

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) | Better evidence: A Prospective Cohort Study Assessing the utility of an Evidence-Based Clinical Resource at the University of Rwanda |
| AUTHORS | Valtis, Yannis; Rosenberg, Julie; Wachter, Keri; Kisenge, Rodrick; Mashili, Fredrick; Chande Mallya, Rehema; Walker, Timothy; Kabakambira, J. Damascene; Egide, Abahuje; Ntacyabukura, Blaise; Weintraub, Rebecca |

VERSION 1 – REVIEW

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| REVIEWER | Patrick Archambault Université Laval, Quebec City, Quebec, Canada |
| REVIEW RETURNED | 12-Nov-2018 |

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| GENERAL COMMENTS | <p>I would like to thank the authors of this paper to have allowed me to review their important work. I congratulate them for trying to answer an important question: does providing free access to an evidence-based resource (UpToDate) increase knowledge of graduating students in a LMIC?</p> <p>The authors present results showing that graduating students performed better after having access to UpToDate.</p> <p>Major comments:</p> <p>1) In the patient engagement section: Patients may not be the subject of this study, but they are the main beneficiaries of better care, so in this sense a patient partner could have been included in the planning of this study as a patient partner. This being said, I understand the constraints having a patient partner involved in such a difficult study setting. I think the authors could simply state that given the difficult study setting in a LMIC, that it was not feasible to include a patient partner for this study. Future studies could involve patients as partners to help identify outcomes that matter to them the most.</p> <p>2- It would be interesting somewhere in this text to explain how much an internet connection costs in Rwanda? Is high speed internet available? Is only mobile phone access to the internet available? What are the prevalences of different types of access. How much do these different accesses cost?</p> <p>3- What explains the low one-year annual student evaluation (52%)?</p> <p>4- There is no discussion about the ethical issues related to giving free access for 5 years and then removing this access. I suppose</p> |
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| | <p>that free access was not for life? What happened after removing the 5-year free access? Do you have statistics about the number of students who decided to renew their subscription? Has Wolters Kluwer offered a prolonged free access to UpToDate? Giving these positive results, how do the authors foresee things moving forward? Is it ethical to have created the habit to access UpToDate and later removing it? Does this not create more harm and angst among the health professionals who did have access and now don't have the means to access it? I think this discussion should be added to the text.</p> <p>5- Why did the authors not attempt to use an interrupted time series design to analyse impact of giving access? They seem to report in Figure 4 enough time points before the intervention to perform an ITS analysis. Perhaps there are not enough time points after the intervention ? (ie only two years of data collected since introducing UpToDate). If an ITS is not possible, I would however like the authors to discuss the apparent trend for student performance to be increasing in the years 2012-2016 even before introduction of the free access to UpToDate in 2015. What can explain this? Could this explain the better results post intervention? Moreover, there is a drop in performance scores between 2016 and 2017. How do the authors interpret this variation?</p> <p>Minor comments:</p> <p>1- There seems to be a missing word in the sentence in lines 40-41: Our findings align with observations from a 2016 in (...): perhaps write "from a 2016 study in (...)"?</p> |
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| REVIEWER | Dragan Ilic Monash University, Australia |
| REVIEW RETURNED | 06-Feb-2019 |

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| GENERAL COMMENTS | <p>The authors have reported on an important topic, examining the utility of an evidence-based clinical resources in low-middle income countries. Cost is a significant barrier to the use of such resources – findings from this study will assist furthering knowledge on the topic and potential impact of such resources in practice.</p> <p>The following points are intended to further strengthen the paper; Introduction</p> <ol style="list-style-type: none"> 1. The last sentence of the first paragraph states that clinicians who have not developed EBP skills are at a disadvantage, as are their patients. Is there any references to support this sentence? Do clinicians with lower levels of competency in EBP perform worse than those with higher levels of competency? 2. Paragraph 2 reports data from a 2011 report regarding infrastructure and number of qualified health practitioners in the region. Given that this is an eight-year-old reference, is there more recent data? One could argue that considerable changes could take place during this period. 3. The second last paragraph the authors state – ‘We hypothesize that better access to better evidence could improve the knowledge base... increase perceptions of self-efficacy etc...’ Is this a hypothesis of this article, previous work? Has this been tested? 4. The last paragraph states - ‘We postulated that medical school is the optimal moment to introduce EBCRs to LMIC...’ Is this the aim of the study? If so, I’m not sure that the results support this |
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| | <p>aim. If so, then further longer term data on final year performance and that of faculty should be explored.</p> <p>Methods</p> <ol style="list-style-type: none"> 1. Both students and faculty members were invited to the study. The authors state that faculty included residents – what other roles were represented by the faculty group? 2. In the evaluation section – students were asked to complete an online baseline survey. How was this facilitated? Does participation impact upon those who where not able to easily access an online instrument? 3. An anonymized dataset of all student grades was used. Was any linkage of exam performance to use of EBCR use linked? This would significantly strengthen the results <p>Results</p> <ol style="list-style-type: none"> 1. What was the distribution of faculty members participating in the study? 2. The authors report that a student in 2017 scoring 68 would rank in the 16th percentile, whilst a student scoring 75 would rank in the 66th percentile. How does this relate to the study? 3. Was student access of material linked with better performance on specific aspects of the exam e.g. internal medicine, surgery etc... |
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VERSION 1 – AUTHOR RESPONSE

Reviewer(s)' Comments to Author:

Reviewer: 1

Reviewer Name: Patrick Archambault

Institution and Country: Université Laval, Quebec City, Quebec, Canada

Please state any competing interests or state 'None declared': No competing interests.

Please leave your comments for the authors below I would like to thank the authors of this paper to have allowed me to review their important work. I congratulate them for trying to answer an important question: does providing free access to an evidence-based resource (UpToDate) increase knowledge of graduating students in a LMIC?

The authors present results showing that graduating students performed better after having access to UpToDate.

Major comments:

1) In the patient engagement section: Patients may not be the subject of this study, but they are the main beneficiaries of better care, so in this sense a patient partner could have been included in the planning of this study as a patient partner. This being said, I understand the constraints having a patient partner involved in such a difficult study setting. I think the authors could simply state that given the difficult study setting in a LMIC, that it was not feasible to include a patient partner for this study. Future studies could involve patients as partners to help identify outcomes that matter to them the most.

We have included the suggested statement.

2- It would be interesting somewhere in this text to explain how much an internet connection costs in Rwanda? Is high speed internet available? Is only mobile phone access to the internet available? What are the prevalences of different types of access. How much do these different accesses cost?

At the time the study was conducted, there was no available wireless internet in most of the UR educational of hospital spaces. Mobile internet was the predominant modality of student access to the internet. The price of mobile internet has been added to the introduction (page 5).

3- What explains the low one-year annual student evaluation (52%)?

The low response rates could be attributed to lack of positive incentives to complete the survey or to students not checking their email to see that the evaluation survey was due. This statement has been added to page 9 of the Results.

4- There is no discussion about the ethical issues related to giving free access for 5 years and then removing this access. I suppose that free access was not for life? What happened after removing the 5-year free access? Do you have statistics about the number of students who decided to renew their subscription? Has Wolters Kluwer offered a prolonged free access to UpToDate? Giving these positive results, how do the authors foresee things moving forward? Is it ethical to have created the habit to access UpToDate and later removing it? Does this not create more harm and angst among the health professionals who did have access and now don't have the means to access it? I think this discussion should be added to the text.

All participants in the study will be eligible for an annually renewable, indefinite subscription to UpToDate after the completion of the study. This statement has been added to Methods in page 7.

We do not yet have statistics about the number of students who choose to renew the subscription at the end of the 5 year study period, as the study began in 2015.

The application link can be found here: <https://www.globalhealthdelivery.org/uptodate>.

5- Why did the authors not attempt to use an interrupted time series design to analyse impact of giving access? They seem to report in Figure 4 enough time points before the intervention to perform an ITS analysis. Perhaps there are not enough time points after the intervention ? (ie only two years of data collected since introducing UpToDate). If an ITS is not possible, I would however like the authors to discuss the apparent trend for student performance to be increasing in the years 2012-2016 even before introduction of the free access to UpToDate in 2015. What can explain this? Could this explain the better results post intervention? Moreover, there is a drop in performance scores between 2016 and 2017. How do the authors interpret this variation?

We agree with the comment that the validity of an ITS would be seriously limited by the fact that we only have two post-intervention data points (2016 and 2017).

The following statement has been added to page 12: The cause of the overall increase in student scores before UpToDate was introduced is unclear and could be related to improving educational methods or easier examinations, although we do not have concrete proof for either of those. In addition, the cause of the fall of students scores from 2016 to 2017 is unknown, and could be statistically random or indicative of a trend. Further follow up will be required to answer this question.

Minor comments:

- 1- There seems to be a missing word in the sentence in lines 40-41: Our findings align with observations from a 2016 in (...): perhaps write "from a 2016 study in (...)"?

The word "study" has been added.

Reviewer: 2

Reviewer Name: Dragan Ilic

Institution and Country: Monash University, Australia

Please state any competing interests or state 'None declared': None declared

Please leave your comments for the authors below The authors have reported on an important topic, examining the utility of an evidence-based clinical resources in low-middle income countries. Cost is a significant barrier to the use of such resources – findings from this study will assist furthering knowledge on the topic and potential impact of such resources in practice.

The following points are intended to further strengthen the paper; Introduction

1. The last sentence of the first paragraph states that clinicians who have not developed EBP skills are at a disadvantage, as are their patients. Is there any references to support this sentence? Do clinicians with lower levels of competency in EBP perform worse than those with higher levels of competency?

Three references have been added after this statement. Reference 5 shows improvement of diagnostic errors with use of UpToDate. Reference 9 shows that clinicians who use EBP perform better on standardized medical examinations. Reference 10 shows that hospitals that subscribe to EBP have lower mortality rates, after controlling for several confounders.

2. Paragraph 2 reports data from a 2011 report regarding infrastructure and number of qualified health practitioners in the region. Given that this is an eight-year-old reference, is there more recent data? One could argue that considerable changes could take place during this period.

I was unable to find a more recent paper addressing this question. I agree that there could be substantial changes, which is why more research in this area is important.

3. The second last paragraph the authors state – ‘We hypothesize that better access to better evidence could improve the knowledge base... increase perceptions of self-efficacy etc...’ Is this a hypothesis of this article, previous work? Has this been tested?

This is the hypothesis motivating our overall work. I have replaced “hypothesize” with “believe” to avoid confusion. I have also specified the hypothesis of this article in the last paragraph.

4. The last paragraph states - ‘We postulated that medical school is the optimal moment to introduce EBCRs to LMIC...’ Is this the aim of the study? If so, I’m not sure that the results support this aim. If so, then further longer term data on final year performance and that of faculty should be explored.

This paragraph has been reframed to more clearly state the motivating beliefs, as well as the hypothesis being tested in this paper.

The following sentence has been added to clearly state the hypothesis of this paper: In this article, we hypothesized that removing the cost barrier to accessing EBCR will lead to high student uptake and possibly lead to an improvement in educational outcomes.

Methods

1. Both students and faculty members were invited to the study. The authors state that faculty included residents – what other roles were represented by the faculty group?

Staff physicians. This has been added to the text in page 7.

2. In the evaluation section – students were asked to complete an online baseline survey. How was this facilitated? Does participation impact upon those who where not able to easily access an online instrument?

All students were emailed the baseline survey to email addresses that they provided to the university. As discussed in the limitations section, “It is possible that students with regular access to email were more likely to respond to our email-based invitation, thus biasing the response set, especially with respect to use of electronic resources and internet access”

3. An anonymized dataset of all student grades was used. Was any linkage of exam performance to use of EBCR use linked? This would significantly strengthen the results

Our dataset allowed for linkage of exam performance to use of EBCRs. We are hoping to obtain the exams and understand whether students who viewed certain topics on the EBCR were more likely to answer exam questions correctly. This will likely require additional ethical approvals and is therefore a future project.

Results

1. What was the distribution of faculty members participating in the study?

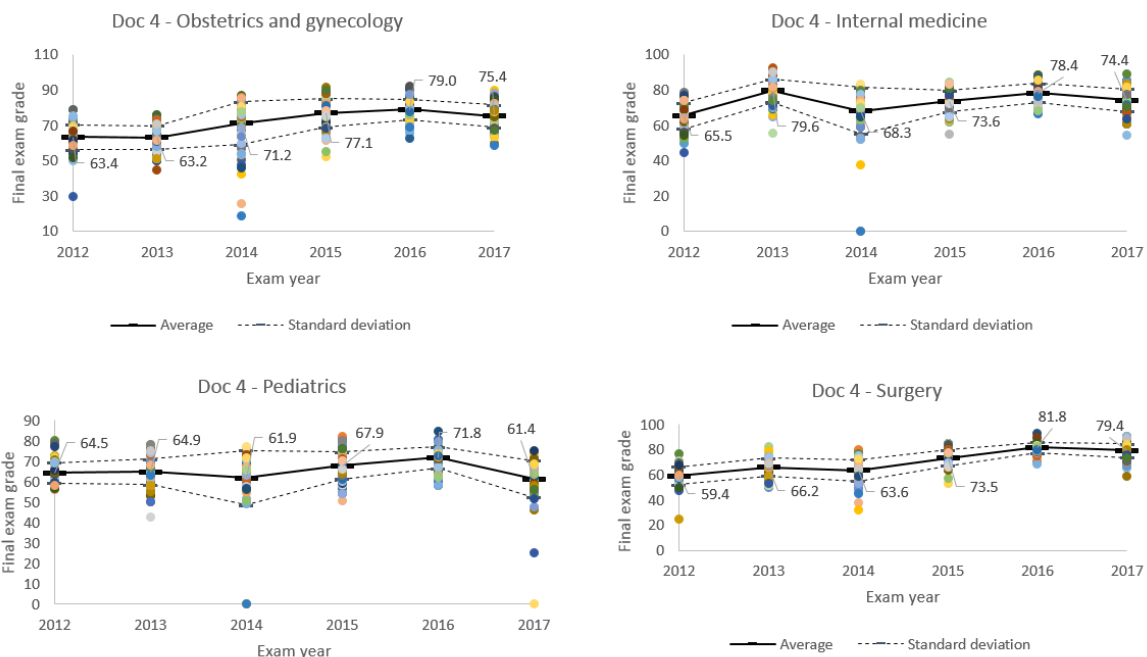
To protect confidentiality and limit the possibility that individual faculty members would be penalized for not enrolling in this study (that was sponsored by senior faculty at UR), we did not collect any demographic information on faculty members.

2. The authors report that a student in 2017 scoring 68 would rank in the 16th percentile, whilst a student scoring 75 would rank in the 66th percentile. How does this relate to the study?

We reported this to help the reader understand the significance of the raw scores.

3. Was student access of material linked with better performance on specific aspects of the exam e.g. internal medicine, surgery etc...

The individual performance on specific aspects of the exam is plotted below. We do not feel that there is a meaningful hypothesis we can make about the differences in these plots, so we have reported the aggregate data in the paper.



Source: Valtis et al., unpublished data. Final Doc 4 grade for each students represents a non-weighted average of their final year written and clinical examinations in each subject. n = 509 Doc 4 students

FORMATTING AMENDMENTS (if any)

Required amendments will be listed here; please include these changes in your revised version:

1. Please re-upload your supplementary files in PDF format.

Done.

2. You have cited Supplementary Appendix 1 rights after Supplementary Appendix 4 which makes your citations incorrect. Please review again your main document and ensure that all Supplementary Appendix will be cited and will appear in numerical order.

Done.

VERSION 2 – REVIEW

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| REVIEWER | Patrick Archambault Université Laval |
| REVIEW RETURNED | 24-Mar-2019 |

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| GENERAL COMMENTS | <p>I thank the authors for allowing me to review this paper again.</p> <p>The remaining issue I think should be better discussed is about the ethics of removing free access to UpToDate after the 5 year period. What is the potential negative impact of giving a free resource for 5 years and then removing it? Have the authors planned how much UpToDate will cost per year for this students? Will they be able to afford it in the future?</p> <p>Can the authors provide more insight into this issue? Has UpToDate considered giving free access to UpToDate for a longer period?</p> |
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| REVIEWER | Dragan Ilic Monash University, Australia |
| REVIEW RETURNED | 01-Apr-2019 |

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| GENERAL COMMENTS | <p>Thank you to the authors for amending their transcript as per the original reviewer comments. I believe the the manuscript is reads better in it current form, with queries appropriately addressed. No further suggestions for any changes.</p> |
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VERSION 2 – AUTHOR RESPONSE

Thank you so much for reviewing our paper again and for providing thoughtful and helpful comments. Reviewer 1 made the following comment:

The remaining issue I think should be better discussed is about the ethics of removing free access to UpToDate after the 5 year period. What is the potential negative impact of giving a free resource for 5 years and then removing it? Have the authors planned how much UpToDate will cost per year for this students? Will they be able to afford it in the future? Can the authors provide more insight into this issue? Has UpToDate considered giving free access to UpToDate for a longer period?

Our response is below:

All study subjects will be eligible for getting free UpToDate access after the 5 years of the study through a donation program that UpToDate has created for all medical doctors practicing in resource limited settings. This donation program is available to any medical provider in a low and middle income country and gives free, unlimited access to UpToDate without a time limit. Donations have to be renewed annually. Hence, all study subjects will be able to get free UpToDate access after this study concludes, for as long as they practice medicine in a resource limited setting. The donation program details can be found here: <https://www.globalhealthdelivery.org/uptodate/apply>.

We have added additional detail to the text of the manuscript to clarify that all study subjects will be able to continue accessing UpToDate for free after the conclusion of the study.