

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

TITLE (PROVISIONAL)	Publicly available apps for Cancer Survivors: a scoping review
AUTHORS	Adam, Rosalind; McMichael, Drew; Powell, Daniel; Murchie, Peter

VERSION 1 – REVIEW

REVIEWER	Harriet Teare University of Oxford, UK Ethics committee (Paid consultant) for Raremark Ltd
REVIEW RETURNED	30-Jul-2019

GENERAL COMMENTS	<p>The paper was very clearly set out, with good discussion of the process and conclusions. It is a very timely area of research, in a growing field of health apps.</p> <p>It would be useful for the table describing the different apps to be separated between the google apps and the apple store, to demonstrate more clearly any differences between the two providers.</p> <p>In the conclusion the authors discuss their recommendations for 'the 5 d's' - the paper would greatly benefit from more detail on how these have been drawn up, based on the results and analysis of the project, and how the authors think they might be useful in the future. There wasn't a clear enough connection between these recommendations and the paper findings - if they could add a bit more of an explanation on this thinking that would be very beneficial. It would also be interesting to include more discussion around their thoughts on the responsibilities of providers to review the quality of the apps to which they provide access - given all the discussions around social responsibility for companies such as facebook, what, if any, role do apple and google have in managing quality and ensuring patients aren't being misled?</p>
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REVIEWER	Anna Roberts University College London, UK
REVIEW RETURNED	31-Jul-2019

GENERAL COMMENTS	<p>This manuscript describes a scoping review of the types of apps that are publicly available for people affected by cancer. I read the paper with great interest and it is a novel, timely and valuable contribution to the literature. The manuscript was very well written and details a transparent description of the methods and results. I only have a couple of minor suggestions, but believe the paper should be accepted for publication in this journal:</p> <p>1) I think there could be a typo in the results section of the abstract - is concerns meant to read companies?</p>
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	<p>2) I might consider rephrasing "cancer is increasingly becoming a chronic disease" in the Intro? I understand the point you're making but it might be worth saying that cancer is increasingly being regarded as a chronic disease due to.....</p> <p>3) please can you provide a reference for the the second half of the first sentence in the second paragraph of introduction (estimated 318000 health apps available in 2018)?</p> <p>4) It might be worth clarifying that the app descriptions were the only thing used to determine eligibility in the inclusion/exclusion criteria section of the methods</p>
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REVIEWER	Deborah Vollmer Dahlke Texas A&M Center for Population Health and Aging USA
REVIEW RETURNED	12-Aug-2019

GENERAL COMMENTS	<p>This is an extremely well conceived study of an emerging and rapidly changing area of cancer patient self care and management. The authors scoping review of apps for cancer survivors was thorough and insightful. I found very little that I would suggest changing or editing. I did have one minor concern regarding the "5Ds" in the conclusion. I suggest the authors determine a number or a range of app downloads as a discussion criteria. Suggesting that 'lots of other people have downloaded an app is a bit vague. Also, while reviews may be helpful, they can also be false or purposefully misleading.</p>
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VERSION 1 – AUTHOR RESPONSE

REVIEWER ONE

Comment: The paper was very clearly set out, with good discussion of the process and conclusions. It is a very timely area of research, in a growing field of health apps.

Response: Thank you.

Comment: It would be useful for the table describing the different apps to be separated between the google apps and the apple store, to demonstrate more clearly any differences between the two providers.

Response: Thank you for this suggestion. Most apps (66/151) were available on both platforms. We have now added two additional columns to Table 1 to describe apps that were unique to Apple or Google stores, respectively.

Comment: In the conclusion the authors discuss their recommendations for 'the 5 d's' - the paper would greatly benefit from more detail on how these have been drawn up, based on the results and analysis of the project, and how the authors think they might be useful in the future. There wasn't a clear enough connection between these recommendations and the paper findings - if they could add a bit more of an explanation on this thinking that would be very beneficial. It would also be interesting to include more discussion around their thoughts on the responsibilities of providers to review the quality of the apps to which they provide access - given all the discussions around social responsibility for companies such as Facebook, what, if any, role do apple and google have in managing quality and ensuring patients aren't being misled?

Response: We have reflected on the five D's and have moved them from the Conclusion section to the Discussion section. We have justified them more clearly and have also revised them based on comments from Reviewer three (removing "Downloads"). We have added a paragraph to our discussion about responsibilities of technology providers, along with references to current media debate around social responsibility for technology companies. The following text has been added to our discussion section:

"The app market is a potentially challenging environment for patients and clinicians to navigate in terms of judging app quality, effectiveness, clinical utility, and data privacy. It may be that app stores themselves should be asked to take more responsibility for the content of the apps they offer. Several high-profile scandals, for example, Cambridge Analytica allegedly using Facebook data to influence election results,(44) and suicides potentially linked to social media use (45), have led to increased public scrutiny surrounding the social responsibilities of technology providers. With respect to app stores, existing legislation, such as trading standards regulations that prevent false or misleading advertising, and General Data Protection Regulation (GDPR) might be enforced to protect consumers. The NHS has also started a library of approved apps that have been screened against quality criteria (46). Three of the apps reviewed here, BECCA – the Breast Cancer Care app, OWISE breast cancer, and Untire: Beating cancer fatigue, appear in the library.

While app stores continue to offer low quality and potentially exploitative apps, we propose a rudimentary check-list (Text box one), the "Four D's", which might be used by patients before downloading a health app. The checklist was derived pragmatically, based on our experiences of conducting this review, and on the existing literature/guidelines discussed above (33,35,38,39).

Text Box one: Four D's to discuss with patients if they are considering using a health app

Intuitively, we considered a fifth "D" – Downloads, in which the number of downloads and positive/detailed consumer reviews might serve as an indicator of quality and trustworthiness. Apps by reputable organisations tended to be highly downloaded, but we also found highly downloaded apps which seemed to be of low quality e.g. Cancer Curing Foods, offering "top ten fruits, vegetables, and foods that can cure cancer" has been downloaded over 10,000 times. We also considered that some app reviews could be false or purposefully misleading. The association between number of downloads and objective measures of quality deserve further attention. "

REVIEWER TWO

Comment: This manuscript describes a scoping review of the types of apps that are publicly available for people affected by cancer. I read the paper with great interest and it is a novel, timely and valuable contribution to the literature. The manuscript was very well written and details a transparent description of the methods and results. I only have a couple of minor suggestions, but believe the paper should be accepted for publication in this journal.

Response: Thank you

Comment: I think there could be a typo in the results section of the abstract - is concerns meant to read companies?

Response: We meant "concern" to be used in terms of a business or commercial interest – some commercial developers seemed to be companies, some "limited" organisations, and others were private individuals with a commercial interest. We have changed the wording to "commercial companies/private individuals".

Comment: I might consider rephrasing "cancer is increasingly becoming a chronic disease" in the Intro? I understand the point you're making but it might be worth saying that cancer is increasingly being regarded as a chronic disease due to.....

Response: Thank you for this suggestion. We have amended the sentence as follows:

Cancer is increasingly becoming being regarded as a chronic disease due to. the growing number of individuals who are living with cancer, or surviving cancer (3) with long-term symptoms (4) and late effects of cancer treatment (5).

Comment: Please can you provide a reference for the second half of the first sentence in the second paragraph of introduction (estimated 318000 health apps available in 2018)?

Response: We have added the reference, and whilst doing so noted that this statistic actually related to the year 2017. We have amended this in the text.

Comment: It might be worth clarifying that the app descriptions were the only thing used to determine eligibility in the inclusion/exclusion criteria section of the methods

Response: Thank you. The "inclusion and exclusion criteria" of the methods section has been amended as follows:

"Eligibility was determined from the descriptions of the apps within the app stores. Descriptions of the final apps selected for inclusion were reviewed by a second author (DM) to ensure that apps met the eligibility criteria."

REVIEWER 3

Comment: This is an extremely well conceived study of an emerging and rapidly changing area of cancer patient self care and management. The authors scoping review of apps for cancer survivors was thorough and insightful. I found very little that I would suggest changing or editing.

Response: Thank you.

Comment: I did have one minor concern regarding the ?5Ds? in the conclusion. I suggest the authors determine a number or a range of app downloads as a discussion criteria. Suggesting that ?lots of other people have downloaded an app is a bit vague. Also, while reviews may be helpful, they can also be false or purposefully misleading..

Response: This is a very valid point. All authors met and discussed our rudimentary checklist, and noted that at least one of the apps that we reviewed had been downloaded over 10,000 times on Google Play, but was of questionable quality. We have removed "Downloads" from our checklist, but raise it as a discussion point (see response to reviewer one, above).

VERSION 2 – REVIEW

REVIEWER	Harriet Teare University of Oxford, UK Ethics committee (Paid consultant) for Raremark Ltd
REVIEW RETURNED	29-Aug-2019
GENERAL COMMENTS	The authors have responded to the comments, and these amendments help to deliver a clearer description of the findings of the project. One small amendment would be to add to the 'Data'

	statement in the '4 Ds' box, as advice for app users, 'the app includes a transparent description of how data will be used and shared'.
REVIEWER	Anna Roberts UCL
REVIEW RETURNED	23-Aug-2019
GENERAL COMMENTS	The authors have adequately addressed the reviewer comments and I feel the manuscript should now be accepted for publication.

VERSION 2 – AUTHOR RESPONSE

RESPONSES

Reviewer one: The authors have responded to the comments, and these amendments help to deliver a clearer description of the findings of the project. One small amendment would be to add to the 'Data' statement in the '4 Ds' box, as advice for app users, 'the app includes a transparent description of how data will be used and shared'.

Response: I have amended the “Four D’s” text box as follows:

<p><u>Does something useful</u> – does it solve a problem you are having?</p> <p><u>Design</u> – are there screenshots that summarise the content and give you an impression of how you would use the app?</p> <p><u>Developer</u> – do you recognise a credible organisation/source behind the app, and do links to the developer website work?</p> <p><u>Data</u> – does the app ask you for personal information that you would prefer not to be shared with others or provide safeguards to keep your information private transparent description of how data will be used and shared?</p>
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Reviewer two

Comment: The authors have adequately addressed the reviewer comments and I feel the manuscript should now be accepted for publication.

Response: Thank you

VERSION 3 – REVIEW

REVIEWER	Harriet Teare University of Oxford, UK Ethics committee (paid consultant) for Raremark
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REVIEW RETURNED	10-Sep-2019
GENERAL COMMENTS	no further comments