PEER REVIEW HISTORY

ARTICLE DETAILS

TITLE (PROVISIONAL)	Investigating primary health care practitioners' barriers and enablers to referral of patients with COPD to Pulmonary Rehabilitation: a mixed methods study using the Theoretical Domains Framework.
AUTHORS	Watson, Jane; Jordan, Rachel; Adab, Peymane; Vlaev, Ivo; Enocson, Alexandra; Greenfield, Sheila

VERSION 1 – REVIEW

REVIEWER	Stokes, Tim Otago University, General Practice & Rural Health
REVIEW RETURNED	04-Dec-2020

GENERAL COMMENTS	This study reports an investigation into UK primary health care practitioners' barriers and enablers to the referral of COPD patients to Pulmonary Rehabilitation utilising an innovative mixed methods approach. The study is both timely and important. Internationally, referral rates to Pulmonary Rehabilitation (PR) for patients with COPD from Primary Care to secondary care remain low (and overall uptake of PR – a different but related question - is low too). Further, this study is novel in that it uses an appropriate implementation theory framework (Theoretical Domains Framework) given that the level of the intervention is at the level of the individual practitioner-patient level. The authors are to be commended for using the latter approach. The paper is well written and there are no significant concerns regarding the methods or interpretation of the results. I make the following minor suggested revisions to further improve this paper: 1. Title: "Patients with COPD" is preferable to COPD patients. 2. Background: p.3, LL98-102. All the references cited here (1-4) are clinical practice recommendations, not a summary of the evidence base for PR per se. This is the key Systematic Review to cite: https://www.cochranelibrary.com/cdsr/doi/10.1002/14651858.CD003793.pub3/information 3. Methods, P.5, L160. Could an appropriate reference for "content analysis" be inserted. 4. Methods, P.5, LL168-172. This text appears in the original primary qualitative study and can therefore be removed to reduce repetition.

	5. Results P., 8, L246. Can heading be made clearer so that it relates to Phase 2 of the study. 6. Results. Tables. There are 5 tables in the body of the results, several of which are large. To improve readability I suggest that table 1 can simply be briefly summarised in the text and then moved to be a supplementary/additional file. The other tables are important and should remain in the body of the paper. 7. Discussion. This section would benefit from restructuring. In line with suggested BMJ style for the discussion section of papers I would recommend that a short summary of findings is presented here – these usually are an expansion of the results section of the abstract. The second and third paragraphs on p.27 (440-449; 451-465) discuss the results with reference to the existing literature and therefore should be moved into the relation to other studies section. 8. Discussion. Strengths and Limitations section. P., 28. It is important that the limitation outlined in the box (5. Generalisability of the overall findings …) is present in the text. The response rate is not known. 9. Discussion. The paper lacks a short Implications for policy and practice section before the Conclusions section. It would strengthen the paper to include this. As currently set out, the discussion exclusively focuses on barriers and facilitators to individual health professionals referring individual patients with COPD with PR. While this is correctly the focus of this paper, it is important to emphasise that barriers to PR referral, and indeed barriers to accessible high quality COPD care, are present at a range of levels in the UK health system and also at different stages of the illness journey (this study has not investigated patients' accounts of referral or PHCP care). Just to give one example from the literature, the authors might find this recent NZ study of interest in terms of its use of the Levesque access framework to set out both the supply side and demand side dimensions of access to high quality care for people with COPD: https://bmjopen.bmj.com/content/9/11/e033524

REVIEWER	Holland, Anne La Trobe University, Melbourne, Victoria, Australia, Discipline of Physiotherapy
REVIEW RETURNED	20-Dec-2020

GENERAL COMMENTS	This study investigates the ongoing challenge of low referral to pulmonary rehabilitation, focusing on primary care. Data from a previous qualitative study was mapped to the TDF, informing development of a questionnaire that was completed by 233 primary care health professionals. Results largely confirm previous findings in this field, although the systematic approach and use of the TDF provide rigor that has not been applied in previous studies. Major comments This manuscript reports data from a qualitative study in 19 individuals that has previously been published (Watson et al, British J General Practice 2020, ref 7). For this study the qualitative data are mapped to the TDF to inform questionnaire

	development, but the findings are essentially the same. This may be better framed as a previously published qualitative study which informed questionnaire development, thus allowing the authors to remove the Phase 1 results (which have been published elsewhere) from this manuscript, including from the abstract. Similarly, I am not sure that this is a mixed methods study – it is a survey study that was informed by a previous qualitative study. I do not think that the 'Connected results' section, where qualitative and quantitative data are combined, adds much value. The qualitative data was hypothesis-generating in a small number of participants (n=19), it guided the format of the questionnaire (n=233). Thus chicken and egg are difficult to sort out - of course some findings will be the same as it guided questionnaire development, and some will be different due to the difference in numbers of participants. This approach does not appear to provide additional insights in this circumstance. Other comments Coding of responses to only one TDF domain surprised me. Referral to PR is a complex behaviour and multiple determinants are likely. Given that only one researcher coded the vast majority of the data, can we be confident that this coding approach could be replicated? Many responses would have mapped to more than one domain. How did the researchers decide that a 'representative range of PHCP' had responded to the survey, and thus closed it off? Table 2 – suggest remove Phase 1 demographics, given these are from a previously published paper. Table 5 – would be helpful to the reader to indicate where differences between frequent and infrequent referrers are found. Figure 2- I did not find this very informative in its current form. Whilst it names relevant TDF domains, it does not indicate how they relate to this specific field of research. There are errors in the labelling of additional files and tables in the manuscript. There are a number of incomplete references in the reference list.

VERSION 1 – AUTHOR RESPONSE

Reviewer: 1
Prof. Tim Stokes, Otago University
Comments to the Author:

This study reports an investigation into UK primary health care practitioners' barriers and enablers to the referral of COPD patients to Pulmonary Rehabilitation utilising an innovative mixed methods approach. The study is both timely and important. Internationally, referral rates to Pulmonary Rehabilitation (PR) for patients with COPD from Primary Care to secondary care remain low (and

overall uptake of PR – a different but related question - is low too). Further, this study is novel in that it uses an appropriate implementation theory framework (Theoretical Domains Framework) given that the level of the intervention is at the level of the individual practitioner-patient level. The authors are to be commended for using the latter approach.

The paper is well written and there are no significant concerns regarding the methods or interpretation of the results.

I make the following minor suggested revisions to further improve this paper:
Title: “Patients with COPD” is preferable to COPD patients

Changed from

'Investigating primary health care practitioners’ barriers and enablers to referral of COPD patients to Pulmonary Rehabilitation: an exploratory sequential study using the Theoretical Domains Framework'.

To

‘Investigating primary health care practitioners’ barriers and enablers to referral of patients with COPD to Pulmonary Rehabilitation: a mixed methods study using the Theoretical Domains Framework.'

2. Background: p.3, LL98-102. All the references cited here (1-4) are clinical practice recommendations, not a summary of the evidence base for PR per se. This is the key Systematic Review to cite:
https://www.cochranelibrary.com/cdsr/doi/10.1002/14651858.CD003793.pub3/information

Completed L100 pg 3

3. Methods, P.5, L160. Could an appropriate reference for “content analysis” be inserted.
Completed add at L173 pg 5.

4. Methods, P.5, LL168-172. This text appears in the original primary qualitative study and can therefore be removed to reduce repetition. This has been removed.

5. Results P., 8, L246. Can heading be made clearer so that it relates to Phase 2 of the study.
Completed – L241 pg 7

6. Results. Tables. There are 5 tables in the body of the results, several of which are large. To improve readability I suggest that table 1 can simply be briefly summarised in the text and then moved to be a supplementary/additional file. The other tables are important and should remain in the body of the paper.
Thank you removed from main text and added to additional file 1. Explanatory response rate text added at L244-251 pg 7

7. Discussion. This section would benefit from restructuring. In line with suggested BMJ style for the discussion section of papers.
I would recommend that a short summary of findings is presented here – these usually are an expansion of the results section of the abstract. The second and third paragraphs on p.27 (440-449;

451-465) discuss the results with reference to the existing literature and therefore should be moved into the relation to other studies section.
Completed pg 27-29

8. Discussion. Strengths and Limitations section. P., 28. It is important that the limitation outlined in the box (5. Generalisability of the overall findings …) is present in the text. The response rate is not known.
Completed L 518-519 pg 29

9. Discussion. The paper lacks a short Implications for policy and practice section before the Conclusions section. It would strengthen the paper to include this. As currently set out, the discussion exclusively focuses on barriers and facilitators to individual health professionals referring individual patients with COPD with PR. While this is correctly the focus of this paper, it is important to emphasise that barriers to PR referral, and indeed barriers to accessible high quality COPD care, are present at a range of levels in the UK health system and also at different stages of the illness journey (this study has not investigated patients' accounts of referral or PHCP care). Just to give one example from the literature, the authors might find this recent NZ study of interest in terms of its use of the Levesque access framework to set out both the supply side and demand side dimensions of access to high quality care for people with COPD: https://bmjopen.bmj.com/content/9/11/e033524
Thank you added pg 30

Reviewer: 2
Prof. Anne Holland, La Trobe University, Melbourne, Victoria, Australia, Institute for Breathing and Sleep Comments to the Author:
This study investigates the ongoing challenge of low referral to pulmonary rehabilitation, focusing on primary care. Data from a previous qualitative study was mapped to the TDF, informing development of a questionnaire that was completed by 233 primary care health professionals. Results largely confirm previous findings in this field, although the systematic approach and use of the TDF provide rigor that has not been applied in previous studies.

Major comments
This manuscript reports data from a qualitative study in 19 individuals that has previously been published (Watson et al, British J General Practice 2020, ref 7). For this study the qualitative data are mapped to the TDF to inform questionnaire development, but the findings are essentially the same. This may be better framed as a previously published qualitative study which informed questionnaire development, thus allowing the authors to remove the Phase 1 results (which have been published elsewhere) from this manuscript, including from the abstract.

Similarly, I am not sure that this is a mixed methods study – it is a survey study that was informed by a previous qualitative study.

It is true that we previously published the results of the qualitative study, but here, we take a different approach to its analysis by applying a behaviour change framework to firstly inform the survey questions from the broad themes, but then to compare the findings of both in a mixed-methods analysis to draw conclusions which inform the development of an intervention/s. This is common in a multiphase sequential mixed methods study which uses the qualitative data in this way to build to the quantitative data (Creswell et al, 2011). Phase 1 and 2 are presented in this paper. This terminology is updated and reflected at various points in the paper notably Title, Abstract L43 pg1, L127, L132 pg 4 and including the updating of Figure 1.

I do not think that the ‘Connected results’ section, where qualitative and quantitative data are combined, adds much value. The qualitative data was hypothesis-generating in a small number of participants (n=19), it guided the format of the questionnaire (n=233). Thus chicken and egg are difficult to sort out - of course some findings will be the same as it guided questionnaire development, and some will be different due to the difference in numbers of participants. This approach does not appear to provide additional insights in this circumstance.

The aim of this approach was to test the findings of the qualitative work within a larger UK cohort of PHCPs and to identify the key barriers and enablers to PR referral. This approach offered important insights in that it strengthened some of the findings of the qualitative data but it also offered new findings either in contrast to, or to supplement the qualitative data. For example, the survey found that it was not considered solely the practice nurses’ role to refer but PHCPs who were respiratory interested, and also that those with respiratory qualifications were more likely to refer. These findings offer important insights for subsequent intervention design.

Other comments

Coding of responses to only one TDF domain surprised me. Referral to PR is a complex behaviour and multiple determinants are likely. Given that only one researcher coded the vast majority of the data, can we be confident that this coding approach could be replicated? Many responses would have mapped to more than one domain.

Interview coded text was aligned to one key TDF construct, which then mapped to the TDF domain as determined by the construct alignment (see Additional file 2). Constructs themselves are particularly detailed, so mapping content to more than one construct descriptor was not likely to be appropriate and would have resulted in overwhelming amounts of data being generated. There is no established ‘gold standard’ of how to apply the TDF (Cowdell and Dyson, 2019), therefore mapping content to only one construct was both a pragmatic and methodological decision.
Clarification of this approach has been added to L171-176 pg 5 and amendments made in strengths and limitations L 522- 525 pg 30
Coding was discussed frequently between the team after the initial independent and collaborative coding of five transcripts; this has been added to the body of the text (L 174 pg 5)

Exact coding reproducibility is unlikely to be possible; partly because coders had different professional backgrounds. (added to L534-36 pg 30).

How did the researchers decide that a ‘representative range of PHCP’ had responded to the survey, and thus closed it off? - line 199 pg 6 - text changed to ‘reasonable’ from ‘representative’.
Reference included to highlight representation of general practice nurse population, but acknowledged that it was less representative of other primary care staff (L503-505 pg 29)

Table 2 – suggest remove Phase 1 demographics, given these are from a previously published paper.
Thank you this has been removed and also becomes Table 1 because of removal of original Table 1. (pg 8/9)

Table 5 – would be helpful to the reader to indicate where differences between frequent and infrequent referrers are found.
A footnote as now been added to the now Table 4 to highlight where a 20% difference between referrer groups was found (pg 18-21)

Figure 2- I did not find this very informative in its current form. Whilst it names relevant TDF domains, it does not indicate how they relate to this specific field of research.
Thank you removed

There are errors in the labelling of additional files and tables in the manuscript. Corrected

There are a number of incomplete references in the reference list. Corrected

VERSION 2 – REVIEW

REVIEWER	Stokes, Tim Otago University, General Practice & Rural Health
REVIEW RETURNED	30-Mar-2021

GENERAL COMMENTS	The authors have appropriately addressed the reviewers' comments however I do need to point out a reference does need reviewing and needs changing as appropriate. For example, DISCUSSION "Whilst this paper highlights multiple barriers in referring patients with COPD to PR, barriers to high quality healthcare for patients with COPD across health services, spanning the disease trajectory (41)". The sentence needs re-wording and Reference 41 I understand was to be changed in light of reviewer's comments (e.g., https://bmjopen.bmj.com/content/9/11/e033524) however reference 41 is the NHS Long Term Plan - which is not a review of the evidence of barriers to COPD care across the pathway of care.

VERSION 2 – AUTHOR RESPONSE

Many thanks for your acceptance of our paper to the BMJ Open.

Comment re: patient barriers to COPD care across the pathway of care has been re-written and an alternative references provided. Highlighted in lines 542 and 543, pg 30.