**Editorial Office Notes:**

RES-16-111

**EDITORIAL**

**Physical activity and health of adults with cystic fibrosis**

**Key words**: cystic fibrosis, physical activity, health, lung function, fitness

Physical activity defined as any bodily muscular movement, which results in energy expenditure above resting baseline values, is an integral component to health and well-being for both children and adults. Being physically active is positively associated with a better quality of life, reduced levels of stress, better quality of sleep, as well as the important reduction in risk factors related to the major non-communicable diseases, i.e., coronary heart disease, type 2 diabetes, and breast and colon cancer.1 Worldwide it is estimated that physical inactivity is responsible for 9% of premature mortality.1 The evidence amassed over the last 60 years through many epidemiological, observational and clinical trials has resulted in research into physical activity being considered as integral to long term health. Current worldwide physical activity guidelines for adults suggest that weekly activity should add up to at least 150 minutes (2½ hours) of moderate intensity activity in bouts of 10 minutes or more. One way to approach this is to do 30 minutes on at least 5 days a week or accumulate the 30 minutes in three bouts of 10 minute periods.2 However current implementation, or more accurately our failure, to adhere to these guidelines shows that at a societal level there is a considerable way to go before we see improvements in global health. Whilst most of the physical activity research has been aimed at so called ‘healthy’ individuals, there is a growing sense of urgency to promote physical activity for patients with chronic diseases to counter the deleterious effects of their disease. Unless there is a clear contra-indication for non-participation in physical activity for patients with chronic diseases, it can be argued that physical activity promotion has just an important role to play in patients as in ‘healthy’ individuals.

In the case of cystic fibrosis, exercise (defined as a sub-component of physical activity with a specific goal to improving aerobic fitness for example in a planned, structured and repetitive manner) is an integral part of the treatment pathway. However, little is known about the patterns of physical activity of adults with cystic fibrosis. In fact most studies of physical activity have been conducted in children3,4 and have shown that physical activity patterns decline in adolescence and continue to further decline into adulthood, a finding replicated in healthy general population studies. Whilst it is known that aerobic fitness is a strong predictor of mortality for patients with cystic fibrosis5,6, the relationship between physical activity and clinical outcomes and mortality is yet to be established with certainty. One of the confounding problems particularly with early physical activity research was the choice of self-report or questionnaire to record physical activity. It tends to overestimate the levels of an individual’s physical activity. More recent technological advances in physical activity measurement has seen the use of accelerometers as the gold standard measurement instrument for physical activity and provides greater confidence in the data in relation to the duration, frequency and intensity of the physical activity.

In this month’s issue of *Respirology,* Narelle Cox and colleagues investigated the pattern of physical activity using accelerometry in adults with cystic fibrosis in a prospective observational study7. They reported that 33 (11 female and 22 males) out of 61 adults with cystic fibrosis achieved more than 30 minutes of moderate to vigorous activity per day. Three new and significant findings were described. Firstly, the majority of the moderate to vigorous activity was accumulated in short periods of less than 10 minutes. This is important for several reasons. Most research has solely focused on the effects (benefits and risks) related to physical activity. By characterising the patterns of the physical activity, researchers will be able to shift studies to investigate the dose-response relationship. This knowledge can then be translated into a clinical setting. For example, it is known that cystic fibrosis patients suffer from airflow limitation during exercise. By reducing the duration of each exercise period, the role of airflow limitation in exercise intolerance can be minimised. In children, this type of exercise training, known as interval training has been shown to be tolerated very well.8 The advancement in knowledge will allow also researchers to examine the inter-relationships between the biological movement, the physical activity behaviour, the environmental and social settings. In regard to this latter point, recent technological advancements in physical activity measurement, including accelerometers capturing sample data at rates as high as 100 Hz and the use of digital cameras to capture the type of activity, will allow a more sophisticated examination of exercise patterns in real time.

The second finding was related to gender differences. Female patients were found to be less physically active than the male patients, which points to the likely need to consider differing gender strategies. Importantly, as females with CF have been shown to have poorer lung function and prognostic outcomes, this finding needs more exploration.9

Lastly, it was shown that the attainment of equal to or greater than 30 minutes daily physical activity was associated with reduced days in hospital over a period of 12 months and better lung function after 12 months compared to those performing less than 30 minutes of daily physical activity. This observation could have important implications for promoting the cost-benefit savings for the introduction of physical activity interventions.

The study has several limitations. Cox and colleague’s choice of accelerometer was confined to land-based activity, thereby underestimating those activities of participants who swim. Although 30 minutes of physical activity was chosen to match current guidelines, there are no established guidelines for patients for chronic diseases, so guidelines are “evidence informed” rather than “evidence based”. Interestingly, exercise capacity (measured by a shuttle walk test) was the only variable to be shown to be an independent predictor of whether equal to or more than 30 minutes moderate to vigorous physical activity would be achieved. This observation points to the need for replication of this study to examine the relationship of fitness and physical activity for this clinical group.

In summary, whilst it has been noted that clinical trials might be the best method to assess whether an intervention works, but not necessarily who will benefit, Mant10 noted “…..in order to apply the results of trials to individual patients, there must be a parallel investment in observational studies – both quantitative and qualitative” (p.744). To this end, Cox and co-workers have started the process of defining the potential positive benefits of physical activity in patients with cystic fibrosis, and have begun to redress the imbalance in physical activity research in patients with chronic diseases.

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