




BMJ Open Healthcare providers' attitudes, beliefs and barriers to pulmonary rehabilitation for patients with chronic obstructive pulmonary disease in Saudi Arabia: a cross-sectional study

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To cite: Aldhahir AM, Alqahtani JS, Aldraiwiesh IA, *et al.* Healthcare providers' attitudes, beliefs and barriers to pulmonary rehabilitation for patients with chronic obstructive pulmonary disease in Saudi Arabia: a cross-sectional study. *BMJ Open* 2022;**12**:e063900. doi:10.1136/bmjopen-2022-063900

► Prepublication history and additional supplemental material for this paper are available online. To view these files, please visit the journal online (<http://dx.doi.org/10.1136/bmjopen-2022-063900>).

Received 14 April 2022
Accepted 05 October 2022



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ABSTRACT

Objectives To assess the attitude of healthcare providers (HCPs) towards the delivering of pulmonary rehabilitation (PR) to patients with chronic obstructive pulmonary disease (COPD) and identify factors and barriers that might influence referral.

Design A cross-sectional online survey consisting of nine multiple-choice questions.

Settings Saudi Arabia.

Participants 980 HCPs including nurses, respiratory therapists (RT) and physiotherapists.

Primary outcome measures HCPs attitudes towards and expectations of the delivery of PR to COPD patients and the identification of factors and barriers that might influence referral in Saudi Arabia.

Results Overall, 980 HCPs, 53.1% of whom were men, completed the survey. Nurses accounted for 40.1% of the total sample size, and RTs and physiotherapists accounted for 32.1% and 16.5%, respectively. The majority of HCPs strongly agreed that PR would improve exercise capacity 589 (60.1%), health-related quality of life 571 (58.3%), and disease self-management in patients with COPD 589 (60.1%). Moreover, the in-hospital supervised PR programme was the preferred method of delivering PR, according to 374 (38.16%) HCPs. Around 85% of HCPs perceived information about COPD, followed by smoking cessation 787 (80.3%) as essential components of PR besides the exercise component. The most common patient-related factor that strongly influenced referral decisions was 'mobility affected by breathlessness' (64%), while the 'availability of PR centres' (61%), the 'lack of trained HCPs' (52%) and the 'lack of authority to refer patients' (44%) were the most common barriers to referral.

Conclusion PR is perceived as an effective management strategy for patients with COPD. A supervised hospital-based programme is the preferred method of delivering PR, with information about COPD and smoking cessation considered essential components of PR besides the exercise component. A lack of PR centres, well-trained staff and the authority to refer patients were major barriers

STRENGTHS AND LIMITATIONS OF THIS STUDY

- ⇒ To our knowledge, this is the first national study that explores healthcare providers' (HCPs') attitudes and beliefs about the delivery of pulmonary rehabilitation (PR) to patients with chronic obstructive pulmonary disease (COPD) and identifies factors and barriers that might influence referral in Saudi Arabia
- ⇒ The availability of PR centres, the lack of trained HCPs and the lack of authority to refer patients were the most common barriers preventing the referral of COPD patients to PR programme
- ⇒ The study was conducted during the COVID-19 pandemic, which may have impacted the respondents' opinions.

to referring patients with COPD. Further research is needed to confirm HCP perceptions of patient-related barriers.

INTRODUCTION

Chronic obstructive pulmonary disease (COPD) is a common, preventable and treatable disease characterised by airway and/or alveolar abnormalities, leading to airflow limitation and persistent pulmonary symptoms.¹ Patients with COPD are susceptible to daily respiratory symptoms, reduced exercise capacity and frequent chest infections that could result in deterioration of lung function and acceleration of disease progression, subsequently leading to emergency hospital admissions.^{1,2} In addition to pharmacologic approaches, the International Global Initiative for Obstructive Lung Disease stresses the importance of including non-pharmacologic interventions such as pulmonary rehabilitation (PR) in the management of COPD symptoms as PR provides symptomatic

improvement,^{3 4} thereby reducing unnecessary hospital admissions.

PR is a comprehensive, multidisciplinary, non-pharmacologic intervention aimed at improving quality of life and exercise performance in patients with COPD.⁴⁻⁶ PR usually consists of patient assessment with an exercise test and dyspnoea assessment, exercise training that includes endurance and resistance training, quality of life measure, nutritional with occupational evaluation and health education and is administered by a group of multidisciplinary HCPs.⁷

There has been an increasing trend in Saudi Arabia's prevalence and incidence of COPD from 1990 to 2019.⁸ In 2019, it has been estimated that around 434560 people had COPD in the Kingdom of Saudi Arabia.⁸ This study shows that the burden of COPD is increasing, and public health policy is necessary to offset this trend. PR programmes are an example of community-based primary care management that must be implemented to lessen such a burden.⁸ However, in Saudi Arabia, PR programmes are often unavailable or underused,⁹ for multiple reasons, including the lack of trained staff who can manage patients with COPD.¹⁰ In addition, PR services across the country must be conducted under close supervision by pulmonologists or internists with an interest in pulmonary medicine, although the number of chest physicians in Saudi Arabia is relatively low.^{11 12} Consequently, an inadequate number of services are provided to meet the needs of patients with COPD.

International and national COPD management guidelines recommend increasing the implementation of PR programmes worldwide by involving well-trained HCPs in the PR team,^{5 11 12} considering that COPD is now perceived as a heterogeneous disease with multisystem manifestation that causes systemic consequences.¹² Despite the current contribution and involvement of experienced HCPs (eg, nurses, respiratory therapists, physiotherapists, psychologists, occupational therapists, and dietitians) in Saudi PR programmes, awareness of and barriers to healthcare professionals in delivering PR programmes in Saudi Arabia are limited. Recently, we have conducted a study to assess pulmonologists', internists' and general practitioners' attitudes towards the delivery of PR to patients with COPD and to identify factors and barriers that might influence PR referral decisions. Our findings showed that the referral rate was low among all physicians, which was attributed to a lack of PR centres and trained staff.¹³ Given the fact that our previous study did not survey non-physicians HCPs' attitudes, although they were implicated as a barrier to referral, the present study aimed to explore allied healthcare professionals' attitudes and expectations towards delivering a PR programme and identify their views on factors and barriers that might influence the referral of patients with COPD in Saudi Arabia.

METHODS

Study design

A cross-sectional survey was conducted through an online platform (Survey Monkey) between 15 September 2021, and 19 January 2022.

Questionnaire tool

The survey was composed of nine multiple-choice closed questions and free text fields for additional comments; it was structured, formulated and validated by multidisciplinary experts including nursing, respiratory therapy, physiotherapy and nutrition in the field of PR based on the currently available literature.^{5 7 14} Before the initial distribution, content and face validity were assessed after piloting the survey with 10 healthcare professionals with a clinical background in COPD management.

Before participants started to answer the questionnaire, the aim of the study was provided, together with information about the lead investigator. Additionally, no personal information was recorded; voluntary participation was ensured by asking if participants were happy to complete the survey or not. An additional statement was provided in the survey: 'By answering "yes" in completing the survey question, you voluntarily agree to participate in this study and give your consent to use your anonymous data for research purposes'. The time required to complete the survey was approximately 3–5 min. The questionnaire consisted of two pages of structured responses that involved multiple-choice answers in three sections. Section 1 requested the respondents' demographic information, including gender, profession, years of experience and responsibilities in the management of COPD. Section 2 consisted of three questions asking about HCPs' perceptions of PR. The first question had six statements regarding the effectiveness of PR with patients with COPD and used a 5-point Likert scale ranging from 1=strongly disagree to 5=strongly agree. The second question asked about additional components of PR aside from the exercise component, and the third question was about the best way to deliver PR for patients with COPD. Section 3 included two questions regarding patient-related factors that influence referral decisions and process-related factors that influence the decision not to refer COPD patients. These questions used influence as a grading tool: no influence, some influence and strong influence (see online supplemental appendix 1).

Sampling strategy

Professional committees managing respiratory diseases such as Saudi Society of Respiratory Care, Saudi Physical Therapy Association and Saudi Nurses Association, and social networks (Twitter, WhatsApp and Telegram) were used to distribute the survey to reach a greater number of HCPs working in Saudi Arabia. Professional committees posted the survey on their social media pages and sent emails to their members. Additionally, four authors from four different medical institutions in four different regions of Saudi Arabia have participated in the data

collection. Each data collector was responsible for distributing the survey in his/her region to HCPs to ensure that all the geographical areas of Saudi Arabia were covered.

Patient and public involvement statement

Patients were not involved.

Sample size

Convenience sampling techniques were used to recruit the study participants. Nurses, respiratory therapists, physiotherapists, psychologists, occupational therapists and nutritionists involved in managing patients with COPD or who had potential contact with this population were the main targets. Sample size calculation was not required, as this was an exploratory study designed.

Statistical analysis

Data were collected and analysed using the Statistical Package for Social Sciences (SPSS software, V.25). The categorical variables were reported and presented in percentages and frequencies. A χ^2 test was used to assess the statistically significant difference between categorical variables. Statistical significance was considered if the $p < 0.05$.

RESULTS

Overall, 980 HCPs (53.1% men) participated in the online survey between 9 September 2021, and 19 January 2022. Nurses accounted for 40.1% of the participants, followed by respiratory therapists (32.1%), physiotherapists (16.5%) and other healthcare specialties (11.2%) such as nutritionists and occupational therapists. The majority of respondents had 1–2 (30%) or 3–4 (26%) years of clinical experience in caring for patients with COPD, while 15.2% had 5–6 years. Oxygen therapy (57%), inpatient treatment (47.1%), ongoing management (42.1%), diagnosis (38.9%) and outpatient clinics (38.1%) were the main responsibilities for managing patients with COPD (table 1).

HCP' opinions on referring patients with COPD

Most HCPs strongly agreed that PR would improve COPD patients' exercise capacity (589 or 60.1%), and they strongly believed that PR would reduce symptoms of dyspnoea and fatigue (545 or 55.6%). In addition, most HCPs strongly agreed that PR would reduce levels of anxiety and depression (479 or 48.9%), and 571 (58.3%) strongly agreed that PR would improve patients' health-related quality of life. Moreover, 517 (52.8%) strongly agreed that PR would reduce hospital readmission, and 528 (53.9%) strongly agreed that PR would reduce the risk of future COPD exacerbation. Moreover, 440 HCPs (44.9%) strongly agreed that PR would improve patients' nutritional status, and the majority strongly agreed that PR would improve disease self-management in COPD patients (589 or 60.1%) (table 2).

Table 1 Demographic data and characteristics of all study respondents (n=980)

Demographic variables	Frequency (%)
Gender	
Male	520 (53.1)
Female	460 (46.9)
Profession	
Nursing	393 (40.1)
Respiratory therapy	315 (32.1)
Physiotherapy	162 (16.5)
Others	110 (11.2)
Year of experience with patients with COPD	
< 1 year	96 (9.8)
1–2 years	294 (30)
3–4 years	255 (26)
5–6 years	149 (15.2)
7–8 years	75 (7.7)
9–10 years	47 (6.5)
>10 years	47 (4.8)
Responsibilities for care with patients with COPD	
Diagnosis	381 (38.9)
Urgent assessments	350 (35.7)
Non-urgent care	360 (36.7)
Ongoing management	413 (42.1)
Admission prevention	227 (23.2)
Medication check	360 (36.7)
Prescribing	106 (10.8)
Oxygen therapy	559 (57)
In patient treatment	462 (47.1)
Outpatient clinics	373 (38.1)
Primary care	282 (28.8)

Data are presented as frequencies and percentages. COPD, chronic obstructive pulmonary disease.

Mode of delivery and components of pulmonary rehabilitation

When asked about the preferred way to deliver a PR programme for patients with COPD, most HCPs believed that in-hospital supervised PR was the preferred method (748 or 76.3%), followed by delivering the PR at home (557 or 56.8%). However, only 275 (28.1%) believed that tailored PR with healthcare provider support over the phone would be the preferred method. Most HCPs believed that the essential components of PR include information about COPD disease (832 or 84.9%), followed by smoking cessation (787 or 80.3%) and COPD symptoms' management (749 or 76.4%), aside from the exercise component (table 3).

Patient-related factors that influence referral decisions to pulmonary rehabilitation

The main factors that strongly influenced the decision to refer patients with COPD to PR from the HCPs' perspective

Table 2 Healthcare providers' perception on referring patients with COPD to pulmonary rehabilitation (n=980)

Item	Frequency (%)
Perception on referring patients with COPD to PR	
I believe PR will improve patients' exercise capacity	
Strongly agree	589 (60.1)
Agree	260 (26.5)
Neutral	32 (3.3)
Disagree	8 (0.8)
Strongly disagree	91 (9.3)
I believe PR would reduce dyspnoea and fatigue	
Strongly agree	545 (55.6)
Agree	297 (30.3)
Neutral	62 (6.3)
Disagree	25 (2.6)
Strongly disagree	51 (5.2)
I believe PR will improve patients' anxiety and depression	
Strongly agree	479 (48.9)
Agree	320 (32.7)
Neutral	105 (10.7)
Disagree	29 (3)
Strongly disagree	47 (4.8)
I believe PR will improve patients' health-related quality of life	
Strongly agree	571 (58.3)
Agree	283 (28.9)
Neutral	57 (5.8)
Disagree	19 (1.9)
Strongly disagree	50 (5.1)
I believe PR will reduce the risk hospital readmission	
Strongly agree	517 (52.8)
Agree	317 (32.3)
Neutral	70 (7.1)
Disagree	28 (2.9)
Strongly disagree	48 (4.9)
I believe PR will reduce the risk of future COPD exacerbation	
Strongly agree	528 (53.9)
Agree	305 (31.1)
Neutral	78 (8)
Disagree	18 (1.8)
Strongly disagree	51 (5.2)
I believe PR will improve patients' nutritional status	
Strongly agree	440 (44.9)
Agree	341 (34.8)
Neutral	117 (11.9)
Disagree	28 (2.9)

Continued

Table 2 Continued

Item	Frequency (%)
Strongly disagree	54 (5.5)
I believe PR will improve patients' disease self-management	
Strongly agree	589 (60.1)
Agree	260 (26.5)
Neutral	32 (3.3)
Disagree	8 (0.8)
Strongly disagree	91 (9.3)
Data are presented as frequencies and percentages. COPD, chronic obstructive pulmonary disease ; PR, pulmonary rehabilitation.	

included mobility affected by patients' breathlessness (64.10%), followed by low activity levels (61.60%), low exercise tolerance (58.20%), patient fatigue related to COPD (52.90%) and patient anxiety related to COPD (50.70%) (figure 1).

Pulmonary rehabilitation referral barriers

From the HCPs' perspective, the main barriers that strongly affect the referral process for patients with COPD included a lack of available PR centres (61.80%), followed by a lack of trained HCPs who could manage patients with COPD (52.70%) and the lack of authority to refer a patient (44.30%). In addition, 43% reported that patients might refuse the referral process (figure 2).

Table 3 Mode of delivery and component of pulmonary rehabilitation programme (n=980)

Item	Frequency (%)
The best way to deliver PR programme for patients with COPD	
In hospital supervised programme	374 (38.16)
At home	276 (28.16)
Online programme with healthcare provider support	192 (19.59)
Tailored programme with healthcare provider support through phone	138 (14.08)
Component of PR programme aside from exercise component	
Information about COPD disease	832 (84.9)
Smoking cessation	787 (80.3)
Symptoms management	749 (76.4)
Psychological support	671 (68.5)
Information about medications	648 (66.1)
Nutritional counselling	526 (53.7)
Data are presented as frequencies and percentages. COPD, chronic obstructive pulmonary disease ; PR, pulmonary rehabilitation.	

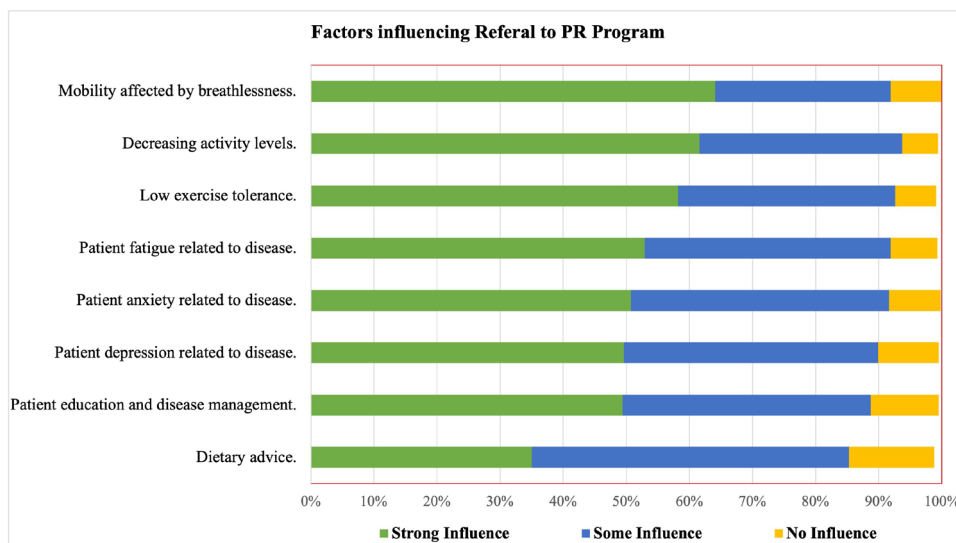


Figure 1 Patient-related factors that influence referral decision to pulmonary rehabilitation (PR), using strong, some or no influence grading (n=980).

DISCUSSION

To the best of our knowledge, this is the first national study that explores assess non-physician HCPs attitudes and expectation toward delivering PR to COPD patients and identify factors and barriers that might influence referral in Saudi Arabia. Findings show that HCPs perceived PR as an effective management strategy in improving clinical outcomes in COPD. While a supervised hospital-based programme was seen as the preferred mode of delivery, the lack of PR centres, well-trained staff, and the authority to refer posed significant barriers to PR referrals. HCPs perceived patients' education about COPD disease, smoking cessation and symptoms management as the most essential components of PR programme next to exercise component.

PR has established a solid position as the cornerstone of the management of patients with COPD. Indeed,

current evidence shows that PR alleviates exercise limitations and dyspnoea, improves nutritional status and psychological well-being and reduces hospitalisations, future COPD exacerbations and mortality rates.^{5 15 16} In our study, HCPs perceived mobility affected by breathlessness, low activity levels and low exercise tolerance as the most common factors that influence referral decision which are in accordance with current international guidelines.^{17 18} According to National Institute for Health and Care Excellence and British Thoracic Society PR should be offered to patients who are short of breath and functionally limited due to breathlessness.^{17 18} All these reported factors that influence referral have been shown to effectively improved in patients with COPD who were enrolled in PR.¹⁹

Despite the current evidence of PR effectiveness, the global referral rate is currently suboptimal.^{13 20 21} Current

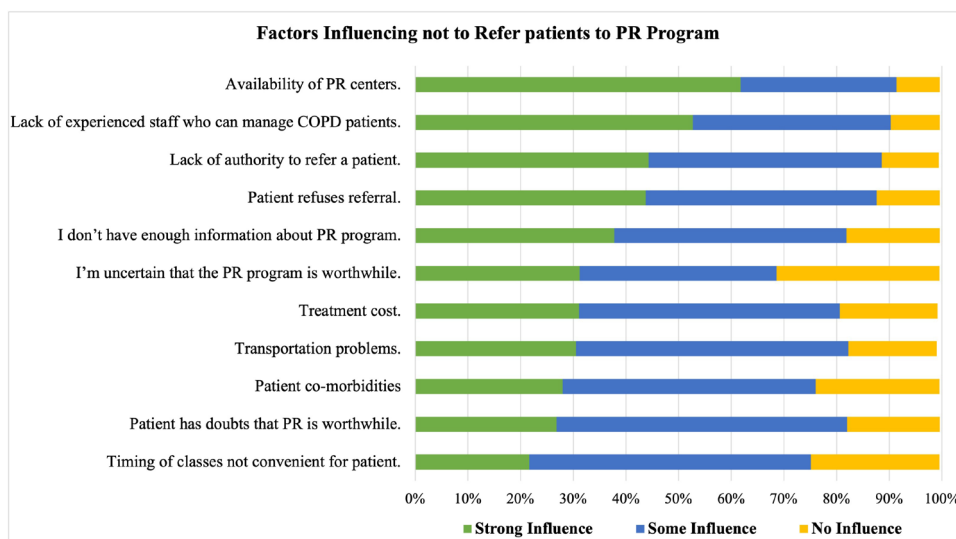


Figure 2 Barriers to referring patients with COPD to PR from HCPs perspective, using strong, some or no influence grading (n=980). COPD, chronic obstructive pulmonary disease; HCPs, healthcare providers; PR, pulmonary rehabilitation.

international COPD guidelines recommend the involvement of experienced HCPs in the referral management of COPD patients; however, referral to PR cannot be performed without physicians' permission in Saudi Arabia.^{11 17 19 21 22} In the current study, nearly half of the participants believed that a lack of authority to refer posed a significant barrier to PR referral. Therefore, experienced HCPs who are part of the PR team or COPD management should promote physicians' knowledge about PR and its potential to enhance the PR referral rate.

Reasons for not referring patients with COPD to PR programmes are likely to be multifactorial; lack of available PR centres is at top of the list, as shown in this study which is in accordance with recent study that included physicians and concluded that limited PR centres was the cause of low PR referral.¹³ Saudi Arabia has a limited number of PR centres, and the number of people who can access these centres is extremely low.⁹ This contrasts, for instance, with the situation in the UK, which has 228 PR services. The gap in the current practice is therefore clear, and the establishment of new PR programmes needs to be facilitated across the country. It is however important to mention that PR programmes can be offered within the existing infrastructure using the incumbent HCPs in the hospitals.²³ It has been previously demonstrated that an outpatient PR programme offered at a small hospital is as effective as a programme offered in a large hospital.²⁴ Current evidence also suggests that PR can be effectively offered using different modalities, including inpatient, community-based, home settings or online.^{24 25} Thus, any of these modes of delivery can be adopted according to the hospital's available resources.

Participants in this study also perceived the lack of well-trained staff as a major barrier to PR referral, in concordance with the current literature.^{13 19 21 26} Studies show that Saudi Arabia suffers from a severe shortage of healthcare professionals and that only limited specialties participate in the management of COPD.^{27 28} Evidence suggests that COPD management is much better if performed by a multidisciplinary team,^{28 29} highlighting the need for an integrated approach. It is however important to mention that the number of specialised physicians and healthcare professionals (eg, respiratory nurses and respiratory physiotherapists) is, overall, low,^{27 28} which could affect the quality of COPD care in the country. Therefore, the healthcare authority in Saudi Arabia should take action to reduce the current shortage by providing training incentives to people willing to specialise in respiratory medicine and encouraging the upskilling of current healthcare workers. In addition, offering high-quality education either inside or outside the country could be a useful approach to stimulate this change.

Almost half of the study participants perceived 'patients might refuse the referral' as a major barrier to refer COPD

patients to PR which is in accordance with recent study included physicians and concluded that 46% perceived patients refuse referral is a major barrier.¹³ This may be due to the lack of patients' knowledge about the PR and its benefit to their condition as well as travel distance to PR.^{19 30 31} Therefore, incorporating patients' preferences of PR delivery mode and increasing awareness of PR and its benefit among COPD population are needed.

Almost 80% of HCPs in this study considered supervised hospital-based programmes the preferred mode of PR delivery, despite the limited number of PR centres in the country. This is likely because of a lack of knowledge about PR services in Saudi Arabia, as only a small proportion of HCPs know what PR is.¹⁰ However, utilising the available resources within the infrastructure of the hospital remains possible for setting up and delivering a PR programme. Alternatively, home settings, which are as effective as conventional PR programmes in improving exercise capacity and respiratory symptoms,³² could be considered a viable option.

In this study, most HCPs believed that information about COPD disease, smoking cessation and symptoms management are the most important components of a PR programme. Indeed, disease-related education contributes to patients' recognition of their symptoms and worsening disease.³³ However, the content of the PR educational programme, who delivers it, and how it is delivered remain unclear. According to the American Thoracic Society/ European Respiratory Society (ATS/ERS) official consensus, smoking cessation is a major component of a PR programme.^{7 14} It is the primary cause of COPD, with the prevalence of COPD smokers ranging from 38% to 77%.³⁴ In addition, smoking contributes to 73% of COPD-related deaths worldwide.³⁵ Smoking is also associated with accelerated lung function declines, higher COPD exacerbations^{36 37} and increased dropout rates from PR. Therefore, support for smoking cessation should be offered throughout the PR programme.

Further research is needed to address COPD patients' attitudes and expectations toward delivering a PR programme and identify factors and barriers of referring. Additionally, future research should also focus on suitable mode of delivering PR as well as essential components from patients' perspective.

Limitations

Convenience sample techniques were used in the study, which may impose a selection bias. In this study, we did not survey or interview physicians who are part of COPD management. Additionally, we have failed to report the geographic distribution of the respondents. Moreover, the exact number of HCPs who involved in PR and with patients with COPD is unclear; therefore, the sample of our study may not represent the general population of HCPs. Finally, the study was conducted during the COVID-19 pandemic, which may have impacted respondents' opinions, especially given that 28% of the total

number of respondents reported that home PR is their preferred method of PR delivery.

CONCLUSION

HCPs across specialties agreed on the effectiveness of PR for patients with COPD. A supervised hospital-based programme is the preferred mode of PR delivery, with information about COPD disease and smoking cessation being considered essential components of PR in addition to the exercise component. The lack of PR centres and well-trained staff and the lack of authority to refer patients were major barriers to the referral of patients with COPD.

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Contributors The study was designed by AA, MA and JSA. Data collection was performed by AAA, IAA, HA and ASA, statistical methodology was performed by AA, and formal analysis was performed by AH, YSA and SMA. The draft of the manuscript was written by AMA, AAA, IAA, RS, EMA and MA, and reviewed and revised by EMA, JSA, HW and SMA. All authors approved the paper for publication. AA is the guarantor of the manuscript and accept full responsibility for the work and conduct of the study, had access to the data, and controlled the decision to publish.

Funding The authors have not declared a specific grant for this research from any funding agency in the public, commercial or not-for-profit sectors.

Competing interests None declared.

Patient and public involvement Patients and/or the public were not involved in the design, or conduct, or reporting, or dissemination plans of this research.

Patient consent for publication Not applicable.

Ethics approval Institutional Review Board approval for the study was obtained from Jazan University, reference number (HAPO-10-Z-001). Participants gave informed consent to participate in the study before taking part.

Provenance and peer review Not commissioned; externally peer reviewed.

Data availability statement Data are available upon reasonable request.

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