PEER REVIEW HISTORY

ARTICLE DETAILS

TITLE (PROVISIONAL)	Healthcare Providers' Attitudes, Beliefs and Barriers to Pulmonary Rehabilitation for Chronic Obstructive Pulmonary Disease Patients in Saudi Arabia: A Cross-Sectional Study
AUTHORS	Aldhahir, Abdulelah; Alqahtani, Jaber S.; AlDraiwiesh, Ibrahim; Alghamdi, Saeed; Alsulayyim, Abdullah; Alqarni, Abdullah; Alhotye, Munyra; Alwafi, Hassan; Siraj, Rayan; Alrajeh, Ahmed; Aldabayan, Yousef; Alzahrani, Eidan; Hakamy, Ali

VERSION 1 – REVIEW

REVIEWER	Degani-Costa, Luiza Hospital Israelita Albert Einstein
REVIEW RETURNED	10-May-2022

GENERAL COMMENTS	Dear Prof. Adrian Aldcroft, Thank you for the opportunity to review this article, which dwells on a subject I am specially interested in termos of research and clinical practice. The authors of the study "Healthcare Providers' Attitudes, Beliefs and Barriers to Pulmonary Rehabilitation for COPD Patients in Saudi Arabia: A National Survey" have a very noble objective of ultimately assessing the barriers to PR delivery in Saudi Arabia and are to be congratulated for the initiative of conducting such a study. However, I am afraid there are significant methodological limitations that preclude publication of the paper in its current form. Please find my detailed comments below: Major comments: 1. The selected study population does not seem to be the best one to answer one of the study aims, which was to understand the barriers to PR referral. As the authors themselves state, only physicians are allowed to refer patients for pulmonary rehabilitation in Saudi Arabia. Therefore, to address the issue of barriers to referral the appropriate study population would be physicians and/or COPD patients. Also, surveying allied healthcare professionals that are already involved in PR teams introduces several bias to the study and limits its external validity. 2. The authors state this was a national survey, but fail to report how representative of the total population of allied healthcare professionals in Saudi Arabia this study sample really is. They also fail to report the geographical distribution of responses throughout the country, an information which was probably not collected by

	the authors given their description of the questionnaire in the methods. Therefore, there is no way we can assure participants were not concentrated in a handful of institutions instead of being adequately distributed throughout the country. Additional minor comments: 3. It is unclear how the sample size was estimated, especially because involving so many different HCP would probably result in significant heterogeneity in response. Also, many different questions were asked in and it is unclear which one they used to guide the sample size calculation. 4. Table 3 shows the respondents answer to the question "the best way to deliver PR", but the sum of the alternatives exceeds 100%. 5. In the discussion, the authors tend to extrapolate the results and make inferences that cannot be supported by their data (eg. the need to train more HCP to deliver PR, which may be true, but is not supported by the study data) Once again, I appreciate the opportunity to review this manuscript and I would be happy to continue collaborating with the BMJ Open. Yours sincerely, Luiza Helena Degani-Costa, MD PhD

REVIEWER	Wilke, Sarah Ciro+, centre of expertise for chronic organ failure, Department of Research and Education
REVIEW RETURNED	23-May-2022

GENERAL COMMENTS	The authors demonstrated that most healthcare providers (HCPs) indicated that PR is an effective treatment strategy for COPD but sufficient PR centres, trained staff and the authority to refer patients are lacking. An in-hospital supervised program is the preferred method and, according to HCPs, disease information and smoking cessation are most essential components of PR. I read the paper with interest and although I agree that understanding HCPs attitudes, beliefs and barriers to pulmonary rehabilitation (referral) is essential, I have some comments and suggestions: - Abstract: language needs improvement. - Some inconsistencies throughout the manuscript: o it should be clear that it is the HCPs perspective. For instance, abstract: ‘An in-hospital supervised PR program is the preferred method of delivering PR’. Consider to add: ‘according to HCPs’. o The authors emphasize that smoking cessation and information about COPD are perceived as essential components of PR; clarify that this is next to exercise component. o Introduction, aims: attitudes and expectations – ‘barriers’ are missing (as well as in discussion). o Suggest to add symptom management as essential component throughout the manuscript (as top 3) as it is also mentioned by almost 80% (like smoking cessation). o Findings show a ‘consensus on the benefits’ or ‘HCPs agreed on the effectiveness’ is not correctly described/phrased. Reaching ‘agreement’ or ‘consensus’ was not the aim of the study and is not

	supported by the results (the study shows prevalences of answers – agreement or consensus might be studied with focus groups for instance. - Abstract: 'Further research is needed…' - the further research-part is missing in the discussion/paper. - Abstract/discussion: the authors state that the COVID-19 pandemic may have impacted respondents' opinions; in which way? - Introduction: prevalence of COPD Saudi Arabia ranging from 2.4-17.2% (references from 2011 and 2014) – is recent data available from a national website for instance? - Introduction: 'PR usually consists of patient assessment, exercise training and health education (…)' – reference is missing (in addition, these 'ingredients' are very limited). - Methods: the 'questionnaire tool' is not clear – I suggest to add/publish the tool as online supplement. It is important to understand the questions and answers/results. For instance, 'most HCPs believed that the essential components of PR include information about COPD (…)' (results) is something different than 'should be incorporated in PR' (discussion). How was/were the question(s) formulated? - Methods: was signing an informed consent form not necessary? - Methods: the rationale for the sample size calculation is not clear. Assuming that around 190 (50% of 377) participants will respond – can the author estimate how many patients were invited? Why did the authors finally included almost 1000 patients (so clearly exceeding the needed amount of participants)? - Results: suggest to rewrite some complex sentences - e.g. 'overall, 980 HCPs (520, or 53.1% male and 460, or 46.9%, female) to '980 HCP's (53% male)'. - Results: most respondents had one or 2 years of clinical expertise; this is not correct (39.6% had up to 2 years experience, meaning that two third (= most respondents) had 3 or more years experiences. - For me it was - till the discussion section - not clear what is meant by 'lack of authority to refer patients'. The authors advise to empower HCPs but I think it is not about empowering them since referral – or with other words: prescription of PR – is not their responsibility (but the responsibility of the physician/medical specialist). HCPs (as included in this study) are – I assume – not allowed to refer. So, it is important to recognize and communicate. - Discussion: 'limited number' compared with 228 PR services in UK – I am wondering what is the exact number in Saudi Arabia then? - 43% reported that patients might refuse the referral process: this is a lot and a very important finding (also underlying the need for studying barriers in patients) – can the authors comment/speculate on this? - Figure 1, patient-related factors are not discussed. - References should be updated; consider including/discussing: o An Evaluation of Factors That Influence Referral to Pulmonary Rehabilitation Programs Among People With COPD. Hug S, Cavalheri V, Gucciardi DF, Hill K. Chest. 2022 Jan 12:S0012-3692(22)00037-X. doi: 10.1016/j.chest.2022.01.006. Online ahead of print. o Overview of barriers: The Need for Expanding Pulmonary Rehabilitation Services. Lahham A, Holland AE. Life (Basel). 2021 Nov 15;11(11):1236. doi: 10.3390/life11111236.

	o An Official American Thoracic Society/European Respiratory Society Policy Statement: Enhancing Implementation, Use, and Delivery of Pulmonary Rehabilitation. o Rochester CL, Vogiatzis I, Holland AE, Lareau SC, Marciniuk DD, Puhan MA, Spruit MA, Masefield S, Casaburi R, Clini EM, Crouch R, Garcia-Aymerich J, Garvey C, Goldstein RS, Hill K, Morgan M, Nici L, Pitta F, Ries AL, Singh SJ, Troosters T, Wijkstra PJ, Yawn BP, ZuWallack RL; ATS/ERS Task Force on Policy in Pulmonary Rehabilitation. Am J Respir Crit Care Med. 2015 Dec 1;192(11):1373-86. doi: 10.1164/rccm.201510-1966ST.

VERSION 1 – AUTHOR RESPONSE

Comments from Reviewer 1:
R1C1: The selected study population does not seem to be the best one to answer one of the study aims, which was to understand the barriers to PR referral. As the authors themselves state, only physicians are allowed to refer patients for pulmonary rehabilitation in Saudi Arabia. Therefore, to address the issue of barriers to referral the appropriate study population would be physicians and/or COPD patients. Also, surveying allied healthcare professionals that are already involved in PR teams introduces several bias to the study and limits its external validity.
R1R1: We thank the reviewer 1 for this comment. Identifying the physicians' attitudes of PR and factors and barriers that might influence referral decisions is very important. For this reason, we have recently conducted a similar study on physicians investigating their attitudes and expectations toward delivering a PR program to patients with COPD and identify factors and barriers that might influence referral in Saudi Arabia. The study is now published (PMID: 35628041). We mentioned the finding of the study in the introduction part (p5, lines 154-159)
Usually, in Saudi Arabia, referring COPD patients to PR is done by multidisciplinary group of healthcare providers included but not limited to nurse, respiratory therapist, and physiotherapist, under the supervision of a physician. Non-physician healthcare providers are part of the referring process, but they cannot refer a patient without a physician permission. Therefore, including non-physicians' healthcare providers as a population would close the gap in this holistic process. We think their opinion is very important in the referring process. We are in the process of conducting a study that included COPD patients.

R1C2: The authors state this was a national survey but fail to report how representative of the total population of allied healthcare professionals in Saudi Arabia this study sample really is. They also fail to report the geographical distribution of responses throughout the country, an information which was probably not collected by the authors given their description of the questionnaire in the methods. Therefore, there is no way we can assure participants were not concentrated in a handful of institutions instead of being adequately distributed throughout the country
R1R2: Thank you for your comments. .. Although we did not report or collect the geographical locations, we have sent this survey to hospitals official using WhatsApp groups in each region of Saudi Arabia. The co-authors of this study work at different institutions located in different cities of Saudi Arabia (e.g., Jazan, Dammam, Makkah, Jeddah, Riyadh, and Al-Hasa). Four co-authors from four different cities participated in the data collection process, and each co-author was responsible to follow up with hospitals official tomake sure that the sample was a representative of the whole country. Additionally, we have contacted official societies such as, Saudi Society of respiratory care, Saudi physical therapy association and Saudi Nurses Association to distribute our survey and this has been added in the methodology (p 7, lines 203 -204)

R1C3: It is unclear how the sample size was estimated, especially because involving so many different HCP would probably result in significant heterogeneity in response. Also, many different questions were asked in and it is unclear which one they used to guide the sample size calculation.
R1R3: Thank you for your comments. We have consulted a statistician and sample size for an exploratory study is not required. Therefore, this was deleted, and we added the following sentence in sample size section (p 6, line 212):
"Sample size calculation was not required, as this was an exploratory study designed."

R1C4: Table 3 shows the respondents answer to the question "the best way to deliver PR", but the sum of the alternatives exceeds 100%
R1R4: Thank you for your comment. We went back to our data, and we have amended table 3.

R1C5: In the discussion, the authors tend to extrapolate the results and make inferences that cannot be supported by their data (eg. the need to train more HCP to deliver PR, which may be true, but is not supported by the study data)
R1R5: Thank you for your comment. Our findings showed that one of the most common barriers of referral is lack of trained HCPs who could manage COPD patients (52.70%) and lack of PR centres also was a barrier. These 2 barriers co-exist with each other. Therefore, we findings suggest that more trained HCPs are needed to deliver PR.

Comments from Reviewer 2:
R2C1: Abstract: language needs improvement.
R2R1: Thank you for your comment. We have made changes to our abstract.

R2C2: Some inconsistencies throughout the manuscript:
it should be clear that it is the HCPs perspective. For instance, abstract: 'An in-hospital supervised PR program is the preferred method of delivering PR'. Consider to add: 'according to HCPs'
R2R2: Thank you for your comments. This has been amended

R2C3: Some inconsistencies throughout the manuscript:
The authors emphasize that smoking cessation and information about COPD are perceived as essential components of PR; clarify that this is next to exercise component.
R2R3: Thank you for your comments. This has been amended

R2C4: Some inconsistencies throughout the manuscript:
Introduction, aims: attitudes and expectations – 'barriers' are missing (as well as in discussion).
R2R4: We thank the reviewer for pointing out inconsistency in wording. We have made the corrections introduction and discussion (tracked).

R2C5: Some inconsistencies throughout the manuscript:
Suggest to add symptom management as essential component throughout the manuscript (as top 3) as it is also mentioned by almost 80% (like smoking cessation).
R2R5: Thank you for your comments. This has been amended throughout the manuscript

R2C6: Findings show a 'consensus on the benefits' or 'HCPs agreed on the effectiveness' is not correctly described/phrased. Reaching 'agreement' or 'consensus' was not the aim of the study and is not supported by the results (the study shows prevalence of answers – agreement or consensus might be studied with focus groups for instance.
R2R6: Thank you for your comment. One aim of the study is to see their expectation regarding PR. We agree with you and we have rephrased this statement to: (p11, line 298-299)

“Findings show that HCPs perceived PR as an effective management strategy in improving clinical outcomes in COPD”

R2C7: Abstract: ‘Further research is needed…’ - the further research-part is missing in the discussion/paper.
R2R7: Thank you for your comment. We have added a section the last part of discussion (p 14, lines 378- 381) regarding future research.

R2C8:Abstract/discussion: the authors state that the COVID-19 pandemic may have impacted respondents’ opinions; in which way?
R2R8: Thank you for your comment. In our opinion, the best way of delivering PR might be impacted as a large percentage (28.16%) chooses at home PR.

R2C9: Introduction: prevalence of COPD Saudi Arabia ranging from 2.4-17.2% (references from 2011and 2014) – is recent data available from a national website for instance?
R2R9: Thank you for your comment. We have added a recent data that was published in the last 2 weeks. And we added this text (p 4, lines 131- 135)
“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 434,560 people had COPD in the Kingdom of Saudi Arabia8. This study shows that the burden of COPD is increasing, and public health policy is necessary to offset this trend.”

R2C10: Introduction: ‘PR usually consists of patient assessment, exercise training and health education (…)’ – reference is missing (in addition, these ‘ingredients’ are very limited).
R2R10: Thank you for your comment. We have amended the description of PR to:(p 4, lines 127-129)
“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”

R2C11: Methods: the ‘questionnaire tool’ is not clear – I suggest to add/publish the tool as online supplement. It is important to understand the questions and answers/results. For instance, ‘most HCPs believed that the essential components of PR include information about COPD (…)’(results) is something different than ‘should be incorporated in PR’ (discussion). How was/were the question(s) formulated?
R2R11: Thank you for your comment. We have delete “incorporated” and rephrase the statement to match our result. The tool will be added as a supplementary file.

R2C12: Methods: was signing an informed consent form not necessary?
R2R12: Thank you for your comment. This is an online survey and we have added this part in the method explaining the way of consenting respondents (p 6, lines 180 - 185)
“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”

R2C13: Methods: the rationale for the sample size calculation is not clear. Assuming that around 190(50% of 377) participants will respond – can the author estimate how many patients were invited? Why did the authors finally included almost 1000 patients (so clearly exceeding the needed amount of participants)?

R2R13: Thank you for your comments. We have consulted a statistician and sample size for an exploratory study is not required. Therefore, this was deleted, and we added this text in sample size section:
"Sample size calculation was not required, as this was an exploratory study designed."

R2C14: Results: suggest to rewrite some complex sentences - e.g. 'overall, 980 HCPs (520, or 53.1%male and 460, or 46.9%, female) to '980 HCP's (53% male)'.
R2R14: Thank you for your comment. This has been amended
R2C15:Results: most respondents had one or 2 years of clinical expertise; this is not correct (39.6%had up to 2 years experience, meaning that two third (= most respondents) had 3 or more years experiences.
R2R15: Thank you for your comment this has been amended in the result section (p 8, lines 232-233)

R2C16: For me it was - till the discussion section - not clear what is meant by 'lack of authority to refer patients'. The authors advise to empower HCPs but I think it is not about empowering them since referral – or with other words: prescription of PR – is not their responsibility (but the responsibility of the physician/medical specialist). HCPs (as included in this study) are – I assume – not allowed to refer. So, it is important to recognize and communicate.
R2R16: Thank you for your comment. First, there is no clear standard in the Kingdom of Saudi Arabia about the referral process. However, usually in Saudi Arabia, referring COPD patients to PR is done by multidisciplinary group of healthcare providers, under the supervision of physician, included but not limited to nurse, respiratory therapist, and physiotherapist. Non-physician healthcare providers are part of the referring process, but they cannot refer a patient without a physician permission and this committee can not work without physicians' involvement. Where in the U.K is different, PR staff can reinvite COPD patients every years. In Saudi this can not be done and every year COPD patient has to go through this committee and physician need to approve the referral. As I mentioned before in our discussion, the number of specialized physicians is low. Therefore, impowering well-trained healthcare providers to refer or re-reinvite COPD to rehab may improve referral rate.

R2C17:Discussion: 'limited number' compared with 228 PR services in UK – I am wondering what is the exact number in Saudi Arabia then?
R2R17: Thank you for your comment. Currently there is no data identifying the exact number of PR in the country. We know the number has been affected by COVD-19 lockdown as few rehab were shutdown.

R2C18: 43% reported that patients might refuse the referral process: this is a lot and a very important finding (also underlying the need for studying barriers in patients) – can the authors comment/speculate on this?
R2R18: Thank you for your comment. We have added this text in the discussion part (p 13 lines 353-360)
"Almost half of the study participants perceived "patients might refuse the referral" as a major barrier to refer COPD patients to PR. 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. Therefore, increase awareness of PR and its benefit among COPD population is needed as well as PR programme should be based on patients' preference.

R2C19: Figure 1, patient-related factors are not discussed.
R2R19: Thank you for your comment. We have added an additional paragraph discussing patients-related factors in the discussion part (pages 12, lines 309- 315)

R2C20: References should be updated; consider including/discussing:
o An Evaluation of Factors That Influence Referral to Pulmonary Rehabilitation Programs Among People With COPD. Hug S, Cavalheri V, Gucciardi DF, Hill K. Chest. 2022 Jan 12:S0012-3692(22)00037-X. doi: 10.1016/j.chest.2022.01.006. Online ahead of print.
o Overview of barriers: The Need for Expanding Pulmonary Rehabilitation Services. Lahham A, Holland AE. Life (Basel). 2021 Nov 15;11(11):1236. doi: 10.3390/life11111236.
o An Official American Thoracic Society/European Respiratory Society Policy Statement: Enhancing Implementation, Use, and Delivery of Pulmonary Rehabilitation.
o Rochester CL, Vogiatzis I, Holland AE, Lareau SC, Marciniuk DD, Puhan MA, Spruit MA, Masefield S, Casaburi R, Clini EM, Crouch R, Garcia-Aymerich J, Garvey C, Goldstein RS, Hill K,Morgan M, Nici L, Pitta F, Ries AL, Singh SJ, Troosters T, Wijkstra PJ, Yawn BP, ZuWallack RL;ATS/ERS Task Force on Policy in Pulmonary Rehabilitation. Am J Respir Crit Care Med. 2015 Dec1;192(11):1373-86. doi: 10.1164/rccm.201510-1966ST.

R2R20: Thank you for providing useful references. All these have been included in our manuscript.

Thank you again for considering our work. We look forward to hearing the outcome of any further peer-review.

Yours sincerely,

Dr. Abdulelah Aldhahir– on behalf of all the authors.

VERSION 2 – REVIEW

REVIEWER	Degani-Costa, Luiza Hospital Israelita Albert Einstein
REVIEW RETURNED	16-Jun-2022

GENERAL COMMENTS	Dear Dr. Andy McLarnon, Thank you again for the opportunity to review the manuscript now entitled "Healthcare Providers' Attitudes, Beliefs and Barriers to Pulmonary Rehabilitation for Chronic Obstructive Pulmonary Disease Patients in Saudi Arabia: A Cross-Sectional Study". Although the authors have made a few modifications based on the reviewers' comments and this has improved the overall quality of the manuscript, I am afraid it still needs further work to be considered suitable for publication. Please find below the main elements of concern: 1. The methods used for distributing the survey are still not clearly described. How many institutions actively participated in data collection? Did the authors set up a study account on social media to advertise the study or did they post invitations to participate in their own personal accounts? Did the authors use paid advertising services to boost response? How was WhatsApp messaging used? Did the Authors send messages to large WhatsApp groups

	of HCP or did they message HCP individually? How did the allied HCP societies advertise the study to their members? 2. The authors repeatedly state this was a national survey of HCP, but unfortunately they still have not provided enough data to support this claim. Geographic distribution of participants is not available and neither is the total number of HCP currently involved in PR in Saudi Arabia. The authors have addressed this concern in their point-by point response to reviewers by informing that 4 authors of 4 different medical institutions have engaged in data collection. They also state that social media was used and that allied HCP societies have also contributed to advertising the survey, but have not described how. Therefore, I suggest that the authors improve their description of the methods used to distribute the questionnaire, clearly stating which institutions actively participated in data collection and how this was performed in order to support their claim that this is a national study. As it is now, I would only refer to it as a multi center study. 3. The authors focus a large part of the discussion on the need to integrate allied HCP on the process of referral to improve PR uptake. They view the alleged "lack of authority" to refer patients as an important barrier to PR. As my fellow reviewer, I am still not convinced that supposedly giving allied HCP the "authority" to refer patients to PR would actually improve PR uptake. Taken by how most healthcare systems work, the patient has a medical doctor of reference who decides whether he/she should see a physical therapist, a respiratory therapist, a psychologist, and so on. This organizational structure is designed to offer care in a coordinated and cost-effective way, although obviously creating additional barriers (such as physician lack of knowledge or awareness) that should be addressed. If the Saudi Arabian healthcare system works like this, simply suggesting giving allied HCP the authority to refer patients to PR would be utterly ineffective, because most patients would not have access to these professionals in the first place. If the authors still believe that allowing HCP to refer patients to PR is a feasible suggestion, they should improve their argument by presenting elements of how the Saudi Arabian healthcare System is designed and how this could be accomplished without being utterly ineffective or totally disruptive. Otherwise, the “lack of authority of HCP” should be treated more like a feeling of being powerless in face of the situation and the discussion should focus more on how experienced HCP such as the ones surveyed in this study could work to improve physician and patient knowledge and awareness about PR. 4. The limitations of the study are not thoroughly described. Authors should clearly state they have no information on the geographic distribution of participants. They should also note there is no information o the number of PR centers or the number of allied HCP working with COPD, so they do not know how representative their sample is of the general population of HCP. They should also explain in the text why they think conducting the survey during the COVID-19 pandemic could have altered the results. 5. Minor comments:

	a. I suggest they modify the abstract conclusions from “Further research is needed to address patients’ attitudes and expectations toward delivering PR program and identify factors and barriers of referring” to “ Further research is needed to confirm HCP perceptions of patient-related barriers to delivering PR.” b. I suggest that in line 160 of the introduction they change “daily symptoms” to “daily respiratory symptoms” c. I suggest that in line 178 of the introduction they change “However, in Saudi Arabia, PR programs are often unavailable or underutilized [9], likely due to the lack of trained staff who can manage patients with COPD[10]” to “However, in Saudi Arabia, PR programs are often unavailable or underutilized [9] for multiple reasons, including the lack of trained staff who can manage patients with COPD[10]. “ d. I suggest the last part of the introduction, where the authors state the reasons for undertaking the study and the study aims, should be rephrased as follows for the sake of clarity: (….). Recently, we have conducted a study to assess pulmonologists’, internists’, and general practitioners’ attitudes toward delivering PR to COPD patients and to identify factors and barriers that might influence PR referral decisions. Our findings showed that referral rate was low among all physicians, which was attributed to a lack of PR centres and trained staff. Giving the fact that our previous study did not survey non-physicians’ health care providers attitudes but they were implicated as a barrier to referral, the present study aimed to explore allied healthcare professionals’ attitudes and expectations toward delivering a PR program and identify their views on factors and barriers that might influence referral of COPD patients in Saudi Arabia. e. I suggest the item 2.3 should be called simple “Sampling strategy” and the description should be improved according to my previous comments. The statement on convenience sampling should be moved to the item “2.5 Sample size”. f. In line 370, where it reads “dyspeptic”, it should read “short of breath” Yours sincerely, Luiza Helena Degani-Costa, MD PhD

VERSION 2 – AUTHOR RESPONSE

Comments from Reviewer 1:

R1C1: The methods used for distributing the survey are still not clearly described. How many institutions actively participated in data collection

R1R1: Thank you for your comment. As we previously mentioned, we have sent this survey to hospitals official using WhatsApp groups in each region of Saudi Arabia. Each WhatsApp group has several hospitals. Additionally, the co-authors of this study work at different institutions located in different cities of Saudi Arabia (e.g., Jazan, Dammam, Makkah, Jeddah, Riyadh, and Al-Hasa). Four

co-authors from four different regions have participated in the data collection process, and each co-author was responsible to follow up with hospitals official in his/ her region as well as distributing the survey to make sure that the sample was a representative of the whole country.

R1C2: Did the authors set up a study account on social media to advertise the study or did they post invitations to participate in their own personal accounts?

R1R2: Thank you for your comment. We use our accounts to advertise as well as several Saudi societies advertise for this study.

R1C3: Did the authors use paid advertising services to boost response?

R1R3: No, we did not.

R1C4: How was WhatsApp messaging used?

R1R4: We write a cover message to the link explaining the aim of the study, time it takes to fill this ssurvey, and the target HCPs.

R1C5: Did the Authors send messages to large WhatsApp groups of HCPs or did they message HCP individually?

R1R5: thank you for your comment. We send the message to large WhatsApp groups of HCPs.

R1C6: How did the allied HCP societies advertise the study to their members?

R1R6: Thank you for your comment. They post it on social media and sent it by email to their members but we could not know the exact number of emails these societies have.

R1C7: The authors repeatedly state this was a national survey of HCP, but unfortunately they still have not provided enough data to support this claim. Geographic distribution of participants is not available and neither is the total number of HCP currently involved in PR in Saudi Arabia. The authors have addressed this concern in their point-by point response to reviewers by informing that 4 authors of 4 different medical institutions have engaged in data collection. They also state that social media was used and that allied HCP societies have also contributed to advertising the survey, but have not described how. Therefore, I suggest that the authors improve their description of the methods used to distribute the questionnaire, clearly stating which institutions actively participated in data collection and how this was performed in order to support their claim that this is a national study. As it is now, I would only refer to it as a multi center study.

R1R7: Thank you for your comment. First, there is no such a published data estimating the number of HCPs currently involved in PR in Saudi Arabia. As I mentioned before, we failed to report the geographic distribution of participants.

I stated that 4 authors from 4 different medical institutions and from 4 different regions of Saudi Arabia have participated in data collection. Saudi Arabia has 4 different regions (south, north, east, and west|). Each data collector was responsible for distributing the survey at his/her regional hospitals.

This study is not centre-focused, and we have added this text in sampling strategy:

"Professional committees posted the survey on their social media as well as sent emails to their members. Additionally, four authors from four different medical institutions as well as from four different regions of Saudi Arabia have participated in data collection. Each data collector was responsible for distributing the survey at his/her region to HCPs to ensure all geographical areas of Saudi Arabia are covered."

R1C8: The authors focus a large part of the discussion on the need to integrate allied HCP on the process of referral to improve PR uptake. They view the alleged "lack of authority" to refer patients as an important barrier to PR. As my fellow reviewer, I am still not convinced that supposedly giving allied HCP the "authority" to refer patients to PR would actually improve PR uptake. Taken by how most healthcare systems work, the patient has a medical doctor of reference who decides whether he/she should see a physical therapist, a respiratory therapist, a psychologist, and so on. This organizational structure is designed to offer care in a coordinated and cost-effective way, although obviously creating additional barriers (such as physician lack of knowledge or awareness) that should be addressed. If the Saudi Arabian healthcare system works like this, simply suggesting giving allied HCP the authority to refer patients to PR would be utterly ineffective, because most patients would not have access to these professionals in the first place. If the authors still believe that allowing HCP to refer patients to PR is a feasible suggestion, they should improve their argument by presenting elements of how the Saudi Arabian healthcare System is designed and how this could be accomplished without being utterly ineffective or totally disruptive. Otherwise, the "lack of authority of HCP" should be treated more like a feeling of being powerless in face of the situation and the discussion should focus more on how experienced HCP such as the ones surveyed in this study could work to improve physican and patient knowledge and awareness about PR.

R1R8: Thank you for your comment. We have modified this part in the discussion and recommended that experienced HCPs should promote physicians' knowledge about PR and its benefit to enhance PR referral rate.

R1C9: The limitations of the study are not thoroughly described. Authors should clearly state they have no information on the geographic distribution of participants. They should also note there is no information o the number of PR centers or the number of allied HCP working with COPD, so they do not know how representative their sample is of the general population of HCP. They should also explain in the text why they think conducting the survey during the COVID-19 pandemic could have altered the results.

R1R9: Thank you for your comments. We have amended our limitations based on your suggestion.

R1C10: I suggest they modify the abstract conclusions from "Further research is needed to address patients' attitudes and expectations toward delivering PR program and identify factors and barriers of

referring" to "Further research is needed to confirm HCP perceptions of patient-related barriers to delivering PR."

R1R10: Thank you for your suggestion. This has been amended in the manuscript.

R1C11: I suggest that in line 160 of the introduction they change "daily symptoms" to "daily respiratory symptoms"

R1R11: T Thank you for your suggestion. This has been amended in the manuscript.

R1C12: I suggest that in line 178 of the introduction they change "However, in Saudi Arabia, PR programs are often unavailable or underutilized [9], likely due to the lack of trained staff who can manage patients with COPD[10]" to "However, in Saudi Arabia, PR programs are often unavailable or underutilized [9] for multiple reasons, including the lack of trained staff who can manage patients with COPD[10]. "

R1R12: Thank you for your suggestion. This has been amended in the manuscript.

R1C13: I suggest the last part of the introduction, where the authors state the reasons for undertaking the study and the study aims, should be rephrased as follows for the sake of clarity: (….). Recently, we have conducted a study to assess pulmonologists', internists', and general practitioners' attitudes toward delivering PR to COPD patients and to identify factors and barriers that might influence PR referral decisions. Our findings showed that referral rate was low among all physicians, which was attributed to a lack of PR centres and trained staff. Giving the fact that our previous study did not survey non-physicians' health care providers attitudes but they were implicated as a barrier to referral, the present study aimed to explore allied healthcare professionals' attitudes and expectations toward delivering a PR program and identify their views on factors and barriers that might influence referral of COPD patients in Saudi Arabia.

R1R13: Thank you for your suggestion. This has been amended in the manuscript.

R1C14: I suggest the item 2.3 should be called simple "Sampling strategy" and the description should be improved according to my previous comments. The statement on convenience sampling should be moved to the item "2.5 Sample size".

R1R14: Thank you for your suggestion. We have amended this part according to your suggestion.

R1C15: In line 370, where it reads "dyspeptic", it should read "short of breath"

R1R15: Thank you for your suggestion. This has been amended in the manuscript.

Thank you again for considering our work. We look forward to hearing the outcome of any further peer-review.

Yours sincerely,

Dr. Abdulelah Aldhahir– on behalf of all the authors.

VERSION 3 – REVIEW

REVIEWER	Degani-Costa, Luiza Hospital Israelita Albert Einstein
REVIEW RETURNED	06-Sep-2022

GENERAL COMMENTS	1. The conclusion of the abstract must be modified to reflect the conclusion of the manuscript. As it is now, the conclusion of the abstract sounds misleading. 2. Please review the spelling and grammar of the new pieces included in the last version of the manuscript. There are several mistakes that must be corrected before the article is suitable for publication (eg.: line 10 page 44: where it says "home PR is the prefer method of delivering PR" it should read "home PR is the preferred method of delivering PR.)

VERSION 3 – AUTHOR RESPONSE

Comments from Reviewer 1:
R1C1: The conclusion of the abstract must be modified to reflect the conclusion of the manuscript. As it is now, the conclusion of the abstract sounds misleading.
R1R1: Thank you for your comments. We have modified the conclusion of the abstract to match it with the conclusion of the manuscript. Here is the new abstract conclusion
“PR is perceived as an effective management strategy for COPD patients. A supervised hospital-based program is the preferred method of delivering PR, with information about COPD disease, smoking cessation and symptoms management being considered essential components of PR in addition to exercise component. Lack of PR centres, well-trained staff, and the authority to refer patients were major barriers to referring COPD patients. Further research is needed to confirm HCP perceptions of patient-related barriers to delivering PR”

R1C2: Please review the spelling and grammar of the new pieces included in the last version of the manuscript. There are several mistakes that must be corrected before the article is suitable for publication (eg.: line 10 page 44: where it says "home PR is the
prefer method of delivering PR" it should read "home PR is the preferred method of delivering PR.)
R1R2: Thank you for your comment. We have review our manuscript using an expert in English language.

Thank you again for considering our work. We look forward to hearing the outcome of any further peer-review.
Yours sincerely,
Dr. Abdulelah Aldhahir– on behalf of all the authors.