., 2020). In order to properly manage asthma and COPD, NPs instruct patients on how to utilize inhalers and monitor their use while educating patients and caregivers about inhaler competency (Scullion, 2018). They provide patient-centered care by assessing their patients and making suggestions based on research while considering the patient circumstances, healthcare priorities, and advocating for them (McDonell et al., 2019).

In summary, a closer inspection of the results suggested that NPs have significant role in the care of adults with chronic respiratory diseases in primary healthcare settings. NPs manage and diagnose chronic respiratory problems, give prescriptions for medicines and provide treatments, keep track of patients' progress and results, and educate patient on the use of respiratory inhalators (Housden et al., 2017; Scullion, 2018). They provide patient-centered care, engage in interprofessional collaboration, use interventions, knowledge, and skills to improve patient outcomes. It is apparent from these results that NPs in primary healthcare team have an effective role in the integration and care coordination to deliver quality care to patients with chronic respiratory diseases.

8 Discussion

Despite the growth in research around advanced practice nursing, there has been limited attention paid to the NPs' role and scope of practice in the care of chronic respiratory adult patients in the primary healthcare. This study aimed to explore the NPs' role and scope of practice in the care of adults with CRDs in the primary healthcare context. The study sought to examine how NPs deliver primary healthcare to chronic respiratory patients within their scope of practice and what their roles in primary healthcare are while dealing with such a patient population. In this scoping review, a total of seven (n=7 papers) explained NPs' roles, scope of practice, and their function within the premise of respiratory diseases such as COPD, asthma, and lung cancer patients in primary health care settings. It is observed that NPs provide a prominent level of clinically focused, advanced nursing care in a variety of specialties across the globe. NPs' scope of practice is built on the platform of a registered nurse scope of practice with more responsibilities and accountabilities (Nursing and Midwifery Board of Australia, 2021). Studies have shown that NPs have a significant role in providing clinical care, collaborating with health care teams, prescribing pharmacological and non-pharmacological treatments, educating patients on self-care and health promotion (Jarell, 2022; Martin-Misener et al., 2015; Schmid-Mohler et al., 2020; Scullion, 2018).

In primary healthcare, NPs focus on treating illness and preventing exacerbations of the existing respiratory condition. In these roles, NPs work with the populations defined by the illness, such as COPD or asthma. Based on the standards of practice for NPs' in the process of care, the NPs assess and evaluate the patient's state of health based on medical history through complete physical examinations. They conduct preventative and diagnostic treatments based on the medical history of the patient, identify health risk factors, and assess the social determinants of health that may affect the patient's health and well-being in the community (AANP, 2022; NMBA, 2021).

The study findings of (Martin-Misener et al., 2015) showed the similar roles as mentioned above. Along with these clinical roles, NPs have the authority to order and interpret diagnostic tests; including blood tests, imaging tests, and other lab works to diagnose and monitor health issues (Housden et al., 2017; Jarell, 2022; Scullion, 2018; Winger et al., 2020). In line with these findings, the study conducted by Winger et al. (2020) also showed consistent results of health assessment information regarding patient

history, prior treatment outcomes, physical findings, and diagnostic data to identify normal, at risk and abnormal states of health of the patients visiting primary health care. Spirometry is the standard for the diagnosis of COPD, as it provides a basis for the classification of disease severity, evaluation of disease progression and prognosis, and establishment of treatment guidelines (Sun, 2020). Many of these diagnostic procedures, that NPs perform independently to the full extent of their education and scope of practice (AANP, 2022).

NPs were particularly effective in providing care for chronic diseases as part of the primary care team, and sought off-site physician consultation when needed. They had full authority to prescribe, refer to specialists and admit patients to the hospital (Martin-Misener et al., 2015; Jarell, 2022). This shows NPs' advanced education and training equip them with the knowledge and skills necessary to perform clinical activities and prescribe medicines (AANP, 2022b; AANP, 2022c) however, the scope of practice for NPs vary significantly depending on the juridiction and instititional policies, which could limit their autonomy and hinder the ability to provide comprehensive care (ACNP, 2021). Some argued that patients' level of understanding on NPs' role as well as NPs' less exposure to complex medical conditions compared to physicians potentially could impact NPs' ability dealing with complex conditions (Woo et al., 2019).

Collaboration and consultation among healthcare professionals is essential for delivering optimal patient care in health care settings (Barratt & Thomas, 2018; Melnyk et al., 2014). NPs effectively collaborate with physicians, nurses, and other team members (Côté et al., 2019; Housden et al., 2017; Scullion, 2018). Another important aspect of collaboration and consultation is the development of NP-led clinics, where they are required to utilize their problem-solving skills, clinical judgements, communication, and decision-making skills not only in providing patient care but also in their leadership roles (NMBA, 2021; NMBI, 2017). Differences in professional cultures, power dynamics, and levels of understanding and respect among team members, however, can cause difficulties in NP collaboration with other health care professionals (Côté et al., 2019). In some cases, NPs may encounter resistance from other medical specialists, which results in little possibilities for participation in decision-making processes (Chavez et al., 2018).

NPs are thoroughly trained in pharmacology and can safely prescribe a variety of drugs regarding COPD and asthma patients in the primary health care (Jarell, 2022; Scullion, 2018). The amount to which NPs are exposed to complex health situations of patients and the scope of practice of NPs' independent

prescribing are still limited in many countries (Maier, 2019). NPs' role in non-pharmacological treatment and education support comprehensive patient care by emphasizing lifestyle changes, counseling, and patient empowerment (Jarell, 2022; McDonell et al., 2019). By educating patients on disease prevention, early detection, and healthy behaviors, NPs empower individuals to take control of their health. However, achieving effective self-care practices requires considering socioeconomic disparities and access to healthcare resources (Mileski et al., 2020).

The findings from McDonell et al. (2019) shows NPs' role in promoting lung cancer screening by educating patients, addressing their concerns, providing counseling, decision support, and facilitating communication between the patients and other healthcare professionals (McDonell et al., 2019). Hence, their role is to provide the patient with diagnostic information and education which are relevant, theory-based, and evidence-informed, using the appropriate teaching, and learning strategies for the patients (AANP, 2022; NMBA, 2021). The role of NPs in the care of lung cancer patients is multifaceted and involved providing a comprehensive assessment, utilizing diagnostic tests, and providing patient-centered holistic care.

Another important finding related to the NPs' roles and scope of practice from Housden et al (2017) was NP led group medical visits in Canadian primary healthcare resulted in knowledge acquisition, increase patient engagement, and disruption of power imbalances between patients and healthcare providers as well as healthcare providers and NPs. These findings suggest that gaining more knowledge about the disease trajectory increase the knowledge in the self-management of chronic disease among patients. NPs' care delivery allows them to harness their professional agency through increased leadership and interdisciplinary collaboration, resulting in NPs having more power and authority (Housden et al., 2017). In other words, their roles allow them to engage in ongoing professional development and accept the personal responsibility for maintaining their competences and practicing their roles.

The World Health Organization principles of primary health care accentuate the importance of accessibility, public engagement, health promotion, technology, and intersectoral collaboration in establishing a robust relationship between NPs and primary healthcare (Adams et al., 2017). These principles form the ground for NPs' scope of practice (CNA, 2010). Within this legislated scope of practice, research done in Switzerland included NPs expanded scope of practice as assessments of patients, diagnostic interventions, medication prescription, and coordination of services for complex

cases, linked to a specific area of expertise or patient group with COPD exacerbations. NPs with competencies offered these patients specialized care and assistance (Schmid-Mohler et al., 2020). As observed in the study, the scope of practice also encompasses specific fields of knowledge within different patient groups.

Other compelling findings of Scullion (2018) additionally put focus on their importance in having a critical role in educating patients and caregivers on inhaler competency to help patients self-manage asthma and COPD effectively. They provide counseling on medication management, and pulmonary rehabilitation to support patients in managing their chronic conditions. This clinically relevant finding indicates that NPs roles and scope of practice encompass a broad range of responsibilities to provide comprehensive care to patients' with chronic conditions such as asthma and COPD, assess inhaler technique, provide patient education, match patients with the proper drug and inhaler device, assess the severity of the disease, and alter treatment regimens (Schmid-Mohler et al., 2020; Scullion, 2018).

NPs can oversee inhaler use, prescribe inhalers, and work with other medical specialists to create a comprehensive treatment plan. NPs support patients in maintaining treatment compliance, managing inhaler use, and enhancing their quality of life, which ultimately improves patient outcomes (Scullion, 2018). NPs' role in improving patient outcomes is also reported (Côté et al.,2019). The study confirms that the quality of relationships between NPs and other healthcare providers can affect NPs' ability to optimize their roles in primary healthcare settings. Organizational factors such as leadership, culture, and communication are important in optimizing NPs' roles, and a positive organizational culture can lead to more effective collaboration and improved patient outcomes. Training in the latest guidelines and best practices for the diagnosis and management of respiratory conditions, as well as continuing education opportunities to stay up to date on new developments in respiratory care, were also identified as influencing NP role optimization (Côté et al., 2019).

9 Methodological Considerations

This study set out with the aim of exploring the roles and scope of practice of NPs. Little information was found in the literature on the question as to the role and scope of practice of NPs in primary health care among chronic respiratory patients. This could be due to the variations in the roles and areas of practice of NPs across various nations and the context in which NPs work.

While conducting this scoping review, the author was also confronted with other limitations. Publication bias, language bias, geographical bias as well as the quality of the included studies were noted. These limitations may have influenced the findings and interpretation of the scoping review. The findings of the scoping review were dependent on the available published literature. It is to be noted that the final number of included studies was limited to seven. The availability of less number of articles on the research topic might have brought the limited results. Only studies conducted in English were included in the data search process. This could have resulted in language bias and restricted the generalizability of the findings by excluding pertinent studies published in other languages.

This scoping review may have inadvertently concentrated more on studies carried out in particular geographical areas where advanced practice nursing roles are highly developed and research on NPs' roles and scope of practice are more common. This could introduce a geographic bias and limit the applicability of the findings to other regions where advanced practice nursing roles are in developmental phase. The scoping review provide an overview of the existing literature, regardless of the quality of the included studies. The quality of the individual studies might vary, and this could impact the robustness and reliability of the review's findings. Although efforts were made to include studies with diverse methodologies such as quantitative, qualitative and mixed method studies.

This scoping review also relied on existing literature and did not involve primary data collection, which might have limited the ability of the author to conduct in depth analysis beyond what is reported in the included studies. However, the author had constantly sought guidance from the supervisor and was able to grasp the potential influence on review findings and apply the results correctly by noting these limitations.

10 Conclusion

This scoping review shed light on the role and scope of practice of NPs in primary health care settings for adults with chronic respiratory diseases. The results of the review showed NPs' role in assessment of respiratory patients, diagnosis of respiratory conditions, monitoring symptoms, disease progressions and providing comprehensive care in collaboration with other health care professionals. Their broad scope of practice enables them to perform physical examinations, order, and interpret diagnostic tests, prescribe medicines, educate patients, promote health, and support self-management among the patients with chronic respiratory diseases.

This review holds significant relevance to the clinical practice. By recognizing and developing the NPs' role in primary healthcare, healthcare systems can effectively address the increasing demands of healthcare needs of the population visiting primary healthcare with chronic diseases. NPs at primary health care sector can then contribute to the holistic health care delivery to the patients. In Finnish primary healthcare where NPs' roles are developing, the results obtained from this scoping review could be used as an example describing what NPs in primary health care can do along with registered nurse to manage chronic respiratory diseases of adult populations. Future research is warranted for a better understanding and dissemination of common knowledge regarding the roles and scope of practice of NPs in a primary healthcare setting.

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Appendices

Appendix 1. Data extractions tables of seven included studies.

Author, year of publication, Publication name, country: Côté et al., 2019. BMC health services research, Canada
Title of the study: New understanding of primary health care nurse practitioner role optimisation: The dynamic relationship between the context and work meaning
Aim of the study: To provide a new understanding of how NPs' work meaning is shaped by their context and how this affects their role optimization
Methodology: Qualitative research methodology
Methods: Purposive sampling strategy, selected 30 NPs who had been practicing for at least two years and worked in diverse primary health care settings.
Data collection: Semi structured Interview with NPs working in primary healthcare setting in Canada Used interview guide to elicit information from the NPs about their experiences working in primary health care their roles and responsibilities.
Location of study data collected : Not mentioned but the NPs who participated in the study worked in various primary healthcare settings, community health centers.
Primary affiliation of primary author: University Laval, Faculty of scial science, research, faculty of medicine, nursing science.
Type of evidence: Research Article
Outcomes of the study: • Provided a new understanding of the dynamic relationship between the context in which NPs work and their work meaning, and how this influences their ability to optimize their roles in primary healthcare settings. • The study identified four factors that influence NPs role optimization: organizational factors, external factors, the personal and professional characteristics, and the NPs relationships with other healthcare providers. • The strategies to optimize the role of NPs in primary healthcare settings should include improving organizational culture and communication, providing ongoing professional development opportunities, and enhancing interprofessional collaboration.
Key findings relevant to the research question: • provides insights into the factors that influence NPs roles • include collaboration with physicians, respiratory therapists, and other allied health professionals. optimizing NPs interprofessional collaboration in the care of respiratory patients in primary healthcare could enhance NPs' ability to provide high-quality care. • training in the latest guidelines and best practices for the diagnosis and management of respiratory conditions, as well as continuing education opportunities to stay up-to-date on new developments in respiratory care.

Author, year of publication, Publication name, country: Housden et al., 2017. Health expectations. Canada
Title of the study: Attending to power differentials: How NP-led group medical visits can influence the management of chronic conditions.
Aim of the study: to examine NP-led GMVs for patients with chronic conditions and consider the barriers and enablers to implementing GMVs in one Canadian province, British Columbia.
Methodology: An instrumental Case study
Methods: Interpretive descriptive methods
Data collection: Indepth interviews with patients and providers (N=24) and 10 hours of direct observation
Location of study data collected in/for:
Primary affiliation of primary author: School of Nursing, University of British Columbia
Type of evidence: Original Research Paper
Outcomes of the study: • Examined the use of nurse practitioner (NP)-led group medical visits in Canadian PHC and how they can disrupt power differentials between patients and health-care providers and amongst other health-care providers. • Patients who participated in NP-led GMV reported of increased knowledge and confidence in managing their conditions, as well as more engaged communication with NPs • GMVs contributed to a more collaborative environment between patients and Nps and allowed NPs to harness their professional agency through increased leadership and interdisciplinary collaboration.
Key findings relevant to the research question: • Relates to NP roles and practice areas is NP-led group medical visits (GMVs) can result in knowledge acquisition, increased patient engagement, and a disruption of power imbalances between patients and healthcare providers as well as between healthcare providers and NPs. • Patients who participated in GMVs had the chance to ask questions about their chronic medical conditions while also benefiting from the knowledge and attention of an NP. • NP-led GMVs emerged as a method of care delivery that allowed NPs to have their professional agency through increased leadership and interdisciplinary collaboration with other healthcare providers.

Author, year of publication, Publication name, country: Jarell, L. (2022), The Nurse Practitioner, USA.
Title of the study: Asthma-COPD overlap: The NPs' role in diagnosis and management
Aim of the study: To provide an overview on diagnosis and management of underecognized asthma-copd overlap
Methodology, methods, data collection : NA
Location of Data collection: NA
Primary affiliaton of the author: University of Texas at Arlington.

Type of evidence: Review Article
Outcome of the study: • NPs are essential to the diagnosis and treatment of ACO, • Enabling early identification, individualized treatment strategies, and patient education.
Key findings relevant to the research question. • A comprehensive patient history, spirometry and other diagnostic procedure as well as development of customized treatment plan that may combine pharmacological and non-pharmacological therapies are all part of the NPs responsibilities. • The necessity of continued patient education, including self management techniques, is emphasized that enhances patient outcomes and quality of life.

Author, year of publication, Publication name, country: Martin-Misener et al., 2015. BMJ Open, Canada
Title of the study: Cost effectivness of nurse practitioners in primary and specialized ambulatory care: Systematic review.
Aim of the study: To determine the cost-effectiveness of nurse practitioners delivering primary and specialised ambulatory care.
Methodology: Systematic review of randomized controlled trials
Methods: NA
Data collection: 10 online databases for bibliographical information, hand searches, bibliographies and websites.
Location of study data collected: NA
Primary affiliation of primary author: Dalhousie University in Halifax, Nova Scotia, Canada
Type of evidence: Systematic review article
Outcomes of the study: • NPs can be a cost effective alternative to physicians in providing primary care and specialized ambulatory care. • NPs can provide similar quality of care as physicians, with similar or lower costs. • NPs were found to be particularly effective in providing care for chronic diseases, such as diabetes, hypertension, copd. • NPs role in addressing the growing demand for primary care services, especially given the shortage of physicians in many areas. • Suggest that policymakers should consider expanding the scope of practice for NPs, including prescribing authority and ordering diagnostic tests, to optimize their contribution to the health care system.

Key findings relevant to the research question:

- NP worked as a part of primary care team alongside general practitoners who were available for consultation and to sign off prescriptions.
- NPs independently staffed a primary care clinic and sought off-site physician consultation when needed.
- NPs had full authority to prescribe, refer to specialists and admit patients to hospital.
- NPs care was associated with higher patient satisfaction. Patients who consulted a NP reported that they had been told the cause of their illness, how to relieve their symptoms, and what to do if the problem persisted.
- NPs had longer consultation times than general practitioners.

Author, year of publication, Publication name, country: McDonell et al, 2019. *Journal of the American Association of Nurse Practitioners,* USA

Study Title: Lung cancer screening: Practice guidelines and insurance coverage are not enough

Aim of the study: to examine knowledge, attitudes, and practices regarding LDCT among NPs who work in primary care settings with lung patients

Methodology: An explanatory, sequential, mixed-method design

Methods: a 32-item questionnaire followed by a semi-structured telephone interview.

Data collection: The survey and interview questions were guided by a conceptual framework

Location of study data collected in/for:
NPs identified as working in primary care settings in the United States
Population: Nurse practitioners as well as NPs with the largest number of patient inquiries on lung cancer screening.

Primary affiliation of the primary author: College of Nursing, University of South Carolina

Type of evidence: Primary source of evidence

Outcomes of the study:

- NP serve as a patient's primary care provider.
- NPs are in the forefront of primary prevention of lung cancer through smoking cessation efforts and have the opportunity to be involved in secondary prevention through screening and early detection.
- NPs' knowledge, practice, and attitudes about the early detection of lung cancer and the management of patients at high risk of lung cancer may improve outcomes.
- NPs assess their patients and provide suggestions based on evidence based research.
- NPs in this study repeatedly stated that it was impossible to provide excellent care without knowing the patient's circumstances because they needed to be their advocate, consider whether or not it was the right time for the patient to get a cancer screening, and be aware of their patient's top healthcare priorities.
- The majority of non-physician primary care providers in the United States are NPs, and in the primary health care they are playing a bigger role in care delivery, particularly for underserved and at-risk populations.

Key finding relevant to the research question:

- NP thought that Shared decision-making about LDCT among patients falls within their area of expertise.
- NPs have limited options for increasing LDCT uptake when working in primary care settings with time constraints.
- NPs are in the forefront of primary prevention of lung cancer
- NPs provide patient education on smoking cessation efforts.
- NPs involve cancer screening and early detection.
- NPs assess their patients and provide suggestions based on research and guidelines.
- NPs promoting lung cancer screening by educating patients and addressing their concerns, providing counseling and decision support, and facilitating communication between patients and other HCPs.
- Importance of incorporating NPs into the lung cancer screening process and optimizing their role in the care team to improve screening rates and reduce lung cancer mortality.
- Need for increased education and resources for NPs to improve adherence to lung cancer screening guidelines and engage in SDM with their patients.

Author, year of publication, Publication name, country: Schmid-Mohler et al., 2020, *ERJ open research, Switzerland*

Study Title: Advanced nursing practice in COPD Exacerbations: The solution for a gap in Switzerland

Aim of the study: To address the need for adaptation of the current model of chronic obstructive pulmonary disease (COPD) care in Switzerland, particularly in regard to acute exacerbations, and how far an integrated approach involving advanced nursing practice can meet those needs

Methodology: Mix of a qualitative, quantitative, and scoping review.

Methods:

- Scoping review of quantitative studies that describe COPD care in Switzerland
- Synthesis of qualitative studies of patient perspectives (from various countries)
- PEPPA framework was used.

Data collection:

- Focus-group interviews with stakeholders

Location of study data collected in/for:
NA

Primary affiliation of the primary author: Centre of Clinical Nursing Science and Division of Pulmonology, University Hospital of Zurich

Type of evidence: Original article

Outcomes of the study:

- Advanced practice nurses, offer patient coaching and assistance regarding patients' daily self-management and have a specialty in encouraging healthy behavior.
- Expanded practice includes the area of expertise, relating to either a phenomenon or a patient group (for example, COPD), and may involve specialized assessments, the performance of chosen diagnostic interventions, ordering laboratory or diagnostic tests, prescribing the medication under

the delegation or supervision of a physician, referral to specialized treatment, and/or coordination of services in complex situations.
Key findings relevant to the research question: • NPs involved in the treatment of COPD patients. • The coordinator, who is an APN, created to offer and guarantee access to COPD-specific care in the primary care context, including outpatient care and home settings, as well as onwards that are not specialized in pulmonary medicine. • The importance of Advanced Practice Nurses (APNs) in the development of a future model of care for patients with chronic obstructive pulmonary disease (COPD) is discussed in the study. • The identified needs in COPD care in Switzerland include coordination of care, self-management support, and screening and management of emotional burden. • Coordinated and self-management-focused models have been effective in improving clinical results.

Author, year of publication, Publication name, country: Scullion, J. (2018). *Canadian respiratory journal,* UK
Study Title: The Nurse Practitioners' Perspective on Inhaler Education in Asthma and Chronic Obstructive Pulmonary Disease.
Aim of the study: examine from the nurse practitioners' perspective, the central role that nurses play in the management of asthma and COPD and the essential interventions they can provide to improve patient outcomes, with a particular focus on inhaler education
Methodology: NA
Methods: NA
Data collection: NA
Location of study data collected in/for: NA
Primary affiliation of the primary author: University Hospitals of Leicester NHS Trust, Leicester, UK
Type of evidence: Review Article
Outcomes of the study: • Advanced nurse practitioners play a significant role in managing chronic diseases such as asthma and COPD. • ANPs are often responsible for diagnosing and treating patients, prescribing medication, and providing patient education on disease management. • Work collaboratively with physicians and other healthcare professionals to provide comprehensive care to patients. • Have a critical role in educating patients and caregivers about inhaler competency to effectively self-manage asthma and COPD
Key findings relevant to the research question: • ANPs are involved in evaluating disease control and modifying treatment plans when necessary. • NPs have a key role in recognizing poor disease control and providing enhanced care or specialist referral for high-risk patients. • The inhaler technique is a crucial part of the patient education they deliver.

- Their extensive knowledge and skills make them essential frontline providers of patient care in managing chronic diseases in primary healthcare.
- NPs' role in the management of patients with asthma and COPD involves several key components. They play a vital role in identifying patients who may be at risk for poor outcomes due to incorrect medication or inhaler use.
- NPs provide education to patients and their caregivers on the proper technique for inhaler use.
- NPs help in matching patients to the right medication and inhaler device, taking into account factors such as age, manual dexterity, cognitive impairment, personal preference, and inspiratory flow rate.
- NPs have the opportunity to assess patients for any comorbidities that may affect medication delivery, as well as to evaluate disease severity, and monitor patients for any changes in medication or inhaler use.
- NP can manage inhaler use among lung patients. Assess inhaler technique and provide feedback. NPs educate patients on how to use inhalers properly, including dosage and potential side effects. They also prescribe inhalers and collaborate with other healthcare professionals to develop comprehensive treatment plans.
- NPs monitor patients' progress and adjust treatment plans as needed to ensure optimal outcomes, help patients adhere to their treatment.
- Nurse-led inhaler instruction in maximizing disease control and enhancing patient outcomes.

Appendix 2. Summary of results on nurse practitioners' role and scope of practice from included studies.

Authors, year, country	Aims of the study & methodology	Outcomes	Evidence relevant to the research question
Côté et al., 2019. Canada	To provide a new understanding of how NPs' work meaning is shaped by their context and how this affects their role optimization Qualitative research methodology utilizing, purposive sampling strategy, selected 30 Nps who had been practicing for at least two years and worked in diverse primary health care settings	NPs role in primary healthcare settings is influenced by the context in which they work and the meaning of the work they do. The study found four aspects that affect NP role optimization: organizational factors, external factors, the NP's personal and professional traits, the connections with other healthcare professionals.	Contribute to improving the standard of care, patient outcomes, and the promotion of better health outcomes for this population by collaborating with other healthcare professionals such as pulmonologist, respiratory therapist etc. NPs improve organizational culture and communication, providing ongoing professional development opportunities, and enhancing interprofessional collaboration.
Housden et al., 2017. Canada	To examine NP-led GMVs for patients with chronic conditions and consider the barriers and enablers to implementing GMVs in one Canadian province, British Columbia An instrumental Case study with interpretive descriptive method	examined the use of NP-led group medical visits in Canadian PHC and how they can disrupt power differentials between patients and health-care providers and amongst other health-care providers. Patients who participated in NP-led GMV reported of increased knowledge and confidence in managing their conditions, as well as more engaged communication with NPs. GMVs also contributed to a more collaborative environment between	Result in knowledge acquisition, increased patient engagement, and a disruption of power imbalances between patients and healthcare providers as well as between healthcare providers and NPs. Provide education and counseling on self-management strategies, lifestyle modifications, and disease prevention. Through GMVs, NPs collaborate with other healthcare providers and engage in interdisciplinary teamwork. NPs diagnose and manage chronic respiratory conditions, prescribe medications and therapies, monitor patient progress and outcomes, provide patient education and counseling.

		patients and NPs and allowed NPs to engage in their professional agency through increased leadership and interdisciplinary collaboration.	Engage in care coordination, health promotion, and advocacy for patients with chronic respiratory disease. utilize telehealth and other technologies to improve access to care and support patient self-management.
Jarell, 2022. USA	To provide an overview on diagnosis and management of underecognized asthma-copd overlap	NPs are essential to the diagnosis and treatment of ACO, enabling early identification, individualized treatment strategies, and patient education.	Assess patient's medical history, symptoms, and perform respiratory function tests to differentiate between asthma, COPD, and ACO. Prescribe appropriate medications, monitor treatment effectiveness, and educate patients about medication adherence and potential side effects. Schedule regular follow-up appointments, monitor disease progression, and develop personalized care plans. emphasize lifestyle modifications and provide support for overall health promotion of patients
Martin-Misener et al., 2015. Canada	To determine the cost-effectiveness of nurse practitioners delivering primary and specialised ambulatory care. Systematic review	Providecost-effective and high-quality care for adults with chronic respiratory disease in primary care Manage chronic diseases, including diabetes, hypertension, and COPD Address the growing demand for primary care services, particularly in areas with physician shortages. Expanding the scope of practice for NPs, including prescribing authority and ordering diagnostic tests, to optimize their contribution to the healthcare system.	Work collaboratively with general practitioners as part of a primary care team, providing patient care for chronic respiratory disease. Work independently in a primary care clinic, having full authority to prescribe, refer to specialists, and admit patients to the hospital. Provide longer consultation times compared to general practitioners, Educate patients about their condition, relieving symptoms, and instructing them on what to do if symptoms persist.
McDonell et al., 2019 USA	To examine knowledge, attitudes, and practices regarding LDCT among NPs who work in	NPs role in the prevention of lung cancer. Smoking cessation efforts and in the secondary prevention through screening and early detection.	Providing primary prevention of lung cancer through screening, counselling on smoking cessations. Assessment of patients participating in secondary prevention through screening and early detection of lung cancer

	primary care settings with lung patients Mixed method designs	Provide patient-centered care by assessing their patients and making suggestions based on research while considering the patient's circumstances, healthcare priorities, and advocating for them.	Assessing patients with chronic respiratory diseases and providing suggestions based on research and guidelines Early detection and management of high-risk patients. Educating patients about lung cancer screening and addressing their concerns Engaging in shared decision-making with patients about low doze computed tomography screening Facilitating communication between patients and other healthcare providers regarding screening and management of chronic respiratory diseases. Preventing and managing chronic respiratory diseases and lung cancer.
Schmid-Mohler et al., 2020, Switzerland		APNs, offer patient coaching and assistance regarding patients' daily self-management. Expanded practice included the area of expertise, relating to either a phenomenon or a patient group (for example, COPD), and involve specialized assessments, performance of chosen diagnostic interventions, ordering laboratory or diagnostic tests, prescribing the medication under the delegation or supervision of a physician Referral to specialized treatment, and/or coordination of services in complex situations.	Offer and gurantee access to COPD- specific care in the primary care context including other areas of care. The identified needs in COPD care are coordination of care, self-management support, and screening and management of emotional burden. Work within the symptom managements. Coordination of care, self-management support, and screening and management of emotional burden caused by respiratory diseases like COPD.
Scullion, J. (2018). UK	To examine from the nurse practitioners' perspective, the central role that nurses play in	ANPs role in managing chronic diseases such as asthma and COPD.	Inhaler use education Assesses patients for other comorbidities, evaluate disease severity, and monitor patients for any changes in medication or inhaler use.

	the management of asthma and COPD and the essential interventions they can provide to improve patient outcomes, with a particular focus on inhaler education NA	ANPs responsible for diagnosing and treating patients, prescribing medication, and providing patient education on disease management. Work collaboratively with multidisciplinary teams Have critical role in educating patients and caregivers about inhaler competency in order to effectively self-manage asthma and COPD	Help in adjusting treatment plans and ensuring optimal outcomes. NP prescribe inhalers and collaborate with other healthcare professionals Develop comprehensive treatment plans for pulmonary patients. Help patients adhere to their treatment plans.