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TITLE PAGE

Title: Establishing and delivering pulmonary rehabilitation in rural and remote settings: the opinions, attitudes and concerns of healthcare professionals.

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Author contributions

CJ: Study conception and design, data collection, data analysis, preparation and revision of manuscript

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ABSTRACT

Objective: Pulmonary rehabilitation is recommended for people with chronic lung disease however access remains limited in rural and remote settings. The aim of this project was to explore the perspectives of rural and remote healthcare professionals regarding the establishment and delivery of pulmonary rehabilitation.

Setting and participants: Healthcare professionals (n=25) who attended a training program focussing on the delivery of pulmonary rehabilitation in rural (NSW) and remote (NT) settings.

Main outcome measure(s): Surveys with open written questions were completed by participants following the training program. Key informants also participated in face-to-face interviews. Thematic analysis was undertaken of data collected on participant opinions, attitudes and concerns regarding the establishment and delivery of pulmonary rehabilitation in their individual situation.

Results: Participating healthcare professionals (predominantly nurses and physiotherapists) identified a number of issues relating to establishing and delivering pulmonary rehabilitation; including staffing, time and case load constraints, patient and community attitudes, lack of professional knowledge and confidence and inability to ensure sustainability. The practicalities of delivering pulmonary rehabilitation, particularly exercise prescription and training, were also important concerns raised.

Conclusions: Lack of healthcare professional staffing, knowledge and confidence were reported to be factors impacting the establishment and delivery of pulmonary rehabilitation. This study has facilitated a greater understanding of the issues surrounding the establishment and delivery of pulmonary rehabilitation in rural and remote settings. Further research is required to investigate the contribution of health professional training and associated factors to improving the availability and delivery of pulmonary rehabilitation in rural and remote settings.

Key Words

Pulmonary Rehabilitation

Rural health services

Health professional training

Lung Diseases

What is already known on this subject?

- Pulmonary rehabilitation is a recommended management strategy for people with chronic respiratory disease. Participation in pulmonary rehabilitation results in improvements in symptoms, exercise capacity, quality of life and reduces healthcare utilisation and cost.
- A lack of suitable locally available programs to which referral could be made may limit participation in pulmonary rehabilitation. This may be of particular concern in rural and remote areas. The contribution of healthcare professional training and/or resource constraints to the availability and delivery of pulmonary rehabilitation is unknown.
- There has been no exploration of the issues perceived by healthcare professionals in terms of the establishment and delivery of pulmonary rehabilitation in rural and remote settings. This information is vital to inform the development of effective strategies aimed at improving the availability and delivery of pulmonary rehabilitation in rural/remote settings.

What does this study add?

- This small study is the first to explore the attitudes and opinions of healthcare professionals in rural/remote settings regarding the establishment and delivery of pulmonary rehabilitation. The main issues and concerns raised related to staffing, resources, sustainability, time and case load constraints, confidence and knowledge, patient/community attitudes and the practicalities of delivering pulmonary rehabilitation (particularly the prescription of exercise training intensity).
- Improving healthcare professional confidence and knowledge and the provision of additional funding may facilitate improved availability of pulmonary rehabilitation in rural and remote settings. Further research to investigate the relative contributions of factors such as retention, availability and training of healthcare professionals and funding on the ability of rural and remote sites to establish and provide ongoing delivery of evidence-based pulmonary rehabilitation is required.

Introduction

Participation in pulmonary rehabilitation (PR), consisting of individualised exercise training, education and psychosocial support, is a recommended component of healthcare management for people with chronic obstructive pulmonary disease (COPD).^{1,2} Participation in PR has been demonstrated to result in an improvement in symptoms, increased functional exercise capacity, better health-related quality of life (QOL) and a reduction in healthcare utilisation and costs.³⁻⁶

Despite the importance and effectiveness of PR, participation by people with COPD who could benefit remains limited.⁷⁻⁹ This is particularly the case for those living in rural and remote settings where the proportion of the population with chronic diseases, including COPD, is higher than major cities.^{10,11} Referral rates to PR are generally poor and reasons for this may include inadequate referrer knowledge of the benefits of PR and/or workload constraints of referring healthcare professionals.¹²⁻¹⁶ It may also be that there are no suitable PR services available locally to which referral may be made.^{13,17,18} Difficulty in establishing and maintaining PR has been reported, possibly due to a lack of adequately trained and skilled staff and/or resource constraints.^{8,19} This may be of particular concern in rural and remote areas where the number of healthcare professionals with appropriate knowledge, training and skills may be restricted due to staff shortages and limited access to continuing professional development.²⁰⁻²²

Increased knowledge and understanding of the issues and challenges facing healthcare professionals is vital to inform the development of effective strategies aimed at improving the availability and delivery of PR in rural/remote settings. Improvements in knowledge and confidence relating to the management of people with COPD, and increased availability of PR in rural/remote settings have been demonstrated following the provision of a training program for healthcare professionals.²³ Factors which may have influenced the establishment and availability of PR were related to the characteristics of the healthcare setting (such as remoteness) and to issues around staffing and staff retention.²³ However an in-depth exploration of the issues surrounding availability, establishment and delivery of PR in rural and remote settings from the perspective of healthcare professionals has not been undertaken. The aim of this project was to explore the attitudes, opinions and concerns of rural and remote healthcare professionals regarding the establishment and delivery of PR following participation in a training program.

Methods

Study Design

This study was a component of a larger research project investigating the impact of a training program for rural and remote healthcare professionals in the management of people with chronic lung disease.^{23,24} The main research project involved both quantitative and qualitative data collection methods.²⁵ Purpose-designed

surveys were used to collect data regarding healthcare service delivery and healthcare professional knowledge, confidence and attitudes. Face-to-face interviews were also conducted to enable deeper exploration of participant attitudes, opinions and concerns.²⁶ Approval for the study was granted from Sydney South West, Greater Southern and Central Australian Human Research Ethics Committees. This paper reports the results from the qualitative aspects of the larger research project (written survey comments and face-to-face interviews).

Participants and recruitment process

Participants were healthcare professionals who participated in the training program, Breathe Easy Walk Easy (BEWE). The BEWE training program was interactive and specifically designed to provide education for rural/remote health care professionals in the delivery of evidence-based PR.²³ The program was provided in an interactive format consisting of workshops, hard-copy, audio-visual and online resources.²³ The program was advertised widely among the local healthcare community with healthcare professionals from any professional background invited to attend.

All program attendees were eligible to participate in the survey component of the research study. All workshop participants were not necessarily expected to be directly responsible for establishing PR in their services. It was, however, possible that they would participate in aspects of the delivery of PR (such as the provision of patient group or individual education). Of the participants attending the BEWE program, key informants were identified by local healthcare service managers as those most likely to be involved in the development, establishment and delivery of PR. These key informants were invited to participate in the face-to-face interview component of the project.

Data collection process and outcome measures

Participants in the survey component of the project completed surveys before, immediately following, three and 12 months after the initial workshop. Questions relating to knowledge, confidence and attitudes regarding establishing and delivering PR were included in categorical or dichotomous form with open short written answers included for further expansion. Open questions only from surveys following the workshops were included in analysis for the current study. Written comments were focussed on participants' expectations and/or experiences of barriers and challenges to establishing PR in their healthcare services. Surveys were completed anonymously but were coded for matching of data over time. Surveys were distributed and collected by the researchers who were independent of the BEWE program presenters.

Key informants participated in interviews either individually or in small groups. Interviews were conducted by the researchers (CJ and JA) and were timed to be soon after the planned commencement of PR. This was at twelve months for all sites except one site where interviews were conducted at three month follow-up. There were no formal set topic lists or defined questions for the interviews, however as insights about particular issues were desired, a small number of broad topics were determined a priori to guide the

conversation. These included the participants' experience of planning, establishing and delivering PR in their individual setting. All interviews were recorded with participant consent.

Data Analysis

All written survey responses and all recorded interviews were transcribed verbatim. A process of simple thematic analysis was used to analyse the transcripts.^{27,28} Initially a process of familiarisation with the transcripts was undertaken. This consisted of reading and re-reading the text. Following the familiarisation, the transcripts were read again and an initial open descriptive coding process undertaken.^{28,29} Words, phrases or segments of text were grouped and preliminary codes were allocated. Once all transcripts had been coded using this descriptive process codes were then examined for similarities, overlap and redundancy. Linked codes were then grouped into a smaller number of themes. Codes and categories were examined until saturated, that is until no further codes, categories or themes were identified indicating that further coding was unnecessary and all data were accounted for in the identified themes.²⁸ Quotes which were representative, covered a number of participants views and were relevant to the research question were selected to illustrate the major themes.

Results

Participant and site characteristics

Twenty five participants completed surveys before and after delivery of the BEWE program workshops. Sixteen participants completed surveys at three month follow-up and seven participants at 12 month follow-up. Reasons for non-completion of surveys at subsequent time points were that participants had left their position, moved from the region, and/or were unable to be contacted. Initial participants were predominantly nurses (n=13, 42%) and physiotherapists (n=9, 29%) and worked in community health (n=17, 55%), public hospitals (n=10, 32%) or private/general practices (n=2, 7%). Eleven key informants participated in interviews. The professional backgrounds of key informants and the characteristics of sites where they worked are presented in Table 1.

TABLE 1

Interviews and written survey comments

The main themes from the written open comments from the survey in response to questions relating to establishing pulmonary rehabilitation and related support needs are presented in Table 2.

TABLE 2

Most of the major barriers and challenges identified from the written survey responses were consistent with those which emerged during the in-depth interviews with key informants: namely; healthcare professional staffing, time and case load constraints, and patient/community/cultural attitudes. Healthcare professional knowledge, confidence and skill in the area of practice, ensuring sustainability and the practicalities of delivering pulmonary rehabilitation (setting, structure and content) were also important additional topics raised during the interviews with key informants.

Health professional staffing, time and case load

All key informants identified healthcare professional staffing as a significant concern. This related to a lack of healthcare professionals, the imposition of extra clinical responsibilities on already full caseloads and also to the high turnover of healthcare professionals in remote and rural settings. The key informants working in the remote community settings reported that the irregular and intermittent nature of allied healthcare professional coverage would be a barrier to establishing and delivering PR. Often allied healthcare professionals would visit communities infrequently, for example monthly or every several months, making establishing a program requiring several face-to-face sessions per week very difficult.

I actually do a lot of other stuff as well, not just pulmonary rehab. I'm a nurse and I do all sorts of chronic disease stuff. I do all sorts of stuff... We don't have the staff, we don't have the capacity... I'm sort of like a sole practitioner...assessment takes about an hour and a half and I do a lot of other work too. So just trying to fit them all into my day is pretty full on. (Rural 2 RN)

Ensuring sustainability

Key informants at Remote site 1 recognised the importance of ensuring sustainability by the upskilling of multiple staff members. They indicated that they and their service managers had prioritised PR by developing strategies to provide the support required to facilitate its establishment and delivery.

So myself and the senior physio here talked with [] the general manager. She was happy just to transfer that project into pulmonary rehabilitation, or transfer my time into doing pulmonary rehabilitation as part of that Commonwealth funding. I had theoretically 50% of my time quarantined off to get this show off the ground, yeah so it was really helpful. (Remote 1 PT)

Healthcare professional clinical confidence and knowledge

Key informants indicated that people with chronic respiratory disease such as COPD were a challenging patient population and required a particular skill set for optimal management. Some indicated that their current positions required them to be generalists and that if knowledge and skill was not used frequently in practice, confidence in providing a service would decrease.

Oh I would never - if they said run a pulmonary rehab program I would have thought - Oh God what do I do now? I don't really - I've never really been involved in pulmonary rehab. (Rural 2 RN)

Community and cultural attitudes

All key informants at the remote sites raised the issue of Indigenous community and cultural attitudes. This issue was not raised at any of the rural sites. The particular issues that these remote informants considered to be of importance in the context of PR were community and cultural attitudes to illness and group-based exercise. They also acknowledged the considerable, and often poorly understood, barriers that Indigenous people faced in regularly attending a program such as PR.

The other thing is that Aboriginal people don't necessarily like being singled out. So saying you and you have to go because you've got, you know, rotten lungs. You two have to walk every day, the rest of you don't. They do but it's really important for you...it would be good if you did. So there's a lot of cultural specificity in ensuring that whichever way you go about it in the Indigenous communities, you really have to make sure that it's something that fits with that community or you don't get by. (Remote 3 PT)

He lives in a town camp... and he's just got more important things than coming to an exercise program. So lots of barriers like that rather than just pure motivation." (Remote 1 PT)

Practicalities of pulmonary rehabilitation

During interviews with key informants at all sites in which PR had commenced, the most commonly raised topics of discussion related to process and practicalities of program delivery. The main concerns, discussion and illustrative quotes which relate to the practicalities of establishing and running PR are presented in Table 3.

TABLE 3

Discussion

This study is the first to explore the attitudes and opinions of healthcare professionals in rural/remote settings regarding the establishment and delivery of PR. There is strong evidence that participation in PR results in reduced hospital admissions and improved exercise capacity and quality of life.^{3,4} Ensuring equity of access to this highly beneficial management strategy for people with COPD in rural and remote settings is essential. Improving the knowledge and skill of healthcare professionals, and understanding their concerns, in order to facilitate availability and delivery of PR is therefore vitally important. The main issues identified by

healthcare professionals were staffing, time and case load constraints, patient/community/cultural attitudes, lack of healthcare professional knowledge, confidence and skill in the area of practice, ensuring sustainability and the practicalities of delivering pulmonary rehabilitation (particularly the prescription of exercise training intensity).

One of the most important barriers to the establishment of PR was perceived to be staffing. The perspectives of the key informants at sites where PR had been established following the BEWE program provided some insight as to why they might have been successful where others were not. None of the sites received external funding following the BEWE program. The physiotherapy department at Remote site 1, however, had diverted internal funding from another project to backfill a part time staff member so that time could be devoted to establishing PR. This decision was based on the needs of their patient population and the strong evidence for the effectiveness of PR. During the interviews the key informants from this site indicated that they would not have been able to establish PR without this assistance.

At other sites PR was established without external funding or diversion of internal funding. However these sites had extra support for exercise and education sessions provided by the local hospital physiotherapy department. So while there was no direct monetary funding, the extra time given to PR by the hospital physiotherapy departments constituted in-kind support. It has been recommended that additional funding for PR is necessary³⁰⁻³³, in particular dedicated funding to support additional health care professional staffing. This may enable the provision of specific education and training and may facilitate the delivery of PR which is more closely aligned with current evidence-based practice and provides better health outcomes for people with COPD.

The results of this exploratory study support the previously unsubstantiated contention that lack of healthcare professional confidence and knowledge may play a part in limiting delivery of PR.^{8,30} Many of the informants in this study were generalist clinicians and, as such, reported that they lacked confidence to deliver a program which was perceived to require a specialised body of knowledge and skills. This is consistent with other published data.¹⁹ In an absence of suitably trained and skilled healthcare professionals contributed to a lack of delivery of PR it could be anticipated that retention of key staff members and an increase in their knowledge, skill and confidence may have contributed to the successful establishment of PR at participating sites. In addition, at all of the sites in this study strong support from healthcare service management was present. Whether the healthcare professionals at these sites, even with their greater level of knowledge, skill and confidence, could have successfully established PR in the absence of this support is unknown.

The issue of Indigenous cultural and community attitudes was raised by informants in the remote settings. Participation in PR by Indigenous Australians, and related barriers and enablers have not been specifically investigated. The feasibility and effectiveness of providing PR in remote settings and to Indigenous patient

populations is unknown and further research is required into the utility and outcomes of various models of delivery.

In the interviews conducted during this study a substantial component of time was spent discussing the practicalities of delivering PR. The area of exercise training was of particular concern, particularly the prescription of exercise training intensity. This is consistent with other findings indicating that prescription of effective exercise training intensity is an area of practice that could be improved in PR in Australia.³⁴ In the future, training programs to upskill healthcare professionals in the delivery of PR may need to devote more time to this specific area of practice.

In conclusion, this study has explored the issues surrounding the delivery of PR in rural and remote settings from the perspective of healthcare professionals. Further research is required to investigate the contribution of factors such as the retention, availability and training of healthcare professionals, and funding for staffing and resources on the ability of rural and remote sites to establish and provide ongoing delivery of evidence-based PR.

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TABLES

Table 1: Description of sites and characteristics of key informant healthcare professionals participating in face-to-face interviews.

Site	Type of service	Local service population	Description of service population	Key informants profession and role
Rural 1	Public Hospital	25 000 (town) 75 000 (regional)	9% Indigenous people	1. Dietitian, coordinator of allied health and chronic care 2. Respiratory nurse, community care
Rural 2	Public hospital	9000 (town)	Predominantly non-Indigenous people	1. Nurse manager/program integration coordinator
Rural 3	Public hospital	4000 (town)	Predominantly non-Indigenous people	1. Physiotherapist, sole practitioner in hospital
Remote 1	Public Hospital	27 000 (town), 50 000 (regional)	80% Indigenous people in service population 30 % Indigenous people in town population.	1. Physiotherapist, respiratory ward senior 2. Respiratory clinical nurse coordinator
Remote 2	Community Health: team covering urban population (within 100km)	27 000 (town), 50 000 (regional)	70% Indigenous people in service population 30 % Indigenous people in town population.	1. Physiotherapist 2. Occupational Therapist
Remote 3	Community Health: team covering remote population (over 100km)	Variable. Population spread over very remote lands.	99% Indigenous people	1. Physiotherapist 2. Occupational therapist
Remote 4	Remote Community Health Service	600 + 5 outstations	100% Indigenous people	1. Registered Nurse, clinical manager

Table 2: Responses to written survey open questions related to establishing pulmonary rehabilitation.

Barriers to practice change/establishing pulmonary rehabilitation		
Time point following initial BEWE workshop	Main themes	Explanation
Immediately after (n=25)	Staffing	Not enough staff available to staff pulmonary rehabilitation – particularly the exercise sessions Lack of funding for staff Sporadic staffing of some remote sites – Allied health professionals only visiting at widely spaced intervals
	Time and case load	Not enough time to devote to effectively establishing and running pulmonary rehabilitation Trying to fit extra responsibilities into an already full case load
	Patient issues	Lack of transport Geographic isolation and travel distance Lack of motivation and compliance Cultural and social barriers for indigenous patients (remote setting)
	Resources	Lack of equipment (for example pulse oximeters, exercise equipment)
	Environment	Lack of suitable space for patient education, exercise testing and training
	Support needs	The provision of resources and extra funding, in particular for equipment but more importantly, for additional staff to enable case load management and the devotion of extra time to establishing and delivering pulmonary rehabilitation
3 month (n=10) and 12 month (n=6) follow-up	Staffing	Lack of available staff hours Private practitioner trying to run a program – not viable
	Time and case load	Trying to fit everything in to an already full case load
	Patient issues	Transport Patient recruitment Cultural and social barriers for indigenous patients (remote setting)

Table 3: Issues identified by participants relating to the practicalities of delivering pulmonary rehabilitation

Theme	Explanation	Illustrative quotes
Space and environment	<p>Environmental requirements, particularly finding adequate space for exercise testing and training were frequently mentioned. Many informants indicated that they could not avail themselves of a suitable space for an exercise program.</p> <p>This was also intrinsically linked to the issue of climate which all informants raised in the context of an adequate location for a pulmonary rehabilitation exercise class. In the remote settings in particular heat in summer precluded exercising outside and no air-conditioned spaces were available to utilise.</p>	<p>“Very hot in summer and bloody freezing in winter.” (Remote 4 RN)</p> <p>“There is a gym with the physio but we can only maximum take about six because I could not physically get them - with our walking track that’s inside in air conditioning, you can only do two or three at the one time because you just haven’t got the room.” (Rural 2 RN)</p>
Program structure and components	<p>The main issues relating to structure of pulmonary rehabilitation were frequency of exercise/education sessions and whether the ‘rolling’ or ‘block’ format should be adopted.</p>	<p>“So if it’s a rolling program and they missed - this is the problem - we have is everyone missing chunks of it or someone missing the odd session and others were missing four weeks of an eight week program. So they just continue on until they’ve done eight sessions.” (Remote 1 PT)</p>
Referrals	<p>The patient referral process was frequently raised during the interview discussions: mainly how referrals to programs were to be made and how healthcare professionals could best source adequate and appropriate referrals, particularly from general practitioners.</p>	<p>“I drum business up at the start of the first program, just a couple of letters too; I think it was three GPs. It was only going to be two and one of those two didn’t respond that well so we found another GP to send stuff to and that was it. So three letters went out and a couple of phone calls and since then I haven’t had to do anything so we’ve got enough people coming in.” (Remote 1 PT)</p>
Patient drop out	<p>At twelve months all sites had commenced pulmonary rehabilitation and the experience and expectations for patient discontinuation and drop out were raised and discussed.</p>	<p>“You get about 55 per cent attendance.... I’ve got one who keeps saying I’m coming, I’m coming. But when I went back and had a look at his records, even though I’ve rung him numerous times, I see him down the street, he’s actually only attended three sessions.” (Rural 1 RN)</p>

Theme	Explanation	Illustrative quotes
Patient assessment	Informants were concerned about measurements which should be included in routine pre-pulmonary rehabilitation assessment: particularly discussing tools for measuring quality of life (the St George's respiratory Questionnaire) and exercise testing using the six minute walk test.	"The Hospital Anxiety and Depression score, the St George, their weight, their height, spirometry, two six minute walks. There's the history, the drugs - no, that's about it. What am I missing?" (Rural 1 PT)
Exercise prescription and training	<p>Many aspects of this topic were raised by informants and discussed at length. Participants used the interview discussions to work through concepts relating to the prescription of type and intensity of exercise training.</p> <p>The initial BEWE workshop contained detailed information about the prescription of exercise including type and mode of exercise and the use of the 6MWT results to prescribe lower limb endurance exercise. This was extensively discussed by participants during all interviews. Informants were still developing an understanding of the concepts around prescribing exercise. All sites which had commenced pulmonary rehabilitation were using the 6MWT results in different ways indicating varied levels of understanding of the associated theoretical concepts.</p>	<p>"I start them on two minute cycles. So they get two minutes on the treadmill, two minutes on the - they go top to bottom, top to bottom, top to bottom.... I don't know whether I'm doing the right thing, but they seem to be surviving." (Rural 1 RN)</p> <p>"So it's a bit muddled and not that clinically progressed. I've basically got them all using 2kg ankle weights to do knee extensions and just hope that's roughly right. I use the Borg scale on the aerobic ones, the step ups and the exercise bike as their target.... As compared to the circuit class where it's pretty erratic I have to say." (Remote 1 PT)</p>
Transport	The issue of patient transport was raised by participants at all sites where pulmonary rehabilitation had commenced as a significant barrier to patient attendance. The particular difficulties associated with transport over long distances and for indigenous patients in rural and remote settings were raised.	"Oh transport's probably our biggest issue in this town I think." (Remote 2 PT)

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