Exercise and pulmonary rehabilitation for people with chronic lung disease in LMICs: challenges and opportunities.

Sally J Singh1,2

David M G Halpin3

Sundeep Salvi4

Bruce J Kirenga5

Kevin Mortimer6

1. Respiratory Science, University of Leicester, Leicester, UK. 2.Centre for Exercise and Rehabilitation Science, University Hospitals Leicester NHS Trust, Leicester, UK

3. University of Exeter Medical School, College of Medicine and Health, University of Exeter, Exeter, UK

4. Chest Research Foundation, Marigold Complex, Kalyaninagar, Pune, INDIA

5. Population Studies and Clinical Trials, Makerere Lung Institute, Makerere University College of Health Sciences, Mulago Hospital, Kampala, Uganda

6. Liverpool School of Tropical Medicine, Liverpool, UK

Corresponding author

Sally J Singh

Centre for Exercise and Rehabilitation Science,

Biomedical Research centre – Respiratory

University Hospitals Leicester NHS Trust

Leicester, UK

Tel 0116 2502535

e-mail [sally.singh@uhl-tr.nhs.uk](mailto:sally.singh@uhl-tr.nhs.uk)

837 Words

The World Health Organization (WHO) *Rehabilitation 2030: Call to Action* makes the case for accessible and affordable rehabilitation as an essential component of health services and crucial to achieving Sustainable Development Goal 3: *‘good health and well-being’* (1). Unfortunately, the need for rehabilitation greatly exceed capacity, especially in low- and middle-income countries (LMICs). The recently published WHO *Guide for Action* (2) aims to strengthen rehabilitation globally by supporting and encouraging governments to increase the accessibility, quality and outcomes of rehabilitation. There is a particular focus on developing rehabilitation in LMICs as part of strategies to achieve Universal Health Coverage.

Rehabilitation, of course, has a very broad scope, but the potential benefits for people with respiratory diseases are considerable. Historically the key respiratory diseases in LMICs has been infections – particularly pneumonia and tuberculosis (TB). The increasing burden of non-communicable respiratory disease – particularly chronic obstructive pulmonary disease (COPD) and post-TB lung disease - has been recognised, however efforts in LMICs are largely directed towards prevention and diagnosis, rather than management. Treatment pathways are dominated by pharmacological management, which although important, doesn’t address the consequences of these long-term conditions or the associated disability.

COPD is the third leading cause of death globally with the major burden falling on LMICs (3). COPD is ranked eighth of global disability adjusted life years (DALYs) in 2015 and in LMICs COPD DALYs increased by 55.7 % between 1990 and 2015 (4). In LMICs the age of disability associated with COPD is typically lower than in high-income countries (HIC) and this compromises individuals’ ability to be economically productive from a younger age, than in HIC (5) resulting in significant economic impact on individuals and societies. Post TB lung disease also carries a significant morbidity and symptom burden for the individual, often associated with a prolonged hospital stay where deconditioning can be profound, with social isolation and stigmatisation in their community frequently observed. The loss of productivity from chronic lung disease has profound implications for individuals and their families.

The clinical and health economic benefits of pulmonary rehabilitation (PR) in chronic lung disease have been unequivocally established in HIC. In these settings, PR comprises guided exercise and education to support effective disease management, over a minimum of 6 weeks. Participation leads to meaningful improvements in symptom burden, exercise capacity and overall health related quality of life as well as psychological benefits in those with anxiety or depression (6). PR is fully integrated in European, American and Australian COPD Guidelines (6) and is recommended by GOLD (7), but clinical PR services are not widely available in most LMICs despite the high prevalence of non-communicable respiratory diseases and an evidence base albeit limited (8). The WHO Rehabilitation 2030 agenda acknowledges there is a profound unmet need for rehabilitation in LMICs, and proposes an up-scaling, with investment in workforce and infrastructure (1).

PR provides a low-cost solution to the increasing burden of chronic lung disease and has potential to restore people’s functional ability allowing them to be economically productive and fulfil meaningful roles. This is particularly important in LMIC where there is little or no social care or benefits. In HICs the population participating in PR is largely retired and so the potential benefit of PR keeping people working has not been explored. Whether or not PR as provided in HIC is the best model for LMIC is an important research question. For example, dances could form the basis for such programmes in countries where there is a tradition of dance and could improve uptake and acceptability. In countries where yoga or tai chi are part of the cultural heritage these activities can be included (9). Accessibility is likely to be a challenge, If people have to travel long distances to attend programmes, they are unlikely to be able to participate and innovate forms of local PR may need to be developed. Technology based solutions might be used to deliver alternatives to conventional PR across wide geographical areas (10). There is a pressing need for locally-relevant research to explore these possibilities further.

There is clear potential for PR to improve health, well-being and economic productivity. Research is necessary to develop culturally appropriate PR in LMIC, programmes are likely to be very different across culture and countries. These efforts should run alongside campaigns to raise awareness and knowledge of PR within and beyond the health care system. The WHO ‘Guide for Action’ proposes that the ‘planning for rehabilitation can move forward without precise data on rehabilitation needs’ (2). The priority is to develop contextually appropriate, acceptable, accessible and affordable PR interventions to reduce the burden of chronic lung disease and achieve Universal Health Coverage in these countries. The fundamentals of rehabilitation must remain with exercise training at the centre of the intervention, however the format of the delivery is not ‘set in stone’. PR has the potential to providing a low-cost solution to the increasing burden of chronic lung disease, however the delivery and sustainability of programmes requires an increase awareness and knowledge within and beyond the health care system.

Acknowledgements

All sources of funding should be declared as an acknowledgment at the end of the text

References

1. WHO - RECHARGE
2. Rehabilitation in health systems: guide for action. Geneva: World Health Organization; 2019.
3. Halpin DMG, Celli BR, Criner GJ, Frith P, López Varela VM, Salvi S, Vogelmeier CF et al. It is time for the world to take COPD seriously: a statement from the GOLD board of directors. Eur Respir J 2019; 54: 1900914
4. Ref 15 from RECHARGE
5. Economic productivity Lancet
6. Spruit MA, Singh SJ, Garvey C, ZuWallack R, Nici L, Rochester C, Hill K et al., An official American Thoracic Society/European Respiratory Society statement: key concepts and advances in pulmonary rehabilitation. Am J Respir Crit Care Med. 2013 Oct 15;188(8): e13-64.
7. Dave Singh, Alvar Agusti, Antonio Anzueto, Peter J. Barnes, Jean Bourbeau, Bartolome R. Celli, Gerard J. Criner, et al. Global Strategy for the Diagnosis, Management, and Prevention of Chronic Obstructive Lung Disease: the GOLD science committee report 2019  
   *Eur Respir J, 53 (5) 1900164; 10.1183/13993003.00164-2019*
8. Jones R, Kirenga BJ, Katagira W, Singh SJ, Pooler J, Okwera A, Kasiita R et al. A pre-post intervention study of pulmonary rehabilitation for adults with post-tuberculosis lung disease in Uganda.Int J Chron Obstruct Pulmon Dis. 2017 Dec 11;12:3533-3539.
9. Polkey MI, Qiu ZH, Zhou L, Zhu MD, Wu YX, Chen YY, Ye SP et al. Chest Tai Chi and Pulmonary Rehabilitation Compared for Treatment-Naive Patients With COPD: A Randomized Controlled Trial. 2018 May;153(5):1116-1124.
10. Demeyer H, Louvaris Z, Frei A, Rabinovich RA, de Jong C, Gimeno-Santos E, Loeckx M et al.

Physical activity is increased by a 12-week semiautomated telecoaching programme in patients with COPD: a multicentre randomised controlled trial. Thorax. 2017 May;72(5):415-423.