



## RACP Foundation Research Awards

### FINAL REPORT

<b>Project / Program Title</b>	The effect of an outpatient exercise training programme on haemodynamics and cardiac magnetic resonance parameters of right ventricular function in patients with pulmonary arterial hypertension	
<b>Name</b>	Dr Karen Chia	
<b>Award Received</b>	2018 AFRM Research Entry Scholarship	
<b>Report Date</b>	9 March 2019	
<b>Chief Investigator / Supervisor</b>	Associate Professor Eugene Kotlyar	
<b>Administering Institution</b>	UNSW	
<b>Funding Period</b>	Start Date:	2 January 2018
	Finish Date:	2 January 2019

#### PROJECT SUMMARY

Although Pulmonary Arterial Hypertension (PAH) is a rare condition, it is an increasingly common cause of breathlessness. Despite many advances in treatment, PAH often still has a significant impact on activity levels and quality of life for patients. In the past, exercise was not recommended due to safety concerns. However, there is now evidence that exercise improves quality of life and endurance. What is not known is the duration, frequency and intensity of exercise required to make a positive difference.

Outpatient exercise programmes are the most commonly available form of exercise training in Australia, but to date there are no studies to show if this type of exercise has any benefit on the structure and function of the heart.

Our study looks at the effect of an outpatient exercise rehabilitation programme on how the heart functions, using the latest technology (cardiac magnetic resonance imaging). It also examines the effect on endurance and quality of life.

#### PROJECT AIMS / OBJECTIVES

Study aim:

To investigate the feasibility of a novel, multidisciplinary exercise rehabilitation program for PAH patients living in the community. It will assess whether the 'real-world' frequency of exercise therapy that is routinely available for Australian out-patients (typically one hour sessions, twice weekly, for 8-12 weeks), can be utilised in a PAH patient population, and whether this will be sufficient to induce functional benefits for patients. Unlike any previous exercise studies, this

project will also utilise cardiac MRI and right heart catheterisation to explore possible physiological mechanisms via which exercise may induce improvements in PAH.

How the aims are being achieved:

Participants are recruited and randomized into the intervention (twice weekly attendance for 12 weeks, completing a physiotherapy based programme with structured psychology involvement) or the control group (given information and instructed to start a home exercise walking programme). A number of outcome measures are collected, including: Cardiac MRI parameters, haemodynamic outcomes measured by right heart catheterization, blood tests, PAH specific quality of life questionnaires.

### **SIGNIFICANCE AND OUTCOMES**

We hypothesize that an outpatient rehabilitation exercise training program that incorporates endurance training, strength training, respiratory muscle training and a structured psychology intervention will be safe, feasible to implement and well-received by patients living with PAH. We anticipate that this novel program will have beneficial effects for patients' strength, endurance, emotional well-being and quality-of-life. Moreover, we hypothesize that these benefits will be accompanied by cardiac remodelling and altered haemodynamics, reflecting improvements in right-sided cardiac function as indicated by an improvement in right ventricular ejection fraction. This would suggest beneficial physiological changes can be induced by targeted and appropriate exercise in PAH.

If our hypothesis proves correct, it will provide supporting evidence to substantiate the current guidelines for exercise in patients with PAH, by utilising novel imaging (cardiac MRI) and right heart catheterisation - the gold standard for haemodynamic assessment. It is hoped that this project will be a catalyst for the development of a specialist Pulmonary Hypertension Rehabilitation service, improving access to high-quality, evidence-based treatment for a patient population in great need.

### **PUBLICATIONS / PRESENTATIONS**

Chia KS, Faux SG, Wong PK, Holloway C, Assareh H, Mclachlan CS, Kotlyar E.

Randomised controlled trial examining the effect of an outpatient exercise training programme on haemodynamics and cardiac MR 12arameters of right ventricular function in patients with pulmonary arterial hypertension:the ExPAH study protocol. BMJ Open. 2017 Feb 6;7(2):e014037. doi:10. 1136/bmjopen-2016-014037.

Publication:

Lavender M, Chia KSW, Dwyer N, Corte T, Spencer L, Thakkar V, McWilliams T, Kotlyar E, Whitford H.

Safe and effective exercise training for patients with pulmonary arterial hypertension: putting current evidence into clinical practice. Expert Rev Res12ir Med. 2018

Nov;12(11):965-977. doi: 10.1080/17476348.2018.1527687.

Oral presentations:

- "Designing an exercise-based rehabilitation program for patients with pulmonary hypertension - review of current evidence, and design of a study protocol". Oral Presentation, Asia Oceania Conference of Physical Medicine and Rehabilitation, Auckland, 2018.
- "Protocol of an exercise-based rehabilitation program for patients with pulmonary hypertension - the ExPAH study". Poster presentation, Pulmonary Hypertension Society of Australia and New Zealand, Melbourne, 2018.