Author’s response to reviews

Title: Increased average number of medical publications per interviewee from 2009 to 2018: a study of 100 interviewees to an academic gastroenterology fellowship program

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Author’s response to reviews:

POINT-BY-POINT RESPONSE LETTER

September 15, 2019

Dr. Upreet Dhaliwal
Editor,
BMC Medical Education

Dear Dr. Upreet Dhaliwal:

RE Manuscript #: MEED-D-19-00416 submitted to BMC Medical Education.
Original title: Novel finding of a statistically significant, more than four-fold increase in mean number of medical publications in peer-reviewed journals per interviewee among 100 interviewees for an academic gastroenterology fellowship position from 2009-2011 to 2016-2018 by Zaid Imam, M.B.B.S; and Mitchell S. Cappell, M.D., Ph.D.

Thank you for your careful review and insightful comments on this manuscript. We have thoroughly revised the manuscript in accord with the reviewers’ and editor’s comments as follows. As an aid in reviewing the revisions we have supplied two versions of the revised paper: a version identified as final for publication and a version identified as having highlighted changes.

Editor’s Comments:
1. This article seeks to demonstrate how publication rates have gone up over the two time periods studied. I feel a succinct declarative title would read better - consider avoiding descriptors like 'novel', and retain only the most important elements (PICOT elements).

Response: As suggested, the title is changed to delete the words “Novel finding of” and to shorten it, as follows:
Title page, page 1.
CHANGED TO:
A large and statistically significant increase in mean number of medical publications per interviewee from 2009 to 2018: a study of 100 interviewees to an academic gastroenterology fellowship program

CHANGED FROM:
Novel finding of a statistically significant, more than four-fold increase in mean number of medical publications in peer-reviewed journals per interviewee among 100 interviewees for an academic gastroenterology fellowship position from 2009-2011 to 2016-2018

Reviewer 1
1. I am from Australia so there may be differences in post graduate medical and surgical specialty training requirements from the US.

Response: No changes requested by Reviewer 1, comment 1. However, the authors thank reviewer 1 for his insightful comments and this particular comment which stimulated the following new paragraph about study limitations:

ADDED PARAGRAPH:
The reported study findings are limited to a university hospital (academic medical center), located in the U.S., like the study hospital of Beaumont Hospital at Royal Oak, and may not apply to gastroenterology fellowships at regional hospitals in the U.S. because of their decreased focus on medical research. The currently reported findings may apply to other highly competitive residencies or fellowships in the U.S., such as orthopedics, but might may not apply to relatively noncompetitive residencies or fellowships, such as geriatrics, in the U.S. The reported findings might not apply to gastroenterology fellowships at hospitals in other highly industrialized countries due to different medical systems.

2. I think this article serves well in documenting this massive shift towards research becoming a core requirement for all fields of medicine and surgery - not just for completing a training program but also being almost mandatory for entry to said programs - a very important consideration for aspiring junior doctors.

Response: No changes requested by Reviewer 1, comment 2. The authors thank reviewer 1 for his insightful comments.

Reviewer 2
1. The article requires to be made concise. Title is too long and verbose. It needs to be made concise.

Response: As suggested, the title is changed to become more concise as follows.
Title page, page 1.

CHANGED TO:
A large and statistically significant increase in mean number of medical publications per interviewee from 2009 to 2018: a study of 100 interviewees to an academic gastroenterology fellowship program

CHANGED FROM:
Novel finding of a statistically significant, more than four-fold increase in mean number of medical publications in peer-reviewed journals per interviewee among 100 interviewees for an academic gastroenterology fellowship position from 2009-2011 to 2016-2018.

2. The results section contains statistics related content which is irrelevant. For example: giving kurtosis and other parameters for convincing that the data was non-parametric is not needed.

Response: The unnecessary statistics is deleted, as follows:

CHANGED TO:
Figures 1A illustrates time trends in mean number of total publications (abstracts and articles) by interviewees per annum from 2009-2018. Figure 1B illustrates time trends in median number of total publications (abstracts and articles) by interviewees per annum from 2009-2018. Both graphs demonstrate quantitatively large time trends (only abstracts and only articles per annum exhibited similar quantitatively large time trends from 2009-2018, not illustrated). The statistical significance of these time trends (for 2009-2011 versus 2016-2018) across the sample of 100 interviewees was analyzed using non-parametric statistics because the number of abstracts, articles, and publications per interviewee per annum was demonstrated to have nonparametric (non-normal) distributions by direct visual inspection of histograms, of Q-Q plots, and of box plots. Shapiro-Wilk’s test also showed a non-normal distribution (p<0.0001 for normal distribution, individually for abstracts, articles, or publications).

CHANGED FROM:
Figures 1A, B and Supplementary-Figures 1A, B illustrate time trends in mean and median number of articles, abstracts, and total publications per annum from 2009-2018. The number of abstracts, articles and publications across the sample of 100 interviewees (2009-2011 versus 2016-2018) were statistically analyzed using non-parametric statistics because nonparametric (non-normal) distributions of abstracts, articles, and publications were demonstrated by direct visual inspection of histograms, of Q-Q plots, and of box plots. Kurtosis values were 3.36, 14.09, and 6.8 (standard error=.65) for abstracts, articles, and publications, respectively, for 2009-2011. Kurtosis values were 3.41, 5.44, and 3.97 (standard error=.67) for abstracts, articles, and publications, respectively, for 2016-2018. Skewness values were 1.80, 3.53, and 2.52 (standard error=0.33) for abstracts, articles and publications respectively for 2009-2011. Skewness values were 1.97, 2.10, and 1.84 (standard error=0.34) for abstracts, articles, and publications respectively for 2016-2018. Shapiro-Wilk’s test also showed a non-normal distribution (p=0.000 for normal distribution, individually for abstracts, articles, and publications).

3. The information provided in the graphs and tables are repetitive. The same information is also provided in text form. Please remove the duplicated reporting of results in the manuscript.

Response:
As suggested, the following four figures have been deleted: Former Figure 1A; former Figure 1B; former Figure 2; former Supplemental Figure 2A; and former Supplemental Figure 2B. Only 2 figures have been retained: Supplemental Figure 1A which has been renamed as Figure 1A, and Supplemental Figure 1B which has been renamed as Figure 1B.

In summary, four of the original 6 figures have been deleted and only two out of the original six figures have been retained. These two figures are not otherwise covered by the tables and text.
because these two figures shows the trends for each year from 2009 through 2018. All the Tables and text deal with comparisons of 2008-2011 versus 2016-2018 and omit years 2012 through 2015.

Accordingly the figure legends for the original Figure 1A, Figure 1B, Figure 2A, and Figure 2B have been deleted. The figure legend for Supplementary Figure 1A has been changed to be called the figure legend for Figure 1A, and the figure legend for Supplementary Figure 1B has been changed to be called the figure legend for Figure 1B.

CHANGED TO:
Figures 1 A illustrates time trends in mean number of total publications (abstracts and articles) by interviewees per annum from 2009-2018. Figure 1B illustrates time trends in median number of total publications (abstracts and articles) by interviewees per annum from 2009-2018. Both graphs demonstrate quantitatively large increases with time (similarly, only abstracts per interviewee per annum and only articles per interviewee per annum had large increases with time during 2009-2018, not illustrated).

The statistical significance of these time trends (for 2009-2011 versus 2016-2018) across the sample of 100 interviewees were analyzed using non-parametric statistics because the number of abstracts, articles, and publications per interviewee per annum were demonstrated to have nonparametric (non-normal) distributions by direct visual inspection of histograms, of Q-Q plots, and of box plots. Shapiro-Wilk’s test also showed a non-normal distribution (p<0.0001 for normal distribution, individually for abstracts, articles, or publications).

By this non-parametric statistical analyses, the 2016-2018 interviewee cohort had significantly more publications than the 2009-2011 interviewee cohort in terms of mean number of: abstracts (7.54 ± 1.16 vs. 1.69 ± 0.37, p<0.0001); articles (6.13 ± 1.29 vs. 1.48 ± 0.30, p<0.0001); and combined number of publications (including both abstracts and articles) (12.76 ± 1.99 vs. 3.17 ± 0.48, p<0.0001)(Table-2). Not surprisingly, the differences were also statistically significant when analyzed using parametric statistics (Table-1).

Associations between different parameters and mean number of publications across all 100 individuals are reported in Tables 3 & 4. Surprisingly, lower recommendation scores significantly correlated with an increased number of publications (correlation coefficient=0.26, p=0.01, Table 3). Foreign medical school graduate status was significantly associated with more publications (Kruskal Wallis test statistic=5.82, p=0.02, Table 4).

CHANGED FROM:
Figures 1 A,B and Supplementary-Figures1 A,B illustrate time trends in mean and median number of articles, abstracts, and total publications per annum from 2009-2018. The number of abstracts, articles and publications across the sample of 100 interviewees (2009-2011 versus 2016-2018) were statistically analyzed using non-parametric statistics because nonparametric (non-normal) distributions of abstracts, articles, and publications were demonstrated by direct visual inspection of histograms, of Q-Q plots, and of box plots (Illustrated Figures). Kurtosis values were 3.36, 14.09, and 6.8 (standard error=.65) for abstracts, articles, and publications, respectively, for 2009-2011. Kurtosis values were 3.41, 5.44, and 3.97 (standard error=.67) for abstracts, articles, and publications, respectively, for 2016-2018. Skewness values were 1.80, 3.53, and 2.52 (standard error=0.33) for abstracts, articles and publications respectively for 2009-2011. Skewness values were 1.97, 2.10, and 1.84 (standard error=0.34) for abstracts, articles, and publications respectively for 2016-2018. Shapiro-Wilk’s test also showed a non-normal
distribution (p=0.000 for normal distribution, individually for abstracts, articles, and publications.

The 2016-2018 interviewee cohort had significantly more publications than the 2009-2011 interviewee cohort in terms of mean number of: abstracts (7.54 \pm 1.16 vs. 1.69 \pm 0.37, p=0.000); articles (6.13 \pm 1.29 vs. 1.48 \pm 0.30, p=0.000); and combined number of publications (including both abstracts and articles) (12.76 \pm 1.99 vs. 3.17 \pm 0.48, p=0.000), by non-parametric statistical analyses (Table-2, Figure 2, Supplementary-Figures 2A & B). However, the differences were also statistically significant when analyzed using parametric statistics (Table-1).

Associations between different parameters and mean number of publications across all 100 individuals are reported in Supplementary-Tables 1 & 2. Surprisingly, lower recommendation scores significantly correlated with an increased number of publications (correlation coefficient=0.26, p=0.01, Supplementary-Table 1). Foreign medical school graduate status was significantly associated with more publications (Kruskal Wallis test statistic=5.82, p=0.02, Supplementary-Table 2).

4. In the conclusion section, it is mentioned that the results of this study has important implications on certain domains. Please specify which are these implications and put this section in the Discussion part.

Response: As suggested, the following new paragraph in the Discussion section discusses whether the enhanced research experience, reflected by more research publications, may render the GI fellowship applicants as better clinicians/gastroenterologists.

ADDED PARAGRAPH IN DISCUSSION:

The current statistically significant trend of greater research productivity by residents (applying for GI fellowships) could improve their clinical acumen as internists and aspiring gastroenterologists. From their research experience, residents learn about the challenges, difficulties, and limitations of research. They may also become more critical readers of the medical literature, aspire to achieve the rigorous standards of evidence-based medicine, question unsubstantiated clinical dogma, and potentially stimulate their interest in academic medical careers.

5. P=0.000 should be reported as P<0.0001.

Response: As suggested, throughout the manuscript changed to “P<0.0001” from “P=0.000”, as follows:

A. Page 2. Abstract, Line 2 of Results. Change to “P<0.0001” from “p=0.000”.
B. Page 2. Abstract, Line 3 of Results. Change to “P<0.0001” from “p=0.000”.
C. Page 2. Abstract, Line 4 of Results. Change to “P<0.0001” from “p=0.000”.
D. Page 6. Results, last line third paragraph. Change to “P<0.0001” from “p=0.000”.
E. Page 6. Results, line 2 of fourth paragraph. Change to “P<0.0001” from “p=0.000”.
F. Page 6. Results, line 3 of fourth paragraph. Changed to “P<0.0001” from “p=0.000”.
G. Page 6. Results, line 4 of fourth paragraph. Changed to “P<0.0001” from “p=0.000”.
H. Page 14. Table 1. Line 1, under Numerical variables. Changed to “P<0.0001*” from “p=0.000*”.
I. Page 14. Table 1. Line 2, under Numerical variables. Changed to “P<0.0001*” from “p=0.000*”.
J. Page 14. Table 1. Line 5, under Numerical variables. Changed to “p<0.0001*” from “p=0.000*”.
K. Page 14. Table 1. Line 7, under Numerical variables. Changed to “p<0.0001*” from “p=0.000*”.
L. Page 15. Table 2. Line 1, under Variable. Changed to “p<0.0001” from “p=0.000”.
M. Page 15. Table 2. Line 2, under Variable. Changed to “p<0.0001” from “p=0.000”.
K. Page 15. Table 2. Line 3, under Variable. Changed to “p<0.0001” from “p=0.000”.

6. In the introduction section, it is not very clear why such a study is important.

Response: As suggested, the following sentence is added about the importance of the reported findings at the end of the Background (Introduction) section.

CHANGE TO:
GI fellowship applicants, GI fellowship program directors, other GI fellowship program selection committee members, and internal medicine (IM) program directors should be cognizant of this robust trend to further promote research productivity of medical residents, and improve their chances of matching in GI fellowship positions. This finding has potentially broad implications in that more training and experience in clinical research may improve the clinical acumen of GI fellowship applicants by gaining skills in critically reading the clinical literature, and may stimulate their interest in academic medicine.

CHANGE FROM:
GI fellowship applicants, GI fellowship program directors, other GI fellowship program selection committee members, and internal medicine (IM) program directors should be cognizant of this robust trend to further promote research productivity of medical residents, and improve their chances of matching in GI fellowship positions.

Editorial Policies
Declarations section includes the mandatory sub-sections.

Response: All mandatory declarations were already submitted on page 10 of the originally submitted manuscript, as follows:
Consent for publication: The IRB granted IRB exemption/approval for this study on January 28, 2018 (IRB Number: 2017-382). This includes consent for publication. See attached IRB letter dated 12/8/17 by Graham Krasan, MD, Chairperson of Institutional Review Board.
Availability of data and material: Data is not shared because data is highly sensitive in that it involves trainees. It also includes data that are not considered conventional identifiers (e.g. medical school of applicants), but could with detective work lead to identification of individuals. Competing interests: None for either Dr. Imam or Dr. Cappell. In particular, Dr. Cappell, as a consultant for the United States Food and Drug Administration (FDA) Advisory Committee for Gastroenterology Drugs, affirms that this paper does not discuss any proprietary confidential pharmaceutical data submitted to the FDA and reviewed by Dr. Cappell. Dr. Cappell was until
one and a half years ago a member of the speaker’s bureau for AstraZeneca and Daiichi Sankyo, co-marketers of Movantik. Dr. Cappell has had one-time consultancies for Mallinckrodt and Shire more than one and a half years ago. This work does not discuss any drug manufactured or marketed by AstraZeneca, Daiichi Sankyo, Shire, or Mallinckrodt.

Authors’ contributions: Dr. Imam wrote a preliminary draft of the manuscript introduction and results, and performed all the preliminary statistical calculations. Dr. Cappell initiated this study, compiled all the primary data as Program Director of the Gastroenterology Fellowship, extensively revised the Introduction and Results, wrote most of the Discussion section, and acted as mentor for Dr. Imam.

Acknowledgements: None.

Thank you for your careful review and interest in our manuscript. We would be delighted to perform further revisions as necessary for publication in this prestigious journal.

Warm regards,
Mitchell S. Cappell, M.D., Ph.D.
Senior author