

PEER REVIEW HISTORY

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ARTICLE DETAILS

TITLE (PROVISIONAL)	Effect of USAID funded obstetric ultrasound service interventions on maternal and perinatal health outcomes at primary health care facilities in Ethiopia: A Propensity Score Matching Analysis
AUTHORS	Yitbarek, Kiddus; Tuji, Alemu; Alemayehu, Yibeltal; Tadesse, Derebe; Tadele, Afework; Tsegaye, Sentayehu; Abera, Yared; Abrar, Mohammed; Ibrahim, Ahmed; Esmael, Salah; Belete, Mebrie; Mohammed, Abdella; Shekabdulah, Muktar; Olani, Hundessa; Selamu, Arab; Medhin, Girmay; Jebena, Mulusew

VERSION 1 – REVIEW

REVIEWER	James-Paul Kretchy Central University, Public Health
REVIEW RETURNED	24-Jun-2022

GENERAL COMMENTS	<p>Review comments: Effect of USAID funded obstetric ultrasound service interventions on maternal and perinatal health outcomes at primary health care facilities in Ethiopia</p> <p>A study like this needs an ethics approval, or authors should provide information whether the primary data collected received ethical clearance. Also, please explain what processes / steps were followed to access the secondary data used in the current analysis. Did the study receive ethical approval? What steps were taken to ensure patient information from the records were not disclosed?</p> <p>The entire manuscript needs professional English proof-reading to correct consistencies in tenses, grammar, and other typographical errors.</p> <p>Please provide information on the source of the STATA software used in analysing the data.</p> <p>How were confounders controlled for?</p> <p>'Study population: All pregnant women who visit health facilities for maternal health care utilization in the selected health facility as intervention and control in Afar, Benishangul-Gumuz, Gambella and Somali regional states of Ethiopia.</p> <p>- How many were the pregnant women in this control group? -</p> <p>There no mention of retrospective study in the methods section? Please provide detailed description about the selection of study samples</p> <p>Provide all prevalence values as (n/%) throughout the manuscript.</p>
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	<p>Please provide the duration within which the study was carried out. How far back was the retrospective data collected and used.</p> <p>The conclusion of the study in the abstract does not seem to derive from the findings. Please state specific major findings in abstract, with values that need explanation</p>
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REVIEWER	G. Luntsi University of Maiduguri, Medical Radiography
REVIEW RETURNED	28-Jun-2022

GENERAL COMMENTS	<p>Thank you for asking me to review the manuscript entitled “Effect of USAID funded obstetric ultrasound service interventions on maternal and perinatal health outcomes at primary health care facilities in Ethiopia”</p> <p>Below are the few points I noted.</p> <p>Abstract: The abstract is well written and it contains all the component of a structured abstract, which I will suggest it to be concisely presented in purpose/aim/objectives, materials and methods, results and conclusion for clarity.</p> <p>Introduction</p> <p>The introduction is well written in plain English. However, the following observations were noted.</p> <ol style="list-style-type: none"> 1. The second paragraph, in line 23 where it says “For instance, a study Bain LE et al shows only half of women receive the recommended amount of health care they need.6” should be rewritten to read thus; “For instance, a study by Bain et al6 reported only half of women receive the recommended amount of health care they need.” 2. Similarly in the second paragraph line 26-27 “Moreover, services quality are not uniformly distributed between and withing regional states that regions such as.....” should be rewritten to read; “Moreover, services qualities are not uniformly distributed between and within regional states, such that regions like.....” 3. Also, almost all of the two concluding paragraphs in the introduction were dedicated to the objectives and purpose of the study? The overall objective of the program was to increase the utilization of high impact and quality reproductive, maternal, neonatal and child health (RMNCH). To improve access, quality and equity for basic maternal and neonatal health services, Transform: HDR introduced Vscan access, a small portable, ultrasound devise for obstetric scanning at its selected Center of Excellence health facilities- eighteen Health Centers and six hospitals in the four of its target regional states. In addition, a skill-based training was provided for midwives and physicians working at these facilities on Vscan utilization followed by post training mentoring and follow up. This intervention is expected to contribute to increasing the number of healthy mothers with successful birth outcomes and sustaining gains of reduction in under five morbidity and mortality in developing regions of Ethiopia. However, to the best of authors knowledge no study has evaluated
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	<p>effectiveness of these interventions in the study areas and less is known the extent to which introduction of such program would improve maternal and perinatal outcome is less explored in Ethiopia. Such evaluation would have both policy and program relevance. Therefore, the main purposed of this study was to investigate the effects of Vscan access on maternal and perinatal health outcomes, uptake of antenatal, delivery and perinatal services among Transform HDR supported health facilities. These can be summarized into one paragraph more concisely and other details can be moved to the materials and method.</p> <p>Materials and Method</p> <p>This also well written, however, the following were noted.</p> <ol style="list-style-type: none"> 1. What was the rationale for selecting these study locations? 2. Was this a pilot study? 3. Was this a census study across all the health centres in the emerging regional states of Ethiopia, namely Afar, Benshangul-Gumuz, Gambella and Somali regional states?, or were other centres left out and why? 4. Authors said they used a Quasi-experimental study design were 13 health facilities were intervention sites and 13 health facilities as control group to compare maternal health service utilization and perinatal health outcomes? I am concerned that the variables in this quasi-experimental study design were the 13(control and study group) health care centres and not the subjects (pregnant women) who used the facility for ANC. Also, the control and study groups, where they selected from the same population? Or from different population?, because if they were selected from different population, it will be difficult to compare the pre and post intervention as there is no stimulus to study the effect. I strongly suggest data from the centres where the interventions has taken place be used for both pre and post intervention. If intervention was in 2019, then use pre intervention data for 2017 and 2018 and the post intervention data 2020 and 2021, for the same healthcare centre using almost and if not the same population, and not a different population and healthcare staff in another centre entirely (Luntsi et al., 2022). The authors can find the article by Luntsi et al., can be found at (G. Luntsi, A.C. Ugwu, C.C. Ohagwu et al., Impact of ultrasound scanning on pregnant Women's compliance with attendance at antenatal care visits and supervised delivery at primary healthcare centres in northern Nigeria: Initial experiences, Radiography, https://doi.org/10.1016/j.radi.2022.01.003) 5. How was systematic random sampling applied in this study to select each of the cases from the registry? Can authors kindly provide detailed explanation for reproducibility? 6. What was the duration of mentoring and was there any examination to ascertain if the trained nurses had gained competency before being allowed to start scanning? 7. What advised the frequency of scanning? As authors stated that pregnant women were scanned once in each semester. "The world health organization (WHO) recommends one ultrasound scan for the expecting mother amidst 8 antenatal visits. Providing early antenatal ultrasound before the 24th week of gestation has been found to aids in accurate estimation of gestational age, improve detection of fetal anomalies and reduces the induction of labour for post-term
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	<p>pregnancies”.</p> <p>8. The current recommendation now is eight (8) ANC visits and not four as stated by authors in this study? Except if this study was done before the recommended guideline by WHO in 2016 and implemented in 2018. With the first contact at 12 weeks of gestation and the next consecutive contacts at 20th, 26th, 30th, 34th, 36th, 38th, and 40th weeks of gestation, and at least one obstetric ultrasound examination before the 24th week of gestation expectant mothers to improve a woman’s pregnancy experience.</p> <p>Results This was well written the write up and the tables are well presented. However, I will suggest that the descriptions should be written first and the tables separated from the write up.</p> <p>Discussion. The discussion is well written.</p>
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VERSION 1 – AUTHOR RESPONSE

Dear Dr. James-Paul Kretchy,

We would like thanks you for your time in reviewing our manuscript and appreciate all the relevant concerns raised. We took time to revise the whole manuscript based on your suggestion and forwarded response for all of your concerns point-by-point:

Review comments: Effect of USAID funded obstetric ultrasound service interventions on maternal and perinatal health outcomes at primary health care facilities in Ethiopia

A study like this needs an ethics approval, or authors should provide information whether the primary data collected received ethical clearance. Also, please explain what processes / steps were followed to access the secondary data used in the current analysis. Did the study receive ethical approval? What steps were taken to ensure patient information from the records were not disclosed?

Response: It is rally an important concern. Of course, the intervention was a part of a big project implemented in the four regions of Ethiopia for about four years. Before its implementation, the intervention has obtained ethical approval. In the case of this paper, we used secondary data from registers and database. In order to get relevant data, we followed the necessary steps across all the regional and facility administration for permission. For this study, we obtained anonymous data and it did not have any personal identifier.

The entire manuscript needs professional English proof-reading to correct consistencies in tenses, grammar, and other typographical errors.

Response: Thank you for the suggestions. The entire manuscript is now copy edited for grammatical and write-up issues.

Please provide information on the source of the STATA software used in analysing the data.

Response: We have now added the source in the manuscript main document of the revised copy.

How were confounders controlled for?

Response: Thank you for your insight full concern. To control the confounding in this study and raise the robustness of the findings we identified relevant confounder variables based on our review of related literature and our experience. We then included these confounding variables in to our data extraction checklist. We then went to records of facilities to extract relevant data for analysis.

Given the nature of secondary data source, we couldn't manage to find all the potential confounding variables (we reported this as a limitation). Having the available confounding variables during the analysis, we tried to match these characteristics among the intervention and control groups using propensity score matching analysis with Kernel Matching approach. We compared the standardized difference in means (SMD) across all the matching approaches and finally we found the Kernel Matching approach is the best approach for our data. The table in supplementary file II and the plots in supplementary file III and IV present how the two groups were matched for confounding variables. And we presented the percentage bias reduction because of the matching. With all these procedures we tried to eliminate the effect of confounders.

'Study population: All pregnant women who visit health facilities for maternal health care utilization in the selected health facility as intervention and control in Afar, Benishangul-Gumuz, Gambella and Somali regional states of Ethiopia.

- How many were the pregnant women in this control group?

Response: In this study, a total of 42632 women visited health centers to have maternal health services. Specifically, in the control group we have got about 18,075 mothers as a population and 24,557 mother in the intervention group. We have now included this population in the revised copy of the manuscript.

There no mention of retrospective study in the methods section? Please provide detailed description about the selection of study samples

Response: Thank you for raising this question. We used a systematic random sampling technique to select each of the cases from the registry. The total number of first ANC were divided by the allocated sample size for a single health center to determine the sampling interval. We made changes in the revised copy to clarify this issue.

Provide all prevalence values as (n/%) throughout the manuscript.

Response: thank you very much, we made changes in the revised version of the manuscript to address this issue.

Please provide the duration within which the study was carried out. How far back was the retrospective data collected and used.

Response: Thank you for the suggestion. We went four years back retrospectively to collect the data. The first two years were before the intervention for both the intervention and control groups. And the second two years data were after the intervention was being started in the intervention group and non-intervention for the control group. The data were collected from 04 to 27 April 2022. We revised the manuscript accordingly.

The conclusion of the study in the abstract does not seem to derive from the findings. Please state specific major findings in abstract, with values that need explanation

Response: thank you for the suggestion. Based on the findings of the study, we concluded that "The findings show a consistent increase in maternal health service use because of the introduction of obstetric ultrasound services at the primary health center level. Furthermore, early detection of complications and following referral for specialty care was found to be high." We now made a revision in the revised copy of the manuscript to address your concern.

Dear Dr. G. Luntsi,

Thank you very much for your time in reviewing our manuscript. We appreciate your contribution for the improvement of our work. You raised very relevant questions and suggestions. We accepted most of them and revised the manuscript main document accordingly. We also provide explanations for all the concerns raised by you in a point by point fashion:

Thank you for asking me to review the manuscript entitled “Effect of USAID funded obstetric ultrasound service interventions on maternal and perinatal health outcomes at primary health care facilities in Ethiopia”

Below are the few points I noted.

Abstract:

The abstract is well written and it contains all the component of a structured abstract, which I will suggest it to be concisely presented in purpose/aim/objectives, materials and methods, results and conclusion for clarity.

Response: Thank you very much for the relevant suggestion. We understand your concern. However, the BMJ Open’s guideline suggest an abstract should be structured in Objective, Design, Setting, Participants, Intervention, Outcome, Results, and Conclusion.

(https://bmjopen.bmj.com/pages/authors/#submission_guidelines)

Introduction

The introduction is well written in plain English. However, the following observations were noted.

1. The second paragraph, in line 23 where it says “For instance, a study Bain LE et al shows only half of women receive the recommended amount of health care they need.⁶” should be rewritten to read thus;

“For instance, a study by Bain et al⁶ reported only half of women receive the recommended amount of health care they need.”

Response: Thank you very much for the edits. We now corrected the text.

2. Similarly in the second paragraph line 26-27

“Moreover, services quality are not uniformly distributed between and withing regional states that regions such as.....” should be rewritten to read;

“Moreover, services qualities are not uniformly distributed between and within regional states, such that regions like.....”

Response: Thank you very much for the edits. We made a revision to correct the text.

3. Also, almost all of the two concluding paragraphs in the introduction were dedicated to the objectives and purpose of the study?

The overall objective of the program was to increase the utilization of high impact and quality reproductive, maternal, neonatal and child health (RMNCH). To improve access, quality and equity for basic maternal and neonatal health services, Transform: HDR introduced Vscan access, a small portable, ultrasound devise for obstetric scanning at its selected Center of Excellence health facilities- eighteen Health Centers and six hospitals in the four of its target regional states. In addition, a skill-based training was provided for midwives and physicians working at these facilities on Vscan utilization followed by post training mentoring and follow up.

This intervention is expected to contribute to increasing the number of healthy mothers with successful birth outcomes and sustaining gains of reduction in under five morbidity and mortality in developing regions of Ethiopia.

However, to the best of authors knowledge no study has evaluated effectiveness of these interventions in the study areas and less is known the extent to which introduction of such program would improve maternal and perinatal outcome is less explored in Ethiopia. Such evaluation would have both policy and program relevance. Therefore, the main purposed of this study was to

investigate the effects of Vscan access on maternal and perinatal health outcomes, uptake of antenatal, delivery and perinatal services among Transform HDR supported health facilities. These can be summarized into one paragraph more concisely and other details can be moved to the materials and method.

Response: Thank you very much for the suggestion. You are right, we took a significant proportion in the introduction to state the objective and intervention that could have been stated precisely in one paragraph. We had a lot of discussion with the coauthors about this issue. Since the intervention is new in the country we believed that it is good to the reader understand more about the intervention from the introduction and the details are included in the methods section. Because of that we tend to keep the text in the introduction. Please let me know if that doesn't satisfy your question.

Materials and Method

This also well written, however, the following were noted.

1. What was the rationale for selecting these study locations?

Response: Transform HDR is a project which intervene in different maternal and child health services and the introduction of Vscan was one in 6 hospitals and 18 health centers in the four regions of Ethiopia. We primarily planned to include all the primary health centers with the Vscan. However some of the facilities were not accessible because of the current conflict in the area and all the records were damaged in some other facilities because of the war.

2. Was this a pilot study?

Response: Yes, the intervention is pilot in limited locations and was not scaled-up to other locations.

3. Was this a census study across all the health centres in the emerging regional states of Ethiopia, namely Afar, Benshangul-Gumuz, Gambella and Somali regional states?, or were other centres left out and why?

Response: There are several health centers in the specified regions. We did not take all the health facilities in the four regions of the country. Off course, the intervention was conducted in 18 health center and six hospitals. We included 13 intervention health centers in the study. Our plan was to take all 18 intervention health centers and 18 control health centers. Unfortunately, five of the health centers were not included because of conflict and war during the study in two of the regions including 3 health centers from Afar and 2 from Benishangul Gumuz regions. Three of the health centers were inaccessible because of the active conflict and two of the health centers lost all the records because of damage during the war.

4. Authors said they used a Quasi-experimental study design were 13 health facilities were intervention sites and 13 health facilities as control group to compare maternal health service utilization and perinatal health outcomes?.

I am concerned that the variables in this quasi-experimental study design were the 13(control and study group) health care centres and not the subjects (pregnant women) who used the facility for ANC.

Also, the control and study groups, where they selected from the same population? Or from different population?, because if they were selected from different population, it will be difficult to compare the pre and post intervention as there is no stimulus to study the effect.

I strongly suggest data from the centres where the interventions has taken place be used for both pre and post intervention. If intervention was in 2019, then use pre intervention data for 2017 and 2018 and the post intervention data 2020 and 2021, for the same healthcare centre using almost and if not the same population, and not a different population and healthcare staff in another centre entirely (Luntsi et al., 2022). The authors can find the article by Luntsi et al., can be found at (G. Luntsi, A.C. Ugwu, C.C. Ohagwu et al., Impact of ultrasound scanning on pregnant Women's compliance with attendance at antenatal care visits and supervised delivery at primary healthcare centres in northern Nigeria: Initial experiences,

Response: That is really important concern. I also went through the article and I found it very interesting. In our case, we took comparable control health facilities to present a causal finding. The intervention and control health facilities and the population in both groups are relatively similar. We considered variables like location (urban/rural), the size of catchment population and proportion of women in the catchment population and the region where the intervention health center is located during selection of comparator (control) health centers. To control the effect of confounders at the individual level, we used the non-experimental causal inference technique, propensity score matching (<https://www.sciencedirect.com/topics/economics-econometrics-and-finance/propensity-score-matching>). We also did sensitivity analysis to check the acceptability of the results.

Having the available confounding variables during the analysis, we tried to match these characteristics among the intervention and control groups using propensity score matching analysis with Kernel Matching approach. We compared the standardized difference in means (SMD) across all the matching approaches and finally we found the Kernel Matching approach is the best approach for our data. The table in supplementary file II and the plots in supplementary file III and IV present how the two groups were matched for confounding variables. Moreover, we presented the percentage bias reduction because of the matching. With all these procedures, we balanced the intervention and control group.

5. How was systematic random sampling applied in this study to select each of the cases from the registry? Can authors kindly provide detailed explanation for reproducibility?

Response: Thank you for raising this issue. We used a systematic random sampling technique to select each of the cases from the registry. The total number of first ANC were divided by the allocated sample size for a single health center to determine the sampling interval. We then chose the first case by lottery method and kept the sampling interval for the rest of the samples. We made changes in the revised copy to clarify this issue.

6. What was the duration of mentoring and was there any examination to ascertain if the trained nurses had gained competency before being allowed to start scanning?

Response: Thank you for raising this important concern. We revised the manuscript to clarify this issue.

The nurses were trained by Radiologists, Integrated Emergency Surgical Officer (ISEO), and Gynecology and Obstetrics specialists for 11 consecutive days. In this phase, the nurses took pre training and post training assessments to measure the knowledge and skill they developed during the training.

After a satisfactory achievement in the post assessment, the trained nurses were sent to their respective health center and started scanning pregnant women with a strong remote mentoring by assigned radiologists, ISEO or Obstetrics and Gynaecology Specialists. The nurses document every scan images and their decision and share it to their mentor for feedback. This monitoring process continued for three months. During these three months, all the trainee nurses and trainers meet together each month for two days to discuss about the process, the findings and challenges.

All the nurses were assessed with a competency assessment tool each month for three consecutive months before they start giving the service independently.

7. What advised the frequency of scanning? As authors stated that pregnant women were scanned once in each semester. "The world health organization (WHO) recommends one ultrasound scan for the expecting mother amidst 8 antenatal visits. Providing early antenatal ultrasound before the 24th week of gestation has been found to aids in accurate estimation of gestational age, improve detection of fetal anomalies and reduces the induction of labour for post-term pregnancies".

Response: You are absolutely right. We went back to the program people and checked that the ultrasound scan service was given once amidst the four expected ANC visit, preferably at the first 24 weeks of gestation in a normal pregnancy. If the mother report any complain or if the professional get some abnormalities during the first scan, the mother would be subjected to additional scans as required. We revised the manuscript accordingly.

8. The current recommendation now is eight (8) ANC visits and not four as stated by authors in this study? Except if this study was done before the recommended guideline by WHO in 2016 and implemented in 2018. With the first contact at 12 weeks of gestation and the next consecutive contacts at 20th, 26th, 30th, 34th, 36th, 38th, and 40th weeks of gestation, and at least one obstetric ultrasound examination before the 24th week of gestation expectant mothers to improve a woman’s pregnancy experience.

Response: You are right. The WHO recommends 8 ANCs for a pregnant woman. However, the Ethiopian ministry of health still works with the four ANC and the registers are designed that way. The national indicators of care for pregnant women are also stated that way. That is why we stick to the four ANC.

Results

This was well written the write up and the tables are well presented. However, I will suggest that the descriptions should be written first and the tables separated from the write up.

Response: we appreciate the suggestion. We revised the manuscript accordingly.

Discussion.

The discussion is well written.

Thank you very much.

VERSION 2 – REVIEW

REVIEWER	James-Paul Kretchy Central University, Public Health
REVIEW RETURNED	17-Aug-2022
GENERAL COMMENTS	Review comments have been satisfactorily addressed
REVIEWER	G. Luntsi University of Maiduguri, Medical Radiography
REVIEW RETURNED	22-Aug-2022
GENERAL COMMENTS	<p>Thank you for asking me to review this manuscript entitled: “Effect of USAID funded obstetric ultrasound service interventions on maternal and perinatal health outcomes at primary health care facilities in Ethiopia: A Propensity Score Matching Analysis”</p> <p>Abstract Objective: Well written Materials and Method The design, setting, participants, intervention, outcome measures all fall under the materials and methods this should be properly captured. Results: Well written. Conclusion: Well written. Introduction.</p>

	<p>The introduction is well written with the rationale and the purpose of the study well stated.</p> <p>Materials and Methods I strongly suggest authors use the materials and method and not just methods!</p> <p>Study setting and design Why 9 were health facilities selected Somali and 5 from each state? What method of sampling was used to select these health facilities? If 13 health facilities were selected as intervention sites and 13 as controls, that sum up to 26, why were 24 health facilities used? The proportions for delivery without intervention was 26.7% and with intervention 6.9%. Which studies had these proportions and why were they not appropriately cited? Systematic random sampling was used for sample selection (not clear please) only and not for health facilities selection? This is a retrospective study and the proper distribution and selection of study centres across the study setting is as important as the sample selection! Using systematic sampling how did authors get their representative sample? It's not clearly explained in the methods for the purpose of reproducibility as recommended in the study!</p> <p>Results The results were well written and presented in self-explanatory tables.</p> <p>Discussions After a hectic data collection and a robust analysis, the discussion to me is somewhat shallow! It is said that the discussion is where a researcher puts on his/her thinking cap and make informed inferences based on the findings of his/her study and can state freely why he/she thinks is the reason for the difference or similarity between his/her work and what others have done in that area of study. Thus, I may suggest authors look inward and give cogent reasons for similarities or otherwise of their findings and that of previous studies done in similar area and write profusely in the discussion please. In the discussion, there shouldn't be a repetition of results figures again but more of insights into the findings and less laundry of results details again, references can be made to the results and not necessarily rewriting the figures. The statement "This finding directly relies on the main aim of introducing obstetric ultrasound services which is early detecting and anticipating potential complications f the mother and the child" in page 15 paragraph 2 line 14,15 and 16. Should read thus This finding directly relies on the main aim of introducing obstetric ultrasound services which is early detecting and anticipating potential complications for the mother and the child. In page 15, paragraph 3 line 31 to 33, authors opted to align with the opinion that "there are pieces of evidence that reported obstetric ultrasound does not have an effect to maternal or child health outcomes.32,33" Can I also add my voice to say that current empirical evidences have shown significant impact of obstetrics ultrasound on maternal and child outcomes and cite relevant current literatures like Luntsi et al., 2022. The full reference is thus.... To have a balanced narrative! Luntsi G., A.C. Ugwu, C.C. Ohagwu, O. Kalu, M. Sidi, E. Akpan. Impact of ultrasound scanning on pregnant Women's compliance with attendance at antenatal care visits and supervised delivery at primary healthcare centres in northern Nigeria: Initial experiences.</p>
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	<p>Radiography. 2022: 28 (2); 480-486. https://doi.org/10.1016/j.radi.2022.01.003.</p> <p>Conclusion In conclusion, first paragraph line 9has shown an increasing pattern The conclusion should say it all in a simple short and easy to understand manner answering the question the researchers set out to answer! In this article the conclusion is up to three paragraphs? (This is unnecessary!) The last paragraph sounds more like a recommendation, why not state it outright as recommendation and/or even implications of your findings!</p>
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VERSION 2 – AUTHOR RESPONSE

Dear Dr. James-Paul Kretchy

You gave us very interesting feedback during the first phase of the manuscript. We are thankful for that. We would like to appreciate acceptance of our revision from your side.

Reviewer: 1

Dr. James-Paul Kretchy, Central University, Central University, Ghana

Comments to the Author:

Review comments have been satisfactorily addressed

Dear Dr. G. Luntsi,

We really appreciate your continued support for the improvement of our manuscript. You raised very relevant concerns and we accepted most of the comments and revised the manuscript accordingly. We also gave responses to the questions point-by-point.

Reviewer: 2

Dr. G. Luntsi, University of Maiduguri

Comments to the Author:

Thank you for asking me to review this manuscript entitled: “Effect of USAID funded obstetric ultrasound service interventions on maternal and perinatal health outcomes at primary health care facilities in Ethiopia: A Propensity Score Matching Analysis”

Abstract

Objective: Well written

Materials and Method

The design, setting, participants, intervention, outcome measures all fall under the materials and methods this should be properly captured.

Results: Well written.

Conclusion: Well written.

Response: Thank you very much for the relevant suggestion. We understand your concern. However, the BMJ Open’s guideline suggest an abstract should be structured in Objective, Design, Setting, Participants, Intervention, Outcome, Results, and Conclusion.
https://bmjopen.bmj.com/pages/authors/#submission_guidelines

Introduction.

The introduction is well written with the rationale and the purpose of the study well stated.

Thank you very much

Materials and Methods

I strongly suggest authors use the materials and method and not just methods!

Response: Thank you for the suggestion. We changed the section heading in the revised copy.

Study setting and design

Why 9 were health facilities selected Somali and 5 from each state?

What method of sampling was used to select these health facilities?

If 13 health facilities were selected as intervention sites and 13 as controls, that sum up to 26, why were 24 health facilities used?

Response: Thank you for asking these questions. The obstetric ultrasound service was intervened in 26 health facilities that involves six hospitals and 18 primary health centers. We were interested in the health centers because there have been ultrasound service before the intervention begun in the hospitals. Therefore, our focus was on the primary health centers. Primarily our plan was to consider all the 18 intervention and equivalent control health centers. Unfortunately, five of the health centers were not included because of conflict and war during the study in two of the regions including 3 health centers from Afar and 2 from Benishangul Gumuz regions. Three of the health centers were inaccessible because of the active conflict and two of the health centers lost all the records because of damage during the war.

The proportions for delivery without intervention was 26.7% and with intervention 6.9%. Which studies had these proportions and why were they not appropriately cited?

Response: Thank you for raising the issue. It was not to mean delivery service attendance was 6.9% with the obstetric ultrasound intervention. It was however, a 6.9% increase in delivery service attendance among ultrasound service users as compared to the non-users. We made changes to clarify this issue.

Systematic random sampling was used for sample selection (not clear please) only and not for health facilities selection? This is a retrospective study and the proper distribution and selection of study centres across the study setting is as important as the sample selection!

Using systematic sampling how did authors get their representative sample? It's not clearly explained in the methods for the purpose of reproducibility as recommended in the study!

Response: Thank you for the concern. We used a systematic random sampling technique to select each of the cases from the registry. We traced back two years before the intervention and two years after the intervention with intervals. The sampling interval was determined by dividing the total number of first ANC by the sample size allocated to the health center. We selected the first case with a lottery method and added the sampling interval to get the next sample. In cases when the selected sample

have not complete data we chose the next cases on the register. We made changes to the revised manuscript and indicated the change with track changes.

Results

The results were well written and presented in self-explanatory tables.

Thank you very much.

Discussions

After a hectic data collection and a robust analysis, the discussion to me is somewhat shallow! It is said that the discussion is where a researcher puts on his/her thinking cap and make informed inferences based on the findings of his/her study and can state freely why he/she thinks is the reason for the difference or similarity between his/her work and what others have done in that area of study. Thus, I may suggest authors look inward and give cogent reasons for similarities or otherwise of their findings and that of previous studies done in similar area and write profusely in the discussion please. In the discussion, there shouldn't be a repetition of results figures again but more of insights into the findings and less laundry of results details again, references can be made to the results and not necessarily rewriting the figures.

Response: Thank you very much for the suggestion. Now we strengthened the discussion section of the manuscript.

The statement "This finding directly relies on the main aim of introducing obstetric ultrasound services which is early detecting and anticipating potential complications f the mother and the child" in page 15 paragraph 2 line 14,15 and 16.

Should read thus This finding directly relies on the main aim of introducing obstetric ultrasound services which is early detecting and anticipating potential complications for the mother and the child.

Response: Thank you very much for the edits. We revised the manuscript main document now.

In page 15, paragraph 3 line 31 to 33, authors opted to align with the opinion that "there are pieces of evidence that reported obstetric ultrasound does not have an effect to maternal or child health outcomes.32,33"

Can I also add my voice to say that current empirical evidences have shown significant impact of obstetrics ultrasound on maternal and child outcomes and cite relevant current literatures like Luntsi et al., 2022. The full reference is thus.... To have a balanced narrative!

Luntsi G., A.C. Ugwu, C.C. Ohagwu, O. Kalu, M. Sidi, E. Akpan. Impact of ultrasound scanning on pregnant Women's compliance with attendance at antenatal care visits and supervised delivery at primary healthcare centres in northern Nigeria: Initial experiences. *Radiography*. 2022; 28 (2); 480-486. <https://doi.org/10.1016/j.radi.2022.01.003>.

Response: Thank you for the suggestions. We made changes to consider the issues raised.

Conclusion

In conclusion, first paragraph line 9has shown an increasing pattern

The conclusion should say it all in a simple short and easy to understand manner answering the question the researchers set out to answer!

In this article the conclusion is up to three paragraphs? (This is unnecessary!)
The last paragraph sounds more like a recommendation, why not state it outright as recommendation and/or even implications of your findings!

Response: Thank you for the suggestions. Now we created a new subsection with the title
“Implication for research and practice”