## PEER REVIEW HISTORY

BMJ Open publishes all reviews undertaken for accepted manuscripts. Reviewers are asked to complete a checklist review form (**http://bmjopen.bmj.com/site/about/resources/checklist.pdf**) and are provided with free text boxes to elaborate on their assessment. These free text comments are reproduced below.

## ARTICLE DETAILS

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| **TITLE (PROVISIONAL)** | Perceived facilitators and barriers to chronic disease management in primary care networks of Singapore: a qualitative study |
| **AUTHORS** | Foo, Chuan De; Surendran, Shilpa; Tam, Chen Hee; Ho, Elaine; Matchar, David; Car, Josip; Koh, Choon Huat, Gerald |

## VERSION 1 – REVIEW

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| **REVIEWER** | Lynne Nemeth<br>Medical University of South Carolina - College of Medicine, Nursing |
| **REVIEW RETURNED** | 08-Jan-2021 |

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| **GENERAL COMMENTS** | This paper reports the results of a qualitative study conducted within Singapore that evaluated the experience of primary care providers that were enrolled in Primary Care Networks related to managing their patients with chronic diseases. Participants were general practitioners in private practice settings. The COREQ criteria and the Braun and Clark six-step process were used to assure a rigorous qualitative process was undertaken. Thirty interviews were conducted, with participants recruited through purposive and snowball sampling. A coding tree was developed which described three facilitator themes/subthemes, and two barrier themes. Each of these themes are presented in two tables. Within the findings section I found myself looking for the meaning of some of the abbreviations, and think less of these abbreviations might be used for clarity. Some of these abbreviations seem to be context specific and are not well clear/intuitive. The coding tree provided in Figure 1 is not readable at present and needs to be modified to be of any value. The discussion and conclusion are reasonable and reflect the findings of this study. |

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| **REVIEWER** | Sarah Dennis<br>University of Sydney, Clinical and Rehabilitation Sciences, Faculty of Health Sciences |
| **REVIEW RETURNED** | 19-Jan-2021 |

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| **GENERAL COMMENTS** | Thank you for asking me to review this interesting paper about PCNs to facilitate use of private GPs for the management of chronic conditions. Overall, it is an interesting paper and highlights the challenges of managing long term conditions in a fee for service model of general practice.<br><br>Introduction<br><br>Overall the intro explains the situation in Singapore but uses quite dramatic language and data is not presented. I would prefer less dramatic language and more data to show exactly what the situation |

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| | is.<br><br>E.g. line 70 As polyclinics and SOCs are inundated with high patient loads – it would be good to put numbers of this and may $ values of the costs of this to Singapore health system<br><br>Such networks have been established in Canada, New Zealand and Germany since the early 2000s, and have produced improved patient access to primary care and quality of care [8–10] – for people with chronic conditions or people genrally?<br><br>It would be good to present the findings from the quant studies on the PCN in Singapore. The studies are just metioned but no information about whether care improved or not.<br><br>Don't call people "chronic patients" better to describe them as people or patients with chronic conditions<br><br>The use of English is quite flowery – it might be good to have it edited by a native English speaker and simplify the language used.<br><br>Methods<br>How many GPs were initially approached to participate in the study. It should be made clear if e-mails etc were sent to 37 participants and then of those 30 agreed to take part. There were >500 GPs enrolled, how were the 30 chosen from this?<br><br>It should be explained that the interviews were face to face and not phone.<br><br>Perhaps this is something that should have been picked up the ethics committee but the questions in the topic guide in the supplementary material are not related to the research aims of this manuscript. Sections 1 and 3 seem to be related to much bigger issues about the delivery of primary care in Singapore. Only questions 5 and 6 relate to the research questions here and I would have expected more questions to really explore this further.<br><br>Did the study have ethics approval? By which ethics committee?<br><br>Results<br>There are demographic characteristics described but no comment about how similar or different these GPS are to those generally working in primary are.<br><br>I am not sure if the authors have put the qualitative comments in the table to save space / words but unfortunately I am not very keen on this approach, especially as the text in the theme sections of the results do not really refer back to the comments in the table. If there is space in the word limit then I would prefer to see the quotes used to illustrate the themes in the text if not then there needs to be better referral back and forth between the text and the table.<br><br>Some of the description of how the PCN supported the CD management should be included in the introduction rather in the results to give the reader more context – eg in Theme 1 section.<br><br>Discussion<br>I wonder if the discussion should be reviewed as there is quite a lot of detail in there about how the PCN operate that was not in the intro |

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| | and would have been good to provide context for the results. It would also be interesting to explain how the qual results extend the results of the PCN in the quant studies. There is ref to the CDR study but I couldn't see the other mentioned. |

**VERSION 1 – AUTHOR RESPONSE**

Reviewer: 1

Dr. Lynne Nemeth, Medical University of South Carolina - College of Medicine

Comments to the Author:

This paper reports the results of a qualitative study conducted within Singapore that evaluated the experience of primary care providers that were enrolled in Primary Care Networks related to managing their patients with chronic diseases. Participants were general practitioners in private practice settings. The COREQ criteria and the Braun and Clark six-step process were used to assure a rigorous qualitative process was undertaken. Thirty interviews were conducted, with participants recruited through purposive and snowball sampling. A coding tree was developed which described three facilitator themes/subthemes, and two barrier themes. Each of these themes are presented in two tables. Within the findings section I found myself looking for the meaning of some of the abbreviations and think less of these abbreviations might be used for clarity. Some of these abbreviations seem to be context specific and are not well clear/intuitive. The coding tree provided in Figure 1 is not readable at present and needs to be modified to be of any value. The discussion and conclusion are reasonable and reflect the findings of this study.

We would like to kindly thank the reviewer for taking the time to review our manuscript. We value all comments made highly and will address them below.

We agree that there might be too many abbreviations used and we have replaced most of the abbreviations throughout the manuscript as stated below with the actual wordings to aid in the readability as suggested.

SOC – Specialist Outpatient Clinic

MOH – Ministry of Health

DRP – Diabetic Retinal Photography

DFS – Diabetic Foot Screening

NC – Nurse Counselling

CPF – Care Plus Fee

CME – Continuing Medical Education

CMS – Clinic Management System

CHAS - Community Health Assist Scheme, will be simplified to "private healthcare subsidies" throughout the main text

AIC – Agency of Integrated Care, will be simplified to "PCN oversight agency" throughout the main text

After much discussion with the rest of the co-authors and looking through other qualitative research articles published in BMJ Open, we found that the use of the coding tree was not commonly employed in the main text or supplementary materials. More importantly, we realised that what we have written

in the main text can better explain what we want to say without the use of a coding tree. As a result, we have decided collectively to remove the coding tree.

Reviewer: 1
Competing interests of Reviewer: none declared

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Reviewer: 2

Sarah Dennis, University of Sydney

Comments to the Author:

Thank you for asking me to review this interesting paper about PCNs to facilitate use of private GPs for the management of chronic conditions. Overall, it is an interesting paper and highlights the challenges of managing long term conditions in a fee for service model of general practice.

Introduction

Overall the intro explains the situation in Singapore but uses quite dramatic language and data is not presented. I would prefer less dramatic language and more data to show exactly what the situation is.

E.g. line 70 As polyclinics and SOCs are inundated with high patient loads – it would be good to put numbers of this and may $ values of the costs of this to Singapore health system

We would like to thank the reviewer for the comments, and we have now modified some words throughout the introduction section to make it less dramatic as suggested.

We agree with the reviewer to add more data to show the situation of healthcare in Singapore, and we have now included the numbers for the increasing trend in polyclinic and specialist outpatient clinic attendances and the rising health system costs in the form of increasing government healthcare expenditure. This is included in lines 71-76.

Such networks have been established in Canada, New Zealand and Germany since the early 2000s, and have produced improved patient access to primary care and quality of care [8–10] – for people with chronic conditions or people generally?

We would like to thank the reviewer for the comment, and we have clarified this point in the manuscript by stating that PCNs in these three countries are for the general population but equipped with services veered towards managing patients with chronic conditions. We have now included the words ‘for the general population and in particular patients with chronic conditions” in the manuscript as suggested in line 92-93.

It would be good to present the findings from the quant studies on the PCN in Singapore. The studies are just mentioned but no information about whether care improved or not.

We would like to thank the reviewer for this comment, and we have now included information from the earlier quantitative studies by stating that the PCN acted as a model of care which was beneficial to patients with diabetes by having more control over clinical parameters such as HbA1c levels and thus better management of their disease condition. This information is added in lines 112-113.

Don’t call people “chronic patients” better to describe them as people or patients with chronic conditions

Thank you for pointing this out, we have now replaced “chronic patients” with “patients with chronic conditions” throughout the manuscript.

The use of English is quite flowery – it might be good to have it edited by a native English speaker and simplify the language used.

We thank the reviewer for comment. We have now simplified the language to the best of our capacity.

Methods
How many GPs were initially approached to participate in the study. It should be made clear if e-mails etc were sent to 37 participants and then of those 30 agreed to take part. There were >500 GPs enrolled, how were the 30 chosen from this?

We thank the reviewer for the comments. More than 500 GPs are currently enrolled in a PCN. The list of enrolled GPs along with their contact details are available on the internet. We contacted each of these GPs in sequential order for each PCN as per the list which is made publicly available on a government-run website designated for PCN. In addition, we had also employed snowball sampling method where participants who completed the interview had introduced us to their GP colleagues who also met the inclusion criteria. All in all, we performed the sequential purposive recruitment (n=28) using the list of PCN GPs and snowball sampling (n=2) until we reached thematic saturation. In total, we approached 37 GPs by sending them emails or calling them by phone. Seven GPs declined to participate. Hence 30 GPs were recruited. The changes are now made to lines 126-133.

It should be explained that the interviews were face to face and not phone.

We thank the reviewer for this comment and have mentioned that the interviews were conducted face-to-face in line 135.

Perhaps this is something that should have been picked up the ethics committee but the questions in the topic guide in the supplementary material are not related to the research aims of this manuscript. Sections 1 and 3 seem to be related to much bigger issues about the delivery of primary care in Singapore. Only questions 5 and 6 relate to the research questions here and I would have expected more questions to really explore this further.

We thank the reviewer for the comments. We must mention that not all questions in the topic guide were used to write this paper. As there is no qualitative study on the PCN conducted before, the topic guide was formulated to explore the different aspects of the PCN model. Thus, not all questions were pertinent to the paper. However, we had conducted pilot tests with 4 GPs prior to formally implementing the topic guide for the actual interviews. During the pilot, the research team found that the participants were able to voice the required and relevant responses which we were looking for that addresses this paper’s research question. In addition, after a few initial formal interviews, we found that the participants had continued to respond with relative similar answers which were also highly relevant to the research question. Furthermore, as this is a semi-structured interview as mentioned in line 135, the interviewer also prompted the participant at times to ensure rich and insightful data is collected during each interview.

Did the study have ethics approval? By which ethics committee?

We thank the reviewer for this comment. We have ethics approval, and it is already stated in lines 622-627 as per the journal’s guidelines.

Results
There are demographic characteristics described but no comment about how similar or different these GPS are to those generally working in primary are.

We thank the reviewer for this comment. Our participants are all private GPs who were once in the “general pool” of private GPs, i.e., not enrolled in PCNs. So, the characteristics of our participants are similar to other GPs except for the operational functions of their clinic practice. The similarities in demographic characteristics are now mentioned in lines 173-175.

We only expect differences to be observed in terms of the clinics' operational characteristics whereby GPs enrolled in a PCN have the provision of ancillary services, mandated chronic disease registry and funding for backend office manpower, Care Plus Fee and locum hiring. Some of these are mentioned in the introduction section of this paper and all in the findings. In the introduction section (lines 67-68) we have also mentioned that private GPs who are not enrolled in a PCN work as solo practices without the provision of ancillary services.

I am not sure if the authors have put the qualitative comments in the table to save space / words but unfortunately, I am not very keen on this approach, especially as the text in the theme sections of the results do not really refer back to the comments in the table. If there is space in the word limit then I would prefer to see the quotes used to illustrate the themes in the text if not then there needs to be better referral back and forth between the text and the table.

We thank the reviewer for this comment, and we have now taken the individual quotes from the tables, deleted the tables and placed all quotes under the text of the respective themes and subthemes for easier reading as suggested.

Some of the description of how the PCN supported the CD management should be included in the introduction rather in the results to give the reader more context – eg in Theme 1 section.

We thank the reviewer for this comment.

Theme 1: We have included the types of ancillary services offered by PCN and how these services are carried out at the ground level for patients to receive them from their GPs.

Theme 2: We have also included how the mandated chronic disease registry helps GPs ensure optimal chronic disease management by tracking of process and clinical outcome indicators.

Theme 3: The aspect of funding is not included in the introduction section as we only knew about the exact funding mechanisms through our interviews, and it is not explicitly disclosed in public domain websites or published articles.

The information is now included the introduction section in lines 103-109.

Discussion
I wonder if the discussion should be reviewed as there is quite a lot of detail in there about how the PCN operate that was not in the intro and would have been good to provide context for the results. It would also be interesting to explain how the qual results extend the results of the PCN in the quant studies. There is ref to the CDR study, but I couldn't see the other mentioned.

We thank the reviewer for the comments, and we have now included aspects of the ancillary services and chronic disease registry in the introduction section. As with the reply to the above comment, aspects regarding funding are not include as we only found out about it after conducting the interviews and the information was not made publicly available on public domain websites or published articles. The information is now included the introduction section in lines 103-109.

I presume the CDR study that is being referred to is the quantitative study conducted by Luo et al. regarding diabetic patients being managed by GPs enrolled in PCN. We would like to thank the reviewer for suggesting to link our study findings with that quantitative study and we completely agree with the reviewer.

In our qualitative study, our findings have shown how the CDR and ancillary services operated at the clinic level. Our qualitative findings corroborate with that of the previous study by Luo et al. by showing how tracking of indicators and provision of diabetes related ancillary services for patients have led to better management of patients' conditions and avert complications due to the enabling features conferred by the PCN to enrolled GPs. This is reported with HbA1c, LDL-C and BP levels. We have also included the other study conducted by Chua et al. in the discussion section as suggested. Both studies had shown improvement in chronic disease management namely for

diabetes which was associated with the provision of ancillary services and the monitoring of patients' indicators.

The information showing how our qualitative findings are linked to the findings of the two prior quantitative studies are now included in the discussion section in lines 351-355 and lines 365-372 as suggested.

Reviewer: 2
Competing interests of Reviewer: None declared

**VERSION 2 – REVIEW**

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| **REVIEWER** | Lynne Nemeth<br>Medical University of South Carolina - College of Medicine, Nursing |
| **REVIEW RETURNED** | 07-Apr-2021 |

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| **GENERAL COMMENTS** | Thank you for the responsive resubmission. The addition of the COREQ checklist and interview probes |

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| **REVIEWER** | Sarah Dennis<br>University of Sydney, Clinical and Rehabilitation Sciences, Faculty of Health Sciences |
| **REVIEW RETURNED** | 13-Apr-2021 |

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| **GENERAL COMMENTS** | The authors have addressed the comments I raised satisfactorily and also those of the other reviewer |