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TITLE:
How prepared are rural and remote health care practitioners to provide evidence-based management for people with chronic lung disease?

RUNNING TITLE:
COPD management by rural and remote healthcare practitioners

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How prepared are rural and remote health care practitioners to provide evidence-based management for people with chronic lung disease?

ABSTRACT

Objective: To investigate the existing experience, training, confidence and knowledge of rural/remote healthcare practitioners in providing management for people with chronic obstructive pulmonary disease (COPD).

Design: Descriptive cross-sectional, observational survey design using a written anonymous questionnaire. This study formed part of a larger project evaluating the impact of Breathe Easy Walk Easy (BEWE), an interactive education and training program for rural and remote healthcare practitioners.

Setting: Rural (n=1, New South Wales) and remote (n=1, Northern Territory) Australian healthcare services.

Participants: Healthcare practitioners who registered to attend the BEWE training program (n=31).

Main outcome measures: Participant attitudes, objective knowledge and self-rated experience, training, and confidence related to providing components of management for people with COPD.

Results: Participants were from a variety of professional backgrounds (medical, nursing, allied health) but were predominantly nurses (n=13) or physiotherapists (n=9). Most participants reported that they had minimal or no experience or training in providing components of management for people with COPD. Confidence was also commonly rated by participants as low. Mean knowledge score (number of correct answers out of 19) was 8.5 (SD=4.5). Questions relating to disease pathophysiology and diagnosis had higher correct response rates than those relating more specifically to pulmonary rehabilitation.

Conclusions: The results of this study indicate low levels of experience, knowledge and confidence related to providing components of management for people with COPD in rural/remote healthcare practitioners and that education and training with an emphasis on pulmonary rehabilitation is needed.
What is already known on this subject?

- Chronic Obstructive Pulmonary Disease (COPD) is a serious health problem in rural and remote areas and healthcare practitioners across all settings are involved in providing components of management for people with COPD.
- Clinical practice guidelines for COPD recommend participation in pulmonary rehabilitation as a standard component of management for people with COPD, however access to this management strategy is often poor.
- There is no published evidence regarding how prepared rural and remote healthcare practitioners are to provide effective management for people with COPD, particularly in terms of the provision of pulmonary rehabilitation.

What does this study add?

- This study is the first to document the preparedness of rural and remote healthcare practitioners to provide components of management for people with COPD
- The healthcare practitioners surveyed had generally poor confidence, knowledge, experience and training in the provision of evidence-based components of management for people with COPD.
- The results of this study suggest that education and training in the provision of evidence-based management for people with COPD, which assumes little pre-existing knowledge, would be useful for many rural and remote healthcare practitioners.
Introduction

Chronic Obstructive Pulmonary Disease (COPD) is a leading cause of death and disability in Australia and worldwide.\(^1,2\) As well as cost to the individual in terms of disability, the burden to the community is very large.\(^2,3\) Annually COPD is estimated to cost Australia at least $1.0 billion directly and, if loss of productivity is considered, as much as $8.8 billion.\(^3\) The proportion of Australians with chronic diseases including COPD, living in regional, rural and remote settings, is higher than in major cities.\(^2\) Access to healthcare is often poor in rural and remote areas and hospital admission rates for COPD are higher.\(^4-6\) Nationally COPD is the second highest cause of preventable hospitalisation\(^7\) and in some rural/remote areas it is the highest.\(^8\) In all Australian states avoidable hospitalisations for COPD are higher in non-metropolitan than in metropolitan areas.\(^7,8\)

One of the most effective components of ambulatory care for people with COPD is pulmonary rehabilitation consisting of exercise training, self-efficacy education and psychosocial support.\(^9\) Pulmonary rehabilitation is now considered standard care and major clinical practice guidelines for COPD management recommend its inclusion as an essential component of effective patient management.\(^9-11\) As well as improving individual patient wellbeing through increasing ability to perform activities of daily life, improving health-related quality of life (QOL) and reducing symptoms, pulmonary rehabilitation has also been shown to have a very significant positive impact on healthcare costs through reduced admission rates and hospital length of stay.\(^12,13\)

Despite the demonstrated benefits of pulmonary rehabilitation, access is poor and this is particularly so for people in rural and remote settings.\(^6,14-17\) Workforce shortages, poor understanding and recognition of the importance of pulmonary rehabilitation, and lack of referral\(^14,18-21\) are potential barriers to the establishment of programs. In rural and remote areas, limited professional development training opportunities and high staff turnover are features which may also serve to further limit the establishment of effective pulmonary rehabilitation programs.\(^22\)

There is no published evidence regarding how prepared healthcare practitioners are to deliver evidence-based management for people with COPD, particularly in terms of the provision of pulmonary rehabilitation. Furthermore there is no published literature relating to this issue from the perspective of rural and remote practitioners, for whom it is of prime importance due to the burden of COPD in rural/remote communities. The aim of this study was therefore to undertake a preliminary evaluation of the existing knowledge, training and confidence of a group of rural and
remote healthcare practitioners regarding the provision of evidence-based components of management for people with COPD, with an emphasis on pulmonary rehabilitation.

METHODS

Study design
The study design was a cross-sectional, observational survey design using a written anonymous questionnaire. This study formed part of a larger project evaluating the impact of Breathe Easy Walk Easy (BEWE) an interactive educational and training program specifically designed for rural and remote healthcare practitioners supported by the Australian Lung Foundation. Ethics approval was granted for the study from Sydney South West (RPAH zone, lead institution) Human Research Ethics Committee (HREC), Greater Southern (GSAHS) HREC and the Central Australian HREC.

Participants
Study participants were healthcare practitioners who attended BEWE education and training workshops. The BEWE workshop was delivered at two sites: one rural (New South Wales) and one remote (Northern Territory). Local healthcare practitioners, from any professional background and from any local healthcare service, who had an interest in the care of people with chronic lung disease, were invited to attend. All healthcare practitioners who attended the workshop were eligible to participate in the research study. There were no exclusion criteria.

Procedure
Hard-copy information about the program details for access to password protected online resource materials were sent to all healthcare practitioners who registered interest in attending the initial BEWE workshop. Workshop participants were also advised of the research project and provided with participant information and consent forms. Registered healthcare practitioners then attended the scheduled two day BEWE workshop at their respective site. Information about the research project, participant information and written consent forms were again provided at the start of the workshop. Time was then allocated for consenting participants to complete the pre-workshop data collection questionnaire. The questionnaire was completed anonymously.
**Questionnaire**

The written questionnaire used in this study was purpose designed and contained sections relating to demographics, knowledge, confidence and attitudes of participants. The questionnaire content was based on the educational subject matter provided in the workshop. Prior to the workshop, the questionnaire was piloted with a small sample of rural healthcare professionals (n=9) from a separate location. Utility and functionality were assessed along with acceptability to participants. Following piloting, small changes were made to the format and layout of the questionnaire. Prior experience, training, and confidence in providing management for patients with COPD were all self-rated using four-point Likert scales (1 to 4, none, a little, moderately, a lot). Participant knowledge was objectively measured using a series of multiple choice questions (n=19) regarding a short COPD case vignette. The response options were true, false or unsure and the order of correct answers was randomly determined. A score of 1 point was awarded for each correct answer and zero if the response was “unsure”, incorrect or omitted. Participant attitudes were canvassed using a combination of categorical and dichotomous questions.

**Analysis**

All data were collated and analysed using PASW v18 (SPSS Inc. Chicago, IL. 2009). Descriptive statistics were generated for appropriate variables. Categorical variables were analysed in terms of frequency and percentage, ordinal variables in terms of mean, median, range and standard deviation.

**RESULTS**

**Participants**

There were 33 workshop participants across both sites and 31 of these completed the pre-workshop questionnaire. A description of the type and geographical spread of the healthcare services represented is presented in Table 1. At the rural workshop, participants represented five 5 separate healthcare services, each from a different population centre. At the remote workshop participants represented five separate healthcare services with four of these services based in the same population centre and one in a remote community. The four services based in the same population centre provided services to disparate groups of people, including remote community centres.
Respondents were predominantly from nursing (n=13, 42%) and physiotherapy (n=9, 29%) professional backgrounds but also included occupational therapists (n=4), doctors (n=2), dieticians (n=1), physiotherapy assistant (n=1) and enrolled nurse (n=1). Respondents’ workplace settings were community health (n=17, 55%), public hospital (n=10, 32%) or private/general practice (n=2, 7%). All those who worked in public hospitals had a combination of in- and outpatient caseloads. The community healthcare practitioners had varied responsibilities. Some were working in town settings, others were working in a town but also travelled to remote communities while others were based in remote communities. The median length of time respondents had worked in their current work role was 2.5 years (range= 3 weeks to 40 years).

**Participant pre-workshop experience and training**

The questionnaire sought responses on a number of components of management for people with COPD. The components of management were based on best practice guidelines. Details of the respondents’ self-rated prior experience and training in these components of management are shown in Table 2. For many of these components the majority of respondents reported that they had little or no past experience or training. More respondents reported their level of experience as “none” in those components specific to pulmonary rehabilitation such as performing a six minute walk test (6MWT) (n=21, 68%) than in the more generic aspects of care, such as providing patient education (n=9, 29%).

**Participant pre-workshop confidence**

Respondent self-rated confidence regarding providing components of management for people with COPD is displayed in Table 3. Few respondents reported “a lot” of confidence for any component and overall confidence relating to all components of management was low. Respondents were least confident with performing a 6MWT, prescribing and delivering exercise and monitoring outcomes.
Mean objective total knowledge score (number of correct answers out of 19) was 8.5 (SD 4.5). The only question that had a 100% (n=31) correct response rate was one relating to what COPD stood for. Questions relating to disease pathophysiology and diagnosis had higher correct response rates than those relating more specifically to other components of management such as pulmonary rehabilitation.

Twenty four (77%) respondents indicated that pulmonary rehabilitation was seen as important by their health services. Respondents were not asked about their individual personal beliefs about the importance of pulmonary rehabilitation. Twenty three respondents (74%) thought that there could be barriers to establishing a pulmonary rehabilitation program in their health service. The most commonly indicated barriers were staff shortages (n=25, 80%), lack of financial resources (n=20, 65%) and lack of staff knowledge and training (n=18, 58%).

This study is the first to document the preparedness of healthcare practitioners in rural and remote settings to deliver evidence-based management for people living with COPD. The main findings of the study were that self-rated levels of experience, training and confidence for components of management for people with COPD were low. Knowledge scores were also low and demonstrated particular limitations in the understanding of pulmonary rehabilitation. Only a few respondents reported “a lot” of experience with any of the identified core components of management for people with COPD and most participants reported very little training in any of these components. Unsurprisingly, self-rated experience and training were higher for more generic skills, such as providing patient education, than for interventions more specifically related to pulmonary rehabilitation, such as evaluating exercise capacity using a 6MWT or prescribing an exercise training program.
Respondent self-rated confidence in providing the components of management was also low overall. No more than six respondents reported that they were “very” confident for any of the listed components. For most of the components “not at all” confident was the highest scoring category of response. Most respondents lacked confidence in any area relating to pulmonary rehabilitation. Interestingly for some questions where a majority of respondents reported higher levels of experience this was not reflected in higher confidence for that area of practice. This was the case for performing spirometry and for patient education. Nineteen (61%) respondents reported “some” or “a lot” of experience and training with patient education yet only eight (26%) rated themselves as “moderately” or “very” confident with planning an education program for people with COPD. This finding suggests that generic skills, experience and training are insufficient to increase the confidence of healthcare practitioners when dealing with the specific management needs of people with COPD.

Knowledge scores conformed to a similar pattern as experience and training. More generic questions relating to disease pathophysiology and diagnosis were more likely to be correctly answered compared with those relating to pulmonary rehabilitation. However even those questions relating to basic concepts of disease cause (smoking), differentiation of COPD from asthma and bronchiectasis, and diagnosis with the aid of spirometry were answered incorrectly by at least 26% of respondents. This would indicate that, as well as specific training related to pulmonary rehabilitation, education pertaining to even the basic concepts of COPD is also required. This is particularly important in rural and remote settings where, due to the need for smaller numbers of multi-skilled providers and ongoing staff shortages, it is more likely a greater number of components of management would be undertaken by a single healthcare practitioner.

There are no other reported studies either in a rural and remote or urban Australian setting with which to compare the current results relating to healthcare practitioner knowledge, training and experience. Confidence and understanding of general practitioners and practice nurses about diagnosis and management of COPD have been examined by Halpin et al in the United Kingdom. General practitioner and practice nurse confidence in diagnosing and managing patients with COPD was generally good and had improved over several years. The results, however, are not directly comparable to the current study as the questions used to assess confidence differed in scale of measurement and emphasis. In the study by Halpin et al emphasis was placed on the medical diagnosis of COPD and differentiation from asthma. Few questions were asked about practitioner confidence in providing any other components of management. Pulmonary rehabilitation was only
addressed by a general question regarding awareness, which was found to be high among participants. Details of the geographic location of participants were not documented, however, as it was a UK-based sample it is likely that participants were either in, or close to, urban centres. Participants only included medical practitioners and practice nurses from general practices and there were no allied health participants.

As stated earlier COPD is a significant cause of preventable hospitalisation and long term disability for rural and remote Australians.\textsuperscript{2,24} Therefore medical, nursing and allied health practitioners in rural and remote locations are likely to be involved in the provision of management for people with COPD. In addition, people with COPD are seen across the spectrum of healthcare services as they are frequent users of general practices, are often hospitalised with acute exacerbations of their disease and regularly require ongoing management at the outpatient or community level. Thus healthcare practitioners in private practice, general practice, inpatient, hospital outpatient and community settings are all likely to be involved in the management of people with COPD. The Australian COPD-X guidelines aim to provide evidence-based standards of care for healthcare practitioners working with people with COPD.\textsuperscript{10} The COPD-X guidelines emphasise the accurate identification and diagnosis of COPD (using spirometry) and the optimisation, promotion and maintenance of function and quality of life through self-management in combination with pulmonary rehabilitation. These same recommendations are also reinforced in the Central Australian Rural Practitioners Association (CARPA) manual for rural and remote healthcare practitioners.\textsuperscript{25} Practitioners managing people with COPD should have knowledge of the standards of care for their patients and as such require a basic understanding of the pathophysiology of the disease, along with knowledge and skills in diagnosis and management, particularly the provision of pulmonary rehabilitation. Improving healthcare practitioner ability to deliver pulmonary rehabilitation is increasingly being seen as an important part of improving access to this effective intervention.\textsuperscript{17,18,24} A lack of knowledge of the benefits of pulmonary rehabilitation, poor referral and as lack of trained staff have been identified as barriers to establishing pulmonary rehabilitation programs.\textsuperscript{14,18,20}

Development of local expertise, through education and training of healthcare practitioners, is a significant issue for rural and remote healthcare services. Dissatisfaction with access to continuing professional development and training is commonly reported by rural and remote healthcare practitioners.\textsuperscript{22,26} It has also been suggested that lack of continuing professional development may contribute to poor staff retention rates and reduced job satisfaction.\textsuperscript{27} Providing rural and remote healthcare practitioners with sound evidence-based training in pulmonary rehabilitation is likely to
be an effective strategy to enhance practitioner knowledge and skills and improve patient care, as well as decrease staff turnover. Further research into the knowledge and skills required by healthcare practitioners is required in order to develop effective training programs which enable rural and remote healthcare practitioners to deliver evidence-based best practice care to their patients with chronic lung disease. In the Australian context nurses and physiotherapists are the healthcare practitioners most likely to be responsible for running pulmonary rehabilitation programs. More detailed examination of the specific learning needs of the different healthcare practitioner groups commonly involved in the running of pulmonary rehabilitation is necessary in order to deliver adequately targeted and tailored training.

One of the limitations of the current study was the small sample size (n=31). Despite the small numbers, the respondents in this study represented a broad section of the community of interest, that is, healthcare practitioners who provide management for people with COPD. Participants were from a number of professional backgrounds (predominantly nursing and physiotherapy) and worked in a variety of settings from hospital inpatient to remote community based healthcare services. Another limitation may have been response bias due to respondent self-selection (by registering for the BEWE Program). The fact that they were interested in participating in a training program related to COPD could mean that respondents had less knowledge about the subject than their colleagues, as those who were knowledgeable may have chosen not to participate. However respondents were identified by their health service directors as the people most likely to be in a position to establish management strategies for people with COPD, including pulmonary rehabilitation. It is therefore reasonable to conclude that the participants were a broadly representative sample and the findings of this study may be applied to similar groups of rural and remote healthcare practitioners.

This preliminary study indicated that rural and remote healthcare practitioners had low levels of experience, training, knowledge, practical skills and confidence related to providing components of management for people with COPD. Education and training of rural and remote healthcare practitioners in the evidence-based management of people with COPD with an emphasis on pulmonary rehabilitation is needed.

Acknowledgements
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collection and thank the rural and remote healthcare practitioners who participated in all aspects of this research.
REFERENCES


**TABLE 1**

Table 1: Geographic spread and healthcare setting of study participants.

<table>
<thead>
<tr>
<th>Type of service</th>
<th>Approximate local population serviced</th>
<th>Number of study participants</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Workshop – Rural</strong></td>
<td></td>
<td>15</td>
</tr>
<tr>
<td>Base Hospital Location 1</td>
<td>63 500</td>
<td>1</td>
</tr>
<tr>
<td>Base Hospital (Workshop site) Location 2</td>
<td>26 000</td>
<td>7</td>
</tr>
<tr>
<td>Local Hospital Location 3</td>
<td>11 000</td>
<td>3</td>
</tr>
<tr>
<td>Local Hospital Location 4</td>
<td>6800</td>
<td>3</td>
</tr>
<tr>
<td>Private practice (covering local hospital)Location 5</td>
<td>1500</td>
<td>1</td>
</tr>
<tr>
<td><strong>Workshop – Remote</strong></td>
<td></td>
<td>16</td>
</tr>
<tr>
<td>Base Hospital (Workshop site)Location 1</td>
<td>26 000</td>
<td>4</td>
</tr>
<tr>
<td>Community health - urban (100km radius) Location 1</td>
<td>26 000</td>
<td>4</td>
</tr>
<tr>
<td>Community health – remote, location 3</td>
<td>*</td>
<td>3</td>
</tr>
<tr>
<td>Community Based remote Healthcare clinic Location 3</td>
<td>400</td>
<td>2</td>
</tr>
<tr>
<td>Aboriginal Corporation remote healthcare service 4</td>
<td>*</td>
<td>3</td>
</tr>
</tbody>
</table>

*Population widely dispersed across very remote lands (some more than 1000km from urban settings)
### Table 2

Table 2: Participant self-rating of previous experience and training in providing components of management for patients with chronic obstructive pulmonary disease (COPD)

<table>
<thead>
<tr>
<th>Previous experience</th>
<th>None n (%)</th>
<th>Some n (%)</th>
<th>A lot n (%)</th>
<th>Missing n</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assessing a patient with COPD</td>
<td>8 (26)</td>
<td>17 (55)</td>
<td>3 (10)</td>
<td>3</td>
</tr>
<tr>
<td>Performing a spirometry test</td>
<td>16 (52)</td>
<td>7 (23)</td>
<td>7 (23)</td>
<td>1</td>
</tr>
<tr>
<td>Performing a 6 minute walk test</td>
<td>21 (68)</td>
<td>6 (19)</td>
<td>2 (6)</td>
<td>2</td>
</tr>
<tr>
<td>Working with chronic disease health programs</td>
<td>10 (32)</td>
<td>13 (42)</td>
<td>5 (16)</td>
<td>3</td>
</tr>
<tr>
<td>Planning/running a pulmonary rehabilitation program</td>
<td>23 (74)</td>
<td>4 (13)</td>
<td>2 (6)</td>
<td>2</td>
</tr>
<tr>
<td>Planning and carrying out patient education</td>
<td>9 (29)</td>
<td>8 (26)</td>
<td>11 (35)</td>
<td>3</td>
</tr>
<tr>
<td>Prescribing an individualised exercise program</td>
<td>18 (58)</td>
<td>9 (29)</td>
<td>2 (6)</td>
<td>2</td>
</tr>
<tr>
<td>Running an exercise program</td>
<td>20 (65)</td>
<td>7 (23)</td>
<td>2 (6)</td>
<td>2</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Previous training</th>
<th>None n (%)</th>
<th>Some n (%)</th>
<th>A lot n (%)</th>
<th>Missing n</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assessing a patient with COPD</td>
<td>14 (45)</td>
<td>11 (35)</td>
<td>3 (10)</td>
<td>3</td>
</tr>
<tr>
<td>Performing a spirometry test</td>
<td>13 (42)</td>
<td>12 (39)</td>
<td>4 (13)</td>
<td>2</td>
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<tr>
<td>Performing a 6 minute walk test</td>
<td>22 (71)</td>
<td>7 (23)</td>
<td>0 (0)</td>
<td>2</td>
</tr>
<tr>
<td>Planning/running a pulmonary rehabilitation program</td>
<td>21 (68)</td>
<td>8 (26)</td>
<td>0 (0)</td>
<td>2</td>
</tr>
<tr>
<td>Planning and carrying out patient education</td>
<td>10 (32)</td>
<td>15 (48)</td>
<td>4 (13)</td>
<td>2</td>
</tr>
<tr>
<td>Prescribing an individualised exercise program</td>
<td>22 (71)</td>
<td>5 (16)</td>
<td>2 (6)</td>
<td>2</td>
</tr>
<tr>
<td>Running an exercise program</td>
<td>20 (65)</td>
<td>7 (23)</td>
<td>1 (3)</td>
<td>3</td>
</tr>
</tbody>
</table>
Table 3: Participant self-rating of confidence in providing components of management for people with COPD.

<table>
<thead>
<tr>
<th>Level of confidence (n=31)</th>
<th>Not at all</th>
<th>A little</th>
<th>Moderately</th>
<th>Very</th>
<th>missing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Explaining COPD and bronchiectasis</td>
<td>4 (13)</td>
<td>10 (32)</td>
<td>11 (36)</td>
<td>5 (6)</td>
<td>1</td>
</tr>
<tr>
<td>Assessing a patient with chronic respiratory disease</td>
<td>8 (26)</td>
<td>12 (39)</td>
<td>7 (23)</td>
<td>3 (10)</td>
<td>1</td>
</tr>
<tr>
<td>Determining who to refer to pulmonary rehabilitation</td>
<td>7 (23)</td>
<td>13 (42)</td>
<td>5 (16)</td>
<td>2 (7)</td>
<td>4</td>
</tr>
<tr>
<td>Performing a spirometry test</td>
<td>13 (42)</td>
<td>8 (26)</td>
<td>3 (10)</td>
<td>6 (19)</td>
<td>1</td>
</tr>
<tr>
<td>Performing a six minute walk test</td>
<td>16 (52)</td>
<td>6 (19)</td>
<td>4 (13)</td>
<td>4 (13)</td>
<td>1</td>
</tr>
<tr>
<td>Assessing quality of life</td>
<td>9 (29)</td>
<td>6 (19)</td>
<td>11 (36)</td>
<td>2 (7)</td>
<td>3</td>
</tr>
<tr>
<td>Planning a program of patient education</td>
<td>13 (42)</td>
<td>9 (29)</td>
<td>6 (19)</td>
<td>2 (7)</td>
<td>1</td>
</tr>
<tr>
<td>Prescribing an exercise program</td>
<td>14 (45)</td>
<td>8 (26)</td>
<td>3 (10)</td>
<td>3 (10)</td>
<td>3</td>
</tr>
<tr>
<td>Delivering an exercise program</td>
<td>15 (48)</td>
<td>6 (19)</td>
<td>5 (16)</td>
<td>4 (13)</td>
<td>1</td>
</tr>
<tr>
<td>Monitoring outcomes of a pulmonary rehabilitation program</td>
<td>15 (48)</td>
<td>8 (25)</td>
<td>3 (10)</td>
<td>2 (7)</td>
<td>3</td>
</tr>
</tbody>
</table>