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Commentary

Distinguishing pulmonary rehabilitation from chest physiotherapy in the African context

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ABSTRACT

Chronic respiratory diseases (CRDs) are highly prevalent in low- and middle-income countries. In Africa, the burden of CRDs is set to worsen due to an increase in smoking prevalence and household air pollution. Chest physiotherapy (CP) and pulmonary rehabilitation (PR) are used to manage CRDs in Africa, but distinguishing between these terms is not clear common among health-care professionals (HCPs) and patients. Here, we provide clarity on the differences between PR and CP to facilitate a greater understanding of PR and remove barriers to research and implementation of PR across Africa. CP is a treatment aimed at clearing secretions within airways of the lungs, while PR, through exercise training, education and self-management, treats extrapulmonary or systemic impairments. We know that there is a need for PR among people living with CRDs in Africa. However, health professionals' knowledge and training in PR remains insufficient. To implement PR services for people with CRDs in Africa, a strong understanding of what PR is, and its evidence base are needed. The development of PR in Africa will start by filling the gaps in knowledge, awareness, advocacy, and training.

Keywords: Chest physiotherapy, Pulmonary rehabilitation, Chronic respiratory diseases, Africa

INTRODUCTION

Chronic respiratory diseases (CRDs), such as chronic obstructive pulmonary disease (COPD), are highly prevalent in low- and middle-income countries (LMIC) where respiratory morbidity is rising fast[1] and where more than 90% of CRD-related deaths occur.[2] In Africa, the burden of CRDs is set to worsen due to the projected increase in smoking prevalence[1] and indoor pollution from biomass fuel.[3] People living with CRDs, such as COPD and post-tuberculosis lung disease (PTLD), are characterized by reduced lung function and chronic respiratory symptoms.[4] Often disabled by breathlessness, people with CRDs also typically experience reduced exercise capacity, poor quality of life, psychological morbidity, and reduced ability to work.[5] The clinical management of CRDs should, therefore, attempt to address both primary (pulmonary) and secondary (extrapulmonary) impairments to improve health status, health-related quality of life, and prognosis for people living with CRDs.[6]

In Africa, the most popular non-pharmacological therapy for people living with CRDs, like bronchiectasis or pulmonary fibrosis, is chest physiotherapy (CP) which aims at removing

secretions in the lung to induce sputum expectoration using postural drainage, percussion, and vibration on the chest.[7] Meanwhile, utilization of pulmonary rehabilitation (PR) in the management of CRDs remains very low in Africa.[8] PR is an evidence-based intervention for people living with CRDs, delivered by an interdisciplinary team, with exercise and education at its core.[9,10] To achieve the World Health Organization (WHO) Sustainable Development Goal 3 ("health and well-being for all"),[11] more efforts need to be put into increasing awareness and implementation of PR in Africa.[12]

PR and CP are often confused with each other in the healthcare setting.[13] From our experiences of running PR services and research as well as interactions with fellow healthcare workers and potential referrers to PR, there is much confusion between CP and PR in Africa. In this communication, we seek to provide clarity on the differences between PR and CP to facilitate a greater understanding of PR and help remove barriers to research and implementation of routine PR services across Africa.

WHAT IS PR?

PR is a complex intervention delivered by an interdisciplinary team, with exercise and education at its core. The American Thoracic Society/European Respiratory Society (ATS/ERS) PR Statement[14] defines PR as "*a comprehensive intervention based on a thorough patient assessment followed by patient-tailored therapies that include, but are not limited to, exercise training, education, and behavior change, designed to improve the physical and psychological condition of people with CRD, and to promote the long-term adherence to health-enhancing behaviors.*"

Individuals with COPD represent the largest proportion of referrals to PR programs and much of the existing evidence is from this population.[15] Randomized controlled trials have also shown effectiveness for several respiratory conditions other than COPD, including interstitial lung disease, bronchiectasis, asthma, cystic fibrosis, post lung transplant, lung cancer, and pulmonary hypertension.[10] PR is supported by the highest level of evidence in COPD[16] and it is known to reduce symptoms, enhance exercise capacity, optimize functional status, and reduce healthcare utilization through stabilizing or reversing systemic manifestations in other CRDs.[17]

The benefits of PR are achieved without significant improvements in physiological pulmonary impairment measures.[17] This is because PR has little or no effect on lung function, which is largely irreversible in COPD.[15,16] Instead, PR primarily addresses the systemic (extrapulmonary) effects of CRDs, including peripheral muscle dysfunction, cardiac dysfunction, and physical inactivity leading to deconditioning, anxiety and depression, and maladaptive behaviors such as a sedentary lifestyle, poor motivation, and poor adherence to prescribed therapies.[17] The essential components of PR include supervised exercise training, patient education, self-management strategies, nutritional interventions, psychosocial support and positive health behavioral change aimed at maintaining long-term benefits of PR.[14]

The use of PR gained significant momentum from the mid-1990s[18] in high-income countries (HICs), where PR is now at the heart of CRD management. PR is a relatively low cost, high impact intervention, recommended in international guidelines[9] and with unequivocal evidence for reversing the disability associated with COPD in HICs.[16] The "WHO Rehabilitation 2030: Call to Action" makes the case for the fundamental role of accessible and affordable rehabilitation, as well as acknowledging the unmet needs in LMICs,[19] including across Africa where the demand for PR greatly outweighs the capacity.[20,21]

WHAT IS CP?

CP is a group of physical techniques utilized to improve clearance of respiratory secretions (fluid or mucus) from airways in patients with ineffective cough or CRDs that produce large amounts of sputum such as bronchiectasis, chronic bronchitis, cystic fibrosis, and lung abscesses.[18,19] These physical techniques may include percussion, vibration, deep breathing using the cupped palm method of percussion [Figure 1], postural drainage, and huffing and/or coughing.[22] The purpose of CP is to clear airways by removing respiratory secretions from the lungs to the large airways where it can be coughed and/or suctioned out. This subsequently improves gas exchange and may help to reduce the work of breathing.[23] Unlike PR, CP may improve lung function as a result of lung re-expansion, as well as loosening and draining/coughing out thick secretions from the airways.[24,25] CP is of great value for those chronic lung diseases with mucus hyper-secretion, notably bronchiectasis, and cystic fibrosis,[26] with limited evidence in stable COPD.[27] Individuals requiring CP may have CRDs that present with extrapulmonary impairments, for which PR may be additionally beneficial.

MAIN DIFFERENCES BETWEEN CP AND PR

CP is a treatment aimed at clearing secretions within airways of the lungs (pulmonary effects of CRD), while PR targets secondary (extrapulmonary or systemic) impairments of CRD. Differences between PR and CP are summarized within [Figure 1], which visualizes key components of these interventions. A guide for implementing PR in an

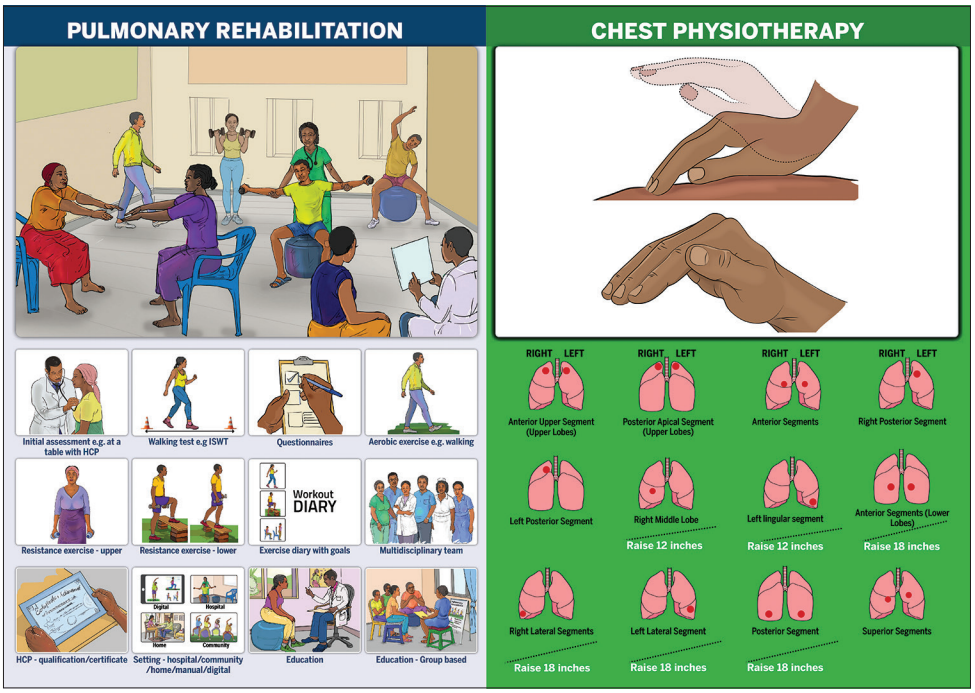

Figure 1: An illustration of the key components of pulmonary rehabilitation in comparison with chest physiotherapy.

African setting, highlighting key components of PR has been suggested, and could be adopted as a guideline template for other African countries in a bid to increase implementation of PR in the region.[28]

THE NEED FOR INCREASING PR CAPACITY IN AFRICA

PR is a very effective and relatively inexpensive[29] intervention that could use only local resources.[30] There is increasing evidence of the need and enthusiasm for PR among people living with CRDs in Africa, but knowledge and training of HCPs for PR is lacking.[31] There is also the need to introduce PR into guidelines or criteria for referring CRD patients in Africa.[31] To implement PR services for people with CRDs in Africa, a strong evidence base for the effectiveness of PR in specific populations is needed. Training and education also needs to be provided for prospective referrers and deliverers of PR to develop a critical mass of HCPs for national and regional PR systems.[31]

There is a need to increase capacity to meet the high demand for PR in Africa, which is now even greater due to the severe acute respiratory syndrome coronavirus 2 pandemic that has caused prolonged symptoms in many survivors, amenable to PR.[32] In addition, more than 58 million people have survived TB this century alone,[33] Yet, the long-term complications are generally not taken into account.[34] PR can play a key role in improving the health-related quality of life for people living with long-term consequences of respiratory infections.[35] The primary providers of PR services are often physiotherapists, as they typically have expertise in exercise testing, exercise prescription and training.[31,36] The WHO reported that although there is no universally agreed or recommended minimal number of physiotherapists, a critical shortage of these professionals in LMICs is evident.[37] In Southern Africa, there are fewer than ten physiotherapists per million inhabitants in most countries.[37] Consequently, the critical mass for physiotherapists is currently inadequate for developing and expanding PR services across Southern Africa. There is also a lack of PR training in the physiotherapy undergraduate curricula in a number of African countries.[38] Noteworthy, this PR training gap is reported to exist in most countries worldwide.[39] However, it is likely more evident in LMICs, especially in Africa, where the current workforce of "skilled" rehabilitation professionals is inadequate to serve the needs of the population.[37] Consequently, to optimize PR capacity in Africa, not only is the training of HCPs, such as physiotherapists and important but also task shifting, whereby wider multidisciplinary teams are utilized for PR. The lack of PR training is contrary to the ATS/ERS policy statement for enhancing the implementation, use, and delivery of PR, which recommends formal training in PR for any HCPs involved in the care of people with CRDs.[39]

WHAT NEXT FOR PR IN AFRICA?

At present, PR remains underutilized worldwide.[10] However, awareness and interest in PR have slowly started to take hold in Africa over the recent years. A systematic review of PR trials conducted in Southern Africa identified six randomized clinical trials published since 2010 (South Africa, Uganda, and Nigeria).[40] This systematic review shows that PR is not absent in Africa, but that the evidence base is disproportionate to the burden of CRDs and the need for PR, while other trials are set to be completed, including the first fully powered trial of PR for people with PTLD in Uganda[41] opportunities to test new service models and workforce training strategies should be embraced. Barriers to PR in LMICs include limited resources and workforce (including lack of PR specialists), low awareness or acceptance of physical therapy services including PR, and patient access costs to PR, including transportation costs associated with long trips to a health care facility to receive PR.[38] Enablers to establishing PR across Africa include generating data showing the need for PR in Africa, creating appropriate and adapted guidelines, disseminating the results of this research in conferences, and congresses, and incorporating this in our teaching curriculum in health school programs (including medicine, physiotherapy, and nursing). Understanding current clinical practice and the determinants of target behaviors associated with PR implementation is crucial for developing strategies to successfully bridge the gap in PR implementation.[42]

CONCLUSION

Confusion between two different but important interventions, PR and CP, may hinder implementation of PR across the Africa and similar settings. CP aims to clear secretions within airways of the lungs, whereas PR targets to reverse the extrapulmonary complications of CRDs. Although the two non-pharmacological treatments can be complementary to each other in certain CRDs, they should not be confused to be the same. Although people who need CP also benefit from PR, the reverse is not true. The future of PR in Africa is promising but significant gaps in training, curricula, and evidence remain.

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Authors' contributions

Abbi-Monique Mamani Bilungula, Mark W. Orme, Fanuel M. Bickton, and Winceslaus Katagira drafted the primary version.

Abbi-Monique Mamani Bilungula and Mark W. Orme edited the final version based on feedback from co-authors.

Abbi-Monique Mamani Bilungula, Mark W. Orme, Fanuel M. Bickton, Sally J. Singh, and Winceslaus Katagira contributed to the literature review. Abbi-Monique Mamani Bilungula, Mark W. Orme, Fanuel M. Bickton , and Winceslaus Katagira conceived the concept of the manuscript. All authors have reviewed and approved the final version.

Declaration of patient consent

Patient's consent not required as there are no patients in this study.

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Conflicts of interest

There are no conflicts of interest.

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