PEER REVIEW HISTORY

ARTICLE DETAILS

TITLE (PROVISIONAL)	Factors that influence compliance for referral from primary care to hospital for maternal and neonatal complications in Bosaso, Somalia: A Qualitative Study
AUTHORS	Morris, Catherine; Meehan, Kate; Had, Hussein; Barasa, Sammy; Hasna, Zainul; Hynes, Michelle; Amsalu, Ribka

VERSION 1 – REVIEW

REVIEWER	Reis, Zilma Universidade Federal de Minas Gerais, Gynecology and Obstetrics
REVIEW RETURNED	08-Dec-2022

GENERAL COMMENTS	Factors that influence compliance for referral from primary care to hospital for maternal and neonatal complications in Bosaso, Somalia: A Qualitative Study General comments ========== This paper presents a descriptive analysis of 54 referrals (4 months) due to maternal complications from primary care to the hospital. This study contributes to the perinatal health programs in scenarios with low resources. My concern about the study is the paucity of data covering 4 months in a year to represent the scenario of the study quantitatively. However, the value of a qualitative approach is present. Specific comments ========== Question 1 – What is already known on this topic? Values presented are from general worldwide statistics. The authors might clarify this point or change it using the real-higher values from low resources birth settings. Question 2 – Methods / study setting (lines 8 to 10) What were the obstetric and neonatal complications primary care could not properly handle? The main document I recommend including in the methods is a straightforward standard operating procedure for the referrals, including non-emergency and emergency obstetric care situations and neonatal indications for safe transfer. For instance, "went to hospital within 24 hours" could be considered a high risk of complications in obstetric emergencies. But, is it compliance with what? Obstetric emergencies must do a safe transfer within two hours.

	Question 3 – Methods / study setting Was there a preference for in-labor transfer against after-childbirth referral? Were mother and child referred simultaneously to the same hospital? What is the clinical protocol for referral in Somalian MCH? Question 4 – Methods / Study setting Regarding the birth scenario, it is relevant to picture the alignment between the Somalian MCH routines and the best practices in perinatal care. Most of them are viable in low resources settings and depend on the training of caregivers. Question 5– Methods / Study setting The lack of information about Somalin MCH's standard operating procedure for perinatal referrals brought a sort of suppositions during the manuscript analysis. Safe transport is a critical issue for obstetric referral. How safe was the emergency transportation? What was the safe distance between the MCH center and the hospital; and how are the practices of the pregnant women transferred? using the MCH ambulance service? Was it dependent on community mobilization interventions? Had patients medical support during the transfer? Question 6 - Methods / Participants Who were the respondents? Medical doctors in the referral hospital, caregivers, and patients? please clarify in methods. Question 7 - Results The referral compliance of (94%) is not clear in supplementary Table 3- What does MNH mean? I suggest clarifying abbreviations under each table. Question 8 - Discussion The high referral compliance reported in this study is affirmative with high uncertainty. Looking at supplemental tables, the reader will not know the standard with clear rules for referrals used for the rate calculation.

REVIEWER	Miranda, Jezid Universidad de Cartagena, Obstetrics and Gynecology
REVIEW RETURNED	15-Dec-2022

GENERAL COMMENTS	This is an important piece of information. I congratulate Dr. Morris and her coauthors for leading this research and the funding agencies. It is well known that 99% of maternal deaths occur in developing countries, with a vast majority of cases occurring in sub-Saharan Africa, especially in zones in which the presence of the government and the health care systems have been lessened due to war, climate crisis, or extreme poverty. In such a scenario, this study could help governments in how to improve health programs for communities affected by humanitarian crises, especially regarding the problem of the cost of transportation of the mother/baby to a hospital, the care in a setting like a hospital, the quality of care and the communication. Qualitative research involves collecting and analyzing non-numerical data to understand concepts, opinions, or experiences. The research methodology was correctly performed simply and clearly. Again, this is a nice piece of work, and I would be happy to see it in print. That said, a qualitative analysis is hardly reproducible in another contest and is scientifically less reliable. Therefore, I do have respectful suggestions for the

	authors to strengthen the message of the manuscript: The authors, however, need to be bolder and more analytical. Can you please add the standard deviation to the means in the main text and the supplementary tables? It should be noted that by extending the study by a few months, they could have obtained a better sample. The data collection tools are well described. However, it could be useful to carry out a duplicate analysis with an analysis of the reports of hospital specialists, to compare the patient-doctor experience. The introduction is well described, with clear analysis and discussion, conclusion with strength and limitation truthful. It is unclear when the authors describe that referral from primary care is common practice in humanitarian and non-humanitarian settings. Do they mean humanitarian crisis, the type of care? After this research, can the authors propose a pathway for research and their insights about how the situation can be improved in their scenario? In table 2, can you describe the mean gestational age at delivery? That would give us an idea about the higher rate of respiratory distress. Table 2, can you specify whether bleeding (n=2) was antenatal or postpartum hemorrhage? It would be fair to say that 21 patients (57%) of the sample were referred to seek a cesarean section. In table 2, can you please specify the difference between preeclampsia and hypertension? Can you expand on the results about the referral time? I believe that the information there is very important.

VERSION 1 – AUTHOR RESPONSE

Reviewer 1
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Comment: This paper presents a descriptive analysis of 54 referrals (4 months) due to maternal complications from primary care to the hospital. This study contributes to the perinatal health programs in scenarios with low resources. My concern about the study is the paucity of data covering 4 months in a year to represent the scenario of the study quantitatively. However, the value of a qualitative approach is present.

Authors' Response: Thanks for the comment, agreed the sample size is small for quantitative analysis and it is included as limitations.

Comment: Question 1 – What is already known on this topic?
Values presented are from general worldwide statistics. The authors might clarify this point or change

it using the real-higher values from low resources birth settings.

Authors' Response: This section has been removed at the request of the journal editors.

Comment: Question 2 – Methods / study setting (lines 8 to 10)
What were the obstetric and neonatal complications primary care could not properly handle? The main document I recommend including in the methods is a straightforward standard operating procedure for the referrals, including non-emergency and emergency obstetric care situations and neonatal indications for safe transfer. For instance, "went to hospital within 24 hours" could be considered a high risk of complications in obstetric emergencies. But is it compliance with what? Obstetric emergencies must do a safe transfer within two hours.

Authors' Response: Thanks for the comment. Have edited the sentence to clarify. Somalia has a standard of care that defines what can be provided at what level of care. At primary healthcare level the services provided are uncomplicated normal vaginal delivery, essential newborn care, resuscitation, and provision of injectable antibiotics. Any maternal complication during labor such as prolonged labor, bleeding, hypertension, and complications of newborns such as neonatal sepsis, preterm or low birth weight, respiratory distress, or any complication that requires inpatient care are referred to hospital. To our knowledge and as was reported by healthcare workers in the interview there is no standard operating procedures for obstetric and neonatal referrals that is printed and in the health facilities. While refugees were provided with cash for referral from UNHCR there are no functioning ambulances. We defined referral compliance as a) patients going to the referral hospital and b) arriving at the referral hospital within 24 hours. We completely agree that emergency referrals ought to include stabilization, care during transport, and immediate arrival at the hospital within hours. Our definition covered both emergency and nonemergency cases – all referrals. That said majority of mothers and babies who were referred arrived within 2 hours at the referral hospital.

Comment: Question 3 – Methods / study setting
Was there a preference for in-labor transfer against after-childbirth referral? Were mother and child referred simultaneously to the same hospital? What is the clinical protocol for referral in Somalian MCH?

Authors' Response: Thanks for the question. From the study aims perspective, no there was not, we included all referrals. What determined the timing of referral was the timing of diagnosis and the decision by the healthcare workers if the mother or baby needed referral. All of the maternal referrals were in-labor. Data collectors were always stationed at the primary health centers to enroll any maternal or newborn referrals. All referrals were made to the same hospital as it is the only public hospital in the area (some participants elected to go to private hospitals). Mothers and newborns were referred together, simultaneously, in our study population.

Comment: Question 4 – Methods / Study setting
Regarding the birth scenario, it is relevant to picture the alignment between the Somalian MCH routines and the best practices in perinatal care. Most of them are viable in low resources settings and depend on the training of caregivers.

Authors' Response: Yes, the first three years of this study focused on this precisely with Essential Newborn Care. In this part of the research, we focused on the experience of referral and factors that influenced decision-making for newborn and maternal complications from the mother/caretaker and healthcare workers' perspectives.

Comment: Question 5– Methods / Study setting
The lack of information about Somalin MCH's standard operating procedure for perinatal referrals brought a sort of suppositions during the manuscript analysis. Safe transport is a critical issue for obstetric referral. How safe was the emergency transportation? What was the safe distance between the MCH center and the hospital; and how are the practices of the pregnant women transferred? using the MCH ambulance service? Was it dependent on community mobilization interventions? Had patients medical support during the transfer?

Authors' Response: Thanks for the comment. We agree – the questions you list are all relevant questions for future research. We have added it for future research recommendation under discussion

section line 15-17. For this study our question was limited to measuring if families comply with referral and not. This line of questioning fell outside the scope of this research. We were not evaluating the referral system in Somalia, but rather interviewing mothers and providers about factors that influenced maternal and neonatal referral compliance in this humanitarian setting.

Comment: Question 6 - Methods / Participants
Who were the respondents? Medical doctors in the referral hospital, caregivers, and patients? please clarify in methods.

Authors' Response: This has been clarified (Page 6, 27-29). Respondents are all what you listed: caretakers, patients, and health care workers. In terms of health care workers, 12 were midwifes, one was a clinical officer in charge of the pediatric ward, and one was a nurse working on the Pediatric ward in Bosaso hospital.

Comment: Question 7 - Results
The referral compliance of (94%) is not clear in supplementary Table 3- What does MNH mean? I suggest clarifying abbreviations under each table.

Authors' Response: Thanks for the comment. MNH was referring to the maternal and newborn health referrals combined. This has been clarified.

Comment: Question 8 - Discussion
The high referral compliance reported in this study is affirmative with high uncertainty. Looking at supplemental tables, the reader will not know the standard with clear rules for referrals used for the rate calculation.

Authors' Response: In this study we defined referral compliance based on two criteria: a) the patients went to the hospital where they were referred and b) they went to the hospital within 24 hours. Our study included all referrals. We have added a foot note in the table to clarify and have also added range and standard deviation for the statistical uncertainty.

Reviewer: 2

Comment: The research methodology was correctly performed simply and clearly. Again, this is a nice piece of work, and I would be happy to see it in print. That said, a qualitative analysis is hardly reproducible in another contest and is scientifically less reliable. Therefore, I do have respectful suggestions for the authors to strengthen the message of the manuscript:

The authors, however, need to be bolder and more analytical. Can you please add the standard deviation to the means in the main text and the supplementary tables?

Authors' Response: Thank you for the comment. We have added the range and standard deviation.

Comment: It should be noted that by extending the study by a few months, they could have obtained a better sample.

Authors' Response: Thank you for the comment. We agree. Small sample size is indeed a limitation. We have added as the limitation of the study line 27 -29.
Comment: The data collection tools are well described. However, it could be useful to carry out a duplicate analysis with an analysis of the reports of hospital specialists, to compare the patient-doctor experience.

Authors' Response: We sought to do this through the in-depth interviews with the healthcare workers at the MCH centers and Bosaso Hospital. The findings from these interviews were described in the Results section on page 11. We agree that a comparison analysis would be interesting but we did not interview providers about individual cases, just their overall perceptions.

Comment: The introduction is well described, with clear analysis and discussion, conclusion with strength and limitation truthful. It is unclear when the authors describe that referral from primary care is common practice in humanitarian and non-humanitarian settings. Do they mean humanitarian

crisis, the type of care?

Authors' Response: This section has been removed at the request of the journal editors.

Comment: After this research, can the authors propose a pathway for research and their insights about how the situation can be improved in their scenario?

Authors' Response: Thank you for the comment. We have added a sentence on the importance of implementation science research that can be done in partnership with academic institutes and have added topics for future research on safety and quality of referral and what Somalia Ministry of Health and partners could do to alleviate current challenges under discussion section last paragraph.

Comment: In table 2, can you describe the mean gestational age at delivery? That would give us an idea about the higher rate of respiratory distress.

Authors' Response: Good question. Gestational age at delivery was not included in our data set.

Comment: Table 2, can you specify whether bleeding (n=2) was antenatal or postpartum hemorrhage?

Authors' Response: Most likely in-labor, as all maternal referrals were in-labor.

Comment: It would be fair to say that 21 patients (57%) of the sample were referred to seek a cesarean section.

Authors' Response: 21 patients were referred because they either had a previous birth with cesarean section or were diagnosed to have prolonged or obstructed labor. The primary care health facilities don't have the capacity to provide trial of labor or to perform assisted vaginal delivery.

Comment: In table 2, can you please specify the difference between preeclampsia and hypertension?

Authors' Response: The diagnosis data is extracted from clinical records. Clinically, the norm is to diagnose anyone who has hypertension with fluid retention as preeclampsia, and those who don't have fluid retention or proteinuria as hypertension.

Comment: Can you expand on the results about the referral time? I believe that the information there is very important.

Authors' Response: The data collectors noted the time of departure from the MCH and the time of arrival at the hospital. We don't have disaggregated data when the referral occurred (morning, afternoon, evening etc.) but did note that arrival at prayer time at the hospital was cited as a reason for delayed care by one respondent.

VERSION 2 – REVIEW

REVIEWER	Reis, Zilma Universidade Federal de Minas Gerais, Gynecology and Obstetrics
REVIEW RETURNED	22-Feb-2023

GENERAL COMMENTS	These are valid and acceptable responses with respective adjustments in the manuscript.

REVIEWER	Miranda, Jezid Universidad de Cartagena, Obstetrics and Gynecology
REVIEW RETURNED	27-Feb-2023

GENERAL COMMENTS	The authors have addressed comments from previous reviewers and revisited the manuscript substantially. Compared with the previous version, the manuscript reads better and has a clearer message. The authors have added detailed information regarding the background and statistical analysis and enhanced the clinical application of the manuscript. Furthermore, the authors have clarified several points, and I believe the manuscript is now clear and accurate. The authors have improved several points, including: 1. The abstract is now more accurate and in agreement with the study design and results. 2. The objective of the study is now clear and consistent with the author's hypothesis. 3. It is now clear that the manuscript is describing an association, and more studies are required to establish a causal relationship. 4. The description of the results is clear, and the limitations of the study regarding sample size, sampling, and study population are now addressed in the revised version.