

Knowledge and confidence levels improvement among obstetrics resi X [Active] SMART

44 of many

### Confirming submission to Heliyon External Inbox x

Heliyon <em@editorialmanager.com> to me Thu, Nov 10, 2022, 2:33 PM

\*This is an automated message.\*

Manuscript Number: HELIYON-D-22-22060R1

**KNOWLEDGE AND CONFIDENCE LEVELS IMPROVEMENT AMONG OBSTETRICS RESIDENTS REGARDING CAESAREAN SECTION TRAINING USING VIDEO-MANNEQUINS COMBINATION**

Dear Dr kurniawati,

We have received the above referenced manuscript you submitted to the Medical Sciences section of Heliyon. To track the status of your manuscript, please log in as an author at <https://www.editorialmanager.com/heliyon/>, and navigate to the "Revisions Being Processed" folder.

Thank you in advance for your understanding, and best wishes for the holiday season.

Kind regards,  
Heliyon

More information and support

Knowledge and confidence levels improvement among obstetrics resi X [Active] SMART

41 of many

### Track the status of your submission to Heliyon External Inbox x

Track your Elsevier submission <no-reply@submissions.elsevier.com> to me Mon, Nov 14, 2022, 7:24 PM

Manuscript Number: HELIYON-D-22-22060  
 Manuscript Title: **KNOWLEDGE AND CONFIDENCE LEVELS IMPROVEMENT AMONG OBSTETRICS RESIDENTS REGARDING CAESAREAN SECTION TRAINING USING VIDEO-MANNEQUINS COMBINATION**  
 Journal: Heliyon

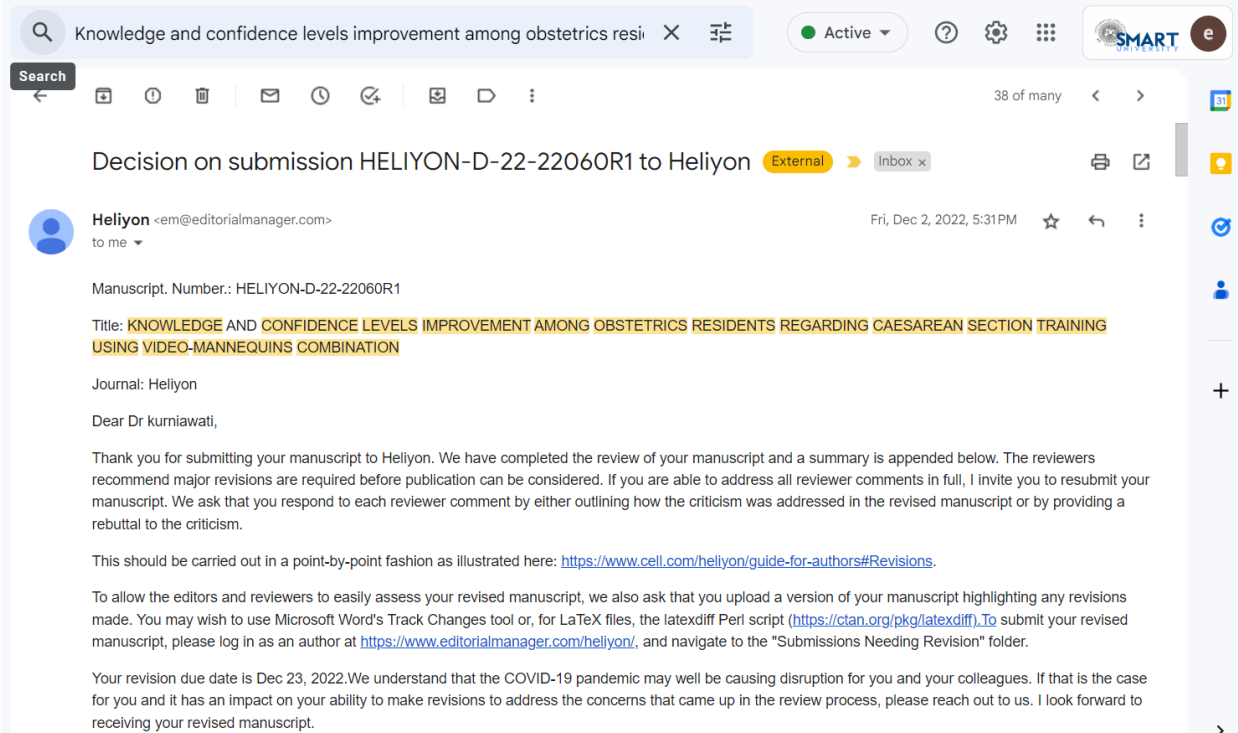
Dear eighty mardiyani kurniawati,

Your submitted manuscript is currently under review. The peer review process can take a while, so we are trying out a new service that allows you to track the peer review status of your submission in more detail. You can access the service here: <https://track.authorhub.elsevier.com?uid=8b2ccc23-3a85-4434-a7c8-d0950bb9ec89>

This page will remain active until the peer review process for your submission is completed. You can visit the page whenever you like to check the progress of your submission. The page does not require a login, so you can also share the link with your co-authors.

We hope you find this service useful.

Kind regards,  
Journal Office of Heliyon  
Elsevier B.V.  
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## Reviewer's Responses to Questions

Note: In order to effectively convey your recommendations for improvement to the author(s), and help editors make well-informed and efficient decisions, we ask you to answer the following specific questions about the manuscript and provide additional suggestions where appropriate.

1. Are the objectives and the rationale of the study clearly stated?

Please provide suggestions to the author(s) on how to improve the clarity of the objectives and rationale of the study. Please number each suggestion so that author(s) can more easily respond.

Reviewer #1: Yes

Reviewer #2: Yes the objectives are clearly stated

Reviewer #3: Thank you for the opportunity to review the manuscript. The authors compared different teaching methods for cesarean section training.

The research question and the teaching methods studied are sufficiently well described and clearly understood in terms of knowledge and confidence.

Reviewer #4: Objectives and rationale are clear, however there are many imperfections of language which force the reader to infer meaning throughout the manuscript. A native English speaker should be employed for clarity. Particularly, some words are used improperly, including those that have conventional meanings within research that differ from their use in lay language.

2. If applicable, is the application/theory/method/study reported in sufficient detail to allow for its replicability and/or reproducibility?

Please provide suggestions to the author(s) on how to improve the replicability/reproducibility of their study. Please number each suggestion so that the author(s) can more easily respond.

Reviewer #1: Mark as appropriate with an X:

Yes  No  N/A

Provide further comments here: Need further details in methods

Reviewer #2: Mark as appropriate with an X:

Yes  No  N/A

Provide further comments here:

Further detail is needed to understand exactly what was performed in each arm of the study

Reviewer #3: Mark as appropriate with an X:

Yes  No  N/A

Provide further comments here:

The methods and study design are sufficiently well described. Only the explicit contents of the video trainings are not detailed in the manuscript.

A detailed listing of the learning contents and learning objectives of the individual methods would clearly contribute to the understanding of the study.

Reviewer #4: Mark as appropriate with an X:

Yes  No  N/A

Provide further comments here:

1. How did you prevent participants from sharing study materials?

2. We need clarity about recruitment and retention of subjects. How many dropped out due to COVID? Other reasons? How were groups assigned?

3. If applicable, are statistical analyses, controls, sampling mechanism, and statistical reporting (e.g., P-values, CIs, effect sizes) appropriate and well described?

Please clearly indicate if the manuscript requires additional peer review by a statistician. Kindly provide suggestions to the author(s) on how to improve the statistical analyses, controls, sampling mechanism, or statistical reporting. Please number each suggestion so that the author(s) can more easily respond.

Reviewer #1: Mark as appropriate with an X:

Yes  No  N/A

Provide further comments here:

Reviewer #2: Mark as appropriate with an X:

Yes  No  N/A

Provide further comments here:

Reviewer #3: Mark as appropriate with an X:

Yes  No  N/A

Provide further comments here:

The statistical methods used are appropriate for the research question investigated. Nevertheless, randomization of study participants is lacking. This would make more valid results possible.

Reviewer #4: Mark as appropriate with an X:

Yes  No  N/A

Provide further comments here:

You report the p-value for the Mean's Differences across groups as 8. This does not make sense in context. It is also  $>0.05$ , yet your conclusion is that this difference is meaningful. This p-value needs to be accurately reported to support the conclusions of the paper.

4. Could the manuscript benefit from additional tables or figures, or from improving or removing (some of the) existing ones?

Please provide specific suggestions for improvements, removals, or additions of figures or tables. Please number each suggestion so that author(s) can more easily respond.

Reviewer #1: Need further explanation on the tables

Reviewer #2: Table one does not list the number of female participants

Table 3

What does the order of cs mean versus the procedure?

Reviewer #3: An overview of the content and learning objectives of each method studied is lacking. Also missing is a description of how the created phantom was integrated into the training.

This could both be provided excellently in tables or figures. It may also be possible to include a sample video from the training as an attachment.

Reviewer #4: Table format needs fixing, but content is fine

5. If applicable, are the interpretation of results and study conclusions supported by the data?

Please provide suggestions (if needed) to the author(s) on how to improve, tone down, or expand the study interpretations/conclusions. Please number each suggestion so that the author(s) can more easily respond.

Reviewer #1: Mark as appropriate with an X:

Yes  No  N/A

Provide further comments here:

Reviewer #2: Mark as appropriate with an X:

Yes  No  N/A

Provide further comments here:

Unsure as it is difficult to read the manuscript due to language issues

Reviewer #3: Mark as appropriate with an X:

Yes  No  N/A

Provide further comments here:

To evaluate the results, I think there is a lack of statistics showing that the groups were equal in knowledge and confidence. The authors only examine the difference from before to after the training. No consideration is given to different baseline values.

Reviewer #4: Mark as appropriate with an X:

Yes  No  N/A

Provide further comments here:

See #4

6. Have the authors clearly emphasized the strengths of their study/theory/methods/argument?

Please provide suggestions to the author(s) on how to better emphasize the strengths of their study. Please number each suggestion so that the author(s) can more easily respond.

Reviewer #1: Yes

Reviewer #2: no

Reviewer #3: no

Reviewer #4: No. The conclusion repeats background lit review. Needs to conform better to conventional formatting.

7. Have the authors clearly stated the limitations of their study/theory/methods/argument?

Please list the limitations that the author(s) need to add or emphasize. Please number each limitation so that author(s) can more easily respond.

Reviewer #1: No. This is a single-center study with small sample size; further investigation is needed. In addition, although knowledge and confidence was investigated, it is probably useful to follow-up on their later performance in clinical practice to evaluate the long-term outcomes

Reviewer #2: no

Reviewer #3: The authors did not clearly list the limitations of the study. The different values in the pre-tests were not taken into account in the interpretation.

Furthermore, practical training on the phantom is not suitable for achieving improvements in theoretical knowledge. Since the pre and post questionnaires seem to be identical, there could also be a bias.

Reviewer #4: No

8. Does the manuscript structure, flow or writing need improving (e.g., the addition of subheadings, shortening of text, reorganization of sections, or moving details from one section to another)?

Please provide suggestions to the author(s) on how to improve the manuscript structure and flow. Please number each suggestion so that author(s) can more easily respond.

Reviewer #1: Need

Reviewer #2: There is a need for multiple english language improvements

Here are some suggestions

Line 10 “it needs to prefer” needs to be reworded .Perhaps what they want to say is “consequently an alternative teaching strategies is needed for the residents to achieve adequate cesarean delivery surgical skills”

Lines 25 and and 32 remove the wording “such as”

Line 35 – “More than half respondents had more than three times clinical experiences in the hospital related to the obstetrics and gynecology sciences”

What does that mean? Please reword

Line 44 remove Besides and could

Line 47due to cesarean surgery or do you mean confidence performing caesarean delivery

Introduction

Line 3 “Cesarean section rates are extremely increased nowadays in the worldwide “needs rewording — perhaps a better wording is : Cesarean delivery rates are increasing worldwide

Line 10 remove “on the other hand”

Line 27 “intrigued” is the wrong word here

Line 35 “ less grade” does not make sense please reword

Line 53 replace contrarily which means stubborn or the opposite

Line 57 needs rewording

Methods

Line 5 remove besides – can replace with “all participants were required to be in their 5th or 8th semester “

Line 39 remove moreover



Line 57 – they are study participants not samples

Research procedures;

Line 1 remove moreover

Line 5 replace samples with participants

Line 30 : “The further procedure was providing interventions for each group”

Needs rewording

Line 19 “3 clinical practices” please explain what a clinical practice is. IS that the same as clinical experience? And what constitutes an “experience ? observing a cesarean delivery? Assisting?

T

Discussion

Line 1 “Therefore, mannequin simulation was considered to be complementary media to learning cesarean section surgery, which is similar to mannequins as an alteration of the patient’s position”

Please reword not sure what patient’s position is referring to

Line 10 what is an enhancement score referring to? Is that an overall confidence or knowledge ?

Line 20 intrigue is the incorrect word here Do the authors mean explain?

Line 25 change lift to improve

Line 40 change research agreed to research confirms

Line 48 “A great simulation  
technology development was being an instrument to increase operation experiences”

Line 1 “A group surgery training  
program with 4-5 residents influenced to enhance surgery confidence”  
Please reword – does not make sense

Reviewer #3: The manuscript does not read smoothly. I recommend having a native speaker revise the manuscript again. Some formulations are grammatically awkward, others are very colloquial.

Reviewer #4: Yes. Please have a native English speaker with knowledge of medical manuscript formatting and terminology edit your paper.

9. Could the manuscript benefit from language editing?

Reviewer #1: Yes

Reviewer #2: Yes

Reviewer #3: Yes

Reviewer #4: Yes

Thank you for submitting your manuscript to Heliyon. It has been reviewed and several areas for improvement have been suggested. In particular all reviewers highlighted that the paper can use language editing. Please consider language editing for your revised manuscript. Please include a point-by-point response to each of the reviewers' comments and include a track-changes version of your revised manuscript.

Reviewer #1: 1. Methods: please further indicate that Institut Teknologi sepuluh November is a public technology university for readers' information.

2. Please provide a checklist for observational studies (STROBE checklist)

3. Please indicate if the study including the questionnaires was conducted in English or Bahasa Indonesia. If it is latter, please indicate that the provided questionnaire was translated to English by (author's name).

4. Please list the definition of levels A, B and C

5. Is there a reason why stratified random sampling was not performed in assigning the respondents into the three groups?

6. Table 2: Please keep the mean values to one decimal place. Please also explain the source of questionnaires used to generate data for Tables 2 and 3.

7. In the supplementary material, the global rating scale technical skills and Objective Structured Assessment Of Technical Skills are previously published by other research group. Please cite accordingly to avoid copyright issues. There are also typos in other questionnaires; please check

Reviewer #2: I think there is interesting and relevant information in this study but unable to fully assess due to language barrier.

Reviewer #3: This field is optional. If you have any additional suggestions beyond those relevant to the questions above, please number and list them here.

Reviewer #4: This field is optional. If you have any additional suggestions beyond those relevant to the questions above, please number and list them here.

Knowledge and confidence levels improvement among obstetrics resi X [filter icon]

Active [dropdown]

SMART UNIVERSITY [logo]

32 of many [arrow]

### Revision reminder for Heliyon [External] [Inbox x]

Heliyon <em@editorialmanager.com> to me [dropdown] Tue, Dec 20, 2022, 1:06 PM [star] [reply] [more]

\*This is an automated message.\*

Manuscript Number: HELIYON-D-22-22060R1  
**KNOWLEDGE AND CONFIDENCE LEVELS IMPROVEMENT AMONG OBSTETRICS RESIDENTS REGARDING CAESAREAN SECTION TRAINING USING VIDEO-MANNEQUINS COMBINATION**

Dear Dr kurniawati,

We would like to remind you that on Dec 02, 2022 we asked you to revise your above referenced manuscript and your revision is due by Dec 23, 2022.

Heliyon values your contribution and we look forward to receiving your revised manuscript.

To submit your revision, please log in as an author at <https://www.editorialmanager.com/HELIYON/>, and navigate to the "Submissions Needing Revision" folder under the Author Main Menu. You will also find the decision letter and comments available there.

If you do not plan to revise your manuscript, please click "Decline to Revise" in the "Submissions Needing Revision" folder.

If you require more time, please contact the journal office by replying to this email.

Kind regards,  
Heliyon

Knowledge and confidence levels improvement among obstetrics resi X [filter icon]

Active [dropdown]

SMART UNIVERSITY [logo]

30 of many [arrow]

### Confirming submission to Heliyon [External] [Inbox x]

Heliyon <em@editorialmanager.com> to me [dropdown] Thu, Dec 22, 2022, 11:18 AM [star] [reply] [more]

\*This is an automated message.\*

Manuscript Number: HELIYON-D-22-22060R2  
**KNOWLEDGE AND CONFIDENCE LEVELS IMPROVEMENT AMONG OBSTETRICS RESIDENTS REGARDING CAESAREAN SECTION TRAINING USING VIDEO-MANNEQUINS COMBINATION**

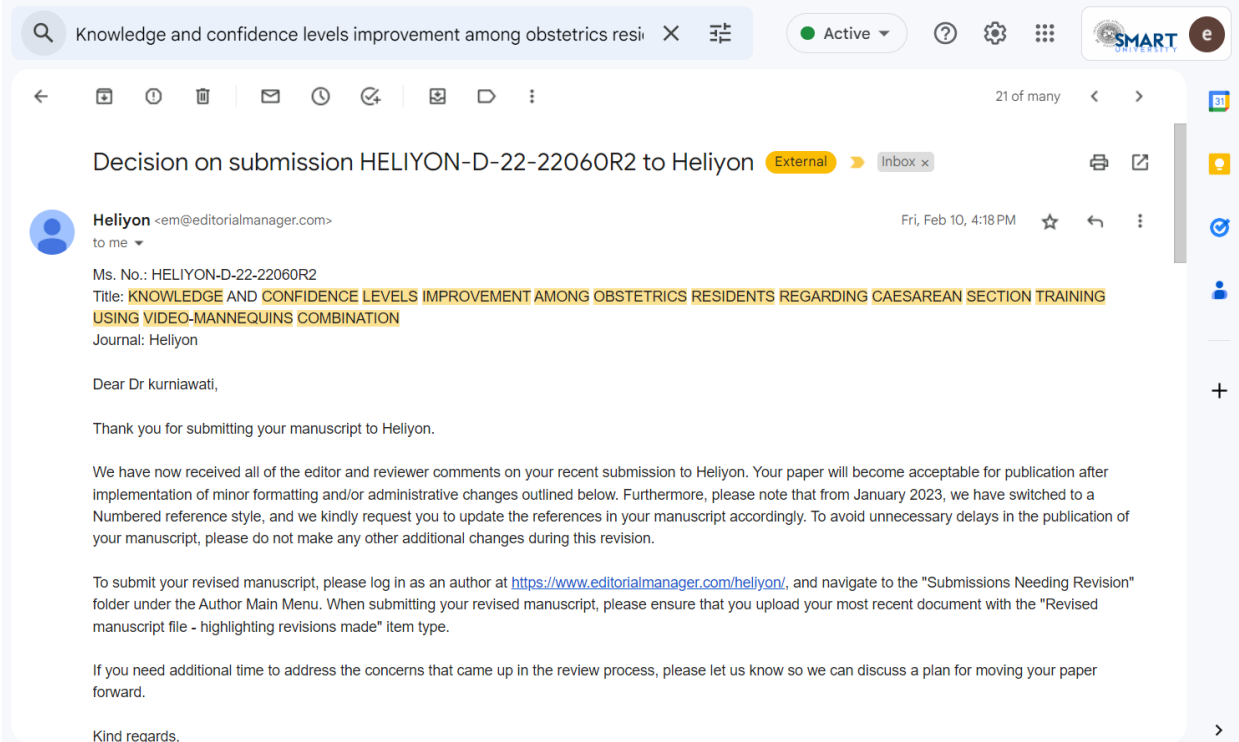
Dear Dr kurniawati,

We have received the above referenced manuscript you submitted to the Medical Sciences **section** of Heliyon. To track the status of your manuscript, please log in as an author at <https://www.editorialmanager.com/heliyon/>, and navigate to the "Revisions Being Processed" folder.

Thank you in advance for your understanding, and best wishes for the holiday season.

Kind regards,  
Heliyon

More information and support



Editor and Reviewer comments:

Editorial office:

Please note that all authors should have made substantial contributions to all of the following: (1) the conception and design of the study, the acquisition of data, or the analysis and interpretation of data (ie. at least one of sections 1-4 below); (2) drafting the article or critically revising its important intellectual content; (3) final approval of the version submitted. Please correct your Author Contribution Statement to follow the guidelines above, using only Heliyon's standard wording as provided:

- 1 - Conceived and designed the experiments;
- 2 - Performed the experiments;
- 3 - Analyzed and interpreted the data;
- 4 - Contributed reagents, materials, analysis tools or data;
- 5 - Wrote the paper.

Please ensure that any co-author with the contribution "Wrote the paper" has also contributed to at least one other numbered section, as drafting of the article is not sufficient contribution to justify authorship in Heliyon.

Please ensure that all figure panels are labelled and the figure captions describe each panel. Currently, Figure [3] contains unlabeled panels.

Editor:

Thank you for submitting your revised manuscript. It has been improved significantly, however a few minor points need to be revised before it can be accepted fully.

Specifically from the reviewer's comments:

1. Introduction line 47 -52 is not clear what is the point, consider removing.

Editor comment: I agree with the reviewer, it is not clear what you mean here.

2. discussion: lines 21-25. You say confidence level improved and then say only for level c -

Editor comment : I agree that this is confusing. You state "Additionally, all three methods could enhance residents'

confidentiality during cesarean section practice in each learning subject. An increase in confidence level only occurs in 7th semester residents or level C."

Firstly please correct "confidentiality" to competence or confidence depending on what you intent to say.

It is confusing when you say that all methods enhance the competence/confidence of the residents but you only saw an increase in confidence level in the 7th semester residents or level C. Please clarify.

3. line 42 "developed" is the wrong word - do you mean improved?

Editor comment: please fix

6. line 16 (page 11) "simulation of clinical practice proved greater performance" do you mean improved performance

Editor comment: You write "Simulation of clinical practice proved greater performance than a single video tutorial in medical students"

Please revise to "Simulation of clinical practice improved performance more than a single video tutorial in medical students." if this is what you meant. Otherwise please revise appropriately.

### Decision on submission to Heliyon External Inbox



**Heliyon** <em@editorialmanager.com>  
to me

Wed, Feb 15, 11:03 PM

Manuscript Number: HELIYON-D-22-22060R4

Title: **KNOWLEDGE AND CONFIDENCE LEVELS IMPROVEMENT AMONG OBSTETRICS RESIDENTS REGARDING CAESAREAN SECTION TRAINING USING VIDEO-MANNEQUINS COMBINATION**

Journal: Heliyon

Dear Dr kurniawati,

Thank you for submitting your manuscript to Heliyon.

I am pleased to inform you that your manuscript has been accepted for publication.

Your accepted manuscript will now be transferred to our production department. We will create a proof which you will be asked to check, and you will also be asked to complete a number of online forms required for publication. If we need additional information from you during the production process, we will contact you directly.

We appreciate and value your contribution to Heliyon. We regularly invite authors of recently published manuscript to participate in the peer review process. If you were not already part of the journal's reviewer pool, you have now been added to it. We look forward to your continued participation in our journal, and we hope you will consider us again for future submissions.

Kind regards,  
Sahana Krishnan  
Editorial **Section** Manager  
Heliyon

## Responses to reviewers' comments

Dear Reviewers

Thank you for the time to review our manuscript and also for the comment to make my manuscript better. You help to change a lot in the manuscript and I agree with it.

In addition, we have revised the manuscript as requested by the editorial. We show the details in this table. I hope you are satisfied with our efforts to revise this manuscript.

Best regards

Suggestion	Author response
<p>1. Are the objectives and the rationale of the study clearly stated?</p> <p>Please provide suggestions to the author(s) on how to improve the clarity of the objectives and rationale of the study. Please number each suggestion so that author(s) can more easily respond.</p> <p>Reviewer #1: Yes</p> <p>Reviewer #2: Yes the objectives are clearly stated</p> <p>Reviewer #3: Thank you for the opportunity to review the manuscript. The authors compared different teaching methods for cesarean section training.</p> <p>The research question and the teaching methods studied are sufficiently well described and clearly understood in terms of knowledge and confidence.</p> <p>Reviewer #4: Objectives and rationale are clear, however there are many imperfections of language which force the reader to infer meaning throughout the manuscript. A native English speaker should be employed for clarity. Particularly, some words are used improperly, including those that have conventional meanings within research that differ from their use in lay language.</p>	<p>Thank you for the review. We have edited language structure and proofreading.</p>



<p>2.If applicable, is the application/theory/method/study reported in sufficient detail to allow for its replicability and/or reproducibility?</p> <p>Please provide suggestions to the author(s) on how to improve the replicability/reproducibility of their study. Please number each suggestion so that the author(s) can more easily respond.</p> <p>Reviewer #1: Mark as appropriate with an X:  Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A <input type="checkbox"/></p> <p>Provide further comments here: Need further details in methods</p> <p>Reviewer #2: Mark as appropriate with an X:  Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A <input type="checkbox"/></p> <p>Provide further comments here:  Further detail is needed to understand exactly what was performed in each arm of the study</p> <p>Reviewer #3: Mark as appropriate with an X:  Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A <input type="checkbox"/></p> <p>Provide further comments here:  The methods and study design are sufficiently well described. Only the explicit contents of the video trainings are not detailed in the manuscript.  A detailed listing of the learning contents and learning objectives of the individual methods would clearly contribute to the understanding of the study.</p> <p>Reviewer #4: Mark as appropriate with an X:  Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A <input type="checkbox"/></p> <p>Provide further comments here:</p> <p>1. How did you prevent participants from sharing study materials?</p> <p>2. We need clarity about recruitment and retention of subjects. How many dropped out due to COVID? Other reasons? How were groups assigned?  decimal place. Please also explain the source of questionnaires used to generate data for Tables 2 and 3.</p> <p>7. In the supplementary material, the global rating scale technical skills and Objective</p>	<p>We have added information in method and detailed in the manuscript.</p>
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<p>Structured Assessment Of Technical Skills are previously published by other research group. Please cite accordingly to avoid copyright issues. There are also typos in other questionnaires; please check- we apologize because we don't use this questionnaire. We only use 2 questionnaires.</p>	
<p>3. If applicable, are statistical analyses, controls, sampling mechanism, and statistical reporting (e.g., P-values, CIs, effect sizes) appropriate and well described?</p> <p>Please clearly indicate if the manuscript requires additional peer review by a statistician. Kindly provide suggestions to the author(s) on how to improve the statistical analyses, controls, sampling mechanism, or statistical reporting. Please number each suggestion so that the author(s) can more easily respond.</p> <p>Reviewer #1: Mark as appropriate with an X:  Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A <input type="checkbox"/>  Provide further comments here:</p> <p>Reviewer #2: Mark as appropriate with an X:  Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A <input type="checkbox"/>  Provide further comments here:</p> <p>Reviewer #3: Mark as appropriate with an X:  Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A <input type="checkbox"/>  Provide further comments here:</p> <p>The statistical methods used are appropriate for the research question investigated. Nevertheless, randomization of study participants is lacking. This would make more valid results possible.</p> <p>Reviewer #4: Mark as appropriate with an X:  Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A <input type="checkbox"/>  Provide further comments here:</p> <p>You report the p-value for the Mean's Differences across groups as 8. This does not make sense in context. It is also &gt;0.05, yet your conclusion is that this difference is</p>	<p>We edited this part. Video (0.42(CI95%-0.11-0.9)), mannequin simulation (0.60(CI95%-0.04-1.25)), and the combination of video-mannequin (1.3(CI95%0.73-1.93)) significantly increased resident's knowledge regarding caesarean section skill. Study participant showed increased scores regarding confidence in their caesarean section skills according to all learning subjects (p&lt;0.05) but a difference in confidence level occurred in level C- 7th semester residents (p&lt;0.05).</p>

<p>meaningful. This p-value needs to be accurately reported to support the conclusions of the paper.</p>	
<p>4. Could the manuscript benefit from additional tables or figures, or from improving or removing (some of the) existing ones?</p> <p>Please provide specific suggestions for improvements, removals, or additions of figures or tables. Please number each suggestion so that author(s) can more easily respond.</p> <p>Reviewer #1: Need further explanation on the tables</p> <p>Reviewer #2: Table one does not list the number of female participants</p> <p>Table 3</p> <p>What does the order of cs mean versus the procedure?</p> <p>Reviewer #3: An overview of the content and learning objectives of each method studied is lacking. Also missing is a description of how the created phantom was integrated into the training.</p> <p>This could both be provided excellently in tables or figures. It may also be possible to include a sample video from the training as an attachment.</p> <p>Reviewer #4: Table format needs fixing, but content is fine</p>	<p>We have edited this part. We also gave an explanation in table - Age, level, gender and clinical experience were not statistically different. Table 3 we have edited the statement. We have completed the information in method.</p>
<p>5. If applicable, are the interpretation of results and study conclusions supported by the data?</p> <p>Please provide suggestions (if needed) to the author(s) on how to improve, tone down, or expand the study interpretations/conclusions. Please number each suggestion so that the author(s) can more easily respond.</p> <p>Reviewer #1: Mark as appropriate with an X: Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A <input type="checkbox"/></p> <p>Provide further comments here:</p> <p>Reviewer #2: Mark as appropriate with an X: Yes <input type="checkbox"/> No <input type="checkbox"/> N/A <input type="checkbox"/></p>	<p>We have edited this part and mark it to limitation</p>

<p>Provide further comments here:</p> <p>Unsure as it is difficult to read the manuscript due to language issues</p> <p>Reviewer #3: Mark as appropriate with an X: Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A <input type="checkbox"/></p> <p>Provide further comments here: To evaluate the results, I think there is a lack of statistics showing that the groups were equal in knowledge and confidence. The authors only examine the difference from before to after the training. No consideration is given to different baseline values.</p> <p>Reviewer #4: Mark as appropriate with an X: Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A <input type="checkbox"/></p> <p>Provide further comments here:</p> <p>See #4</p>	
<p>6. Have the authors clearly emphasized the strengths of their study/theory/methods/argument?</p> <p>Please provide suggestions to the author(s) on how to better emphasize the strengths of their study. Please number each suggestion so that the author(s) can more easily respond.</p> <p>Reviewer #1: Yes Reviewer #2: no Reviewer #3: no Reviewer #4: No. The conclusion repeats background lit review. Needs to conform better to conventional formatting.</p>	<p>We have added strength and editing the conclusion</p>
<p>7. Have the authors clearly stated the limitations of their study/theory/methods/argument?</p> <p>Please list the limitations that the author(s) need to add or emphasize. Please number each limitation so that author(s) can more easily respond.</p> <p>Reviewer #1: No. This is a single-center study with small sample size; further investigation is needed. In addition, although knowledge and confidence was investigated, it is probably</p>	<p>We have added limitation and recommendation</p>

<p>useful to follow-up on their later performance in clinical practice to evaluate the long-term outcomes</p> <p>Reviewer #2: no</p> <p>Reviewer #3: The authors did not clearly list the limitations of the study. The different values in the pre-tests were not taken into account in the interpretation.</p> <p>Furthermore, practical training on the phantom is not suitable for achieving improvements in theoretical knowledge. Since the pre and post questionnaires seem to be identical, there could also be a bias.</p> <p>Reviewer #4: No</p>	
<p>8. Does the manuscript structure, flow or writing need improving (e.g., the addition of subheadings, shortening of text, reorganization of sections, or moving details from one section to another)?</p> <p>Please provide suggestions to the author(s) on how to improve the manuscript structure and flow. Please number each suggestion so that author(s) can more easily respond.</p> <p>Reviewer #1: Need</p> <p>Reviewer #2: There is a need for multiple english language improvements</p> <p>Here are some suggestions</p> <p>Line 10 “it needs to prefer” needs to be reworded .Perhaps what they want to say is “consequently an alternative teaching strategies is needed for the residents to achieve adequate cesarean delivery surgical skills”</p> <p>Lines 25 and and 32 remove the wording “such as”</p> <p>Line 35 – “More than half respondents had more than three times clinical experiences in the hospital related to the obstetrics and gynecology sciences”</p> <p>What does that mean? Please reword</p> <p>Line 44 remove Besides and could</p> <p>Line 47due to cesarean surgery or do you mean confidence performing caesarean delivery</p>	<p>We have edited as requested in manuscript</p>

## Introduction

Line 3 “Cesarean section rates are extremely increased nowadays in the worldwide “needs rewording – perhaps a better wording is : Cesarean delivery rates are increasing worldwide

Line 10 remove “on the other hand”

Line 27 “intrigued” is the wrong word here

Line 35 “ less grade” does not make sense please reword

Line 53 replace contrarily which means stubborn or the opposite

Line 57 needs rewording

## Methods

Line 5 remove besides – can replace with “all participants were required to be in their 5th or 8th semester “

Line 39 remove moreover

Line 57 – they are study participants not samples

Research procedures;

Line 1 remove moreover

Line 5 replace samples with participants

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Needs rewording

Line 19 “3 clinical practices” please explain what a clinical practice is. IS that the same as clinical experience? And what constitutes an “experience ? observing a cesarean delivery? Assisting?

T

## Discussion

<p>Line 1 “Therefore, mannequin simulation was considered to be complementary media to learning cesarean section surgery, which is similar to mannequins as an alteration of the patient’s position” Please reword not sure what patient’s position is referring to</p> <p>Line 10 what is an enhancement score referring to? Is that an overall confidence or knowledge ?</p> <p>Line 20 intrigue is the incorrect word here Do the authors mean explain?</p> <p>Line 25 change lift to improve Line 40 change research agreed to research confirms</p> <p>Line 48 “A great simulation technology development was being an instrument to increase operation experiences”</p> <p>Line 1 “A group surgery training program with 4-5 residents influenced to enhance surgery confidence” Please reword – does not make sense Reviewer #3: The manuscript does not read smoothly. I recommend having a native speaker revise the manuscript again. Some formulations are grammatically awkward, others are very colloquial. Reviewer #4: Yes. Please have a native English speaker with knowledge of medical manuscript formatting and terminology edit your paper.</p>	
<p>9. Could the manuscript benefit from language editing? Reviewer #1: Yes Reviewer #2: Yes Reviewer #3: Yes Reviewer #4: Yes</p>	<p>We have edited the language. We also edited the method.</p>

Thank you for submitting your manuscript to Heliyon. It has been reviewed and several areas for improvement have been suggested. In particular all reviewers highlighted that the paper can use language editing. Please consider language editing for your revised manuscript. Please include a point-by-point response to each of the reviewers' comments and include a track-changes version of your revised manuscript.

Reviewer #1: 1. Methods: please further indicate that Institut Teknologi sepuluh November is a public technology university for readers' information.

2. Please provide a checklist for observational studies (STROBE checklist)

3. Please indicate if the study including the questionnaires was conducted in English or Bahasa Indonesia. If it is latter, please indicate that the provided questionnaire was translated to English by (author's name).

4. Please list the definition of levels A, B and C

5. Is there a reason why stratified random sampling was not performed in assigning the respondents into the three groups?

6. Table 2: Please keep the mean values to one  
Reviewer #2: I think there is interesting and relevant information in this study but unable to fully assess due to language barrier.

Reviewer #3: This field is optional. If you have any additional suggestions beyond those relevant to the questions above, please number and list them here.

Reviewer #4: This field is optional. If you have any additional suggestions beyond those relevant to the questions above, please number and list them here.



## KNOWLEDGE AND CONFIDENCE LEVELS IMPROVEMENT AMONG OBSTETRICS RESIDENTS REGARDING CAESAREAN SECTION TRAINING USING VIDEO-MANNEQUINS COMBINATION

--Manuscript Draft--

<b>Manuscript Number:</b>	HELIYON-D-22-22060R4
<b>Article Type:</b>	Original Research Article
<b>Section/Category:</b>	Medical Sciences
<b>Keywords:</b>	Learning media, caesarean section, study method, confidence improvement
<b>Manuscript Classifications:</b>	130: Health Sciences; 130.300: Women's Health
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<b>First Author:</b>	eighty mardiyani kurniawati
<b>Order of Authors:</b>	eighty mardiyani kurniawati Citra Aulia Bachtiar Hermanto Tri Juwono Budi Utomo
<b>Abstract:</b>	<p>Background: Cesarean section rates are increasing worldwide. Obstetrics and gynecology residents are required to be experts in this surgery to provide safe procedures. Because of the COVID-19 pandemic situation, an alternative teaching strategy is needed to achieve adequate cesarean section skills. The purpose of this study was to identify the effect of video, mannequins, and the combination of video mannequins on residents' knowledge and confidence regarding cesarean section.</p> <p>Method: A quasi-experimental study with pre-test and post-test designs was done. Based on stratified random sampling, 33 obstetrics and gynecology residents involved as study participant. Three groups were formed and received different interventions, learning using videos, mannequins, and a combination of video-mannequins. Two kinds of questionnaires were used to examine residents' knowledge and their confidence levels. The collected data were analyzed statistically.</p> <p>Results: Video (0.42(CI95%-0.11-0.9)), mannequin simulation (0.60(CI95%-0.04-1.25)), and the combination of video-mannequin (1.3(CI95%0.73-1.93)) significantly increased resident's knowledge regarding cesarean section skill. Study participant showed increased scores regarding confidence in their cesarean section skills according to all learning subjects (<math>p &lt; 0.05</math>) but a difference in confidence level occurred in level C- 7th semester residents (<math>p &lt; 0.05</math>).</p> <p>Conclusion: The combination of videos and mannequin simulations is the best method for increasing knowledge of cesarean sections, compared to single video and mannequin simulations. The confidence level has been shown to increase in all subject studies but the effectiveness at each level of resident needs to be investigated further.</p>
<b>Opposed Reviewers:</b>	

## Responses to reviewers' comments

Dear Reviewers

Thank you for the time to review our manuscript and for the comment to make my manuscript better.

In addition, we have revised the manuscript as requested by the editorial. We show the details in this table. I hope you are satisfied with our efforts to revise this manuscript. We hope this manuscript will be accepted as soon as possible.

Thank you

Best regards

Suggestion	Author response
<p>Please correct your Author Contribution Statement to follow the guidelines above, using only Heliyon's standard wording as provided:</p> <ol style="list-style-type: none"> <li>1 - Conceived and designed the experiments;</li> <li>2 - Performed the experiments;</li> <li>3 - Analyzed and interpreted the data;</li> <li>4 - Contributed reagents, materials, analysis tools or data;</li> <li>5 - Wrote the paper.</li> </ol>	<p>Eighty Mardiyani Kurniawati: Conceived and designed the experiments; Performed the experiments; Wrote the paper.</p> <p>Citra Aulia Bachtiar: Performed the experiments; Analyzed and interpreted the data; Wrote the paper</p> <p>Hermanto Tri Joewono: Conceived and designed the experiments; Contributed reagents, materials, analysis tools or data; Wrote the paper.</p> <p>Budi Utomo: Analyzed and interpreted the data; Contributed reagents, materials, analysis tools or data; Wrote the paper.</p>

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KNOWLEDGE AND CONFIDENCE LEVELS IMPROVEMENT AMONG OBSTETRICS  
RESIDENTS REGARDING CAESAREAN SECTION TRAINING USING VIDEO-  
MANNEQUINS COMBINATION

Eighty Mardiyani Kurniawati<sup>1</sup>, Citra Aulia Bachtiar<sup>2</sup>, Hermanto Tri Joewono<sup>1</sup>, Budi Utomo<sup>3</sup>

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7 **Abstract**  
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10 **Background:** Cesarean section rates are increasing worldwide. Obstetrics and gynecology  
11 residents are required to be experts in this surgery to provide safe procedures. Because of the  
12 COVID-19 pandemic situation, an alternative teaching strategy is needed to achieve adequate  
13 cesarean section skills. The purpose of this study was to identify the effect of video,  
14 mannequins, and the combination of video mannequins on residents' knowledge and  
15 confidence regarding cesarean section.  
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21 **Method:** A *quasi-experimental* study with pre-test and post-test designs was done. Based on  
22 stratified random sampling, 33 obstetrics and gynecology residents involved as study  
23 participant. Three groups were formed and received different interventions, learning using  
24 videos, mannequins, and a combination of video-mannequins. Two kinds of questionnaires  
25 were used to examine residents' knowledge and their confidence levels. The collected data  
26 were analyzed statistically.  
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32 **Results:** Video (0.42(CI95%-0.11-0.9)), mannequin simulation (0.60(CI95%-0.04-1.25)), and  
33 the combination of video-mannequin (1.3(CI95%0.73-1.93)) significantly increased resident's  
34 knowledge regarding caesarean section skill. Study participant showed increased scores  
35 regarding confidence in their caesarean section skills according to all learning subjects ( $p<0.05$ )  
36 but a difference in confidence level occurred in level C- 7<sup>th</sup> semester residents ( $p<0.05$ ).  
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42 **Conclusion:** The combination of videos and mannequin simulations is the best method for  
43 increasing knowledge of caesarean sections, compared to single video and mannequin  
44 simulations. The confidence level has been shown to increase in all subject studies but the  
45 effectiveness at each level of resident needs to be investigated further.  
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50 **Keywords:** *Learning Media, cesarean section, study method, confidence improvement*  
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**Commented [a1]:** Line 10 "it needs to prefer" needs to be reworded .Perhaps what they want to say is "consequently an alternative teaching strategies is needed for the residents to achieve adequate cesarean delivery surgical skills"

Lines 25 and and 32 remove the wording "such as"  
Line 35 – "More than half respondents had more than three times clinical experiences in the hospital related to the obstetrics and gynecology sciences"  
What does that mean? Please reword

Line 44 remove Besides and could  
Line 47due to cesarean surgery or do you mean confidence performing caesarean delivery

**Commented [a2R1]:** We have edited as requested

## Introduction

Cesarean delivery rates are increasing worldwide [1-3]. When performing a safe cesarean section, doctors are required to have proper and adequate practice [4-5]. Training in surgery was an important component of obstetrics and gynecology resident education, to serve optimum care for patients [6]. COVID-19 is an obstacle for medical students because they have to learn several special skills when providing care to patients in health facilities [7-8]. The education system needed to be reconstructed to react to this pandemic influence [9], [10]. COVID-19 pandemic made some interruptions in training experiences among residents of obstetrics and gynecology [11]. Health services with patients directly become constrained because of restrictions on the mobility of people around the world. As a solution, online teaching was introduced to decrease physical contact and minimalizing COVID-19 transmission [12]. However, medical students argued that this method decreased study outcome quality, the emergence of psychological disorders, and fatigue [7], [13], [14]. In addition, online learning demonstrated low technical skills of the students and social interaction [15]. They experienced a limited session of clinical supervision from lecturers [16]. As a result, this phenomenon significantly causes medical students to get lower grades than expected grades [17].

Online learning is useful for sharing knowledge [18]. However, this method did not accommodate clinical skill practice. The other learning methods were required to achieve clinical skill competencies. Mannequin simulation and video tutorials could be alternative approaches in educational institution [19]. The limited number of mannequins causes simulations using mannequins to be carried out by students at the same location and time [20].

Video tutorials and mannequin simulations were compared for effectiveness in several studies [19-20]. Previous research revealed that virtual media was more effective technique

**Commented [a3]:** Reviewer #1: Need Reviewer #2: There is a need for multiple english language improvements  
Here are some suggestions

Introduction  
Line 3 "Cesarean section rates are extremely increased nowadays in the worldwide "needs rewording — perhaps a better wording is : Cesarean delivery rates are increasing worldwide

Line 10 remove "on the other hand"  
Line 27 "intrigued" is the wrong word here  
Line 35 " less grade" does not make sense please reword

Line 53 replace contrarily which means stubborn or the opposite  
Line 57 needs rewording

**Commented [a4R3]:** We have edited this part

**Commented [a5R3]:** We have proofread and edit the language structure

**Commented [a6]:** 1. Introduction line 47 -52 is not clear what is the point, consider removing.

Editor comment: I agree with the reviewer, it is not clear what you mean here.

**Commented [a7R6]:** Thank you we deleted this part

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7 compared to face-to-face learning method[20]. Otherwise, mannequin simulation is assumed  
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9 to greatly improve students' clinical skills instead of virtual coaching[21]. A systematic review  
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11 explained that the combination of online and face-to-face learning substantially enhanced  
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13 students' knowledge[22]. Blended learning was proven to increase medical students'  
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15 understanding and clinical capability[23-24]. According to these explanations, the purpose of  
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17 this study was to identify the effect of video, mannequins, and the combination of video  
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19 mannequins on residents' knowledge and confidence regarding cesarean section.  
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## 21 **Method**

### 22 **Ethics statement**

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24 The study's ethical consideration was approved by the research ethical committee of Dr.  
25  
26 Soetomo General Academic Hospital No. 0273/KEPK/X/2021.

### 27 **Study design**

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29 This research is a quasi-experimental research with pre-test and post-test designs. The research  
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31 was carried out in the Department of Obstetrics and Gynecology at Dr. Soetomo General  
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33 Academic Hospital-Faculty of Medicine Universitas Airlangga Indonesia from April until  
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35 November 2021. The independent variables were the cesarean section training using  
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37 mannequins, video, and mannequin-video combination. The dependent variable was the  
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39 resident's knowledge and confidence in doing a cesarean section.  
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### 41 **Study Participant**

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43 This study involved 33 residents of Obstetrics and Gynecology at the Faculty of Medicine  
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45 Universitas Airlangga Indonesia. Study participant were chosen using stratified **proportional**  
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47 random sampling according to inclusion criteria. The inclusion criteria were residents who had  
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49 not carried out independent cesarean sections as an operator. All participants were required to  
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51 be in their 5th or 8th semester. The participant would be excluded if they did not follow all the  
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#### Commented [a8]: Methods

Line 5 remove besides – can replace with “all participants were required to be in their 5th or 8th semester “

Line 39 remove moreover

Line 57 – they are study participants not samples

Research procedures;

Line 1 remove moreover

Line 5 replace samples with participants

Line 30 : “The further procedure was providing interventions for each group”  
Needs rewording

Line 19 “3 clinical practices” please explain what a clinical practice is. IS that the same as clinical experience? And what constitutes an “experience ? observing a cesarean delivery? Assisting?”

Commented [a9R8]: We have edited this part. Line 19 3 clinical practice is practice in general obstetrics and gynecology such as papsmear, etc

Commented [a10]: Is there a reason why stratified random sampling was not performed in assigning the respondents into the three groups?

Commented [a11R10]: Yes, the respondent was assigned to their group using stratified random sampling. We have added in research procedure.

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7 sessions of cesarean section lectures and had been infected by COVID-19 during the research  
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9 process.

### 10 **Research instruments**

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12 Research instruments used mannequins and video as learning media. This study collaborated  
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14 with a team of Design Product Experts from Institut Teknologi Sepuluh Nopember Indonesia  
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16 to construct the mannequins. Institut Teknologi Sepuluh Nopember is a university that focuses  
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18 on technology development. The prototype designed according to the Netter Atlas of Anatomy  
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20 took 8 months to produce. The mannequin models included an abdominal organ (Figure 1); a  
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22 set of babies, an umbilicus, a placenta (Figure 2); and a uterus (Figure 3). Figure 1 showed that  
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24 the abdominal prototype was using for incising the lower uterine segment and expelling the  
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26 baby. Figure 2 showed that the umbilical cord is made using disposable silicone so that it can  
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28 be replaced with another when cutting is done, while for babies and placenta it remains with  
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30 one prototype so that it can be used repeatedly and does not damage the shape of the prototype.  
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32 Figure 3 showed that the uterus consists of the fundus and lower uterine segment for suturing.  
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34 Mannequins were formed as like the actual structure of the human body using basic materials  
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36 from *liquid latex*, *silicone rubber RTV 48*, and a round *neodymium* magnet. A virtual video was  
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38 made by researchers using a mannequin model that had been made and a caesarean section  
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40 checklist that was implemented at the Department of Obstetrics and Gynecology, Faculty of  
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42 Medicine, Universitas Airlangga. The 13-minute video will be played 2 times. The content of  
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44 the video is tutorials on practical caesarean sections using mannequins.  
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**Figure 1.** The prototype of the abdominal organ

Study participant knowledge regarding caesarean section was assessed using pre-test and post-test questionnaires. The questionnaire was tested for validity and reliability with Cronbach's alpha on those who were not study participant. The results of the validity and reliability tests obtained 15 valid and reliable questionnaire questions. The questions in the questionnaire consist of abdominal organ anatomy, indications for caesarean section, and surgical techniques. [The questionnaire was written in Indonesian and then translated into English (translated by author)]. Measurement of resident confidence in carrying out caesarean section was carried out using pre-simulator and post-simulator questionnaires. Study participants were asked to answer five questions with 4 levels of the Likert scale, namely very poor, poor, enough and good. The confidence questionnaire was tested for validity and reliability based on the professional judgment of 2 obstetricians and gynecologists. The questionnaire can be found in the supplementary file.

**Commented [a14]:** Please indicate if the study including the questionnaires was conducted in English or Bahasa Indonesia. If it is latter, please indicate that the provided questionnaire was translated to English by (author's name).

**Commented [a15R14]:** We have added the information





**Figure 2.** A baby prototype set (including baby, placenta, and umbilical)

### ***Research procedures***

Stratified random sampling was performed in assigning the respondents into the three groups. Strata are formed based on the similarity of attributes or characteristics of members, in this study, namely the level of resident education. The first group received a video tutorial about caesarean section procedures. The first group was given knowledge and confidence assessment regarding caesarean section then the video is played for 13 minutes 2 times. Study participants were then asked to fill out a post-test questionnaire. The second group received a mannequin models simulation. The second group underwent a knowledge and confidence assessment and then demonstrated using a caesarean section mannequin model. Study participants also tried caesarean section techniques on the model at least 2 times. After being given a demonstration of a simulation model and experiments with mannequins, the research subjects were assessed by completing knowledge test posts and self-confidence assessments. The third group received a combination of video tutorials and mannequin simulation. The third group underwent a knowledge and confidence assessment. After filling out the questionnaire, a 13-minute video was played, accompanied by a demonstration using caesarean section mannequin model. Study participants also tried caesarean section techniques on the model at least 2 times. After that, study participants were then asked to fill out a post-test questionnaire. Pretest and posttest assessments are given in all group 1 week apart. To prevent participants from sharing material such as videos, the researcher played the video using zoom for two views and then was given

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7 an evaluation questionnaire. There were 2 resident in group 2 who dropped out because of  
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22 **Figure 3.** The uterus prototype

### 23 **Data Analysis**

24 Data were analyzed descriptively and statistically. Residents are divided into several levels,  
25 namely level A, B, C, and senior level. Level A is a 5th semester resident, level B is a 6th  
26 semester resident, level C is a 7th semester resident and senior level is an 8th semester resident.  
27 Clinical experience is divided into 2, namely < 3 years and > 3 years. The intended clinical  
28 experience is generally practice in obstetrics and gynecology such as in pregnancy care,  
29 oncology, etc. The data would be analyzed statistically using SPSS 26.0 application. Pre-test  
30 and post-test data were analyzed using the Wilcoxon Signed-Rank Test (significant at  $p < 0.05$ ).  
31 The data were also tested using the Kruskal Wallis Test (significant at  $p < 0.05$ ). Lastly, this  
32 study uses the Mann-Whitney test to examine the effect between the 2 variables (significant at  
33  $p < 0.05$ ).

### 34 **Results**

#### 35 **Respondent's characteristics**

36 The age of the respondents ranged from 28 years to 38 years. Study participants are divided  
37 proportionally according to their level. Although the number of residents from Levels A to C  
38 varies, this study places 2 senior residents in each group. This study mostly involved male  
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Commented [a19]: We need clarity about recruitment and retention of subjects. How many dropped out due to COVID? Other reasons? How were groups assigned?

Commented [a20R19]: We have added information in here and write how the group assigned in study participant.

Commented [a21]: Please ensure that all figure panels are labelled and the figure captions describe each panel. Currently, Figure [3] contains unlabeled panels.

Commented [a22R21]: Thank you we have edited this part

Commented [a23R21]: Figure 1 showed that the abdominal prototype was using for inserting the lower uterine segment and expelling the baby. Figure 2 showed that the umbilical cord is made using disposable silicone so that it can be replaced with another when cutting is done, while the babies and placenta it remains with one prototype so that can be used repeatedly and does not damage the shape of the prototype. Figure 3 showed that the uterus consists of the fundus and lower uterine segments for simulation.

Commented [a24]: Please list the definition of Levels A, B and C

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7 residents. Most study participants had more than 3 clinical experiences in hospitals related to  
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9 obstetrics and gynecology. This study found that Level B and Level C residents had less clinical  
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11 experience. Age, level, gender and clinical experience were not statistically different (see  
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13 Table 1).

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15 **Table 1. Respondent's characteristics**

Demographic	Group			p-value
	Group I (Video)	Group II (Mannequins)	Group III (Combination)	
Age (years)	31 (28-36)	32 (29-38)	30 (28-34)	0.174
Resident Level				
Level C	2 (18.2%)	2 (18.2%)	4(36.4%)	0.797
Level B	3(27.3%)	3 (27.3%)	2 (18.2%)	
Level A	4 (36.4%)	4(36.4%)	3(27.3%)	
Senior Level	2(18.2%)	2(18.2%)	2(18.2%)	
Gender				
Male	7 (63%)	7 (63%)	6(54%)	0.884
Female	4 (37%)	4(37%)	5(46%)	
Clinical experiences				
<3	4	5	5	0.102
>3	7	6	6	

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47 ***Resident's knowledge and confidence***

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49 All study participant demonstrated enhanced knowledge of cesarean section after obtaining the  
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51 interventions. Statistical analysis presented  $p < 0.05$  ( $p = 0.038$ ), which pointed out that  
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mannequin simulation, video tutorial, and the combination of video-mannequin simulation could be an effective method (see Table 2). Third group showed significant differences between the pre-test and post-test (1.3 (CI95%0.73-1.93)). First group and second group presented slight mean differences (0.42 (CI95%-0.11-0.9) vs. 0.60 (CI95%-0.04-1.25)). Table 2 was data from questionnaire 1: Knowledge pretest and posttest questionnaire (see supplementary file).

**Table 2. Respondent’s knowledge**

	Group I		Group II		Group III		p-value
	(Video)		(Mannequins)		(Combination)		
	Pre-test	Post-test	Pre-test	Post-test	Pre-test	Post-test	
<b>Mean</b>	(7.2±0.9)	(7.6±0.7)	(7.3±1.2)	(8.0±0.5)	(7.0±1.0)	(8.3±0.8)	
<b>Mean’s</b>	0.4		0.6		1.3		0.038
<b>Differences</b>	(CI95%-0.1-0.9)		(CI95%-0.0-1.2)		(CI95%0.7-1.9)		

Respondents also showed increased scores regarding confidence in their caesarean section skills according to learning subjects (p<0.05). A significant difference occurred in level C residents who were more confident after the intervention (mean=1.07). All study participants presented an average difference of more than 0.05 in the subjects studied (see Table 3). The confidence level regarding cesarean section procedures during the pre-test remained low with a score of 2.8. This score has elevated to 3.4 in the post-test. Table 2 was data from questionnaire 2: pre-simulator survey sheet and post survey simulator confidence (See the supplementary file).

**Table 3. Respondent’s confidence level**

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Commented [a29R28]: Yes, we have edited this part

Commented [a30]: We have added this information

	Pre-test	Post-test	Mean Differences	p value
<b>Learning subjects</b>				
Instrument understanding	3.0	3.5	0.5	<0.001
Structure of abdominal wall	3.0	3.6	0.5	<0.001
Caesarean section procedure	2.8	3.4	0.6	0.001
Suturing	3.1	3.7	0.5	<0.001
<b>Residents Level</b>				
Level C	2.4	2.5	1.0	0.026
Level B	3.0	3.2	0.1	0.301
Level A	3.2	3.6	0.3	0.058
Senior Level	3.2	3.7	0.4	0.068

## Discussion

### Key result

The combination of video tutorials and mannequins was the most effective media to increase residents' knowledge significantly. Confidence level increases significantly only occurred in 7th semester residents or level C.

### Interpretation

The video tutorial and mannequin simulation combination significantly improved residents' knowledge about cesarean section surgery. Compared to the single intervention of video and

Commented [a32R31]: We have edited this part

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Commented [a33]: Line 1 "Therefore, mannequin simulation was considered to be complementary media to learning cesarean section surgery, which is similar to mannequins as an alteration of the patient's position"

Please reword not sure what patient's position is referring to

Line 10 what is an enhancement score referring to? Is that an overall confidence or knowledge ?

Line 20 intrigue is the incorrect word here Do the authors mean explain?

Line 25 change lift to improve

Line 40 change research agreed to research confirms

Line 48 "A great simulation technology development was being an instrument to increase operation experiences"

Line 1 "A group surgery training program with 4-5 residents influenced to enhance surgery confidence"

Please reword – does not make sense

Reviewer #3: The manuscript does not read smoothly. I recommend having a native speaker revise the manuscript again. Some formulations are grammatically awkward, others are very colloquial.

Reviewer #4: Yes. Please have a native English speaker with knowledge of medical manuscript formatting and terminology edit your paper.

Commented [a34R33]: Line 10 about knowledge

Commented [a35R33]: We have edited this part

Commented [a36]: 2. discussion: lines 21-25. You say confidence level improved and then say only for level c -

Editor comment : I agree that this is confusing. You state "Additionally, all three methods could enhance residents' confidentiality during cesarean section practice in each learning subject. An increase in confidence level only occurs in 7th semester residents or level C."

Firstly please correct "confidentiality" to competence or confidence depending on what you intent to say.

It is confusing when you say that all methods enhance the competence/confidence of the residents but you only saw an increase in confidence level in the 7th semester residents or level C. Please clarify.

...

Commented [a37R36]: Thank you. We have edited this part

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7 mannequin simulation, this combination showed the highest improvements in residents'  
8 cesarean section understanding. This result was supported by previous research, which  
9 mentioned that the integrated simulation method and video tutorial escalated cognitive and  
10 clinical abilities compared to the single learning method, especially for health professionals  
11 and medical students[25-27]. Although it would be influenced by several factors, this  
12 combination method improved the theoretical knowledge of residents[23]. Blended virtual  
13 video and face-to-face simulation was considered to be an effective approach to link theoretical  
14 knowledge and clinical practice[23-24]. The combination of video and mannequin simulation  
15 could be an appropriate method to advance cesarean section knowledge for obstetrics and  
16 gynecology residents.

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26 The intervention using a single mannequin simulation also displayed knowledge enhancement.  
27 According to the study result, this research disclosed that mannequin simulation showed better  
28 influence to increase understanding, instead of video tutorial. Previous literature reviews  
29 mentioned that this mannequin became an excellent simulation media[28]. Furthermore, a  
30 recent study claimed cesarean section practice using mannequin simulation demonstrated  
31 important knowledge improvement, particularly in suturing ability[29]. Simulation of clinical  
32 practice improved performance more than a single video tutorial in medical students [19]. This  
33 method allowed residents to gain experiment chances repeatedly along with a minimum stress  
34 environment[29]. Simulation using a mannequin is considered as a complementary medium for  
35 learning caesarean section, because the mannequin can be adjusted similar to the management  
36 of patients[30].

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47 Video tutorial intervention demonstrated knowledge development, even though it displayed the  
48 lowest enhancement score. A study endorsed that online learning was able to improve students'  
49 knowledge and skill[10]. This method provided diseases explanation and became an alternative  
50 media to practice residents' communication ability[7], [31]. Nevertheless, this tutorial video  
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7 was inadequate to improve clinical ability as the residents did not have any opportunity to try  
8 a caesarean section using actual media[7], [31]. These reasons led to the low improvement  
9 score of this group's intervention. Virtual video authorized the residents to explore their audio  
10 and visual senses but did not improve their practical competencies. The use of video tutorials  
11 as a medium to reach cesarean section competency was not commonly carried out in frequent  
12 courses, however, it was employed as an additional method in a real cesarean section  
13 preparation[28].  
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20 Educational intervention for residents essentially escalated their self-confidence in doing  
21 surgery[32]. This study found that video and mannequin simulation increased residents' self-  
22 confidence levels in the cesarean section only in 7<sup>th</sup> semester resident. Research confirm that  
23 intervention using virtual video was suitable as a media to elevate self-confidence of surgery  
24 competency[33]. In addition, the mannequin simulation developed residents' self-confidence,  
25 so it caused a relaxed and calm situation among residents[30]. Developments in simulation  
26 technology can help improve the operating experience[34]. Surgery learning at university  
27 levels presented an association with low confidence during surgery performance[34]. The type  
28 of clinical training program and the kind of hospital also affected the confidence in their surgery  
29 ability[35]. The number of surgery performances could develop residents' confidence to  
30 perform a surgery independently[35]. Training programs by forming groups of 4-5 residents  
31 can increase operating confidence [34].  
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#### 45 **Limitation and Recommendation**

46 This research is an initial study that learn the effect caesarean section mannequins in medical  
47 learning. This study was a single center study with a small sample size so further investigation  
48 is needed. This study also has not examined the difference in scores on the pre-test in  
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7 interpretation. In addition, there may be bias in the use of the questionnaire. The  
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9 recommendation for further research is that although knowledge and confidence were  
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11 investigated in this research, it may be useful to follow up on the resident subsequent  
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13 performance in clinical practice to evaluate long-term.

## 14 15 **Conclusion**

16  
17 The combination of videos and mannequin **simulations** is the best method for increasing  
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19 knowledge of caesarean sections, compared to single video and mannequin simulations. The  
20  
21 confidence level has been shown to increase in all subject studies but the effectiveness at each  
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23 level of resident needs to be investigated further.

## 24 25 **Disclosure**

### 26 27 *Ethical clearance*

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29 The study's ethical consideration was approved by the research ethical committee of Dr.  
30  
31 Soetomo General Academic Hospital No. 0273/KEPK/X/2021. All the research methodologies  
32  
33 were conducted according to the relevant guidelines and regulations. The research subjects  
34  
35 have agreed to be involved in this study and signed the informed consent.

### 36 37 *Consent for publication*

38  
39 Not applicable

### 40 41 *Availability of data and materials*

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43 The supportive data of study findings are available from Kurniawati and Bachtiar but it is  
44  
45 restricted to be published due to under license for the study. However, data are available upon  
46  
47 reasonable request.

### 48 49 *Funding*

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Commented [a38]: The conclusion repeats background lit review. Needs to conform better to conventional formatting.

Commented [a39R38]: We have edited this part



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7 This study was not granted any financial support from any funding agencies.  
8  
9

#### 10 **Competing interest**

11 All the authors of this study declared that there is no conflict of interest.  
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13

#### 14 **Author Contribution**

15  
16 Eighty Mardiyani Kurniawati: Conceived and designed the experiments; Performed the  
17 experiments; Wrote the paper.  
18  
19

20 Citra Aulia Bachtiar: Performed the experiments; Analyzed and interpreted the data; Wrote the  
21 paper  
22  
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24 Hermanto Tri Joewono: Conceived and designed the experiments; Contributed reagents,  
25 materials, analysis tools or data; Wrote the paper.  
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28 Budi Utomo: Analyzed and interpreted the data; Contributed reagents, materials, analysis tools  
29 or data; Wrote the paper.  
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31

#### 32 **Acknowledgment**

33  
34 This study would like to give high gratitude to the team of Design Product Experts of Sepuluh  
35  
36 Nopember Institute of Technology Indonesia for the mannequin production during this study.  
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**Commented [a40]:** Please correct your Author Contribution Statement to follow the guidelines above, using only Heliyon's standard wording as provided:  
1 - Conceived and designed the experiments;  
2 - Performed the experiments;  
3 - Analyzed and interpreted the data;  
4 - Contributed reagents, materials, analysis tools or data;  
5 - Wrote the paper.

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