

PEER REVIEW HISTORY

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ARTICLE DETAILS

TITLE (PROVISIONAL)	Characteristics of online medical care consultation for pregnant women during the COVID-19 outbreak: a cross-sectional study
AUTHORS	Chen, Miaomiao; Liu, Xiyao; Zhang, Jun; Sun, Guoqiang; Gao, Ying; Shi, Yuan; Baker, Philip; Zeng, Jing; Zheng, Yangxi; Luo, Xin; Qi, Hongbo

VERSION 1 – REVIEW

REVIEWER	Pradip Dashraath, MRCOG National University Hospital, Singapore
REVIEW RETURNED	16-Aug-2020

GENERAL COMMENTS	<p>This is a cross-sectional survey on the acceptability of remote antenatal care for pregnant women affected by the COVID-19 pandemic in China. In this regard, the research topic is novel and topical. The authors must be congratulated for their attempt to study an alternative model of care that may adopted by other nations in lockdown. A major strength of the article lies in it originating from a country with one of the largest number of cases and at a time when the pandemic was reaching its peak. It is limited, however, by the very short study period (13 days) and recall bias.</p> <p>For this manuscript to realise its maximal potential, I suggest that the authors consider the following key points:</p> <ol style="list-style-type: none">1) Please explain how the veracity of data regarding obstetric history were assured in this e-platform. For example, was gestational age based solely on patient recall or was the patient required to log in with their medical identification numbers (or equivalent) that would link to their medical records? I note from Figure 3 that n=46 patients were excluded for an "impossible gestational age" - why was this?2) Were obstetric providers able to access the patient's medical records during these e-consultations? Additionally, what were the protocols if a provider deemed a patient to be high-risk needing emergency care or hospital admission? This needs to be elaborated in the manuscript. Please also discuss the ethical and medicolegal considerations at play during such situations.3) In the absence of blood pressure, urine dipstick and fetal doptone (which are ordinarily performed during routine antenatal visits), how were patients being reassured of maternal and fetal well-being during these e-visits?
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	<p>4) It would be important to provide a sub-group analysis of the (i) number and (ii) satisfaction scores of women with high-risk obstetric conditions who utilised this platform, ie, those with pre-existing or gestational DM, gestational hypertension or pre-eclampsia. I would be most keen to read about how this group of women were managed.</p> <p>5) Please elaborate if video conferencing was used to supplement the online consultations. If it was, was this conducted on Health Insurance Portability and Accountability (HIPPA)-compliant telemedicine video conferencing platforms? This needs to be addressed in the Methods and Discussion.</p> <p>6) What is the usual frequency of antenatal visits for patients in the third trimester - fortnightly? If so, during the 2 week study period, what is the proportion of patients who returned to the online platform for repeat consults?</p> <p>7) On a related note, why was the study period capped at 2 weeks in February 2020? Given that this manuscript was submitted on 4 August, 2020, I have concerns therefore, about the sample size. This manuscript would be much better served by a retrospective analysis of a longer study duration with larger participant numbers.</p> <p>8) Please consider including a section with qualitative data - e.g., verbatim reports of patient experiences, concerns and feedback for improvement after utilising tele-consulting services.</p> <p>9) Please provide a statement disclosing any conflicts of interests or financial affiliations with YueYiTong Science and Technology Co., Ltd. If there are none to declare, this should be explicitly stated in the manuscript.</p>
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REVIEWER	Babatunde Akinwunmi Brigham and Women's Hospital, Boston Unites States.
REVIEW RETURNED	20-Aug-2020

GENERAL COMMENTS	<p>I appreciate the extensive work done by the authors. I have the following comments;</p> <ul style="list-style-type: none"> • Page 4, line 8: The authors should change "medical resource" to "medical resources" • Page 4, line 17: The authors can briefly add a line on the criteria they used to categorize the study areas into mild, moderate and severe epidemic areas. • Page 4, lines 23 & 24: The authors should add percentages to the result figures to make it much easier to translate. • Page 4, lines 29 - 33: Please rephrase this statement. It is complex and confusing in its present form. • Page 4, line 33: Don't start the sentence with figures. You can simply start by... "Total of 957 participants completed the satisfaction part of the survey..." • Page 5: The strengths and limitations should be more clearly stated. This section is also better put at the end of discussion. The authors may add that additional limitation of their study is the short duration of the data collection and also the cross-sectional study design. Because a lot of changes in response may have occurred as a result of prolongation of the virus epidemic since February 2020 up to the moment. Therefore, more longitudinal studies will
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	<p>be good to also assess any changes or the pattern of utilization and acceptability of the e-health.</p> <ul style="list-style-type: none"> • Page 5, line 56: Modify the phrase.. "in the clinical" by writing..."in the clinical setting" • Page 6, line 4: Change "focus" to past tense i.e. "focused" • Page 6, line 31: The authors can remove the statement currently in the bracket and simply put the YunYiTong platform as a reference for the readers to look at if they are interested. The authors need to modify these statements so that the paper is not appearing like it is emphasizing on promotion of the work by YunYiTong, rather than the opportunities and benefits of e-health use to pregnant women during COVID-19 crisis. • Page 7, lines 6 - 8: Here the authors also need to state how they first introduced the platform to the pregnant women and how they obtained their consent for research participation before registration on the platform. • Page 7, lines 41 - 47: For more details, the authors should add more information here on the average numbers of confirm cases in the selected areas as at the time of data collection which qualify them as mild, moderate and severe epidemic areas. A table or chart of this may also be added. • Page 8, lines 52 - 55: The authors should be mindful of the correct use of terminologies. Perinatal period relates to the time, which usually is some weeks, immediately before delivery and after delivery of the baby. Therefore, it is not accurate to say that a study that assessed pregnant women in their first, second and third trimester of pregnancy was used in perinatal health care. Also there have been some recent publications on Online Antenatal Care During the COVID-19 Pandemic in China and additional literature search will improve this manuscript. • Page 10, Table 2: Some figures in the table are overlapping and they should be better arranged. The authors may also do odd ratios and control for possible confounders to confirm and enrich their results. • Page 10, line 37: This statement should be expunged from here and taken to the discussion section. It can also be mentioned as one of the study limitations. • Page 12, line 37 to 45: Most of the content here are better put as discussion. Most part of the result should be rephrased to talk specifically on the results and the points observed while the explanation of the results and inferences from the results should be written in the discussion section. • Page 14, line 16: The authors should be consistent with their date format and use same format all through in the text. Different format was used earlier in the text. • Page 14, line 18: complete the data as "March 23, 2020". • Page 15, line 19: Correct "evens" to "events" • Page 15, line 26: Rephrase as "recommended during pregnancy" • Page 15, line 29: Please remove this statement in bracket "... (the corresponding author, Professor Qi, is included)" and simply put a reference. • Also, in the reference list, the same reference is repeated in 10 and 30. The authors should correct this and make it one. • Page 15, line 47: correct "might related" to "might be related" • Page 17, line 14: Correct "satisfy by" to "satisfactory to"
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VERSION 1 – AUTHOR RESPONSE

Reviewer #1:

Dear Prof. Pradip:

I want to mention one thing before answering the following questions that our research aimed at the difference of pregnant women's concerns among areas of different severities of epidemic during the outbreak. We recommended to apply the E-health to antenatal care care(ANC) according to the current medical policies and medical modes, rather than completely substitute the outpatient service. This combination mode can both alleviate the pressure of outpatient services during the epidemic, and avoid contact infection by reducing unnecessary crowded gatherings.

For this manuscript to realise its maximal potential, I suggest that the authors consider the following key points:

1) Please explain how the veracity of data regarding obstetric history were assured in this e-platform. For example, was gestational age based solely on patient recall or was the patient required to log in with their medical identification numbers (or equivalent) that would link to their medical records? I note from Figure 3 that n=46 patients were excluded for an "impossible gestational age" - why was this?

Response: Registration was required for each pregnant woman before using the platform, including last menstrual period and current gestational age. Verification was performed afterwards, in which impossible gestational age was identified whenever last menstrual or current gestational age showing less than 0 week or more than 45 weeks gestational age (page 5, line 145-146).

2) Were obstetric providers able to access the patient's medical records during these e-consultations? Additionally, what were the protocols if a provider deemed a patient to be high-risk needing emergency care or hospital admission? This needs to be elaborated in the manuscript. Please also discuss the ethical and medicolegal considerations at play during such situations.

Response: The electronic medical records had not been used in areas involved in this research before the outbreak of the epidemic, while this platform was exactly developed during the epidemic, therefore, the obstetricians cannot access the patient's medical records during these e-consultations. This platform aimed to provide consultation-focused perinatal healthcare services for pregnant women during the outbreak. As to the emergencies you mentioned above, we would advise her to go to the hospital immediately on the premise of personal protection, and inform the corresponding hospital to make preparation for docking in advance according to the known information. Thank you very much

for your question. This platform is currently under development, and corresponding processes will be developed according to the severity of the disease for further classification management.

3) In the absence of blood pressure, urine dipstick and fetal doppler (which are ordinarily performed during routine antenatal visits), how were patients being reassured of maternal and fetal well-being during these e-visits?

Response: This platform mainly provided the following helps for pregnant women: the consultations of examination reports, diagnosis of discomfort complaints (dizzy, lightly vaginal bleeding, etc.), non-examined diagnosis, etc. Our research aimed to figure out the differences of pregnant women's concerns among areas of different severities of epidemic during the outbreak. During the online consultation, professional diagnoses would be provided according to pregnant women's questions, and immediate outpatient services would be advised to them for uncertain fetal status, meanwhile, the hospital would prepare for the reception to maximize the reduction of adverse outcomes. With the constant improvement of medical system, more ANC items will be done online in the future, such as blood pressure measurements, fetal heart monitoring, etc.

4) It would be important to provide a sub-group analysis of the (i) number and (ii) satisfaction scores of women with high-risk obstetric conditions who utilised this platform, ie, those with pre-existing or gestational DM, gestational hypertension or pre-eclampsia. I would be most keen to read about how this group of women were managed.

Response: We are appreciated that this suggestion is beneficial for sorting and classification administration of pregnant women, but our platform aimed to provide consultation-focused antenatal healthcare services for pregnant women who were afraid of or unable to go out during the outbreak. Because this platform is the consultation-focused service, that is mainly led by pregnant women through volunteeredly consults without professional guidance, therefore, the subgroup data would be absent if pregnant women didn't mention her complicated diseases. However, the advice you put forward is very important, which will contribute to further promoting the integration of medical resources, helping better classification administration, and facilitating the further promotion and utilization of the online medical clinic platform after the pandemic.

5) Please elaborate if video conferencing was used to supplement the online consultations. If it was, was this conducted on Health Insurance Portability and Accountability (HIPAA)-compliant telemedicine video conferencing platforms? This needs to be addressed in the Methods and Discussion.

Response: Voices, words and images were used in the present research, which can basically satisfied the need of primary diagnose. While, video conferencing is urgent to be developed in the future online diagnosis.

6) What is the usual frequency of antenatal visits for patients in the third trimester - fortnightly? If so, during the 2 week study period, what is the proportion of patients who returned to the online platform for repeat consults?

Response: According to our domestic advices on perinatal health care, we currently recommended fortnightly antenatal examination for pregnant women with 32-36 weeks of gestation, and weekly antenatal examination for those with 36-41 weeks of gestation. Thanks for your advice, we recalculated the number of people reusing the platform in different areas with varying severities of pandemic according their phone IP. In remote areas with mild severe epidemic, 83(18.53%) pregnant women reused our platform with the same phone IP, of which 67 were in the third trimester, accounting for 33.67% of all third trimester patients in those areas; 327(24.55%) pregnant women reused the platform in Chongqing (neighboring areas with moderate severe epidemic), of which 209 were in the third trimester, accounting for 34.89% of all third trimester patients in this area; 218(26.62%) pregnant women reused the platform in the hardest-hit areas, of which 144 were in the third trimester, accounting for 43.64% of all third trimester patients in those areas. However, the accuracy of this data is not guaranteed for some participants may change their phone IP by logging in with different phones. What's more, gestation weeks might had changed when the pregnant woman reused the platform after the first time, thus we can't calculate the proportion of patients in their third trimester who returned to use the platform for repeat consults.

7) On a related note, why was the study period capped at 2 weeks in February 2020? Given that this manuscript was submitted on 4 August, 2020, I have concerns therefore, about the sample size. This manuscript would be much better served by a retrospective analysis of a longer study duration with larger participant numbers.

Response: In fact, we submitted our manuscript to *BMC childbirth and pregnancy* on 8th April, but the editor replied on 16th June to reject us for the reason that only one reviewer was available, and they failed to find the second reviewer during the pandemic. Then we made certain modifications according to the first reviewer's advices, and submitted to *BMJ open* on 4th August and so luckily to receive your advices. Given that 10th to 23rd February is the most hopeless phase throughout the outbreak, many pregnant women were unable to decide whether to go outpatient department for antenatal care as scheduled or stay at home to avoid the risk of infection of COVID-19. Therefore, the online consultation greatly met the needs of pregnant women during this period. Why was this period ? Because pregnant women would more truly and faithfully reflect their urgent needs through online

consultations during this period than normal time. More pregnant women were willing to go to the outpatient department for antenatal care from March to now since the epidemic situation was mitigated, while there were still a number of pregnant women resorted to online consultations. We are about to compare the online medical consultations between during and after the epidemic outbreak in the further studies.

8) Please consider including a section with qualitative data - e.g., verbatim reports of patient experiences, concerns and feedback for improvement after utilising tele-consulting services.

Response: Thank you for your advices, we rephrased the reports of patient experiences and feedback in the section of *Participants experience with e-health* (table 4)(page 10, line 245-253) . Participants concerns by the trimesters of gestation and/or the severity of the epidemic were shown in table 1- table 3.

9) Please provide a statement disclosing any conflicts of interests or financial affiliations with YueYiTong Science and Technology Co., Ltd. If there are none to declare, this should be explicitly stated in the manuscript.

Response: There aren't conflicts of interests or financial affiliations with YueYiTong Science and Technology Co., Ltd (page 16, line 381-382).

Reviewer #2:

Dear Prof. Akinwunmi:

I appreciate the extensive work done by the authors. I have the following comments;

- Page 4, line 8: The authors should change "medical resource" to "medical resources"

Response: Thank you for your reminder, we have corrected it. (page 3,line 87; page 12, line 283)

- Page 4, line 17: The authors can briefly add a line on the criteria they used to categorize the study areas into mild, moderate and severe epidemic areas.

Response: Thank you for your advice, we have added the description on criteria with "From February 10th to 23rd, we collected data on online obstetric consultations and participants' satisfaction through YYT platform in mild, moderate and severe epidemic areas which were defined according to the local confirmed cases" (page 2, line 39-41).

- Page 4, lines 23 & 24: The authors should add percentages to the result figures to make it much easier to translate.

Response: Thank you for your advice, we added the percentage of each data in this study (page 2, line 45 - 46; page 6, line 176-178; page 10, line 230 -231).

- Page 4, lines 29 - 33: Please rephrase this statement. It is complex and confusing in its present form.

Response: We rephrase the statement as “The distribution of the amount of online consultations were significantly different not only in different areas, but also in different trimesters. In any trimester, the amount of consultations on the second category (obstetric care-seeking behaviour) was the highest in the severe epidemic areas.” (page 2, line 52-55).

- Page 4, line 33: Don't start the sentence with figures. You can simply start by... "Total of 957 participants completed the satisfaction part of the survey..."

Response: Thank you for your advice, we corrected it as you suggested (page 2, line 48-49).

- Page 5: The strengths and limitations should be more clearly stated. This section is also better put at the end of discussion. The authors may add that additional limitation of their study is the short duration of the data collection and also the cross-sectional study design. Because a lot of changes in response may have occurred as a result of prolongation of the virus epidemic since February 2020 up to the moment. Therefore, more longitudinal studies will be good to also assess any changes or the pattern of utilization and acceptability of the e-health.

Response: ‘Strengths and limitations of this study’ was required to be placed after the abstract. As you suggested, “the short duration of the data collection and also the cross-sectional study design” was included in this section, and we have rephrased this section (page 3, line 69).

- Page 5, line 56: Modify the phrase.. "in the clinical" by writing..."in the clinical setting"

Response: Thank you for your reminder, we have corrected it (page 3, line 88).

- Page 6, line 4: Change "focus" to past tense i.e. "focused"

Response: Thank you for your reminder, we have corrected it (page 3, line 91).

• Page 6, line 31: The authors can remove the statement currently in the bracket and simply put the YunYiTong platform as a reference for the readers to look at if they are interested. The authors need to modify these statements so that the paper is not appearing like it is emphasizing on promotion of the work by YunYiTong, rather than the opportunities and benefits of e-health use to pregnant women during COVID-19 crisis.

Response: As you suggested, we have removed this section, and we have provided the website of YunYiTong platform for readers (page 4, line 99-101).

• Page 7, lines 6 - 8: Here the authors also need to state how they first introduced the platform to the pregnant women and how they obtained their consent for research participation before registration on the platform.

Response: The following ways were performed to promote the free online service for obstetric consultations provided by YYT: forwarding the link of the online medical consultation service website to colleagues and friends and distributing the free online treatment information (page 4, line 114-116).

Every pregnant woman have access to the free online treatment after registration on the platform, and can choose obstetricians or hospitals at will. Before the consultation, the pregnant women were informed that the contents of the consultation would be used for scientific research and be kept absolutely confidential. If they chose "I already know and agree to the above", they can continue their free online consultation (page 4-5, line 121-124).

• Page 7, lines 41 - 47: For more details, the authors should add more information here on the average numbers of confirm cases in the selected areas as at the time of data collection which qualify them as mild, moderate and severe epidemic areas. A table or chart of this may also be added.

Response: The table S1 was added as supplementary material (page 5, line 137 and Table S1).

Table S1: confirmed cases in the selected areas as at the time of data collection.

The severity of the epidemic situation	Representative areas	Confirmed cases (cases)
Mild	Gansu	91
	Xinjiang	76
Moderate	Chongqing	575

	Hubei	64287
Severe	Henan	1271
	Hunan	1261

• Page 8, lines 52 - 55: The authors should be mindful of the correct use of terminologies. Perinatal period relates to the time, which usually is some weeks, immediately before delivery and after delivery of the baby. Therefore, it is not accurate to say that a study that assessed pregnant women in their first, second and third trimester of pregnancy was used in perinatal health care. Also there have been some recent publications on Online Antenatal Care During the COVID-19 Pandemic in China and additional literature search will improve this manuscript.

Response: This was our carelessness, we have corrected it. Thank you very much for your kindly reminder (page 6, line 180).

• Page 10, Table 2: Some figures in the table are overlapping and they should be better arranged. The authors may also do odd ratios and control for possible confounders to confirm and enrich their results.

Response: Thank you for your advice, we applied logistic regressions to examine the association between the distribution of the amount of online consultation and the trimesters (page 7 and 8, line 199 and 202, and table 2).

Table 2: Reasons for online consultation by trimesters of pregnancy.

	Trimesters of pregnancy			Total	OR (95% CI)	P-value
	First trimester (n=417)	Second trimester (n=1054)	Third trimester (n=1128)			
Classification of online medical care consultation						<i>p</i> <0.001**
Routine antenatal check-up	239(57.31)	419(39.75)	350(31.03)	1008(38.78)	Reference(1)	
Obstetric care-seeking behaviour	45(10.79)	257(24.38)	284(25.18)	586(22.55)	1.265 (1.044 to 1.532)	0.016
Abnormal symptoms	74(17.75)	211(20.02)	260(23.05)	545(20.97)	1.380 (1.134 to 1.680)	0.001

Maternal comorbidity and pregnancy complications	28(6.71)	75(7.12)	181(16.05)	284(10.93)	2.639 (2.031 to 3.429)	$p < 0.001^{**}$
Other needs for e-health	31(7.43)	92(8.73)	53(4.70)	176(6.77)	0.742 (0.533 to 0.984)	0.039

*Note: Data are n (%); OR, odds ratio; CI, confidence interval; * $p < 0.05$ ** $p < 0.01$.*

- Page 10, line 37: This statement should be expunged from here and taken to the discussion section. It can also be mentioned as one of the study limitations.

Response: As you suggested, we have taken the statement to the discussion section (page 12, line 273-275).

- Page 12, line 37 to 45: Most of the content here are better put as discussion. Most part of the result should be rephrased to talk specifically on the results and the points observed while the explanation of the results and inferences from the results should be written in the discussion section.

Response: Thank you for your reminder, we rephrased this part as:

An average of 79.94% participants deemed that e-health could save time, and 82.45% participants thought it could reduce the risk of COVID-19 infection. In addition, There were 39.81% and 41.17% participants held the view that e-health could make them feel comfortable and save money respectively. As for their suggestions for e-health in the near future, 32.92%, 28.21%, 57.37%, and 47.02% participants hoped for the function of online video, physician's reply within a defined time, automatic referral to appropriate obstetricians, and management of maternal medical condition respectively. There were 3.76% participants expressed more needs for e-health, such as remote fetal heart monitoring, electronic prescription, and online pharmacies, etc. (page 10, line 245-253).

- Page 14, line 16: The authors should be consistent with their date format and use same format all through in the text. Different format was used earlier in the text.

Response: Thank you for your reminder, we have made the data format to be consistent (page 3, line 79; page 12, line 263-265).

- Page 14, line 18: complete the data as "March 23, 2020".

Response: Thank you very much, we have corrected it (page 12, line 265).

- Page 15, line 19: Correct "evens" to "events"

Response: Thank you very much, we have corrected it (page 13, line 297).

- Page 15, line 26: Rephrase as "recommended during pregnancy"

Response: As you suggested, we have corrected it (page 13, line 299).

- Page 15, line 29: Please remove this statement in bracket "... (the corresponding author, Professor Qi, is included)" and simply put a reference.

Response: As you suggested, we have removed this statement in bracket (page 13, line 302).

- Also, in the reference list, the same reference is repeated in 10 and 30. The authors should correct this and make it one.

Response: Please accept my sincere apology. We have removed the repeated reference (page 14, line 335).

- Page 15, line 47: correct "might related" to "might be related"

Response: Thank you very much, we have corrected it (page 13, line 310).

- Page 17, line 14: Correct "satisfy by" to "satisfactory to"

Response: As you suggested, we have corrected it (page 15, line 357).

VERSION 2 – REVIEW

REVIEWER	Babatunde AKINWUNMI Brigham and Women's Hospital, Boston
REVIEW RETURNED	24-Sep-2020
GENERAL COMMENTS	I congratulate the authors for the revision of this manuscript and appreciate the efforts put into it. . Some of the issues I raised in the first version have not been fully addressed.

	. There are still some grammatical errors in the text and the authors need to read through thoroughly again and make corrections. For example, the authors should rephrase the following statement on line 69....."This study is the cross-sectional designed with the short duration of the data collection"
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VERSION 2 – AUTHOR RESPONSE

Reviewer #2:

Dear Prof. AKINWUNMI:

-Some of the issues I raised in the first version have not been fully addressed.

There are still some grammatical errors in the text and the authors need to read through thoroughly again and make corrections. For example, the authors should rephrase the following statement on line 69....."This study is the cross-sectional designed with the short duration of the data collection"

Response: Thank you for your advice. Considering your advice, we asked the language editing company for help. And we corrected the statement on line 69(the first version) as "This is a cross-sectional study with the short duration of data collection".

We tried our best to improve the manuscript and made some modifications in the manuscript, which will not influence the content and framework of the paper. We appreciate the Editor-in-Chief Reeves and Prof. AKINWUNMI for your warm work, and hope that the correction will meet with approval.

Once again, thank you very much for your comments and suggestions