PEER REVIEW HISTORY

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ARTICLE DETAILS

TITLE (PROVISIONAL)	'Our Care through Our Eyes'. Impact of a co-produced digital education programme on nurses' knowledge, confidence and attitudes in providing care for children and young people who have self-harmed: a mixed-methods study in the UK
AUTHORS	Manning, Joseph; Carter, Tim; Latif, Asam; Horsley, Angela; Cooper, Joanne; Armstrong, Marie; Crew, Jamie; Wood, Damian; Callaghan, Patrick; Wharrad, Heather

VERSION 1 - REVIEW

REVIEWER	Karen Cleaver University of Greenwich UK
REVIEW RETURNED	12-Nov-2016

GENERAL COMMENTS	This is an interesting and well written paper which I consider worthy of publication, drawing attention as it does to a comparatively under researched group of nurses and their education and training needs in respect of self-harm. Abstract It would help if earlier in the abstract the nature of the intervention was mentioned- i would put intervention before participants. Introduction Data about hospital presentation is dated (ref 4 & 5) - see Carroll, R., Metcalfe, C., & Gunnell, D. (2014). Hospital presenting self-harm and risk of fatal and non-fatal repetition: systematic review and meta-analysis. PloS one, 9(2), e8994 for more up to date picture. The studies referred to in relation to children's nurses (10 - 12) are not specific to self-harm, rather young people with mental health problems generally, self-harm being one of the presentations, so you could be clearer as to why self-harm was chosen, probably as this is the most common presentation encountered by children's nurses? The introduction is very brief, and for an international audience they may not realise that, unlike other countries, children's nurses in the UK are trained as such at a pre-registration level, whereas in many countries it is a post-qualifying specialty. so I would suggest some further contextual information on children's nurses and their education , given they are your sample. It would be useful to re-state the purpose/aims of the RLO's and intended learning outcomes - did the data indicate these were met? (was this measured?)

	In relation to the methods, some details re the interviews is warranted. were they structured or semi-strucutred, assume the latter given the generation of codes etc. What topics did the interview address? It would also be useful to have more information on the interview sample in terms of length of experience as this has been found in a number of studies to have an effect on attitudes amongst nurses. Nurses with more than 16 years experience tend to have more negative attitudes. Overall the discussion section could summarise more clearly attitudes found pre-intervention, important because as you point out, to date little empirical work has measured attitudes of CYP nurses working in acute paediatric wards. To this end it would be useful to make some comparisons to other studies, although possibly word count precludes this.

REVIEWER	Keith Hawton University of Oxford
REVIEW RETURNED	23-Nov-2016

GENERAL COMMENTS	**Manuscript ID bmjopen-2016-014750 "'Our Care through Our Eyes'. Impact of a co-produced digital education programme on nurses' knowledge, confidence and attitudes in providing care for children and young people who have self-harmed: a mixed-methods, uncontrolled, pre and post intervention study"** This paper reports on an important topic, namely, efforts to try to improve the care of young people who self-harm through providing training to nursing staff who are likely to see such individuals when they present to hospitals. However, the report requires considerable modification before it is suitable for publication. **Major comments** 1. I think that the interpretations of the findings are far too positive, especially as they are based on an uncontrolled study. There was a relatively low participation rate. Some of the apparent changes in the measures which, although statistically significant, appeared relatively small. 2. There is a surprising lack of reference to the self-harm guidance from NICE. 3. There are no actual behavioural measures relating to outcome. While this might not have been possible in this study, this should be highlighted. This is a general weakness in studies of this kind, in that it is not known if apparent changes in knowledge, confidence etc. lead to actual changes in behaviour towards patients. 4. There needs to be more detailed reporting of the recruitment procedure to both parts of the study. 5. In reporting attitudes the authors should give a clear indication of what specific items the overall measures of effectiveness, negativity and worry include. 6. The reporting of the qualitative findings in pages12-20 seems to

	be over-extensive in relation to the size of this part of the work. After all, the amount of data involved is less than two hours of interview material. Also, I am not sure that Table 6 is needed – the content could be summarised in the text. 7. In discussing the generalisability of the findings on page 22 I believe the authors overstate the extent of representitiveness of the sample, when only a third of potential participants were recruited and the intervention may have been delivered to those who had most interest in this particular group of patients. The authors ought to emphasise the need for a future controlled trial in order to test the extent to which the intervention is truly effective. **Minor comments** Page 3 Line 11 CYP should be indicated in full before the abbreviation. Primary outcome measures – I think that it is unusual to include references in an Abstract . Page 4 Results - an indication of the effect sizes should be provided here. Page 4 Line 6 I don't think that the statement that the 'majority' of people who self-harm are aged 11 to 25 years' is correct – I would stick to the second part of the sentence. Page 7 Line 26 Isn't it unusual that consent to participation is implied through completion of a questionnaire? Intervention – I don't think this section gives the reader a clear idea of the actual content of the training. Page 9 I suggest that the full self-report questionnaire is included as an on-line supplement. Page 10 Sensitivity analysis – I think that in general the point about sensitivity analyses needs to be clarified to indicate that the authors are comparing those who completed the intervention with those who did not. This is also relevant to the reporting of the findings on pages 11 and 12, where I think the nature of the sensitivity analyses needs to be indicated each time so that this is clear to the reader. Page 11 Line 18 45% is not "the majority". Line 53 does a reduction in "self-efficacy" imply a negative effect? Page 12 Lines 5 – 6 the sentence is incomplete.

	Line 16 “on” should be “of”. Line 25 “the” should be inserted before “median score”. Page 14 Lines 15-17 This sentence is badly written. Lines 21-23 This sentence is unclear. Page 20 Lines 22 -24 This sentence is unclear. Page 21 Lines 25-29 It is important that the authors do not give the impression that behavioural change would definitely result from the intervention as this was not measured. Lines 40-46 The authors should be more cautious as only a minority of potential participants took up the intervention. Page 22 Lines 27-29 This sentence is incomplete. Page 23 Line 6 the content of this sentence is too positive, whereas the following sentence is better.

VERSION 1 – AUTHOR RESPONSE

Dr Karen Cleaver
1. Abstract
It would help if earlier in the abstract the nature of the intervention was mentioned - i would put intervention before participants.

Author’s response:
Intervention section moved before Participants section in the abstract

2. Data about hospital presentation is dated (ref 4 & 5) - see Carroll, R., Metcalfe, C., & Gunnell, D. (2014). Hospital presenting self-harm and risk of fatal and non-fatal repetition: systematic review and meta-analysis. PloS one, 9(2), e8994 for more up to date picture.

Author’s response:
Sentence revised to incorporate new citation: Self-harm is one of the most frequent reasons for emergency hospital admission.1 Children and young people (CYP) aged 11 and 25 years have more hospital presentations for self-harm than any other age group2.

3. The studies referred to in relation to children's nurses (10 - 12) are not specific to self-harm, rather young people with mental health problems generally, self-harm being one of the presentations, so you could be clearer as to why self-harm was chosen, probably as this is the most common presentation encountered by children's nurses?

Author’s response:
Sentence revised to make point clearer: Previous qualitative research has identified that registered children’s nurses feel they lacked essential skills in effectively communicating with CYP with general

mental health conditions, rendering them powerless and feeling unable to care for them in a confident and safe manner 7-9.

Sentence added to provide rationale for why self-harm focus of intervention: Given that CYP presenting with self-harm is the most common mental health presentation encountered by children's nurses it seems prudent that this should be the focus of any educational intervention.

4. The introduction is very brief, and for an international audience they may not realise that, unlike other countries, children's nurses in the UK are trained as such at a pre-registration level, whereas in many countries it is a post-qualifying specialty. So I would suggest some further contextual information on children's nurses and their education, given they are your sample.

Author's response:
We have purposefully kept the introduction and background brief as we did not want to duplicate information that was included in the study protocol, published in BMJ Open, and which is cited in the paper. However we do take on board the deficit of information pertaining to how children's nurses are trained in the UK context and therefore have included the following: In the UK, the majority of registered children's nurses are trained at a pre-registration and undergraduate level 7. This training pathway enables children's nursing students to exit a minimum of a three year undergraduate curricular and register as a children's nurse with the Nursing and Midwifery Council (UK). However, the specific content of this curriculum may vary according to higher education institution of study, including education in relation to caring for CYP in mental health crisis.

5. It would be useful to re-state the purpose/aims of the RLO's and intended learning outcomes - did the data indicate these were met? (Was this measured?)

Author's response:
The overall aim of this study was to evaluate whether a digital educational intervention (in its entirety) improved nurses' knowledge, confidence, attitudes and clinical behavioural intention in providing care for CYP admitted to hospital with self-harm. Therefore we did not measure specific outcomes pertaining to the learning objectives for each RLO. Instead, data relating to the psychometric outcomes (confidence, knowledge, self-efficacy, clinical behavioural intention) were collected. However, we have added the hyperlinks to the RLOs in our revision of the manuscript as the specific learning objective is narrated within each resource.

6. In relation to the methods, some details re the interviews is warranted. Were they structured or semi-structured, assume the latter given the generation of codes etc. What topics did the interview address? It would also be useful to have more information on the interview sample in terms of length of experience as this has been found in a number of studies to have an effect on attitudes amongst nurses. Nurses with more than 16 years' experience tend to have more negative attitudes.

Author's response
We have included more detail is provided in methods section: In an attempt to understand the immediate and wider context in which the digital education programme was employed, and the variation in any impact observed, semi-structured qualitative interviews were undertaken. As outlined by Mann, et al. 19 semi-structured interviews allow for an in-depth exploration of the impact that local structures and processes have upon the utilisation of interventions. Therefore, respondents of the post-intervention questionnaire were invited to take part in a face-to-face or telephone semi-structured interview. The interviews were conducted by experienced interviewers (JCM / TC) using an interview schedule (supplementary file 1).

When reporting the characteristics of the sample we have stated: All participants were female, worked

in either General Medical, Paediatric Critical Care, Medical short stay or 'other' clinical areas, their seniority ranged from Band 5 -7 on the NHS Agenda for Change banding, and years since qualifying ranged from 1 to 29 years (median 5 years).

7. Overall the discussion section could summarise more clearly attitudes found pre-intervention, important because as you point out, to date little empirical work has measured attitudes of CYP nurses working in acute paediatric wards. To this end it would be useful to make some comparisons to other studies, although possibly word count precludes this.

Author's response:
Due to the distinct paucity of contemporary empirical data pertaining to children's nurses' attitudes, knowledge and confidence in caring for CYP with self-harm we will present the analysis (regression) of the baseline data and a comprehensive discussion of this in another paper (currently being drafted).

Prof. Keith Hawton

Major comments

1. I think that the interpretations of the findings are far too positive, especially as they are based on an uncontrolled study. There was a relatively low participation rate. Some of the apparent changes in the measures which, although statistically significant, appeared relatively small.

Author's Response:
We have revised the manuscript to reflect these points and ensure that the assertions made align to the results in light of the study limitations. Furthermore, we have clearly identified these limitations by stating: Despite positive implications, the findings from this study need to be considered with caution. The sample was recruited from a single site and therefore may not be reflective of the wider population of registered children's nurses working in acute paediatric inpatient care. However, the sample did reflect over a third of the total number of registered children's nurses at the site and this is likely to be representative of the knowledge, attitudes and confidence of nurses at this site. Additionally, the lack of a control condition limits the ability to make strong claims regarding causation. However, sensitivity analysis suggests that those who completed the intervention improved to a greater extent across all outcomes and across more domains compared with equivalent analysis of the full sample. Therefore suggesting improvements in outcomes were associated with intervention engagement.

2. There is a surprising lack of reference to the self-harm guidance from NICE.

Author's Response:
Included the following in the background section: In line with national clinical guidance, it is recommended that following initial assessment and management in the Emergency Department, all CYP under the age of 16 years should be, 'admitted overnight to a paediatric ward and assessed fully the following day before discharge or further treatment and care is initiated' 4, p.29. However, NICE Clinical Guideline 16 reports that, 'The experience of care for people who self-harm is often unacceptable' 4, p.50.

3. There are no actual behavioural measures relating to outcome. While this might not have been possible in this study, this should be highlighted. This is a general weakness in studies of this kind, in that it is not known if apparent changes in knowledge, confidence etc. lead to actual changes in behaviour towards patients.

Author's Response:
This point has been recognised in the strengths and limitations section and states: A further limitation of this study is the lack of data being collected pertaining to the actual behavioural measures relating to CYP outcome. It is therefore not known if the apparent changes in knowledge, attitudes and confidence led to actual changes in behaviour towards patients and their outcomes of care.

4. There needs to be more detailed reporting of the recruitment procedure to both parts of the study.

Author's Response:
Additional detail has been added: A total of 251 registered children's nurses, from a single tertiary NHS trust, were invited to participate in the study. Eligible participants were identified by a locally held database and emailed inviting to participate from the Head Nurse for children and young peoples. The email contained an information sheet and invited registered children's nurses to complete the baseline online questionnaire which was made available for 4 weeks. Following this period, the digital educational intervention was made available to participants for 4 weeks, after which the post-intervention questionnaire was made available for 2 weeks. An invitation email to complete the post-intervention questionnaire was sent directly by the study team and sent to the participants who had completed the baseline questionnaire. Nurses who participated in the development of the digital educational intervention were excluded to avoid potential bias.

And: Therefore, respondents of the post-intervention questionnaire were invited to take part in a face-to-face or telephone semi-structured interview. Participants were contacted directly by the study team via email inviting them to participate in an interview, were provided with a written information sheet, and requested to contact the research team directly (via email or telephone) if interested in participating.

5. In reporting attitudes the authors should give a clear indication of what specific items the overall measures of effectiveness, negativity and worry include.

Author's Response:
Inserted the following text: The scale captures three factors of attitude; (1) "effectiveness" which is defined as a sense of personal effectiveness in managing self-harm); (2) "negativity" which is defined as negativity expressed towards patient or family; and (3) "worry" which is defined as concerns about being blamed or feeling personally responsible for these patients20. We have included the reference to the source paper which lists the 13 items included in the questionnaire. Furthermore, as requested we have included the full self-reported questionnaire used in this study as a supplementary file for the reader.

6. The reporting of the qualitative findings in pages12-20 seems to be over-extensive in relation to the size of this part of the work. After all, the amount of data involved is less than two hours of interview material. Also, I am not sure that Table 6 is needed – the content could be summarised in the text.

Author's Response:
The qualitative findings section has been revised substantially and reduced to 4 pages including qualitative data excerpts. Furthermore, Table 6 has been removed and narrated within the qualitative findings section.

7. In discussing the generalisability of the findings on page 22 I believe the authors overstate the extent of representativeness of the sample, when only a third of potential participants were recruited and the intervention may have been delivered to those who had most interest in this particular group of patients. The authors ought to emphasise the need for a future controlled trial in order to test the extent to which the intervention is truly effective.

Author's Response:
Inserted following text: However, before substantial claims regarding efficacy can be made, multi-site evaluation is required via a randomised control trial to test the extent to which the intervention is truly effective.

Minor comments
Page 3
Line 11 CYP should be indicated in full before the abbreviation.
Primary outcome measures – I think that it is unusual to include references in an

Author's Response:
Children and Young people expounded in full prior to abbreviation. Citations have been removed from the abstract

Page 4: Results - an indication of the effect sizes should be provided here.

Author's Response:
We have stated in the methods: Cohen's d effect sizes (parametric) and Rosenthal's effect sizes (non-parametric) were calculated for statistically significant results.

Effect sizes are reported in the abstract, results section and tables.

Results section in the abstract has been changed to: For those who completed the intervention (n=33), improvements were observed in knowledge (Effect size, ES: 0.69), confidence, and in some domains relating to attitudes (Effectiveness domain- ES: 0.49), and clinical behavioural intention (Belief about consequences-ES:0.49; Moral Norm-ES: 0.43; Beliefs about capability-ES: 0.42).

Page 4: Line 6 I don't think that the statement that the 'majority' of people who self-harm are aged 11 to 25 years' is correct – I would stick to the second part of the sentence.

Author's response:
Sentence amended and now states: Self-harm is one of the most frequent reasons for emergency hospital admission, 1 with children and young people (CYP) aged 11 and 25 years having more hospital presentations for self-harm than any other age group2.

Page 7: Line 26: isn't it unusual that consent to participation is implied through completion of a questionnaire?

Author's response:
Inserted paragraph to provide rationale for consent process: Consent to participate in the pre and post intervention study was implied through completion of the baseline online questionnaire. This is advocated as an ethical and appropriate approach to obtaining consent for anonymous surveys as long as sufficient information about the study has been provided 14. Therefore all eligible participants were sent a participant information sheet that described the study, explained what participation involved, and outlined any risks and benefits of participating.

Intervention – I don't think this section gives the reader a clear idea of the actual content of the training.

Author's response:
Inserted paragraph into section with relevant hyperlinks to each element of the digital educational

intervention:
The final digital educational intervention consisted of three RLOs which focused on a different aspect of care that included: (1) Understanding self-harm and care pathways for CYP admitted to hospital (http://sonet.nottingham.ac.uk/rlos/mentalhealth/octoe/knowledge/index.html); (2) Effective communication with CYP following self-harm admission (http://sonet.nottingham.ac.uk/rlos/mentalhealth/octoe/communication/index.html); and (3) Assessing risk and managing safety with CYP admitted with self-harm (http://sonet.nottingham.ac.uk/rlos/mentalhealth/octoe/risk/index.html). The specific content varied across the three RLOs but information included was evidence based and expert peer-reviewed as part of the development process. The content was delivered through a range of multimedia to enhance the interest and authenticity, such as videos of youth actors narrating the experiences of CYP admitted to hospital with self-harm.

Page 9: I suggest that the full self-report questionnaire is included as an on-line supplement.

Author's response:
Full self-report questionnaire uploaded as supplementary online file and a statement inserted into methods section: These outcome measures were compiled into a self-reported online questionnaire (Supplementary File 2) prefaced with questions pertaining to participant characteristic and demographic information.

Page 10:
Sensitivity analysis – I think that in general the point about sensitivity analyses needs to be clarified to indicate that the authors are comparing those who completed the intervention with those who did not. This is also relevant to the reporting of the findings on pages 11 and 12, where I think the nature of the sensitivity analyses needs to be indicated each time so that this is clear to the reader.

Author's response:
We have amended the results section to ensure that when referring to the sensitivity analysis what data and participants we are referring to.

Page 11: Line 18 45% is not "the majority".
Line 53 does a reduction in "self-efficacy" imply a negative effect?

Author's response:
Sentences changed to: Participants level of education ranged from diploma to master's level with 45% (n=44) of nurses educated to degree level.

Sentences changed to provide clarity over direction and meaning of change: A statistically significant reduction in self-efficacy (negative effect) was observed at post intervention for analysis conducted on all respondents including those that did not complete the digital educational intervention (see Table 3). When sensitivity analysis of only those who completed the intervention was conducted the difference (negative effect) no longer retained statistical significance.

Page 12
Lines 5 – 6 the sentence is incomplete.
Line 16 "on" should be "of".
Line 25 "the" should be inserted before "median score".

Author's response:
Changes made in the text.

Page 14
Lines 15-17 This sentence is badly written.
Lines 21-23 This sentence is unclear.

Author's response:
Both sentences have been removed
Page 20
Lines 22 -24 This sentence is unclear.

Author's response:
This sentence removed
Page 21
Lines 25-29 It is important that the authors do not give the impression that behavioural change would definitely result from the intervention as this was not measured.
Lines 40-46 The authors should be more cautious as only a minority of potential participants took up the intervention.

Author's response:
Statement included in section to ensure clarity of discussion point: Saying that, it is important to recognise that behavioural change was not measured as part of this study. Therefore to establish the impact of this intervention on behavioural change future empirical research is required

Page 22
Lines 27-29 This sentence is incomplete.

Author's response:
Amended

Page 23
Line 6 the content of this sentence is too positive, whereas the following sentence is better.

Author's response:
Sentence removed and revised to state: Initial evidence of the effect of the digital educational intervention is promising and demonstrates the potential this intervention has in improving knowledge, confidence and attitudes of registered children's nurses. However, before substantial claims regarding efficacy can be made, multi-site evaluation is required via a randomised control trial to test the extent to which the intervention is truly effective. Additional outcome measures need to include patient reported measures relating to care experience and outcome.

We look forward to hearing the outcome of your review of the revised manuscript.

VERSION 2 – REVIEW

REVIEWER	Karen Cleaver University of Greenwich. UK
REVIEW RETURNED	06-Feb-2017

GENERAL COMMENTS	The authors have fully addressed the feedback provided at the last review. However, while I have said 'yes' to criterion 15, from a style point of view, the paper does lack a degree of fluency in how it reads. This is mainly due to short sentence construction and some grammatical errors, the first paragraph exemplifying this. The authors should also avoid words such as 'crucial' which I would not

	expect to see in an academic paper. I would therefore recommend accept with minor revisions, the revisions being concerned with style rater than substance and which might therefore, be an editorial matter.