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Assessment of Respiratory Therapists' Knowledge and Attitudes Toward Pulmonary Rehabilitation, Patient Education, and Home Health Care in Reducing COPD Readmissions

Dhaifallah Alotaibi, Salah Alanazi, Manal Almunea, Bedoor Alotaibi, Sarah Alsaeed, Nawaf Alanazi, Abdulaziz Alanazy, Abdulaziz Alrowail, Mohammed Alobaidy, Ibrahim Aldhwayan, Laila Anizi, Naifa Alauda, Abdulmajeed Alanazi, Ahmed Majrashi, Rami Alkhalid, Bader Albooshi, Abdulkhaliq Alanazi, Watin Alshahrani, and Wael Almutairi, Mamdoh Obaid Alanazi, Yasser Almutairi, Saad Alrashdaa

Respiratory Services, Tertiary Hospital

Abstract:- **Background:** Chronic Obstructive Pulmonary Disease (COPD) is a profound global public health issue, recognized as a progressive and debilitating respiratory condition characterized by persistent airflow limitation, leading to frequent, acute exacerbations and high rates of costly hospital readmission. Non-pharmacological interventions, such as Pulmonary Rehabilitation (PR), patient education, and home health care, have emerged as essential strategies, validated by numerous systematic reviews for their efficacy in mitigating symptom burden, significantly improving patients' health-related quality of life, and reducing recurrent hospital utilization. Respiratory Therapists (RTs) are uniquely positioned to deliver these complex, multidisciplinary services. However, the consistent and effective implementation of PR is often hindered by systemic barriers, including limited awareness and a shortage of trained personnel. Therefore, this study aimed to evaluate the current knowledge and attitudes of respiratory therapists regarding the integral roles of pulmonary rehabilitation, patient education, and home health care in effectively reducing hospital readmission rates among patients with COPD

Methodology: A quantitative, cross-sectional study design was implemented. The research was conducted within the respiratory services at a Tertiary Hospital , targeting adult RTs with at least six months of clinical experience across various high-acuity and chronic care units, including intensive care, wards, and pulmonary rehabilitation. Data was gathered from participating RTs using a validated questionnaire by Wu et al. that systematically assessed 10 knowledge items and 10 attitude items related to PR and COPD management strategies.

Results: The quantitative cross-sectional study successfully surveyed 92 respiratory therapists. The demographic analysis of the surveyed RTs revealed a professional workforce, with a

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balanced gender split (50% male, 50% female) , a high rate of Bachelor's degree attainment (64.13%) , and extensive experience, as over half of the respondents reported seven or more years of experience (57.61%). The findings indicated a fundamental strong professional attitude toward these services, with a majority (57.61%) agreeing that reducing COPD readmissions is a critical measure of care quality (Q18). Despite this strong intent, the study identified significant, actionable knowledge and operational deficiencies: a critical deficit was found in the ability to effectively document interventions to track patient outcomes (Q10), with over half of RTs (53.26%) expressing disagreement with their proficiency in this area. Furthermore, a notable resistance to modernizing care delivery was observed, as 42.39% actively disagreed that telehealth is a valuable tool for follow-up and education (Q14). Knowledge scores also displayed high variability across the sample regarding evidence-based PR standards, such as the main components (Q1) and recommended frequency/duration (Q3) of the program.

Conclusion: This assessment establishes that the RT workforce possesses a high level of professional commitment to implementing pulmonary rehabilitation and patient education in COPD management. However, the efficacy of these programs is severely constrained by specific, critical gaps. The most substantial barrier identified is the lack of proficiency in outcome-focused documentation, which directly impedes the ability to measure and justify the value of respiratory services. Furthermore, the resistance to telehealth adoption and the inconsistent knowledge of PR operational standards pose immediate threats to optimizing care delivery and reducing hospital readmissions. Strategically addressing these specific knowledge and technological deficiencies is paramount for empowering RTs, enhancing clinical outcomes, and ensuring the sustainability of high-quality COPD care.

Keywords: Respiratory Therapists, Knowledge, Attitudes, Pulmonary Rehabilitation, COPD Readmissions, Patient Education.

1. Introduction

Chronic Obstructive Pulmonary Disease (COPD) is a progressive and debilitating respiratory condition characterized by persistent airflow limitation, inflammation of the airways, and structural changes in the lungs. It encompasses chronic bronchitis and emphysema and is primarily caused by long-term exposure to harmful particles or gases, most notably tobacco smoke (World Health Organization [WHO], 2023). COPD significantly impairs respiratory function, resulting in chronic dyspnea, reduced exercise tolerance, and frequent exacerbations that necessitate recurrent hospitalizations. Despite being preventable and treatable, COPD remains one of the top contributors to global disease burden and mortality. According to the WHO (2023), an estimated 251 million people globally suffer from COPD, with the disease responsible for approximately 3.2 million deaths in 2019, making it the third

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leading cause of death worldwide. In the United States alone, Ford et al. (2015) estimated that the total medical and absenteeism-related costs of COPD exceeded $49 billion in 2010, with projections indicating continued economic strain through 2020. These figures underscore the urgent need for improved disease management strategies that not only enhance patient outcomes but also alleviate the financial pressures on healthcare systems. Within the landscape of COPD management, respiratory therapists (RTs) play a pivotal role in the implementation of non-pharmacological interventions aimed at reducing readmissions, enhancing patient functionality, and promoting long-term recovery. Among these interventions, pulmonary rehabilitation (PR) has emerged as one of the most effective strategies in mitigating symptom burden, improving quality of life, and reducing hospital utilization. PR is a comprehensive, multidisciplinary intervention that typically includes supervised exercise training, nutritional counseling, education, and psychological support tailored to individuals with chronic respiratory diseases (McCarthy et al., 2015). Numerous systematic reviews and meta-analyses have confirmed the efficacy of PR in reducing dyspnea, increasing exercise capacity, and improving health-related quality of life in patients with COPD (Puhan et al., 2016; McCarthy et al., 2015). Specifically, McCarthy et al. (2015) found that patients undergoing PR experienced significant reductions in hospital admissions and improvements in physical performance metrics. Moreover, PR initiated shortly after acute exacerbations has been shown to reduce the risk of rehospitalization and mortality, emphasizing the importance of timely and accessible rehabilitation services (Puhan et al., 2016). RTs are at the forefront of PR delivery due to their specialized knowledge in respiratory physiology, therapeutic modalities, and patient care coordination. Their responsibilities in PR extend beyond exercise supervision to include comprehensive assessment of patients' respiratory function, education on inhaler techniques, oxygen therapy management, and reinforcement of behavioral modifications. However, despite the established benefits of PR, its implementation remains inconsistent, particularly in resource-limited settings. (Alsubaiei et al. 2017) identified key barriers to PR in the Eastern Province of Saudi Arabia, including a shortage of trained personnel, inadequate funding, and limited awareness among healthcare providers and patients. These findings highlight the pressing need to evaluate and enhance RTs' preparedness and confidence in delivering PR. The variability in PR uptake may also reflect disparities in RTs' educational exposure, institutional support, and perceived role in chronic disease management. In addition to pulmonary rehabilitation, patient education is a cornerstone of effective COPD care, particularly in reducing readmissions and enhancing self-management skills. Structured educational programs delivered by RTs can improve patients' understanding of disease mechanisms, medication adherence, correct inhaler use, and strategies for recognizing and responding to exacerbation symptoms. Lindenauer et al. (2020) demonstrated that the initiation of PR, which included patient education, following hospital discharge was associated with improved 1-year survival among Medicare beneficiaries with COPD. These findings affirm the

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notion that RTs' involvement in educating patients is not merely supplementary but essential to improving long-term outcomes. However, the success of educational initiatives depends on RTs' ability to communicate effectively, tailor content to patients' literacy levels, and foster motivation for behavioral change. The transition of care from hospital to home further extends the responsibilities of RTs into the realm of home health care, where they play a critical role in ensuring continuity of care and reducing the likelihood of readmission. The application of telehealth in delivering PR and monitoring COPD patients at home has shown promising results. Bhatt et al. (2015) reported that a video-based telehealth PR intervention significantly reduced 30-day hospital readmissions in COPD patients, indicating the feasibility and effectiveness of remote care models. In such settings, RTs are instrumental in providing virtual coaching, monitoring respiratory symptoms, and managing equipment such as oxygen devices and nebulizers. However, the effective integration of home health services requires that RTs possess not only clinical competencies but also technological literacy and adaptability to new care models. Moreover, the broader contributions of RTs to the healthcare system are evident in their role in critical care, particularly in early mobilization and rehabilitation of patients in intensive care units (ICUs). A systematic review by Tipping et al. (2017) found that early rehabilitation in ICU settings was associated with improved mortality and functional outcomes. This reinforces the need to recognize RTs as integral members of the multidisciplinary team across the continuum of care. Yet, the extent to which RTs embrace these expanded roles in pulmonary rehabilitation, education, and home care is largely influenced by their knowledge base, attitudes toward chronic disease management, and practical experiences in diverse clinical settings. Therefore, assessing RTs' knowledge an attitudes related to PR, patient education, and home health care is critical for identifying educational gaps. In regions like Saudi Arabia, where implementation of chronic disease interventions remains uneven, this research has the potential to guide strategic investments in respiratory therapy services and optimize care delivery. Ultimately, empowering RTs with the necessary skills and knowledge can significantly contribute to reducing COPD-related hospitalizations, enhancing patient quality of life, and ensuring sustainable healthcare outcomes.

2. Methods

A quantitative, cross-sectional study design was implemented. The research was conducted within the respiratory services at a tertiary hospital, targeting adult RTs with at least six months of clinical experience across various high-acuity and chronic care units, including intensive care, wards, and pulmonary rehabilitation. Data was gathered from participating RTs using a validated questionnaire by Wu et al. that systematically assessed 10 knowledge items and 10 attitude items related to PR and COPD management strategies.

3. Results

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The quantitative cross-sectional study successfully surveyed 92 respiratory therapists across intensive care units, wards, pulmonary rehabilitation, and pulmonary function testing units. The study gathered responses from professionals in various clinical settings. The demographic analysis reveals a relatively seasoned and balanced workforce, based on the full sample of 92 respondents.

Table 1: Demographic Profile of Survey Respondents.

Characteristic	Category	Frequency ()	Percentage (%)
Age	20–29	24	26.09%
	30–39	17	18.48%
	40–49	35	38.04%
	50 and above	16	17.39%
Gender	Male	46	50.00%
	Female	46	50.00%
Educational Level	Diploma	25	27.17%
	Bachelor's degree	59	64.13%
	Master's degree	8	8.70%
Experience (RT)	1–3 years	22	23.91%
	4–6 years	17	18.48%
	7–10 years	30	32.61%
	More than 10 years	23	25.00%

The age distribution indicates that the majority of respondents fall into the mid-career category, with the 40–49 age bracket contributing 38.04% of the sample, followed by the 20–29 age bracket (26.09%) and the 30–39 bracket (18.48%). The gender distribution was equally split, with 50.00% Male respondents and 50.00% Female respondents. Educational attainment was

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high, with 64.13% holding a Bachelor's degree, 27.17% holding a Diploma, and 8.70% possessing a Master's degree. Crucially, the RT experience profile demonstrated a strong weighting toward established professionals, with 32.61% reporting 7–10 years of experience, and an additional 25.00% reporting more than 10 years of experience. This extensive clinical background suggests the perspectives captured are those of experienced frontline practitioners who have a robust understanding of current operational realities within the facility. Furthermore, all respondents reported their current position as "Staff Respiratory Therapist," meaning the study solely reflects the views of implementers rather than managerial or supervisory staff.

I.2. Assessment of Knowledge Regarding COPD Management Interventions (Q1–Q10)

The analysis of the 10 knowledge items addresses the primary objective of assessing RT knowledge concerning evidence-based PR practices. The results indicate a variable understanding of PR components, showing strength in traditional clinical skills but significant weakness in systemic, outcome-focused knowledge, particularly documentation.

Table 2: Descriptive Statistics of Respiratory Therapists' Knowledge Scores.

Knowledge Statement	Mean (SD)	% Agreement (1+2)	% Neutral (3)	% Disagreement (4+5)
Q1 (Components of PR)	2.96 (1.58)	44.57%	13.04%	43.48%
Q2 (PR reduces readmissions)	2.87 (1.52)	48.91%	13.04%	39.13%
Q3 (Frequency/duration of PR)	2.83 (1.46)	47.83%	17.39%	35.87%
Q4 (Teach inhaler techniques)	2.89 (1.54)	47.83%	11.96%	40.22%

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Q5 (Benefits of home-based PR)	2.88 (1.47)	50.00%	17.39%	32.61%
Q6 (Role of patient self-monitoring)	2.66 (1.48)	55.43%	13.04%	31.52%
Q7 (Identify early signs of exacerbation)	2.92 (1.53)	47.83%	17.39%	34.78%
Q8 (Know common barriers)	2.99 (1.56)	45.65%	14.13%	40.22%
Q9 (Telehealth use in PR/Education)	2.89 (1.55)	45.65%	14.13%	40.22%
Q10 (Document interventions effectively)	3.55 (1.57)	30.43%	16.30%	53.26%

Highlights of Knowledge Domains

Areas of Moderate Strength: The highest agreement was found regarding the role of patient self-monitoring (Q6), with 55.43% agreeing. Confidence in teaching correct inhaler techniques (Q4) was also moderately high at 47.83%. These indicate foundational skills in direct patient care and education. Fragmented Understanding of PR Standards: Knowledge regarding the main components of PR (Q1) and recommended frequency/duration (Q3) showed high variability, suggesting an inconsistent grasp of evidence-based programmatic guidelines. Critical Deficit in Documentation: The most pronounced knowledge gap was identified in effective documentation to track outcomes (Q10). A majority of 53.26 % expressed

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disagreement regarding their proficiency in this area, representing a significant barrier to measuring quality improvement and justifying resource needs.

I.3. Evaluation of Attitudes Towards COPD Management Interventions (Q11–Q20)

The evaluation of RT attitudes addresses the second primary objective of the study. Overall, RTs demonstrated strong positive belief in the value of PR, patient education, and their professional impact.

Table 3: Descriptive Statistics of Respiratory Therapists' Attitude Scores.

Attitude Statement	Mean (SD)	% Agreement (1+2)	% Neutral (3)	% Disagreement (4+5)
Q11 (PR is essential for QoL)	2.60 (1.64)	54.35%	11.96%	35.87%
Q12 (Patient education is critical)	2.93 (1.60)	47.83%	11.96%	40.22%
Q13 (Home health care is effective)	2.83 (1.44)	47.83%	17.39%	34.78%
Q14 (Telehealth is a valuable tool)	3.12 (1.66)	42.39%	15.22%	42.39%
Q15 (Multidisciplinary collaboration)	2.92 (1.55)	46.74%	15.22%	38.04%
Q16 (Confident in	3.16 (1.55)	44.57%	14.13%	41.30%

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ability to educate)				
Q17 (Workplace supports me)	2.54 (1.51)	54.35%	10.87%	34.78%
Q18 (Reducing readmissions is important)	2.47 (1.51)	57.61%	11.96%	30.43%
Q19 (PR programs offered to all)	2.85 (1.59)	50.00%	13.04%	36.96%
Q20 (Role significantly impacts outcomes)	2.78 (1.47)	51.09%	16.30%	32.61%

Evaluation of Professional Beliefs and Confidence

Strong Endorsement of Intervention Value: RTs showed a powerful commitment, with 57.61% agreeing that reducing COPD readmissions is an important measure of care quality (Q18). Over half also believe PR is essential for improving quality of life (Q11, 54.35%) and that their role significantly impacts patient outcomes (Q20, 51.09%). Perceived Institutional Support: A notable finding is the relatively high agreement (54.35%) that the workplace supports me in providing pulmonary rehabilitation and patient education (Q17).

Area of Low Confidence and Resistance: Despite strong belief in the interventions, low scores were recorded for practical readiness. Only 44.57% were confident in their ability to provide effective education (Q16). The lowest attitude score related to technology: 42.39% actively disagreed that telehealth is a valuable tool (Q14).

I.4. Relationship Between Professional Characteristics and Core Outcome Measures

Exploratory analysis found that overall knowledge peaked among RTs with 7–10 years of experience (Mean) and slightly declined in the most senior group (>10 years, Mean). Attitude

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scores, conversely, showed a modest, continuous improvement with seniority (highest mean, , in the >10 years cohort).

Table 4: Influence of Experience on Average Knowledge and Attitude Scores.

Professional Experience (Years)	N	Mean Total Knowledge Score (SD)	Mean Total Attitude Score (SD)
1–3 years	22	3.05 (0.87)	3.00 (0.82)
4–6 years	17	2.95 (0.91)	2.86 (0.78)
7–10 years	30	2.80 (0.81)	2.72 (0.83)
More than 10 years	23	2.99 (0.85)	2.70 (0.75)

4. Discussion

The current study provides a critical assessment of the readiness of respiratory therapists at the participating institution to implement comprehensive strategies for COPD readmission reduction, specifically focusing on pulmonary rehabilitation, patient education, and home health care. The results reveal a significant disparity: The RTs demonstrate a robust professional attitude toward these critical services, yet this positive intent is hampered by specific, actionable knowledge gaps that compromise the systematic effectiveness of program delivery. The analysis establishes a foundational strength among the respiratory therapist workforce: an intrinsic professional belief in the importance of chronic disease management. This is evident in the strong agreement that pulmonary rehabilitation is essential for quality of life (Q11) and that reducing COPD readmissions is a core measure of care quality (Q18). However, this positive intent is contradicted by fragmented operational knowledge. The variability in knowledge scores regarding the essential logistical and clinical requirements of PR, such as its core components (Q1) and recommended frequency/duration (Q3), suggests an inconsistent grasp of evidence-based programmatic guidelines. This finding aligns with assessments of RTs in other settings, which have also revealed low knowledge levels concerning COPD management, with one study reporting an average knowledge score of only 49.9% correct answers (Alobaidi et al., 2025). The consistent application of standards is vital for PR efficacy, and this inconsistency indicates that while the institution possesses committed personnel, systemic training gaps prevent the translation of positive attitudes into standardized, high-quality clinical practice. The most critical and actionable deficit identified is the lack of

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proficiency in effective documentation of interventions to track patient outcomes (Q10), with over half of RTs expressing low confidence in this area. This represents a significant systemic vulnerability. Effective outcome tracking is paramount, as it provides the measurable data necessary to transition from simply delivering care activities to demonstrating concrete, quantifiable success in mitigating the substantial clinical and economic burden of COPD. Without the ability to systematically capture and report standardized metrics on improvements in patient functionality or reductions in exacerbation frequency post-intervention, the institution lacks the objective evidence required to justify sustained investment and strategic expansion of services. This deficit points toward a need for institutional policy adjustments that integrate standardized outcome metrics into electronic health records (EHR) and provide focused training on chronic disease documentation protocols, mirroring the emphasis on robust care management and outcome tracking seen in successful population health efforts using dedicated respiratory therapist care managers (Craddock et al., 2025). Patient education delivered by RTs is globally recognized as essential for reducing readmissions and enhancing patient self-management. While therapists demonstrate basic knowledge in critical areas like correct inhaler techniques (Q4) and self-monitoring (Q6), a moderate confidence gap remains in their overall ability to provide effective COPD education (Q16). This competence-confidence mismatch suggests that RTs may lack the specialized communication skills or pedagogical training required to effectively tailor complex information to diverse patient populations and motivate durable behavioral change. Research supports that technology-enabled patient education, which includes relevant information and encourages interaction, can lead to better patient experience, improved learning attainment, and increased physical activity behavior changes (Blackstock et al., 2021). Of equal concern is the variable knowledge regarding the early identification of COPD exacerbation signs (Q7). In the post-discharge environment, the RT serves a crucial role in monitoring for deterioration; weakness in this knowledge domain directly undermines the goal of preventing recurrent hospitalizations and necessitates focused, scenario-based training addressing transition-of-care protocols. The recorded resistance to accepting telehealth as a valuable tool for follow-up and education (Q14) poses a substantial challenge to the future of chronic disease management at the facility. International research has demonstrated the effectiveness of remote care models, particularly video-based pulmonary rehabilitation interventions, in significantly reducing readmission rates. Given the regional logistical challenges often associated with delivering comprehensive, in-person care, remote models are an advantageous strategy for expanding PR access and ensuring continuity of care. The low acceptance of telehealth observed in this study aligns with findings from other assessments, where respiratory therapists and nurses demonstrated significantly lower odds of having a positive attitude toward technology compared to other healthcare professionals (Qutob et al., 2025). This resistance is likely rooted in unfamiliarity, the absence of standardized technological platforms, or a deficit in training required to

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effectively operate these systems in a clinical context. This resistance creates a barrier to aligning the facility's services with contemporary global trends in chronic care, and overcoming it requires mandatory training that demonstrates successful clinical workflows using digital platforms. The secondary analysis revealed a non-linear relationship between professional experience and knowledge: while attitudes improved slightly with seniority, clinical knowledge peaked among the 7–10 year experience cohort and declined among the most senior RTs. Knowledge scores were lowest in the most junior cohort (1–3 years), suggesting a need for foundational orientation, and declined in the most veteran cohort (>10 years). This finding contrasts with studies that suggest overall years of experience may not be a significant predictor of COPD knowledge but highlights the importance of context: staff in direct bedside roles often demonstrate better knowledge than those in purely supervisory or educational roles (Alobaidi et al., 2025). The pattern emphasizes the necessity for robust, mandatory Continuous Professional Development (CPD) programs specifically designed to refresh the knowledge of senior personnel on the most current operational standards. A primary strength of the study is its focused, quantitative assessment of RTs' knowledge and attitudes toward the specific, interconnected strategies—PR, patient education, and home health care—that are vital for reducing COPD morbidity and mortality. Furthermore, the use of a validated questionnaire ensures reliable measurement of the variables. However, the findings must be interpreted in light of limitations, including a lower-than-calculated sample size, which reduces statistical power, and the cross-sectional design, which captures readiness at a single moment in time.

5. Conclusion

The evaluation of respiratory therapists reveals a clinically engaged and professionally motivated workforce that fundamentally believes in the essential role of pulmonary rehabilitation, patient education, and home health care in managing COPD. This strong professional attitude provides a solid basis for organizational improvement. However, the study identified critical knowledge and operational deficiencies that limit the programs' efficacy. The most significant finding is the lack of proficiency in effective documentation and outcome tracking, which directly undermines the organization's ability to measure the value of its respiratory services based on established quality metrics. Furthermore, resistance to adopting telehealth technology and inconsistent knowledge regarding PR operational standards pose immediate barriers to modernizing COPD care delivery. Empowering respiratory therapists by addressing these specific knowledge and technological gaps is essential for improving clinical practice, significantly contributing to the reduction of COPD-related hospitalizations, and ensuring sustainable healthcare outcomes.

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