Author’s response to reviews

Title: Key Attributes of Patient Centered Medical Homes Associated with Patient Activation of Diabetes Patients

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Note: Changes made during the first revision has been incorporated in this document (accepted track changes). All edits seen in current document are based solely on the second revision suggestions.

1. The definition of the concept of “patient activation”, and its differentiation from the concepts of patient motivation and patient engagement. The authors seem to treat these concepts as the same

Response: A definition on patient activation and discussion on the difference of activation versus motivation and engagement was added. In addition, we revised the manuscript where we may have referred to motivation or engagement and changed it to activation, when appropriate.

2. More review on the application and citation of evidence on validity and reliability of the PAM should be provided.

Response: Additional applications and citations on the evidence and reliability of PAM has been added to the manuscript.
3. The questionnaire that was used to measure the 7 PCMH was newly developed, although Cronbach’s alpha of the four multi-item domains were acceptable, there is no data to support the validity of the items for the allocated domains, some psychometric tests such as factor analysis or item-scale correlation should be carried out and the results should be added to the Methods section. The validity of the single item on “how often did your personal doctor spend time with you?” as an indicator of interpersonal treatment is questionable, which may explain why the score failed to detect any effect on PAM score.

Response: The questionnaire was a modification of the ACES questionnaire where we selected items from 7 of the 11 measures. We did not change the wording of any of the items used and we grouped them under the same domains used in the ACES. In some cases, such as the single item domains, we did not include all of the items listed in these domains from the ACES. We provided more detail in the manuscript about this process. The validity and reliability of these items and domains can be found in the Safran et al paper in the references.

4. The division of the PAM scores into four categories 0-40, 41-60, 61-75, 76-100, required better explanation and justification, as reviewer 2 has commented on. Your response that “the data was skewed with very few low scores. The data was grouped based on this distribution.” Please clarify whether the categorization was based on an equal allocation of subjects to each group. Please also address the statistical reviewer’s question on the justification on the cut off score of 4.5.

Response: Originally, we had modified the category cutoffs to better align with our response distribution but we have revised the manuscript and Tables 3 and 4 using the category ranges that are recommended by the PAM developers in order to be consistent with other articles that have used the PAM tool. In doing so, one of the domains, integration of care, is no longer significant.

With regards to the cut off score for the ACES, we chose to dichotomize all PCMH domain scores into binary variables (high/low) because the Hosmer-Lemeshow goodness of fit test revealed violations of linearity when using the raw values. Furthermore, using binary variables simplified the interpretation of the results. Observations with a score of 4.5 (mean score for composites) or greater were coded as 1 (a high perception of that PCMH domain) and those below were coded as a 0 (a low perception of that PCMH domain). We ran sensitivity analyses with different thresholds (e.g. midpoint of raw score range), each of which produced similar results. Therefore we only report the results using the mean score of 4.5 as the cut-off point.
5. The discussion section is rather superficial. More discussion is needed on the possible reason why communication, office staff helpfulness, interpersonal treatment, and trust became insignificant after controlling for other PCMH domain scores. The possibility of overlapping concepts and psychometric deficiency of single-item domains should be discussed. Previous reviewer 2’s recommendation on more in-depth discussion on the “implications of this study in regards to the adoption of PCMH concepts and practices” was not fully addressed. More specific suggestion on how the findings on the importance of organizational access, Comprehensive knowledge and integration of care can be operationalized in PCMH to improve patient activation among patients with diabetes mellitus.

The conclusion is too general, please add a few key messages based on the findings of the study.

Response: We provided additional information in the discussion section to address these points.

Reviewer reports:

Meredith Fort (Reviewer 2):
- I suggest including diabetes in the title.
Response: Added Diabetes to the title.

- The abstract and the paper should be reviewed for grammar and readability.
Response: Made additional revisions to the manuscript for improved readability.

Introduction:
- The model is typically the Chronic Care Model.
Response: Wagner’s model is now called the Chronic Care Model.

- The section would benefit from including a purpose statement - which could be the one currently at the beginning of the Methods section.
Response: The purpose statement was moved from the methods section to the introduction section.
Methods:
- It would be helpful to have more information about the diabetics - (e.g. years with diabetes, A1C, BMI, if they are on insulin) - they have self-rated health but these diabetes-specific measures as well. If this is not possible, I recommend including this as a limitation.

Response: We did not collect data on diabetes related measures as part of the study and have included this as a limitation.

- The questions in Table 1 focus on the physician-patient exchange but diabetes care often includes other members of a team including mid-level providers and support staff. Is there a reason that the questions focus on the patient's "personal doctor"? It would be helpful to explain the context of the family medical centers.

Response: The questions are from the ACES tool and even though they used the term “your personal doctor’s office” to refer to the team, we did not change the questions to reflect other providers.

- The authors should explain how they selected the medical home domains that are listed in Table 1.

Response: These domains are from the ACES which included 11 domains. We chose 7 of the 11 domains that best fit the organizational structure of the PCMHs in the study. We added more details about the development of the short version of the ACES in the manuscript.

- It would be helpful to know the total eligible population of diabetics in the 4 centers (approximately) or the total population served by the 4 centers - this may be a strength of this study.

Response: We included the total number of diabetic patients being managed by these practices.

Discussion:
- It would be helpful to highlight strengths about this study.

- What additional/future research do the authors recommend?
Response: Additional information was added to the discussion and conclusion sections to address these comments.

Carlos KH Wong (Reviewer 3):

Results in abstract: three PCMH domains (organizational access, integration of care, and comprehensive knowledge) found to be significant attributes. Odds ratio and corresponding CI should be reported but only odds ratio of 'comprehensive knowledge' was reported because of having the highest odds ratio among three significant attributes. Furthermore, the abbreviation 'PAM' is defined in earlier part.

Response: We added the odds ratio and confidence intervals to the two other significant variables.

Method in text:

Inclusion criteria were 1) patients who were adults, 2) diabetes diagnosed by ICD-9 coding, 3) had at least 2 visits within the past 2 years, and 4) who did not opt out. Regarding the third criteria, the observation period is unclear - the adult patients with diabetes visited the center over certain period should be specified.

Response: These were patients who were seen in 2012-2013 and this information was added to the manuscript.

Authors gave a power analysis requiring 1301 participants to detect a 5-point difference in domain ratings across the four clinics with 80% power. The estimated sample size was 1301 but the number of observed data without missing was 1253. It reduced the statistical power which may no longer reach 80%. Another concern on the power analysis was the reference of 5-point difference - is that the minimally important difference of PAM score? (Or composite score?) The evidence on the use of 5-point difference, out of theoretical range of 100, is better justified.

Response: We were able to have useable data on over 96% of the sample collected and this had a minimal effect on the power, especially since the analysis was very conservative using a 5 point difference for the test.
What is the distribution of composite scores? Authors defined the domain score of $\geq 4.5$ as high perception of domain, while it will be helpful to give the possible option of each survey question, interpret the score and provide reference to a cut-off of 4.5.

Response: We chose to dichotomize all PCMH domain scores into binary variables (high/low) because the Hosmer-Lemeshow goodness of fit test revealed violations of linearity when using the raw values. Furthermore, using binary variables simplified the interpretation of the results. Observations with a score of 4.5 (mean score for composites) or greater were coded as 1 (a high perception of that PCMH domain) and those below were coded as a 0 (a low perception of that PCMH domain). We ran sensitivity analyses with different thresholds (e.g. midpoint of raw score range), each of which produced similar results. Therefore we only report the results using the mean score of 4.5 as the cut-off point.”

In statistical analysis, please give the module used in STATA for ordered logistic random-effect regression analysis, and the method to deal with missing co-variates / socio-demographic variables (missing value for PCMH composite outcome is defined).

Response: We used the ologit procedure in STATA with Activation (4 ordered categories) as the dependent variable and independent variables are listed in table 1. The Primary care centers were used as the random effects. For the missing data, these participants were excluded from the analysis. That is why there was a decrease in participants from 1301 to 1253.

Analysis surrounding patients with type 2 diabetes usually accounted for duration of diabetes, treatment modality, and presence of diabetes-related complication in adjusted model. This study neglected those covariates, albeit those may not have impact on PAM. This issue should be addressed in limitation.

Response: We did not collect data diabetes related measures as part of the study and have included this as a limitation.

Table 2: please provide SD for characteristics in continuous form

Response: The SD was added to the mean age category in Table 2.

Table 3: from the footnote, all regression models were fitted with 1253 participants. Is that correct?
Response: That is correct.

Table 4: remove '(low scores) in the row 'PCMH domains' as 'low scores' is not the reference category of PCMH domains. 'Ptient' is typo

Response: The low scores wording was removed from the table.