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Research Article

Integration of a Pulmonary Rehabilitation Program to the Management of Patients with Chronic Respiratory Disease at Georgetown Public Hospital Corporation

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Abstract

Background: Pulmonary rehabilitation (PR) is a crucial, evidence-based intervention for patients with Chronic Respiratory Disease (CRD), yet a formal program is currently absent in Guyana. This study addresses this critical gap by assessing the health needs and demonstrating the feasibility of integrating a PR program at the Georgetown Public Hospital Corporation (GPHC).

Aims: The primary aims were to conduct a comprehensive health needs assessment (HNA) for a PR program among CRD patients at GPHC and to demonstrate the program's feasibility within the existing healthcare framework.

Methods: A two-pronged approach was employed, comprising a Health Needs Assessment (HNA) and a feasibility study. The HNA utilized data from the Global Access to Spirometry Project (GASP) database, analyzing records of 4621 CRD patients at GPHC. The feasibility study was conducted through a thorough literature review on PR efficacy and implementation, complemented by findings from the HNA and GASP data. Ethical approval was obtained for all aspects of the research.

Results: Analysis of 4621 CRD patient records revealed a significant burden of disease, with common conditions including COPD (853 patients), ILD (1336 patients), and mixed obstructive/restrictive lung disease (463 patients). The predominant symptom burden was breathlessness, alongside chronic fatigue, anxiety/depression, and chronic cough. The literature review consistently demonstrated that PR significantly reduces symptom burden, improves exercise endurance, enhances psychological function and physical activity, and ultimately improves overall Quality of Life (QoL). Furthermore, PR has been shown to reduce healthcare costs by over 50%, and the HNA indicated greater than 95% acceptability among the target population.

Conclusion: The findings unequivocally highlight the urgent need for a PR service at GPHC, driven by significant patient symptom burden and a clear treatment gap. The study confirms that integrating a PR program is not only feasible and cost-effective but also promises substantial improvements in patient outcomes and a reduction in overall healthcare expenditures. This research provides a strong evidence base for the implementation of PR as a standard component of CRD management in Guyana.

Keywords: Pulmonary Rehabilitation; Chronic Respiratory Disease; Health Needs Assessment; Feasibility Study; Guyana; Georgetown Public Hospital Corporation

Introduction

Research Background

Chronic Respiratory Diseases (CRDs), encompassing conditions such as Asthma, Chronic Obstructive Pulmonary Disease (COPD), and Interstitial Lung Disease (ILD), represent a significant global health burden [1]. In Guyana, the prevalence of CRDs is particularly notable, with cigarette smoking being a primary cause of COPD among males, and workplace or household exposure to cigarette smoke contributing to its incidence in women [2,3]. ILD, characterized by lung scarring and inflammation, is often linked to long-term occupational exposure to dusts and chemicals, prevalent in Guyana's industrial and agricultural sectors [2,4,5].

Patients afflicted with CRDs frequently experience debilitating symptoms including chronic dyspnea, fatigue, cough, chest pain, decreased exercise tolerance, and mood disorders [6]. These symptoms severely impair their quality of life (QoL), often leading to reduced physical activity, social isolation, and financial hardship [7-10]. Undernutrition is also a common comorbidity in CRD patients, further exacerbating muscle weakness, increasing mortality risk, and contributing to higher healthcare costs due to increased hospital admissions and prolonged stays [11,12].

Pulmonary Rehabilitation (PR) is an evidence-based, multidisciplinary intervention recognized as the 'gold standard' non-pharmacological treatment for COPD and a standard of care for other CRDs [13-15]. PR programs are designed to alleviate symptoms, improve exercise tolerance, provide nutritional guidance, offer mental health support, and facilitate smoking cessation [16-18]. By empowering patients with self-management skills, PR significantly enhances QoL and promotes reintegration into society [6,17]. International health initiatives, such as the Healthy China Initiative (2019–2030), advocate for the integration of PR into CRD action plans [17].

Despite the profound benefits of PR, Guyana currently lacks a formal PR program. The Global Access to Spirometry Project (GASP), initiated in Guyana in 2013 at the Georgetown Public Hospital Corporation (GPHC), has significantly expanded respiratory care services. However, a crucial component missing from its comprehensive offerings is a dedicated PR program [19,20]. With over 4261 active adult follow-up patients diagnosed with CRD at GPHC, including a substantial number with ILD (1336) and COPD (853), there is an urgent need for a tailored PR program to improve patient outcomes and reduce healthcare burdens [2,3].

Literature Review

Extensive research consistently demonstrates the efficacy of PR in ameliorating the chronic symptoms experienced by CRD patients, such as dyspnea, cough, fatigue, and anxiety, while concurrently improving their overall QoL and health-related QoL (HRQoL) [21]. A systematic review of 13 studies on PR in COPD patients highlighted significant improvements in exercise tolerance, breathlessness, QoL, and HRQoL [22]. Similar benefits have been observed in patients with bronchiectasis and ILD, irrespective of etiology or severity [6,21,23].

Beyond clinical improvements, PR has a well-documented impact on reducing healthcare costs and burdens. Studies, including the National COPD Audit Programme, have consistently shown that patients who complete PR programs experience fewer emergency room visits, hospital admissions, and shorter lengths of hospital stay. For instance, the 2017 National COPD Audit Programme reported that 76% of PR participants avoided hospital admission within six months post-program, compared to 61.2% of non-participants. Furthermore, PR was associated with a 50% reduction in hospital stay duration and a significant decrease in mortality rates [24,25]. These findings underscore the economic and public health imperative for integrating PR into CRD management.

Goals and aims

This study is driven by the overarching goal of improving the quality of life for individuals with CRD by minimizing breathlessness and other disabilities, promoting independence and confidence, increasing participation in physical and social activities, and facilitating smoking cessation. Concurrently, a key objective is to minimize healthcare costs by reducing hospitalizations, emergency room visits, and clinic appointments.

To achieve these goals, the study specifically aims to:

- Conduct a comprehensive health needs assessment for a PR program for persons with CRD at GPHC.
- Demonstrate the feasibility of implementing a PR program at GPHC.

Rationale

The rationale for integrating a PR program at GPHC is compelling, given the significant burden of CRD among patients attending the respiratory clinic. Many patients present with chronic cough, dyspnea at rest or with minimal exertion, and persistent fatigue, leading to inactivity, increased breathlessness, depression, anxiety, social isolation, and a decline in overall health and QoL [2]. The implementation of a PR program offers a proactive solution to prevent and reverse these complications, thereby enhancing patient well-being [17].

Furthermore, a PR program is anticipated to substantially reduce healthcare costs and patient load. By improving patient self-management and reducing exacerbation frequency, the program will lead to fewer emergency room visits, hospital admissions, and shorter hospital stays, consequently decreasing the need for acute medications and frequent clinic follow-ups. This will not only benefit the healthcare system but also alleviate the financial and emotional burden on patients and their families, allowing them to maintain employment and reduce unexpected medical expenses.

The burden of chronic respiratory diseases in Guyana

Chronic Respiratory Diseases (CRDs) pose a significant public health challenge in Guyana, mirroring global trends but with unique local contributing factors. The primary CRDs affecting the Guyanese population include Asthma, Chronic Obstructive Pulmonary Disease (COPD), and Interstitial Lung Disease (ILD) [1]. The prevalence of COPD in Guyana is notably influenced by high rates of cigarette smoking among males. For women, exposure to secondhand smoke, often within the home or workplace, is a significant risk factor, highlighting the pervasive nature of tobacco smoke exposure in the country [2,3]. This underscores the need for comprehensive public health interventions that address both active and passive smoking.

Interstitial Lung Disease (ILD) in Guyana is frequently linked to occupational exposures. The country's economic landscape, heavily reliant on industries such as mining, agriculture, and timber, exposes a substantial portion of the workforce to dusts, chemicals, and other airborne irritants. Specific examples include exposure to asbestos, silica, and organic dusts from lumber and grains, which are common in Guyanese industries [2,4,5]. Beyond occupational hazards, autoimmune diseases, particularly rheumatoid arthritis, and certain drug-induced etiologies, such as methotrexate, also contribute to the ILD burden in Guyana [2,4,5]. A notable challenge is the presence of idiopathic cases, where the underlying cause remains unknown, complicating diagnosis and management [2].

The impact of these CRDs on affected individuals is profound and multifaceted. Patients commonly experience chronic dyspnea (shortness of breath), which can occur at rest or with minimal exertion, significantly limiting their daily activities. Other debilitating symptoms include persistent fatigue, chronic cough (which may or may not be productive of mucus), chest pain or tightness, and a marked decrease in exercise tolerance. Beyond the physical manifestations, CRDs are frequently associated with peripheral muscle dysfunction, mood disorders such as anxiety and depression, and recurrent wheezing [6]. These symptoms collectively contribute to a severely diminished quality of life (QoL). Many patients report struggling with routine daily activities, often requiring frequent pauses due to breathlessness, cough, and fatigue [7]. The fear of breathlessness often leads to a sedentary lifestyle, paradoxically worsening their condition and creating a vicious cycle of inactivity and increased dyspnea [8,9].

The psychosocial and economic consequences are equally severe. Many CRD patients experience frustration and depression, finding themselves unable to work and sustain themselves or cover essential medical expenses, including daily inhalers or oxygen therapy [10]. Undernutrition is a prevalent comorbidity, affecting approximately 53% of COPD patients. This is often a consequence of the increased physiological work of breathing, frequent disease exacerbations, depression, social isolation, and poor economic conditions [11,12]. Undernutrition further compromises respiratory and skeletal muscle strength, leading to increased dyspnea and fatigue, elevated mortality risk, and a higher incidence of hospital admissions and prolonged hospital stays, thereby escalating healthcare costs [11,12]. These interconnected challenges highlight the urgent need for holistic interventions that address not only the physiological aspects of CRDs but also their profound psychosocial and economic impacts.

The role of pulmonary rehabilitation

Pulmonary Rehabilitation (PR) stands as a critical, evidence-based, and multidisciplinary intervention designed to mitigate the severe complications associated with CRDs and alleviate the burden on healthcare systems [13]. It is recognized globally as an

individualized rehabilitation program seamlessly integrated into the comprehensive management of CRD patients [14]. The core objectives of a PR program are multifaceted: to alleviate symptoms of breathlessness and reduce disability, enhance exercise tolerance, provide crucial nutritional guidance, offer robust mental health support, and facilitate smoking cessation [16-18]. Where indicated, PR also incorporates airway clearance techniques and adaptation strategies for long-term oxygen therapy [18]. A pivotal aspect of PR is its emphasis on empowering patients with self-management skills, enabling them to effectively manage their illness, thereby significantly improving their QoL and fostering their reintegration into society [6,17].

PR is widely regarded as the 'gold standard' non-pharmacological treatment for patients with COPD and serves as the standard of care for other CRDs [15]. Its inclusion in CRD management is strongly recommended by evidence-based medicine [26]. Furthermore, major global health initiatives, such as the Healthy China Initiative (2019–2030), explicitly endorse the integration of PR programs as an essential component of national CRD action plans [17]. The overwhelming and robust evidence demonstrating the benefits of PR forms the foundational premise for this paper, which advocates for the integration of such a program into the management of CRD patients at the Georgetown Public Hospital Corporation (GPHC).

The global access to spirometry project (GASP) in Guyana

The Global Access to Spirometry Project (GASP) was introduced to Guyana in November 2013, marking a significant milestone in the country's respiratory healthcare landscape [19]. This initiative commenced at the Georgetown Public Hospital Corporation (GPHC), which serves as Guyana's sole tertiary hospital and a critical healthcare hub for a population of approximately 788,581 individuals [27,28]. The initial mandate of GASP was to provide specialized respiratory care and services, beginning with spirometry testing and comprehensive Asthma/COPD education [19,20].

Over the years, the GASP program has undergone substantial expansion, evolving to offer an almost full spectrum of respiratory services. However, a notable deficiency in its current comprehensive offerings is the absence of a dedicated Pulmonary Rehabilitation (PR) program. This omission is particularly critical as PR is considered a main component of a holistic CRD treatment approach. According to GASP data from 2021, there are 4261 active adult follow-up patients diagnosed with CRD through spirometry or CT scans of the chest [2]. This cohort includes 1336 individuals with ILD, 853 with COPD, and 463 with mixed obstructive and restrictive lung disease [2]. Patients with these conditions stand to benefit tremendously from a tailored PR program, which is currently unavailable in Guyana. The World Health Organization (WHO) Global Alliance against CRDs envisions a world where all individuals can breathe freely [3]. By integrating PR, patients experiencing breathlessness would achieve improved respiratory function, greater independence, and an enhanced QoL, simultaneously contributing to a reduction in overall healthcare costs and burdens.

Detailed methodology for health needs assessment (HNA)

The Health Needs Assessment (HNA) was meticulously designed to provide a comprehensive understanding of the burden of Chronic Respiratory Diseases (CRD) and the existing gaps in their management at the Georgetown Public Hospital Corporation (GPHC). The primary data source for the HNA was the Global Access to Spirometry Project (GASP) database, a robust repository of patient information maintained at GPHC. This database includes demographic details, diagnostic information (based on spirometry and/or CT scans), and clinical data for a large cohort of CRD patients. The HNA involved a retrospective analysis of this de-identified patient data.

Key aspects of the HNA methodology included:

- **Patient Population Characterization:** Analysis of the GASP database to determine the demographic profile (age, gender, geographical distribution where available) of CRD patients, and the prevalence of specific CRD diagnoses (e.g., COPD, ILD, asthma, bronchiectasis, mixed obstructive/restrictive lung disease, occupational lung disease, ACOS). This provided a quantitative measure of the CRD burden at GPHC.
- **Symptom Burden Assessment:** Identification and quantification of the most common and debilitating symptoms experienced by CRD patients. This involved analyzing patient records for documented symptoms such as dyspnea, chronic cough (productive or non-productive), fatigue, chest pain/tightness, wheezing, and associated

psychosocial issues like anxiety and depression. The severity and impact of these symptoms on daily life and quality of life (QoL) were inferred from clinical notes and previous assessments within the GASP database.

- **Current Treatment Landscape Analysis:** Review of existing patient management protocols and available services for CRD at GPHC. This included assessing the utilization of pharmacological treatments, oxygen therapy, and other supportive care. A critical component was to identify the absence of a structured, multidisciplinary pulmonary rehabilitation (PR) program as a significant gap in the current treatment paradigm.
- **Resource Availability and Gaps:** An assessment of the human resources (e.g., pulmonologists, respiratory therapists, nurses, physiotherapists, dietitians, psychologists), physical infrastructure (e.g., space for exercise, educational facilities), and equipment (e.g., exercise machines, oxygen delivery systems) currently available at GPHC that could be leveraged for a PR program. Concurrently, this involved identifying the resources that would need to be acquired or developed to establish a fully functional PR service.
- **Community and Stakeholder Readiness:** While primarily a desk-based review of existing data, the HNA also considered the general receptiveness of the healthcare community and, indirectly, the patient population towards new interventions. This was informed by the high patient acceptability rates for PR reported in the literature and the perceived need for more comprehensive CRD management among clinicians at GPHC.

The data extracted from the GASP database were systematically organized and analyzed to generate descriptive statistics on patient demographics, disease prevalence, and symptom profiles. This quantitative analysis provided the empirical foundation for asserting the need for a PR program at GPHC.

Detailed methodology for feasibility study

The feasibility study was conducted in parallel with the HNA and primarily relied on a comprehensive review of existing scientific literature on pulmonary rehabilitation, complemented by the findings from the HNA and additional data from the GASP database. The objective was to ascertain the practicality, sustainability, and potential benefits of implementing a PR program within the specific context of GPHC and the Guyanese healthcare system.

Key components of the feasibility study methodology included:

- **Literature Review on PR Efficacy and Outcomes:** An extensive search of peer- reviewed journals and reputable medical databases (e.g., PubMed, Cochrane Library, Google Scholar) was conducted to gather evidence on the effectiveness of PR in various CRD populations. The review focused on studies reporting improvements in symptom burden (e.g., dyspnea, fatigue), exercise capacity, QoL, psychosocial well-being (e.g., anxiety, depression), and reductions in healthcare utilization (e.g., hospitalizations, emergency room visits). This provided a strong evidence base for the clinical benefits that could be expected from a PR program at GPHC.
- **Cost-Effectiveness Analysis from Literature:** The literature review also specifically targeted studies that evaluated the economic impact and cost- effectiveness of PR programs. Data on reduced healthcare expenditures, such as decreased hospital readmissions and shorter lengths of stay, were extracted and synthesized. This analysis aimed to demonstrate the potential financial benefits of PR, making a compelling case for its integration from a health economics perspective.
- **Operational Feasibility Assessment:** This involved evaluating the practical aspects of establishing and running a PR program. Drawing from the literature on successful PR models in similar resource settings, and considering the insights from the HNA regarding GPHC's existing resources, the study assessed:
- **Site Selection:** Potential physical spaces within GPHC suitable for conducting PR sessions (e.g., exercise areas, educational rooms).
- **Staffing Requirements and Training:** Identification of the multidisciplinary team members required (e.g., respiratory therapists, physiotherapists, nurses, physicians, dietitians, psychologists) and the necessary training and certification for these personnel.
- **Patient Recruitment and Retention Strategies:** Review of best practices for identifying eligible patients, referral pathways, and strategies to ensure patient adherence and completion of the program.

- **Program Curriculum Development:** Consideration of the core components of a PR program, including exercise training (aerobic, strength, flexibility), education (disease management, medication adherence, nutrition, energy conservation), and psychosocial support.
- **Monitoring and Evaluation:** Establishing potential metrics for tracking program effectiveness and patient outcomes.
- **Sustainability Assessment:** Evaluation of long-term viability, including potential funding mechanisms, integration into existing healthcare pathways, and strategies for continuous quality improvement.

A PR program at GPHC. This approach ensured that the recommendations were not only evidence-based but also tailored to the local realities and resource constraints.

Detailed health needs assessment findings

The Health Needs Assessment (HNA), conducted through a meticulous analysis of the Global Access to Spirometry Project (GASP) database at the Georgetown Public Hospital Corporation (GPHC), provided compelling evidence for the urgent need of a Pulmonary Rehabilitation (PR) program. The database, comprising 4621 active adult follow-up patients with Chronic Respiratory Diseases (CRD), revealed a significant and diverse burden of respiratory illness. Specifically, the patient cohort included:

- **Chronic Obstructive Pulmonary Disease (COPD):** 853 patients.
- **Interstitial Lung Disease (ILD):** 1336 patients (excluding idiopathic pulmonary fibrosis), indicating a substantial prevalence of fibrotic lung conditions.
- **Mixed Obstructive and Restrictive Lung Disease:** 463 patients, highlighting complex respiratory pathologies.
- **Idiopathic Pulmonary Fibrosis (IPF):** 47 patients, a severe and progressive form of ILD.
- **Occupational Lung Disease:** 342 patients, underscoring the impact of industrial and agricultural exposures in Guyana.
- **Bronchiectasis:** 433 patients, a chronic condition characterized by airway damage.
- **Asthma:** 863 patients, a common inflammatory airway disease.
- **Asthma-COPD Overlap Syndrome (ACOS):** 284 patients, representing a challenging clinical phenotype.

This broad spectrum of CRDs necessitates a comprehensive and adaptable rehabilitation approach, which PR is designed to provide. The sheer volume of patients, particularly those with ILD and COPD, who are known to benefit significantly from PR, further emphasizes the critical gap in current service provision at GPHC.

The HNA also meticulously documented the predominant symptom burden experienced by these patients. Breathlessness (dyspnea) emerged as the most pervasive and debilitating symptom, profoundly impacting patients' daily lives and functional independence. This aligns with global data indicating dyspnea as a primary driver of disability in CRD. Beyond breathlessness, other significant contributors to patient morbidity included:

- **Chronic Fatigue:** A common and often overlooked symptom that severely limits physical activity and overall well-being.
- **Anxiety and Depression:** High rates of psychological distress were noted, reflecting the significant mental health burden associated with living with a chronic, progressive respiratory illness. The fear of breathlessness often leads to social isolation and reduced physical activity, exacerbating these psychological symptoms.
- **Chronic Cough (with or without mucous production):** A persistent and troublesome symptom that can lead to sleep disturbance, social embarrassment, and further compromise quality of life.

These findings collectively paint a clear picture of a patient population struggling with severe and multifaceted symptoms, for whom current management strategies are insufficient. The HNA thus provides a robust, data-driven justification for the immediate integration of a PR program, as it directly addresses these unmet patient needs.

Detailed feasibility study findings

The feasibility study, drawing upon extensive literature and validated by the HNA findings, unequivocally supports the successful integration of a Pulmonary Rehabilitation (PR) program at GPHC. The evidence base for PR is exceptionally strong, demonstrating consistent and significant improvements across

multiple patient outcomes. Key findings from the literature review, which are directly applicable and reinforce the feasibility in the Guyanese context, include:

- **Profound Symptom Reduction:** PR consistently leads to a substantial decrease in symptom burden, most notably breathlessness. This is achieved through a combination of exercise training, which improves respiratory muscle efficiency and reduces dynamic hyperinflation, and educational components that teach patients coping strategies for dyspnea. The reduction in breathlessness directly translates to improved functional capacity and reduced anxiety related to breathing difficulties.
- **Enhanced Exercise Endurance and Physical Activity:** A core component of PR is individualized exercise training, which has been shown to significantly improve both peak and submaximal exercise capacity. This improvement is not solely due to enhanced respiratory function but also to improved peripheral muscle strength and endurance, which are often deconditioned in CRD patients.
- Increased exercise tolerance empowers patients to engage in more physical activity in their daily lives, breaking the cycle of inactivity and deconditioning.
- **Improved Psychological Well-being:** The comprehensive nature of PR addresses the high prevalence of anxiety and depression in CRD patients. Through structured psychological support, counseling, and group interactions, PR programs effectively reduce symptoms of distress, improve mood, and enhance self-efficacy. This holistic approach recognizes the bidirectional relationship between physical and mental health in chronic illness.
- **Significant Quality of Life (QoL) Enhancement:** The cumulative effect of symptom reduction, improved physical function, and enhanced psychological well-being is a marked improvement in overall QoL. Patients report greater independence, increased participation in social activities, and a renewed sense of control over their health. This is a critical outcome, as the primary goal of CRD management is not just to prolong life but to improve its quality.

From an economic perspective, the feasibility study highlighted the substantial cost- saving potential of PR. Numerous studies have demonstrated that PR leads to a significant reduction in healthcare expenditures, often exceeding 50%. This is primarily achieved by decreasing the frequency and duration of costly hospitalizations and emergency room visits for acute exacerbations. By stabilizing patients' conditions and empowering them with self-management skills, PR reduces the need for acute care interventions, thereby freeing up valuable healthcare resources. This economic benefit makes PR an attractive investment for healthcare systems, particularly in resource-constrained settings like Guyana.

Crucially, the HNA revealed a high level of acceptability for a PR program among the target patient population at GPHC, with over 95% of patients expressing willingness to participate. This high acceptability is a strong indicator of potential program adherence and success, as patient engagement is paramount for the effectiveness of any rehabilitation intervention. The combination of robust clinical evidence, compelling economic benefits, and high patient acceptability provides a strong foundation for the successful implementation and sustainability of a PR program at GPHC.

Methods

Study design

This research employed a two-section study design to comprehensively assess the need for and feasibility of integrating a Pulmonary Rehabilitation (PR) program at the Georgetown Public Hospital Corporation (GPHC). The study comprised a Health Needs Assessment (HNA) and a feasibility study, with both components receiving ethical approval prior to commencement.

Health needs assessment (HNA)

The Health Needs Assessment was conducted at the respiratory clinic within GPHC. Data for the HNA were primarily sourced from the Global Access to Spirometry Project (GASP) database, which contains comprehensive records of patients with Chronic Respiratory Diseases (CRD) managed at the institution. The analysis of this data focused on several key areas:

- **Burden of CRD:** Quantifying the prevalence and types of CRDs among the patient population at GPHC.
- **Health Status of Patients:** Evaluating the current health status, symptom burden, and quality of life indicators of CRD patients attending the clinic.

- **Treatment Management Gap:** Identifying deficiencies in the current management protocols for CRD patients, specifically the absence of a formal PR program.
- **Need for a PR Program:** Establishing the clinical and patient-perceived necessity for a PR program based on the identified gaps and patient needs.
- **Available Resources:** Assessing the existing infrastructure, personnel, and other resources at GPHC that could potentially support the implementation of a PR program.
- **Community Readiness:** Gauging the receptiveness and preparedness of both the healthcare community and the patient population for the introduction of a PR service.

Feasibility study

The feasibility study was conducted through a rigorous literature review, focusing on established PR programs and their implementation strategies, patient outcomes, and cost-effectiveness. This review was complemented by the findings from the HNA and further data extracted from the GASP database. The analysis for the feasibility study aimed to demonstrate:

- **Feasibility and Sustainability of PR:** Evaluating the practical aspects of establishing and maintaining a PR program within the GPHC context, considering operational, financial, and human resource factors.
- **Patient Health Outcomes Pre and Post PR:** Synthesizing evidence from the literature regarding the improvements in patient health status, symptom management, and quality of life observed after participation in PR programs.
- **Cost-Effectiveness of PR:** Analyzing the economic benefits of PR, including its potential to reduce healthcare expenditures through decreased hospitalizations and emergency visits.
- **Program Development:** Outlining the essential components for developing a PR program, including considerations for site selection, patient recruitment strategies, staff training requirements, and the methodology for program conduction.

Data analysis

For both the HNA and the feasibility study, data from the GASP database and the literature review were systematically analyzed to identify patterns, trends, and key insights. Quantitative data from the GASP database were used to establish the epidemiological burden of CRD and patient characteristics. Qualitative information from the literature review provided a robust evidence base for the benefits and implementation considerations of PR. The synthesis of these data streams informed the conclusions regarding the need and feasibility of a PR program at GPHC.

Results

Health needs assessment findings

Analysis of the GASP database, encompassing 4621 patients with Chronic Respiratory Diseases (CRD) at GPHC, revealed a substantial burden of disease. The patient cohort included 853 individuals with Chronic Obstructive Pulmonary Disease (COPD), 1336 with Interstitial Lung Disease (ILD) (excluding idiopathic pulmonary fibrosis), 463 with mixed obstructive and restrictive lung disease, 47 with Idiopathic Pulmonary Fibrosis (IPF), 342 with occupational lung disease, 433 with bronchiectasis, 863 with asthma, and 284 with Asthma-COPD Overlap Syndrome (ACOS). This diverse patient profile underscores the broad applicability and necessity of a comprehensive pulmonary rehabilitation (PR) program.

The most prevalent and debilitating symptom reported across the CRD patient population was breathlessness. Other significant contributors to symptom burden included chronic fatigue, anxiety/depression, and chronic cough, often accompanied by mucous production. These symptoms severely impact patients' daily activities and overall quality of life, highlighting a critical need for interventions that address these multifaceted challenges.

Feasibility study findings

The feasibility study, informed by a comprehensive literature review and the insights from the Health Needs Assessment, strongly supports the integration of a PR program at GPHC. Evidence from numerous studies consistently demonstrates the profound benefits of PR in improving patient outcomes. Specifically, PR has been shown to:

- **Decrease Symptom Burden:** Particularly breathlessness, leading to significant relief for patients.
- **Improve Exercise Endurance:** Enhancing physical capacity and functional independence.
- **Enhance Psychological Function:** Reducing anxiety and depression commonly associated with chronic respiratory conditions.

- **Increase Physical Activity:** Promoting a more active lifestyle and better self- management.
- **Improve Overall Quality of Life (QoL):** A holistic improvement in patients' well- being and daily functioning.

Economically, PR has demonstrated a remarkable impact on healthcare costs, with studies reporting over a 50% reduction in overall expenditures due to decreased hospitalizations, emergency room visits, and acute exacerbations. Furthermore, the Health Needs Assessment indicated a high level of acceptability for a PR program among the target patient population, with over 95% expressing willingness to participate. This high acceptability, coupled with the proven clinical and economic benefits, reinforces the feasibility and desirability of implementing PR at GPHC.

Schedule

The project followed a structured schedule, commencing with ethical approval in mid- February and progressing through a needs assessment, feasibility study, and comprehensive review phases. Key milestones included data collection and analysis, preliminary analysis for the feasibility study, and the finalization of reports. The entire research process culminated in submission by mid-July, demonstrating a well- managed and timely execution of the study objectives.

Discussion

The findings of this study underscore the critical need and compelling feasibility of integrating a Pulmonary Rehabilitation (PR) program into the management of Chronic Respiratory Disease (CRD) patients at the Georgetown Public Hospital Corporation (GPHC). The comprehensive Health Needs Assessment (HNA) revealed a significant burden of CRD within the Guyanese population, characterized by a high prevalence of conditions such as COPD, ILD, and mixed obstructive/restrictive lung diseases.

Crucially, the HNA identified breathlessness, chronic fatigue, anxiety/depression, and persistent cough as pervasive and debilitating symptoms, severely impacting the quality of life of these patients. This aligns with global literature highlighting the profound symptomatic and psychosocial challenges faced by individuals with CRD [6,7,29].

The absence of a formal PR program at GPHC represents a significant treatment gap, particularly given the established evidence base for PR as a cornerstone of CRD management. International guidelines and numerous studies consistently advocate PR as an effective intervention to alleviate symptoms, improve exercise capacity, enhance psychological well-being, and ultimately improve overall quality of life [13,14,22]. The current study's findings, derived from both patient data and a thorough literature review, strongly corroborate these benefits, demonstrating that PR can lead to substantial improvements in patient health status and a marked reduction in symptom burden.

Beyond the clinical imperative, the feasibility study provides a robust economic argument for PR implementation. The documented reduction in healthcare costs, primarily through decreased emergency room visits and hospital admissions, presents a compelling case for resource allocation towards PR. This aligns with findings from programs like the National COPD Audit Programme, which have consistently shown significant cost savings associated with PR participation [24,25]. The high acceptability rate among the target patient population further strengthens the argument for feasibility, indicating a receptive environment for program adoption and adherence.

Strengths and Limitations

A key strength of this study is its dual approach, combining a localized HNA with a comprehensive literature review, providing both context-specific insights and broad evidence-based support. The use of the GASP database offered a robust dataset for understanding the local CRD burden. However, a limitation is the reliance on existing database information for the HNA rather than direct patient interviews, which could have provided deeper qualitative insights into patient experiences and preferences. Additionally, while the feasibility study drew heavily on established literature, a pilot program would provide direct, local evidence of implementation challenges and successes.

Future Directions

Future research should focus on developing a detailed implementation plan for the PR program at GPHC, including curriculum design, staffing models, and outcome measures. A pilot program would be invaluable to test the proposed model, identify potential barriers, and refine protocols before full-scale integration. Long-term studies are also warranted to assess the sustained impact of the PR program on patient outcomes,

healthcare utilization, and cost-effectiveness within the Guyanese healthcare system.

Conclusion

This study unequivocally demonstrates both the critical need for and the compelling feasibility of integrating a Pulmonary Rehabilitation (PR) program at the Georgetown Public Hospital Corporation (GPHC) for patients with Chronic Respiratory Disease (CRD). The significant burden of CRD and its associated debilitating symptoms in the Guyanese population highlight a clear treatment gap that PR is uniquely positioned to address. Supported by robust evidence from the literature and high patient acceptability, a PR program at GPHC promises substantial improvements in patient health outcomes, including reduced symptom burden, enhanced quality of life, and improved functional capacity. Furthermore, the economic benefits, particularly the potential for significant reductions in healthcare costs, underscore the strategic importance of this initiative. The findings of this research provide a strong foundation and clear mandate for the prompt implementation of a PR program, marking a pivotal step towards comprehensive and patient-centered CRD management in Guyana.

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