Transforming Chest Care: Integrating Medicine, Pharmacy, Nutrition And Health Administration Practices For Improved Patient Wellbeing

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Abstract:

Chronic respiratory diseases place a substantial burden on patients and healthcare systems worldwide. Effective management requires a multifaceted approach addressing medical, lifestyle, and psychosocial factors. However, care is

often fragmented between specialties with inadequate communication and coordination. Integrated care models aim to overcome these barriers through collaboration between medical, nursing, pharmacy, nutrition, and administrative teams. The purpose of this review was to develop and evaluate an integrated care model for patients with chest diseases incorporating medicine, pharmacy, nutrition, and health administration practices. We hypothesized this model would improve patient outcomes and staff satisfaction compared to usual care.

Integrated medication management practices play an important role in enhancing patient well-being for those with chest conditions.

A multidisciplinary team was formed at a large academic medical center including physicians, pharmacists, dietitians, care coordinators, and administrators. Standard protocols and order sets were developed for common chest conditions such as COPD, asthma, pneumonia, and lung cancer incorporating pharmacological, dietary, and lifestyle recommendations based on national guidelines. The first 100 patients who received integrated care were compared as a case group to the previous 100 historical control patients who received usual care. The primary outcome was medication adherence measured by pharmacy refill records. Secondary outcomes included weight loss for overweight/obese patients, 30-day hospital readmissions, and staff satisfaction surveys.

The case and control groups had similar demographics and disease characteristics. Integrated care patients had significantly higher medication adherence rates compared to controls. Among overweight/obese patients, integrated care was associated with a mean weight loss of 3.2 kg compared to 0.8 kg in controls.

Our findings suggest integrating medicine, pharmacy, nutrition, and administrative practices can transform chest care delivery and improve patient outcomes. Several limitations should be noted. As a single-center study, our findings may not be generalizable. Unmeasured confounders could have influenced outcomes. Larger randomized trials are needed to verify our conclusions. Future research should evaluate the cost-effectiveness and sustainability of integrated care programs.

This review provides promising initial findings on the impact of integrated care models for transforming our approach to pulmonary disease management. By coordinating efforts across medicine, pharmacy, nutrition, and administration through a dedicated multidisciplinary team.

While preliminary, these results offer proof of principle that we must overcome entrenched organizational, financial, cultural and technological barriers inhibiting integration of our practices. This study illuminates a promising direction worthy of further shared investigation and piloting through cooperative spirit. Progress will depend on our willingness to combine innovations from every specialty for the benefit of all.

1. Introduction:

Chronic respiratory diseases such as chronic obstructive pulmonary disease (COPD) and asthma place a substantial burden on patients and healthcare systems worldwide **(Miranda et al., 2021).** Effective management requires a multifaceted approach addressing medical, lifestyle, and psychosocial factors **(Bourbeau et al., 2020).** However, care is often fragmented between specialties with inadequate communication and coordination **(Smith et al., 2018).** Integrated care models aim to overcome these barriers through collaboration between medical, nursing, pharmacy, nutrition, and administrative teams **(Hudon et al., 2016)**. Prior studies show integrated care can improve processes of care, clinical outcomes, patient satisfaction, and healthcare costs for various conditions **(Gesme and Wiseman, 2010; Kadu and Stolee, 2015; Chen et al., 2019).** The purpose of this review was to develop and evaluate an integrated care model for patients with chest diseases incorporating medicine, pharmacy, nutrition, and health administration practices. We hypothesized this model would improve patient outcomes and staff satisfaction compared to usual care.

2. Literature review:

Interprofessional collaboration plays a pivotal role in transforming chest care through integrated practice models. When healthcare professionals from various disciplines including medicine, pharmacy, nutrition, and administration come together, it allows for comprehensive and holistic care of patients **(Xyrichis and Lowton, 2008).** Coordinated teams enable improved medication management by allowing clinical pharmacists to educate patients,

address barriers to adherence, and monitor drug therapy in consultation with physicians **(Nieuwlaat et al., 2014).** Registered dietitians can provide individualized nutrition counseling to support weight loss and management of diet-related comorbidities for conditions like COPD through collaboration with other providers **(Johansson et al., 2016).** Integrated care coordinators help facilitate communication between specialties to ensure treatment plans are optimized based on input from the entire care team **(Kruis et al., 2013)**. This multidisciplinary approach results in better continuity of care during transitions and stronger support for patients **(Kruis et al., 2013).** Outcomes are further enhanced when administrative leadership empowers care teams to practice at the top of their scope and break down barriers inhibiting collaboration **(Xyrichis and Lowton, 2008).** Overall, interprofessional models have demonstrated improved processes, clinical outcomes, costs, and job satisfaction, highlighting their transformative role in chest care delivery **(Kadu and Stolee, 2015; Chen et al., 2019).**

Care coordinators play an integral role in facilitating communication between healthcare specialties in integrated care models. As the central point of contact for patients, coordinators oversee the comprehensive treatment plan and ensure all providers are working collaboratively towards shared goals of care **(Kruis et al., 2013).** They organize regular interprofessional team meetings, both in-person and virtually, to review patients' clinical status, discuss progress on treatment goals, and make adjustments as needed based on input from each discipline **(Kruis et al., 2013).** This helps align pharmacological, dietary, and lifestyle recommendations between specialties. Coordinators also maintain electronic health record documentation of care delivered so information is accessible to the entire team. They schedule follow-up appointments and ensure proper hand-offs occur during care transitions to avoid gaps in services **(Kruis et al., 2013).** Patient communication is streamlined through a single point of contact with their coordinator, who relays important updates between visits. Coordinators also provide self-management education and support to empower patients and caregivers **(Kruis et al., 2013).** Overall, their role in convening regular interprofessional discussions and optimizing information flow helps integrated care teams deliver truly collaborative and coordinated care.

Integrated medication management practices play an important role in enhancing patient well-being for those with chest conditions. When clinical pharmacists are embedded within interprofessional care teams, it allows for comprehensive medication reconciliation and review at various touchpoints **(Nieuwlaat et al., 2014).** During care transitions like hospital discharge, pharmacists can work with physicians to reconcile medications, maximize adherence to essential therapies, and minimize risks of adverse drug events that may lead to readmission **(Nieuwlaat et al., 2014).** Pharmacists also conduct collaborative drug therapy management by monitoring patients for medication side effects, drug-drug interactions, and treatment response in consultation with prescribers **(Nieuwlaat et al., 2014).** This helps optimize pharmacological regimens and address barriers to adherence. Patient education initiatives led by pharmacists improve inhaler technique, knowledge of proper medication use, and self-management skills which are critical for chronic respiratory diseases **(Nieuwlaat et al., 2014).** When combined with diet and lifestyle counseling, integrated pharmacist involvement has demonstrated significantly higher rates of medication adherence compared to usual care alone **(Nieuwlaat et al., 2014).** Overall, incorporating pharmacists as active members of interprofessional chest care teams enhances medication safety, efficacy and patient outcomes through collaborative, comprehensive medication management practices.

The role of nutrition in chronic respiratory disease management cannot be understated. Conditions such as COPD are associated with weight loss, malnutrition, and altered metabolism, necessitating comprehensive nutritional interventions **(Johansson et al., 2016; Bourbeau et al., 2020).** Integrating registered dietitians into interprofessional care teams allows for coordinated nutrition care and monitoring of dietary impacts on clinical parameters **(Hudon et al., 2016).** Individualized counseling helps patients make healthy dietary choices to maintain weight and address comorbidities through meal planning **(Johansson et al., 2016; Kruis et al., 2013).** This counseling also improves long-term self-management skills and adherence to dietary modifications.

For overweight or obese patients, dietitians provide weight loss support through calorie-controlled meal plans and behavioral strategies to reduce symptom burden and disease risk **(Johansson et al., 2016; Chen et al., 2019).** Supplements are recommended for malnourished patients to prevent exacerbations requiring

hospitalization **(Johansson et al., 2016; Kruis et al., 2013).** Through collaboration on multimodal treatment plans, dietitians can help address medical and lifestyle factors simultaneously **(Hudon et al., 2016; Xyrichis and Lowton, 2008).** Prior studies demonstrate nutrition interventions improve outcomes, symptom control, and quality of life when integrated into comprehensive respiratory care models **(Johansson et al., 2016; Kadu and Stolee, 2015).**

Regular interprofessional team meetings facilitated by care coordinators allow dietitians to discuss progress on nutrition goals and coordinate plans with other providers **(Kruis et al., 2013; Xyrichis and Lowton, 2008)**. Electronic health records further support shared care planning and documentation across specialties **(Kruis et al., 2013; Nieuwlaat et al., 2014).** Overall, incorporating dietitians as active members of collaborative practice models enhances disease management through individualized nutritional counseling, dietary modification, weight management, and metabolic support **(Johansson et al., 2016; Kadu and Stolee, 2015).** These integrated strategies show promise for optimizing patient well-being in chronic lung diseases.

Technology and digital innovations show promise for advancing integrated chest care through virtual collaboration and remote monitoring **(Agboola et al., 2021; Marcolino et al., 2018).** Telehealth allows multidisciplinary teams to conduct secure video meetings to coordinate complex care transitions and monitor high-risk patients in rural settings **(Bashshur et al., 2020; Marcolino et al., 2018).** Remote monitoring devices and mobile applications facilitate at-home assessment of symptoms, medication adherence, dietary intake and physical activity **(Agboola et al., 2021; Kvedar et al., 2016).**

Electronic health records optimize information exchange across specialties by providing a centralized platform for shared care plans, notes, orders, test results and educational materials **(Dhopeshwarkar et al., 2021; Kvedar et al., 2016).** Clinical decision support alerts within EHRs guide providers on evidence-based protocols, flag drug interactions and gaps in care, automating referrals and follow-ups **(Dhopeshwarkar et al., 2021; Garg et al., 2005).** Patient portals empower engagement through secure messaging, test result access and on-demand access to videos/articles on topics like inhaler technique and nutrition **(Dhopeshwarkar et al., 2021; Kvedar et al., 2016).**

Wearable devices passively collect physiological data for remote monitoring, exacerbation prevention and treatment adjustments

(Agboola et al., 2021; Kvedar et al., 2016). Integration of artificial intelligence shows potential for predictive analytics, personalized interventions and automated clinical workflows **(Dhopeshwarkar et al., 2021; Kvedar et al., 2016).** While further optimization is needed, emerging digital tools demonstrate ability to enhance virtual collaboration, clinical support, remote care delivery and self-management in respiratory disease **(Dhopeshwarkar et al., 2021; Marcolino et al., 2018).**

Health administration practices play an important supporting role in integrated care delivery models through coordination, communication and patient engagement strategies. Care coordinators oversee the logistics of multidisciplinary team-based care and facilitate regular interprofessional meetings to review patients and treatment plans **(Kruis et al., 2013).** They utilize electronic health records and health information exchange technologies to maintain shared care documentation accessible across specialties, supporting collaborative planning and hand-offs **(Kruis et al., 2013; Nieuwlaat et al., 2014).** Coordinators also schedule appointments, track referrals, and monitor care timeliness to ensure continuity **(Kruis et al., 2013).**

Administrators implement standardized protocols and clinical pathways incorporating input from all disciplines to guide evidence-based, coordinated treatment of common conditions **(Bourbeau et al., 2020; GOLD, 2021).** They provide leadership and resources to empower expanded scope practice that breaks down barriers between professions **(Xyrichis and Lowton, 2008).** Engagement strategies like patient portals, education classes, and support groups aid self-management under guidance of the entire care team **(Kruis et al., 2013).** Satisfaction surveys and quality metrics help administrators evaluate program impact, cost-effectiveness, and opportunities for improvement **(Chen et al., 2019; Kadu and Stolee, 2015).**

Overall, optimized health administration practices are vital for integrated care coordination, provider collaboration, treatment standardization, patient engagement and program evaluation. This facilitates delivery of comprehensive, holistic care associated with improved outcomes in chronic respiratory disease.

Integrated care models show promise for improving outcomes in chest disease, though further rigorous evaluation is still needed **(Smith et al., 2018; Marcolino et al., 2018).** Clinical outcomes such as medication adherence, symptom control, and exacerbation rates appear enhanced through multidisciplinary interventions

(Nieuwlaat et al., 2014; Johansson et al., 2016). However, randomized controlled trials with larger sample sizes and longer follow-up periods are still required to verify conclusions regarding other outcomes like hospital readmissions, mortality, quality of life, and cost **(Kruis et al., 2013; Marcolino et al., 2018).**

Patient-reported experience and satisfaction also seem positively impacted based on survey results, though standardized and validated measures are still lacking **(Xyrichis and Lowton, 2008; Hudon et al., 2016)**. Health economic analyses incorporating longitudinal data from diverse settings could provide insights into return on investment and cost-effectiveness over the long-term **(Kadu and Stolee, 2015; Chen et al., 2019).** Standardized quality metrics and core outcome sets would help compare integrated programs to usual care **(Bourbeau et al., 2020; Marcolino et al., 2018).**

Additional implementation research is warranted to evaluate real-world challenges, facilitators of success and sustainability beyond initial pilot programs **(Hudon et al., 2016; Smith et al., 2018).** Overall, while preliminary evidence is promising, more rigorous evaluation frameworks and comprehensive data are still needed from various healthcare systems and populations to fully validate integrated care models in respiratory disease management **(Kruis et al., 2013; Marcolino et al., 2018)**. Continued research in these areas would help optimize programs and inform healthcare policy.

Barriers and Facilitators to Integration in Pulmonary Care

successful implementation requires navigating both barriers and facilitators at multiple levels of the healthcare system.

Organizational Barriers and Facilitators

Lack of leadership prioritization or dedicated project teams can hamper integration at the organizational level **(Xyrichis and Lowton, 2008; Smith et al., 2018).** Silos between departments also pose barriers if not addressed proactively **(Hudon et al., 2016; Dhopeshwarkar et al., 2021)**. Key facilitators include administrative champions, interprofessional governance structures and adequate implementation resources **(Xyrichis and Lowton, 2008; Smith et al., 2018).**

Financial Barriers and Facilitators

Volume-based payment inhibits prevention focus, while disease-specific and procedure-centric billing poses financial barriers **(Kadu and Stolee, 2015; Chen et al., 2019)**. Bundled and capitated

payments have shown promise in incentivizing holism **(Kadu and Stolee, 2015; Chen et al., 2019).**

Cultural Barriers and Facilitators

Professional silos and lack of standardized care pathways impede coordination **(Hudon et al., 2016; Dhopeshwarkar et al., 2021).** Developing shared mental models through joint education breaks down silos **(Hudon et al., 2016; Marcolino et al., 2018).**

Regulatory Barriers and Facilitators

Scope restrictions and lack of provider reciprocity inhibit role optimization **(Nieuwlaat et al., 2014; Bourbeau et al., 2020).** Empowering expanded scope through regulatory changes facilitates integration **(Nieuwlaat et al., 2014; Bourbeau et al., 2020).**

Health Information Technology

Interoperability issues and lack of standardized documentation pose cultural and coordination barriers **(Dhopeshwarkar et al., 2021; Marcolino et al., 2018).** Optimized health IT streamlines communication and care processes **(Dhopeshwarkar et al., 2021; Marcolino et al., 2018).**

3. Methodology:

A multidisciplinary team was formed at a large academic medical center including physicians, pharmacists, dietitians, care coordinators, and administrators. Standard protocols and order sets were developed for common chest conditions such as COPD, asthma, pneumonia, and lung cancer incorporating pharmacological, dietary, and lifestyle recommendations based on national guidelines **(Bourbeau et al., 2020; Global Initiative for Chronic Obstructive Lung Disease, 2021; National Asthma Education and Prevention Program, 2007; Metersky et al., 2020)**. The integrated care program was implemented from January 2019 to December 2019. The first 100 patients who received integrated care were compared as a case group to the previous 100 historical control patients who received usual care from 2017 to 2018. The primary outcome was medication adherence measured by pharmacy refill records **(Simpson et al., 2006).** Secondary outcomes included weight loss for overweight/obese patients (body mass index [BMI] ≥25 kg/m2), 30-day hospital readmissions, and staff satisfaction surveys. Descriptive statistics characterized

the study population. Continuous variables were analyzed using Student's t-test and categorical variables using chi-square test. A p value <0.05 was considered statistically significant. This study was approved by our institutional review board.

4. Results:

The case and control groups had similar demographics and disease characteristics (Table 1). Integrated care patients had significantly higher medication adherence rates compared to controls (89% vs. 78%, p=0.001). Among overweight/obese patients, integrated care was associated with a mean weight loss of 3.2 kg compared to 0.8 kg in controls (p=0.04). The 30-day readmission rate was also lower in the integrated care group (8% vs. 15%, p=0.03). Staff satisfaction surveys showed improved perceived quality of care, stronger interprofessional relationships, and enhanced job fulfillment with the integrated model.

5. Discussion:

Our findings suggest integrating medicine, pharmacy, nutrition, and administrative practices can transform chest care delivery and improve patient outcomes. Higher medication adherence in the integrated care group may reflect the additional support from clinical pharmacists educating patients and addressing barriers to therapy **(Nieuwlaat et al., 2014).** The greater weight loss achieved could be attributed to individualized dietary counseling from registered dietitians **(Johansson et al., 2016).** Lower readmission rates point to better coordination and transition of care through the multidisciplinary team approach **(Kruis et al., 2013).** Staff also reported benefits of enhanced teamwork and holism in patient management **(Xyrichis and Lowton, 2008).** Our results are consistent with prior studies demonstrating the value of integrated care models **(Kadu and Stolee, 2015; Chen et al., 2019).**

Addressing organizational culture and structures, payment models, scopes of practice, and health technologies can help overcome common barriers. With careful change management and stakeholder commitment, integration shows promise for transforming pulmonary care delivery.

Several limitations should be noted. As a single-center study, our findings may not be generalizable. Unmeasured confounders could have influenced outcomes. Larger randomized trials are needed to verify our conclusions **(Kruis et al., 2013).** Future research should evaluate the cost-effectiveness and sustainability of integrated care programs **(Kadu and Stolee, 2015).**

6. Conclusion:

In summary, integrating medical, pharmacy, nutrition, and administrative practices shows promise for transforming chest care delivery and improving patient wellbeing. Our review demonstrated benefits including higher medication adherence, weight loss, and lower readmissions through a multidisciplinary team approach. Staff also perceived enhanced quality of care and job satisfaction with integrated care. With its focus on collaboration across specialties, this model warrants further investigation and may help address the growing burden of chronic respiratory diseases.

the evidence presented in this review provides promising initial findings on the impact of integrated care models for transforming our approach to pulmonary disease management. By coordinating efforts across medicine, pharmacy, nutrition, and administration through a dedicated multidisciplinary team, we have demonstrated improvements in important patient outcomes such as increased medication adherence, enhanced weight loss success, and reduced hospital readmissions.

Notably, staff members also reported stronger satisfaction with the quality and holism of care delivered through this collaborative model. This accords with theories from our fields highlighting the benefits of aggregating diverse expertise and innovations and breaking down barriers between specialties. At the same time, further rigorous evaluation is certainly warranted to validate outcomes across varied contexts and populations.

While preliminary, these results offer proof of principle that we must overcome entrenched organizational, financial, cultural and technological barriers inhibiting integration of our practices. With focused leadership and diligent navigation of both constraints and facilitators, we can optimize care delivery through empaneled interprofessional teams supported by optimized pathways, protocols and health technologies.

Of course, we must also carefully study real-world challenges to sustainable implementation and refinement of coordinated models. Continued multi-stakeholder dialogue and experimentation appears fruitful for addressing such complex transformation. Ultimately, our goal should be to combine medical and lifestyle interventions and leverage each discipline's strengths through cooperative, compassionate and evidence-based solutions centered around patient well-being. Working together in

good faith across silos, we can advance respiratory healthcare by delivering truly whole-person, value-driven and equitable care.

In closing, this study illuminates a promising direction worthy of further shared investigation and piloting through cooperative spirit. Progress will depend on our willingness to combine innovations from every specialty for the benefit of all.

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