PEER REVIEW HISTORY

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ARTICLE DETAILS

TITLE (PROVISIONAL)	A Cross-Sectional Analysis of Bibliometrics And Altmetrics – Comparing The Impact of Qualitative and Quantitative Articles in The British Medical Journal
AUTHORS	Retrouvey, Helene; Webster, Fiona; Zhong, Toni; Gagliardi, Anna; Baxter, Nancy

VERSION 1 – REVIEW

REVIEWER	Professor Samy Azer King Saud University, Saudi Arabia
REVIEW RETURNED	19-Jun-2020

GENERAL COMMENTS	Comparing The Impact of Qualitative and Quantitative Articles in The British Medical Journal – An Cross-Sectional Analysis of Bibliometrics And Altmetrics BMJ open-2020-040950 Research Article Thank you for asking me to review the above-titled manuscript. The topic is interesting and suitable for the journal's readers. However, there are several problems in the manuscript. 1. Article summary point 2 needs editing. Not clearly written. Any weaknesses in the study to mention? 2. Introduction: the first sentence, state the time frame. 3. Strauss & Corbin (Ref number 8 is not correct). No reference in the whole list shows these two names? 4. The reference 10- not the right reference, please check. 5. The statement, "Bibliometrics focus on the academic impact…", page 10 lines 15/21 needs a reference. 6. Methods: How were the articles screened? Line 44, page 11. 7. Give more information about Plum X Matrics- and its URL. Give the URL of ProQuest Altmetrics. Justify why these two were used to inform about Altmetric scores. 8. Methods: Were there differences, in the altmetric scores versus the number of citations in papers published in the period from 2007 to 2012 versus those published from 2013 to 2017? Explain differences 9. Methods: What about top-cited articles published in this period and published in the BMJ can you identify them (top 50) and make a comparison regarding their altmetric scores versus their citations. How about the articles with the lowest citation numbers and published in the BMJ can you compare their citation numbers versus their altmetric scores. What can these two comparisons tell us about the quantitative and qualitative research if you consider these comparisons regarding top-cited and lowest cited in each of these two categories? This comparison is important to make a

	conclusion and see factors that possibly affect these two measures. 10. Results: Table 1: The citation numbers given by Scopus is different from that of the Web of Science and Google Scholar. In the text or under the table, please explain why these differences, and the meaning for the differences in these scores. 11. Table 2: The examples given are not clear and not informative. Give details of steps that others can follow and produce these results. The same applies to Capture, Mentions, etc. 12. Figure 1 is missing 13. Discussion- Compare with other studies that looked at altimetric scores versus the number of citations such as Azer's paper on Professionalism. 14. The authors stated Weiner et al. 2011, while in the list of references Weiner BJ et al. published in 2012, not 2011. 15. The authors stated "In 2016, BENSHAI et al., (Ref 36). While Ref 36 is BANSHAL SK et al. 2018. Mistakes in the name of the author and the year. Which one should we believe? 16. Researchers doing such altmetric scores and bibliometric studies must be meticulously accurate. These errors in references and citations are not good indicators. There are many others, as I dig deeper. 17. How these comparison discussions can be compared with similar studies on JAMA, CMAJ, and MJA, can the authors compare any of similar studies on these journals? 18. The whole paper and citations/references, and tables need careful revision by authors.

REVIEWER	Arfon G Powell Cardiff University
REVIEW RETURNED	24-Jun-2020

GENERAL COMMENTS	Thank you for the opportunity to review this manuscript. I have made some comments below which I hope are useful. 1. The title may benefit from revision to 'A Cross-Sectional...' 2. Why was the date of inclusion form 2007 onwards? Does this have anything to do with Twitter starting around this time? If so, this should be included. If not, then the inclusion dates should be justified. 3. The matching process needs to be described in more detail. Why 3:1? Was there a statistical method used for controlling confounders? 4. Why were meta-analyses excluded? This may require justifying in the methods. 5. There are occasional typographical errors dotted throughout the manuscript. This includes different font size and line spacing. "Statically" on line 34 page 14 needs revised. 6. I would recommend p-values to three decimal places but this should reflect journal style requirements. 7. Were the Altmetric data collected for all articles at the same time?

	General opinon This is an interesting study looking at bibliometrics vs Altmetric measures of impact. Furthermore, different measures of 'Altmetric' were used. The main limitation is the omission of data related to subject. I appreciate this is difficult because I suspect very little overlap will exist between quantitative and qualitative studies, but the control of confounding needs to be acknowledged/addressed. A very enjoyable read. Arfon G Powell, Cardiff University

REVIEWER	Elizabeth C. Whipple Indiana University School of Medicine, USA
REVIEW RETURNED	26-Jun-2020

GENERAL COMMENTS	12. Are the study limitations discussed adequately? I would like to see why certain quantitative publication types (systematic reviews, meta analysis, and research methods) were excluded. This was not adequately explained. Comparing The Impact of Qualitative and Quantitative Articles in The British Medical Journal – An Cross-Sectional Analysis of Bibliometrics And Altmetrics Overall, this is an interesting paper that addresses some of the issues raised around the “impact” of quantitative vs. qualitative papers, specifically in BMJ. The irony is not lost on me that this is being considered for publication in BMJ Open instead of BMJ, the journal on which the bibliometrics analysis was done. I would like more explanation on why systematic reviews, meta analyses, and research methods articles were excluded from the analyses. According to the Mori (6) article cited, which included systematic reviews and randomized trials, qualitative studies were cited less frequently than systematic reviews and randomized trials. And on Page 17, Line 2 is says that excluding the mixed methods did not alter findings. If this is the case, then I would exclude them altogether. It would make a stronger case for the article's hypothesis. Table 3 The Altmetric Attention Score doesn't adequately and clearly convey anything in and of itself. Similarly, since the Altmetric Score Percentile is tied to it, this is also not a hugely meaningful piece of data. The Mentions and Readers parts are more straightforward and meaningful, and I would focus on these metrics instead. If keeping the Altmetric Attention Score, there needs to be more explanation of what it is and its value/meaning. In the last paragraph on Pg 19, I would include the citation Ann Thorac Surg. 2020 Jun 3;S0003-4975(20)30860-2. Does Tweeting Improve Citations? One-Year Results From the TSSMN Prospective Randomized Trial Jessica GY Luc, Michael A Archer, Rakesh C Arora, Edward M Bender, Arie Blitz, David T Cooke, Tamara Ni Hlci, Biniam Kidane, Maral Ouzounian, Thomas K Varghese Jr, Mara B Antonoff PMID: 32504611 DOI: 10.1016/j.athoracsur.2020.04.065

	which concludes that tweeting (one form of social media/altmetrics use) does, in fact, increase citation counts over time. General: Use consistent fonts throughout the paper—this kept on changing. Table 2 under Captures--should read "Captures can be linked.." Pg 18, Line 55 "were citated less frequently..." should be "were cited less frequently..." Pg 19, Line 2 "were similarly citated compared to..." should be "were similarly cited compared to..."

VERSION 1 – AUTHOR RESPONSE

Reviewer: 1
Samy Azer
King Saud University, Saudi Arabia

Thank you for asking me to review the above-titled manuscript. The topic is interesting and suitable for the journal's readers. However, there are several problems in the manuscript.

Thank you for reviewing our manuscript. We appreciate your feedback.

1. Article summary point 2 needs editing. Not clearly written. Any weaknesses in the study to mention?

We have modified point 2:

- “Evaluation of impact included both the academic and social impact of research”

We have added a limitation to the summary points:

- “Comparison of impact was limited to articles published in the BMJ”

2. Introduction: the first sentence, state the time frame.

The three articles referred had different time frames:
Gagliardi AR, Dobrow MJ. Paucity of qualitative research in general medical and health services and policy research journals: analysis of publication rates. BMC Health Serv Res. 2011;11:268.
Articles published between 1999 and 2008

Gagliardi AR, Umoquit M, Webster F, Dobrow M. Qualitative research publication rates in top-ranked nursing journals: 2002-2011. Nurs Res. 2014;63(3):221-7.
Articles published between 2002 and 2011

Yamazaki H, Slingsby BT, Takahashi M, Hayashi Y, Sugimori H, Nakayama T. Characteristics of qualitative studies in influential journals of general medicine: a critical review. Biosci Trends. 2009;3(6):202-9.
Articles published between 2000 and 2004

We have thus edited the first sentence to:

"The number of qualitative studies published in medical journals has increased over the last twenty years."

3. Strauss & Corbin (Ref number 8 is not correct). No reference in the whole list shows these two names?

We have updated reference 8.

4. The reference 10- not the right reference, please check.

We have edited reference 10.

5. The statement, "Bibliometrics focus on the academic impact…", page 10 lines 15/21 needs a reference.

We have added references to this statement.

6. Methods: How were the articles screened? Line 44, page 11.

We have added information on the screening process.
"All articles published in the BMJ between January 1 2007 and December 31 2017 were screened. One author specifically screened the title and methods section of all articles to determine the article type. The research team was consulted if uncertainty arose during the screening process."

7. Give more information about Plum X Matrics- and its URL. Give the URL of ProQuest Altmetrics. Justify why these two were used to inform about Altmetric scores.

We have added the URL for Plum Analytics to our manuscript.

As noted by Melero et al., there are several altmetrics tools available.

Table 1. Sources used for the aggregation of information data by the four Article-Level Metrics (ALM) tools described in this article (*ALM-PLoS, Altmetrics, ImpactStory, Plum Analytics*). Sources can be broken down in 5 categories usage, captures, mentions, social media, and citations (10).

Article-/metrics level tool	Main categories of sources for aggregation of information				
	Coverage	Usage	Citations	Captures	Social Media
ALM-PLoS	Papers from PLOS	PLOS and PubMed Central	PubMed Central, Scopus, ISI Web of Science, and CrossRef	CiteULike, Mendeley, Reddit, Google+, Stumble Upon Connotea	Twitter, Facebook, Google Blogs, Researchblogging. org, Nature Blogs
Altmetric	Scholarly articles	PubMed, Arxiv or pages containing a DOI	Scopus, Web of Science CrossRef	CiteULike, Mendeley	Twitter, Facebook, Blogs, YouTube, Google +, Pinterest, Wikipedia, Weibo users, Redditors
ImpactStory	All the research products (Journal articles, blog posts, datasets, and software…)	PLOS, PubMed, ArXiv, slideshare, vimeo, youtube, Dryad package views, figshare views, webpages (from Impactstory), ScienceSeeker, ORCID)	Scopus, Web of Knowledge, Highwire, Google Scholar Citations, Pubmed	CiteULike, Mendeley, CrossRef, Vimeo, Figshare, Github, Slideshare, Youtube, Delicious	Twitter, Facebook, Blogs, Figshare, Wikipedia, Vimeo, Youtube, Slideshare, Delicious, GitHub
Plum Analytics	Journal articles, books, videos, presentations, conference proceedings, datasets, source code	EBSCO, PLOS, bit.ly, Facebook, GitHub, Dryad, Figshare, Slideshare, Institutional Repositories, WorldCat.	CrossRef, PubMed Central, Scopus, USPTO	CiteULike, Delicious, Slideshare, YouTube, GitHub, Goodreads, Mendeley, Vimeo	Facebook, Reddit, Slideshare, Vimeo, YouTube, GitHub, StackExchange, Wikipedia, SourceForge, Research Blogging, Science Seeker, Amazon, Google Plus, Twitter via DataSift

Melero R. Altmetrics - a complement to conventional metrics. Biochem Med (Zagreb). 2015;25(2):152-160.

We discussed the different altmetric options available with an experienced librarian/informatician at our institution. We selected 2 tools, Plum Analytics and Altmetric/ProQuest Altmetrics, to collect a wide variety of altmetric values for our study. We selected Plum Analytics as they provide a detailed breakdown of 5 categories allowing for a comprehensive assessment of social impact of research. We included ProQuest Altmetrics as it calculates an overall altmetric score, a useful tool to compare individual articles. In addition, this tool has been adopted by publishers such as Springer and Nature Publishing.

We have added this to our methods:
"We selected Plum Analytics as it provides a detailed breakdown of 5 categories (usage, captures, mentions, social media and citations) allowing for comprehensive assessment of impact. We selected ProQuest Altmetric as this platform calculates an overall altmetric score, a useful tool to compare individual articles."

8. Methods: Were there differences, in the altmetric scores versus the number of citations in papers published in the period from 2007 to 2012 versus those published from 2013 to 2017? Explain differences

Due to the limited number of articles published in the last 5 years of our analysis (2013 and beyond), we could not evaluate publication trends/variations over time.

To specifically answer your questions, we cannot comment on differences in altmetrics between papers published in 2007-2012 and 2013-2017 as the number of qualitative articles published in the BMJ after 2013 is limited. In fact, as per Figure 1,
we identified 41 qualitative articles published between 2007 and 2011 and only 1 article after 2013.

9. Methods: What about top-cited articles published in this period and published in the BMJ can you identify them (top 50) and make a comparison regarding their altmetric scores versus their citations. How about the articles with the lowest citation numbers and published in the BMJ can you compare their citation numbers versus their altmetric scores. What can these two comparisons tell us about the quantitative and qualitative research if you consider these comparisons regarding top-cited and lowest cited in each of these two categories? This comparison is important to make a conclusion and see factors that possibly affect these two measures.

Though they are very interesting research questions, these go beyond the scope of this article. These should be answered through future research.

Although we used complementary methods to assess impact (both altmetrics and bibliometrics), the goal of this study was not to compare altmetrics and citation numbers. Additionally, since there were very few qualitative studies published during this time period, the top and bottom 50 articles published in the BMJ would likely be overwhelmingly quantitative studies. Comparing the altmetric and bibliometric parameters of the top 50 to the bottom 50 articles published in the BMJ would likely not shed light on the different impact of quantitative and qualitative research published in this journal. Also, given there were only 42 qualitative studies published during our eleven-year review, comparing the top 50 qualitative studies to the top 50 quantitative studies would not be possible.

10. Results: Table 1: The citation numbers given by Scopus is different from that of the Web of

Science and Google Scholar. In the text or under the table, please explain why these differences, and the meaning for the differences in these scores.

Great question. We included multiple platforms for collection of citation numbers as each platform has a different way of collection citation information. Web of Science was the only citation tracker for years until the introduction of Scopus and Google Scholar in 2004 as well as ProQuest Altmetric in 2010. Web of Science covers the oldest citations, from 1900 to present. Scopus citation coverage starts in 1966, but it indexes a larger number of journals as well as a greater number of international and open access journals as compared to Web of Science. Google Scholar does not reveal information on its citation algorithm. ProQuest Altmetric uses a novel research insight platform called Dimensions which captures references beyond classic publication-based citations. The platform developers state that Dimensions is not comparable to Web of Science, Google Scholar or Scopus, although details about why these are different are not available.

We have added this as a note bellow Table 1:
"Note: Citation numbers are different between Scopus, Web of Science, Google Scholar and ProQuest Altmetric as each platform collects citation information differently. Web of Science covers the oldest citations, from 1900 to present.[1] Scopus covers citations starting in 1966, but it indexes a larger number of journals including a greater number of international and open access journals as compared to Web of Science. Google Scholar and ProQuest Altmetric do not reveal information on their method of citation collection. ProQuest Altmetric uses a novel research insight platform called Dimensions which captures references beyond classic publication-based citations.[2] The platform developers state that Dimensions is not comparable to Web of Science, Google Scholar or Scopus, though no further information is provided."

11. Table 2: The examples given are not clear and not informative. Give details of steps that others can follow and produce these results. The same applies to Capture, Mentions, etc.

Using the Plum Analytics website (https://plumanalytics.com/learn/about-metrics/), we have edited table 2 to be more informative. Plum Analytics does not specify the exact steps used to collect these results but provides good explanations of the data provided. We trust you will find this revised table more helpful and information for readers.

12. Figure 1 is missing

Figure 1 is included as a separate file as it cannot be embedded in the manuscript document.

13. Discussion- Compare with other studies that looked at altimetric scores versus the number of citations such as Azer's paper on Professionalism.

Thank you for this suggestion. We have added this very interesting article to enrich our discussion. We have also added additional references for those who wish to read further into this topic.

"In a variety of fields, individuals have evaluated impact using bibliometrics and altmetrics to determine research interests of the members of the public and of the scientific community.[3-7] In 2018, Powell et al. compared the altmetric score and bibliometric data of the 100 most cited articles in surgery and found, similar to our study, that bibliometric and altmetric analyses provide important but different perspectives on article impact.[7] Altmetrics offered the unique advantage of timely assessment of articles generating discussions online and positively correlated with citation numbers.[7] In 2018, Banshal et al. compared the top 100 Altmetric papers and the top 100 cited papers and found minimal overlap between these.[6] The authors suggested that it was unlikely that

one assessment tool predicts the other. The authors concluded that altmetric score provided additional rather than duplicate information to citation scores. In 2019, Azer and Azer found no correlation between the number of citations and the altmetric scores for top-cited articles in medical professionalism; though, for articles published after 2007, the authors found a significant correlation between number of citations and altmetric scores.[8] The relationship between altmetric and bibliometric measures thus remains controversial.[9,10] Because of the debatable correlation between altmetrics and article citations, some authors had cautioned the use of altmetrics as a measure of impact.[11] Rather, we suggest that altmetrics should be viewed as complementary to existing tools to measure impact."

Additional references:
"Azer SA, Azer S. Top-cited articles in medical professionalism: a bibliometric analysis versus altmetric scores. BMJ Open. 2019;9(7):e029433.
Luc JGY, Archer MA, Arora RC, Bender EM, Blitz A, Cooke DT, et al. Does Tweeting Improve Citations? One-Year Results from the TSSMN Prospective Randomized Trial. The Annals of Thoracic Surgery. 2020.
De Filippo D, Sanz-Casado E. Bibliometric and Altmetric Analysis of Three Social Science Disciplines. Frontiers in Research Metrics and Analytics. 2018;3:34.
Ortega JL. Relationship between altmetric and bibliometric indicators across academic social sites: The case of CSIC's members. Journal of Informetrics. 2015;9(1):39-49."

14. The authors stated Weiner et al. 2011, while in the list of references Weiner BJ et al. published in 2012, not 2011.
15. The authors stated "In 2016, BENSHAI et al., (Ref 36). While Ref 36 is BANSHAL SK et al. 2018. Mistakes in the name of the author and the year. Which one should we believe?
16. Researchers doing such altmetric scores and bibliometric studies must be meticulously accurate. These errors in references and citations are not good indicators. There are many others, as I dig deeper.

Thank you for noting these. We have reviewed all references to ensure that all are accurate.

17. How these comparison discussions can be compared with similar studies on JAMA, CMAJ, and MJA, can the authors compare any of similar studies on these journals?

When initiating this research project, we reviewed several medical journals and found very low publication rates of qualitative research. Similar to reports by Gagliardi and Dobrow in 2011 as well as Yamazaki et al. in 2009, very few qualitative studies were published in high impact medical journals including JAMA and CMAJ, with the majority in the BMJ.

Table 3 Number/percentage of qualitative articles published in top general medical journals, 1999 to 2008

Journal	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	Total
BMJ											
qualitative empirical articles	2	3	8	14	7	2	2	1	0	2	**41**
total empirical articles	677	624	592	676	754	622	600	534	565	695	**6339**
percentage qualitative	**0.3**	**0.5**	**1.4**	**2.1**	**0.9**	**0.3**	**0.3**	**0.2**	**0.0**	**0.3**	**0.6**
CMAJ											
qualitative empirical articles	0	2	2	2	0	0	0	0	0	0	**6**
total empirical articles	268	241	223	247	251	237	266	227	210	206	**2378**
percentage qualitative	**0.0**	**0.8**	**0.9**	**0.8**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.3**
J Intern Med											
qualitative empirical articles	0	0	0	0	0	0	0	0	0	0	**0**
total empirical articles	146	151	118	124	142	136	121	124	123	110	**1295**
percentage qualitative	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
JAMA											
qualitative empirical articles	2	0	0	0	2	0	0	0	0	0	**4**
total empirical articles	649	675	664	654	563	456	491	451	463	504	**5570**
percentage qualitative	**0.3**	**0.0**	**0.0**	**0.0**	**0.4**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.1**
Lancet											
qualitative empirical articles	0	2	2	1	0	0	0	2	1	0	**8**
total empirical articles	931	823	837	881	922	850	738	656	567	600	**7805**
percentage qualitative	**0.0**	**0.2**	**0.2**	**0.1**	**0.0**	**0.0**	**0.0**	**0.3**	**0.2**	**0.0**	**0.1**
NEJM											
qualitative empirical articles	0	0	0	0	0	0	0	0	0	0	**0**
total empirical articles	465	448	446	461	508	634	636	611	615	610	**5434**
percentage qualitative	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**

Gagliardi AR, Dobrow MJ. Paucity of qualitative research in general medical and health services and policy research journals: analysis of publication rates. BMC Health Serv Res. 2011;11:268.

Table 2. Trend in qualitative studies published in Big Five between 1990 and 2004

Journal / Years	1990-1994	1995-1999	2000-2004
N Engl J Med	0	0	0
JAMA	2	5	3
Lancet	0	6	3
Ann Intern Med	1	3	1
BMJ	3	40	73
Total	6*	54*	80

* Raw results from Medline prior to individual confirmation to exclude papers that were not actual qualitative studies.

Yamazaki H, Slingsby BT, Takahashi M, Hayashi Y, Sugimori H, Nakayama T. Characteristics of qualitative studies in influential journals of general medicine: a critical review. Biosci Trends. 2009;3(6):202-209.

We selected the BMJ for our study as this journal 1) publishes the most qualitative research amongst the high impact medical journals, and 2) would allow our research team to evaluates the statements made by the editors of the BMJ that qualitative research is less accessed and cited than other quantitative designs in the BMJ.

We hope that the publication of our article will encourage journals to publish a greater number of qualitative articles.

18. The whole paper and citations/references, and tables need careful revision by authors.

We have carefully reviewed the paper and updated citations/references as needed.

Your comments and feedback have helped to significantly improved our manuscript. We trust you will enjoy the revised version.

Reviewer: 2
Arfon G Powell
Cardiff University

Thank you for the opportunity to review this manuscript. I have made some comments below which I hope are useful.

Thank you for reviewing our manuscript. We appreciate your feedback.

1. The title may benefit from revision to 'A Cross-Sectional...'

We have revised the title to: “A Cross-Sectional Analysis of Bibliometrics And Altmetrics – Comparing The Impact of Qualitative and Quantitative Articles in The British Medical Journal”

2. Why was the date of inclusion form 2007 onwards? Does this have anything to do with Twitter starting around this time? If so, this should be included. If not, then the inclusion dates should be justified.

As two years are needed after paper publications in order for bibliometric indicators to be used reliably, this time period was chosen.

We have justified our time period:
“Articles between 2007 and 2017 were included as this marks the beginning of online platforms such as Twitter and provides two years for bibliometric measures to be generated. Previous authors have suggested that two years post publication are needed to allow for reliable bibliometric indicators [12].”

3. The matching process needs to be described in more detail. Why 3:1? Was there a statistical method used for controlling confounders?

We have added details of the matching process as well as a justification for our matching:
“Qualitative research articles were matched 1:3 without replacement to quantitative articles published during the same year using an excel random number generator (Microsoft Excel Version 14.6.2; Microsoft®, Redmond, Washington). Specifically, each qualitative article published in a given year was given a unique identifier, which was then matched to 3 unique quantitative articles from that same year. We matched each qualitative article to 3 quantitative articles in the aim of balancing covariates, decreasing variance, while controlling for year of publication.13-15”

4. Why were meta-analyses excluded? This may require justifying in the methods.

We have added justification:

“Only research articles with primary sources of data were included in our analysis. Research articles included quantitative studies (observational studies, economic evaluations and clinical trials) and qualitative articles. Article types such as systematic reviews, meta-analysis, research methods, editorials, rapid responses, personal views, and opinions were excluded. Systematic reviews and meta-analysis were excluded as they present secondary data, ie. synthesis of published primary data from qualitative and/quantitative sources.”

5. There are occasional typographical errors dotted throughout the manuscript. This includes different font size and line spacing. "Statically" on line 34 page 14 needs revised.

Thank you for noting these. We have revised the manuscript to correct these errors.

6. I would recommend p-values to three decimal places but this should reflect journal style requirements.

We have added 3 decimal places for p values close to 0.05 for clarity. See updated tables for details. We can add 3 decimals to all p values as required. Please indicate.

7. Were the Altmetric data collected for all articles at the same time?

All data was collected at the same time in April 2019.

The methods section was adjusted:
“Bibliometrics (Table 1)
[…] We determined these measures from Web of Science, Google Scholar, Scopus and ProQuest Altmetric for all articles in April 2019. […]
Altmetrics (Table 2 and 3)
Altmetric measures were obtained from Plum Analytics (Table 2) and ProQuest Altmetric (Table 3, https://www.altmetric.com) for all articles in April 2019.”

General opinion
This is an interesting study looking at bibliometrics vs Altmetric measures of impact. Furthermore, different measures of 'Altmetric' were used. The main limitation is the omission of data related to subject. I appreciate this is difficult because I suspect very little overlap will exist between quantitative and qualitative studies, but the control of confounding needs to be acknowledged/addressed. A very enjoyable read.

Thank you again for your feedback. We are delighted that you enjoyed our manuscript.
We reviewed data related to subject during our analysis, but as you noted, there is very little overlap. We can create an appendix table at your request to address this point.
Your comments and feedback have helped to improve our manuscript. We truly appreciate your insight.

Reviewer: 3
Elizabeth C. Whipple
Indiana University School of Medicine, USA

Overall, this is an interesting paper that addresses some of the issues raised around the “impact” of quantitative vs. qualitative papers, specifically in BMJ. The irony is not lost on me that this is being considered for publication in BMJ Open instead of BMJ, the journal on which the bibliometrics analysis was done.

I would like more explanation on why systematic reviews, meta analyses, and research methods articles were excluded from the analyses. According to the Mori (6) article cited, which included systematic reviews and randomized trials, qualitative studies were cited less frequently than systematic reviews and randomized trials.

Systematic reviews, meta analyses, and research methods articles were not included as they do not present primary data. We aimed to compare qualitative and quantitative articles presenting primary sources of data. Systematic reviews and meta-analysis summarize primary data, leading to comprehensive reviews of the literature. These articles are thus likely to be cited more frequently than either qualitative or quantitative articles presenting primary data.

We have justified our choice of studies included:
"Only research articles presenting primary sources of data were included in our analysis. Research articles included quantitative studies (observational studies, economic evaluations and clinical trials) and qualitative articles. Article types such as systematic reviews, meta-analysis, research methods, editorials, rapid responses, personal views, and opinions were excluded. Systematic reviews and meta-analysis were excluded as they present secondary data, ie. synthesis of published primary data from qualitative and/quantitative sources."

And on Page 17, Line 2 is says that excluding the mixed methods did not alter findings. If this is the case, then I would exclude them altogether. It would make a stronger case for the article's hypothesis.

We included mixed methods research articles as a form of qualitative research in our manuscript firstly as this is an important use of qualitative methods. Second, mixed methods research articles have gained popularity in recent years, and showcase the usefulness of qualitative methods. In addition, the quantitative audience reading our manuscript will be seeking high numbers of articles in our analysis, thus the importance of include both pure qualitative and mixed methods articles. For these reasons, we feel that it is important to include mixed methods articles in our manuscript.

Table 3 The Altmetric Attention Score doesn't adequately and clearly convey anything in and of itself. Similarly, since the Altmetric Score Percentile is tied to it, this is also not a hugely meaningful piece of data.
The Mentions and Readers parts are more straightforward and meaningful, and I would focus on these metrics instead. If keeping the Altmetric Attention Score, there needs to be more explanation of what it is and its value/meaning.

We agree that each altmetric measure provides information on the social impact of research. No measure can be used alone as each one provides different information on the online usage of research. We have included a variety of altmetric measures in our manuscript to reflect this.

In response to your comment, we have added information on the Altmetric Attention Score and have modified Table 3.

"The Altmetric Attention Score provides a weighted count of the quantity of attention that a paper has received online and is derived from an automated algorithm.[16] The score is weighted based on 3 main factors: 1) volume (how many times the article is mentioned), 2) sources (where the mentions come from), and 3) authors (authors of the mentions).[17] This score helps to identify the level of online activity surrounding an article from a variety of sources (eg. News, blogs, Twitter, Facebook, Wikipedia)."

We have also added to Table 2 in order to better defined each category of Plum Analytics.

Categories	Explanation	Example	
Usage	Signal that individuals are reading the articles and using the research.	Abstract Views	Number of times the abstract has been viewed
		Full Text Views	Number of times the full text has been viewed
		Clicks	Number of clicks of a URL
		Downloads	Number of times the artifact has been downloaded
		Holdings	Number of libraries that hold the artifact
Captures	Measure indicating that the individual wants to return to the work. Captures can be linked to future citations.	Bookmarks	Number of times an artifact has been bookmarked
		Favorites	Number of times the artifact has been marked as a favorite
		Readers	Number of people who have added the artifact to their library
		Exports/Saves	Number of times an artifact citation has been exported to bibliographic tool Number of times an artifact's citation has been saved/emailed/printed
Mentions	Mentions indicate that people are engaging with the research.	Blog Mentions	Number of blog posts written about the artifact
		Comments	Number of comments made about an artifact

		News Mentions	Number of news articles written about the artifact
Social media	Social Media can help measure the interest for an article.	Likes	Number of times an artifact has been liked
		Shares, Likes & Comments	Number of times a link was shared, liked or commented on
		Tweets	Number of tweets and retweets that mention the artifact

In the last paragraph on Pg 19, I would include the citation
Ann Thorac Surg. 2020 Jun 3;S0003-4975(20)30860-2.
Does Tweeting Improve Citations? One-Year Results From the TSSMN Prospective Randomized Trial
Jessica GY Luc, Michael A Archer, Rakesh C Arora, Edward M Bender, Arie Blitz, David T Cooke, Tamara Ni Hlci, Biniam Kidane, Maral Ouzounian, Thomas K Varghese Jr, Mara B Antonoff
PMID: 32504611 DOI: 10.1016/j.athoracsur.2020.04.065
which concludes that tweeting (one form of social media/altmetrics use) does, in fact, increase citation counts over time.

We have added this to our discussion.

"In a variety of fields, individuals have evaluated impact using bibliometrics and altmetrics to determine research interests of the members of the public and of the scientific community.[3-7] In 2018, Powell et al. compared the altmetric score and bibliometric data of the 100 most cited articles in surgery and found, similar to our study, that bibliometric and altmetric analyses provide important but different perspectives on article impact.[7] Altmetrics offered the unique advantage of timely assessment of articles generating discussions online and positively correlated with citation numbers.[7] In 2018, Banshal et al. compared the top 100 Altmetric papers and the top 100 cited papers and found minimal overlap between these.[6] The authors suggested that it was unlikely that one assessment tool predicts the other. The authors concluded that altmetric score provided additional rather than duplicate information to citation scores. In 2019, Azer and Azer found no correlation between the number of citations and the altmetric scores for top-cited articles in medical professionalism; though, for articles published after 2007, the authors found a significant correlation between number of citations and altmetric scores.[8] In contrast, in 2020, Luc et al. found that tweeting significantly increased citations numbers over time.[18] The relationship between altmetric and bibliometric measures thus remains controversial.[9,10] Because of the debatable correlation between altmetrics and article citations, some authors had cautioned the use of altmetrics as a measure of impact.[11,19] Rather, we suggest that altmetrics should be viewed as complementary to existing tools to measure impact."

General:
Use consistent fonts throughout the paper—this kept on changing.

We have used Times 12 pts throughout the manuscript.

Table 2 under Captures--should read "Captures can be linked.."

Thank you. This has been modified.
Table 2 now reads “Measure indicating that the individual wants to return to the work.
Captures can be linked to future citations.”

Pg 18, Line 55 "were citated less frequently..." should be "were cited less frequently..."
Pg 19, Line 2 "were similarly citated compared to..." should be "were similarly cited compared to..."

Thank you. These have been modified.

VERSION 2 – REVIEW

REVIEWER	Professor Samy Azer King Said University, Saudi Arabia
REVIEW RETURNED	01-Sep-2020

GENERAL COMMENTS	Thank you for submitting an amended version of the manuscript. The authors have addressed issues and questions raised by the reviewer. The amended version is suitable for publication in BMJ Open.

REVIEWER	Arfon G Powell Cardiff University Cardiff, Wales
REVIEW RETURNED	15-Sep-2020

GENERAL COMMENTS	The reviewers have addressed the comments made by the reviewers. Thank you for the invitation to review.

REVIEWER	Elizabeth C. Whipple Ruth Lilly Medical Library Indiana University School of Medicine USA
REVIEW RETURNED	02-Sep-2020

GENERAL COMMENTS	All of my comments have been addressed adequately by the authors. I look forward to seeing this article published.