

Health Care Workers' Experiences, Challenges of Obstetric Referral Processes and Self-Reported Solutions in South Western Uganda: Mixed Methods Study

Hamson Kanyesigye¹, Joseph Ngonzi¹, Edgar Mulogo², Yarine Fajardo¹, Jerome Kabakyenga²

¹Department of Obstetrics and Gynecology, Faculty of Medicine, Mbarara University of Science and Technology, Mbarara, Uganda; ²Department of Community Health, Mbarara University of Science and Technology, Mbarara, Uganda

Correspondence: Hamson Kanyesigye, Tel +256752806921, Email hkanyesigye@must.ac.ug

Introduction: In resource limited settings, the highest burden of adverse maternal-fetal outcomes at referral hospitals is registered from emergency obstetric referrals from lower health facilities. Implementation of referral protocols has not been optimally successful possibly attributed to lack of understanding of profile of obstetric referrals and local challenges faced during implementation process.

Objective: This study described the profile of emergency obstetric referrals, challenges faced in implementation of obstetric referral processes and explored self-reported solutions by health workers.

Methods: This was a mixed methods study done at Mbarara Regional Referral Hospital (MRRH) and health centre IVs in South-Western Uganda. We consecutively recruited emergency obstetric referrals from Isingiro district for delivery at MRRH. Using a pre-tested questionnaire, we collected demographics, obstetric and referral characteristics. We described the profile of referrals using frequencies and proportions based on demographics, obstetric and referral characteristics. We conducted focus group discussions and in-depth interviews with health workers using discussion/interview guides. Using thematic analysis, we ascertained the challenges and health worker self-reported solutions.

Results: We recruited 161 referrals: 104(65%) were below 26 years, 16(10%) had no formal education, 11(7%) reported no income, 151(94%) had no professional-escort, 137(85%) used taxis, 151(96%) were referred by midwives. Common diagnoses were previous cesarean scar (24% [n=39]) and prolonged labour (21% [n=33]). There was no communication prior to referral and no feedback from MRRH to lower health facilities. Other challenges included inconsistencies of ambulance and anesthesia services, electric power, medical supplies, support supervision, and harassment by colleagues. Self-reported solutions included the use of phone call technology for communication, audit meetings, support supervision and increasing staffing level.

Conclusion: Most referrals are of poor social-economic status, use taxis, and lack professional-escort. Health workers suffer harassment, lack of communication and shortage of supplies. We need to experiment whether mobile phone technology could solve the communication gap.

Keywords: obstetric referral challenges, health care workers' experiences, self-reported solutions

Introduction

The practice of having appropriate emergency obstetric referrals from lower health facilities to referral hospitals is an important standard of care for managing mothers in labor,¹ but it has not been optimally successful due to challenges in the obstetric referral systems.² In order to improve maternal health, there is need to have efficient management of obstetric referrals.³ The health care system is supposed to follow standard protocols for a successful process of obstetric referral.⁴ Appropriate obstetric referral should be timely, follow established guidelines, have adequate documentation, staff accompaniment and prompt care by competent healthcare providers at the receiving facility.⁵ Different levels of healthcare facilities are equipped differently with referral hospitals having more specialized services and capacity to

handle more volumes of patient turnover.⁴ In Uganda, emergency obstetric referral should be referred with a referral letter, escorted by the midwife who should handover the patient to the referral hospital staff.⁶ The referring health facility should provide ambulance services for appropriate means of transport and care during the transit.⁶

Ugandan health system structure has different levels from health centre I to National referral hospital.⁵⁴ The different levels reflect the population that a certain facility should serve, the medical services available and therefore the staffing level/skills available at a particular level. Health centre I (HCI) has no existing physical structure, is supposed to serve a village-population and is managed by the village health team (VHT). These are not professional health workers but are identified from the population and given basic knowledge on danger signs, required first-aid and how to refer to a professional health worker. Health centre II serves a parish, health centre III serves a sub-county while health centre V serves a county. In the same way, patient referral should be done from HCI to HCIV. All HCIVs should refer patients to a district hospital which is the health centre V (District general hospital) which then refers to the regional referral hospital like Mbarara Regional Referral Hospital (MRRH). The regional referral hospital can refer to a national referral hospital. However, this protocol of the levels of referral is sometimes violated and patients bypass from lower health centres direct to a regional referral hospital.⁷ Each health facility is supposed to be supervised by the immediate upper facility. MRRH has an officer in charge of outreach services, who is a doctor, and together with a multidisciplinary team of health workers from MRRH ideally should organize and conduct support supervision visits to the lower health facilities.⁸

The practice of emergency obstetric referral reduces both fetal and maternal morbidities.⁹ In Western Uganda and other resource limited settings, the highest burden of adverse maternal and fetal outcomes at referral hospitals is registered from emergency obstetric referrals from lower health facilities.^{10–12} Emergency referrals often reach the referral hospitals late with maternal complications which contribute to poor delivery outcomes.¹³ Therefore, the barriers to accessing emergency obstetric care could be attributed to poor handling of referrals due to non-functioning referral systems. Although there are health system factors affecting the referral process, patient contribution to a successful referral is important and this is determined by the profile of the maternal referrals.¹⁴ According to the three-delay model by Thaddeus and Maine, the patient's profile has association with delays which can be attributed to the patient's capacity to make decisions to seek health care (delay 1) but also to fund transportation to access health facility (delay 2) and buying certain sundries at the referral hospital to avoid delays to having timely and appropriate intervention in the health facility (delay 3)¹⁴

There are guidelines for a functional emergency obstetric referral system, but the health workers have challenges with the implementation process, including late referrals, unescorted referrals and communication challenges.¹⁵

Although there are documented barriers to obstetric care access such as poor transport and communication infrastructure, overcrowding, patient incapacity to make decisions and inability to provide necessary funding,^{16–18} there is paucity of knowledge regarding the challenges faced by health workers while implementing the referral process from lower facilities to regional referral hospitals. No study in our setting has documented health workers' self-reported solutions to the challenges mentioned. Also, the profile of patients referred from lower health facilities to referral hospital has not been documented.

This study therefore documented the profile of emergency maternal referrals, challenges faced by health care workers while implementing the maternal referral process and the self-reported solutions.

Methods

Study Design

This was a mixed-methods study where we employed both quantitative and qualitative study designs.

Study Site

We conducted a quantitative study at maternity ward of Mbarara Regional Referral Hospital (MRRH) in South Western Uganda, and the qualitative interviews were conducted at MRRH, Rwekubo HCIV and Kabuyanda HCIV in Isingiro district, in South Western Uganda.

Mbarara Regional Referral hospital is a teaching hospital for Mbarara University of Science and Technology (MUST). This hospital is located in Mbarara City about 250 km south-west of the capital city Kampala. It has a bed capacity of approximately 350 beds and the department of Obstetrics and Gynecology registers about 10,000 deliveries per year. The facility has a full-time operating theatre with a caesarean section rate of 40%.¹⁹ The hospital offers specialized obstetric and gynecological operations, it also has an active pediatric ward with special care units for pre-matures and neonates. Mothers are referred to MRRH in search for specialized services which are lacking at the health centre IVs.

Isingiro district is located in South-Western Uganda, with 60 lower level health centres which refer patients to two active health centre IVs (Kabuyanda Health Centre and Rwekubo Health Centre) and these two health centre IVs routinely refer mothers in labour to MRRH especially for management of complications and surgery. Each of the health centre IVs is headed by a general doctor with basic surgical skills including performance of cesarean section, they have maternity services offered by midwives, nurses and Clinical officers, all supervised by the doctor. On average they conduct 2160 deliveries a year. These HCIVs work as health sub-district health centres where health centre IIIs refer patients for further management.^{20,21} Health centre IVs are around 50 km from Mbarara Regional Referral Hospital (MRRH) and patients have to travel from this far following referral to MRRH any time of the day.

Study Population

The study population for the quantitative component was pregnant women in labour at MRRH referred from Rwekubo HCIV and Kabuyanda HCIV in Isingiro district. The study participants for the qualitative study were health care workers including doctors, midwives, clinical officers and nurses working on maternity ward of Rwekubo and Kabuyanda HCIVs. The in-charges of the health centre IVs, district health officer (head of health services in Isingiro district), head of the department of Obstetrics and Gynecology at MRRH, and head of outreach services at MRRH were also interviewed.

Eligibility, Selection Criteria and Study Period

For the quantitative component, all pregnant women in labour referred from Rwekubo and Kabuyanda HCIVs to MRRH for delivery were consecutively recruited into the study during the period from December 2019 to April 2020. Four referrals had no referral notes and were not included in the study. Participants of the qualitative component were purposively selected due to their knowledge and professional experience in management and referring mothers in labour from the two health centre IVs to MRRH. All midwives, nurses, clinical officers, anesthetic officers and doctors who work on maternity wards were eligible for Focused Group Discussions (FGDs). The in-charges of Rwekubo HCIV and Kabuyanda HCIV, the district health officer (DHO), the head of department of obstetrics and gynecology at MRRH, and the in-charge of outreach services at MRRH were targeted for in-depth interviews. Qualitative interviews were conducted in May 2020 immediately after the quantitative data collection.

Recruitment and Study Procedure

For quantitative component, pregnant mothers referred from Isingiro district for delivery at MRRH were approached daily by research assistants for informed consent. Participants were guided through interviewer-administered questionnaire about their demographics, obstetric factors, time when the mother was referred to MRRH and causes of delay, means of transport, if escorted by the health care worker or not. We reviewed their referral letters for the cadre of health care workers who referred, referral diagnosis, reasons for referral and completeness of referral letters. Medical examination information such as patient vital signs (blood pressure, temperature, pulse rate, respiratory rate) were taken/obtained from the patient files to complete the questionnaire at MRRH. The patients were then managed according to the MRRH protocols.

After completion of recruitment for quantitative study, we then conducted focused group discussions (FGDs) and in-depth interviews involving health care workers at the HCIVs and the referral hospital (MRRH). This sequential pattern of conducting qualitative interviews with health workers at the referring health centres after quantitative recruitment of the referrals was chosen to limit Hawthorne effect.²² The FGDs were 3 with a total of 27 health care workers (participants) composed of doctors, midwives, nurses, clinical officers and anesthetic officers. We identified 16 eligible health workers

at the maternity ward of Rwekubo HCIV including the in-charge, and had one FGD of 12 participants: midwives (n=9), nurses (n=1), doctors (n=1) and anesthetic officer (n=1). The in-charge participated in the in-depth interview. Three (3) of the 16 at Rwekubo HCIV did not participate; one doctor was on study leave while one nurse and one clinical officer were off duty. Eligible participants at Kabuyanda HCIV were 18 and we purposively distributed them to form two FGDs. One FGD consisted of 8 health workers: midwives (n=4), nurses (n=1), clinical officers (n=1), anesthetic officers (n=1) and doctors (n=1), and the second FGD had 7 participants: midwives (n=4), nurses (n=1), clinical officers (n=1), anesthetic officers (n=1). Two (2) of the 18 at Kabuyanda HCIV did not participate, ie, two midwives and one nurse were off duty. We did five in-depth interviews with; in-charge of Rwekubo HCIV, Kabuyanda HCIV, DHO Isingiro district, Head of department of obstetrics and gynecology department at MRRH, in-charge of outreach services at MRRH.

The interviews occurred in a quiet room to avoid noise and distraction but also to provide privacy. All study participants were comfortable with English language therefore the interviews were conducted in English. All interviews and FGDs were audio recorded, there was also a moderator and a note taker to supplement the audio recordings. Each interview lasted between 30 and 90 minutes. The principal investigator (PI) and research assistant collected the data. Participants were allowed to talk freely encouraged by probing questions for more explanations in addition to the interview guide.

Data Collection Tools and Study Variables

Quantitative data was collected by use of a structured interviewer administered questionnaire, while qualitative data was by use of a semi-structured interview guide with open ended questions. Both tools were developed by the PI, guided by the study objectives and by literature from the 3-delay model,¹⁴ and the efficient referral chain.⁶ The findings from the quantitative study also informed the focus of a qualitative interview guide.

The quantitative study variables included

(i) patient-related factors; age, address, marital status, socioeconomic status, distance from the health centre, education level, religion, obstetric factors including gravidity, parity, previous operations (C/S), history of complications like APH, postpartum hemorrhage (PPH), sepsis, still birth. The patient-related factors affect the individual's ability to seek and fund health care which lead to delay 1 and delay 2.¹⁴

(ii) Health centre-related factors; lack of medical personnel on duty, lack of sundries, lack of equipment (reasons for referral), referral diagnosis, cadre in charge of referral, cadre that escorted referral if any, and availability of ambulance services. These factors relate to delay 2 and delay 3.¹⁴ Interactive communication and feedback between the initiating-health facility and the receiving health facility feed into the components of an efficient referral chain.⁶

Qualitative data was collected under the following topics:

Knowledge of Health Care Workers on Conducting a Maternal Referral

Common referral hospitals for the HC, recommended steps/procedure/process of referring a mother in labour Probes include documentation in the patient file and counseling the patient, referral book, filling referral forms, informing the receiving hospital/MRRH, Ambulances/transportation, escorting the client, feedback from the receiving hospital/MRRH.

Practice and Challenges Faced in the Referral Process Section

Views of health workers on challenges with documentation of referral Availability of stationery, staff and manpower to refer the mother, ambulance services, escort of the patient, communication before referral, feedback from MRRH, audits and interpretation of data concerning referrals at the HC

Self-Reported Solutions to the Challenges

Included probes on documentation, transportation, communication before referral, lack of escort of mothers by health workers, and feedback from MRRH.

Sample Size (n) Calculation

For the quantitative cross-sectional study, sample size was calculated using Cochran's sample size formula for proportion.²³ We assumed that the proportion of Intrapartum mothers who are referred from peripheral health units to regional referral hospitals was 11% based on a study done in Zambia.²⁴ At 95% confidence interval and with a precision of 0.05, the required sample size was 150 participants. Considering a 5% non-response, the targeted sample size was 158 participants.

For the qualitative component, we purposively included all the health care workers at maternity wards of Rwekubo and Kabuyanda HCIVs, the in-charges of the two HCIVs, the head of department of obstetrics and gynecology at MRRH, and head of outreach services at MRRH. We interviewed all the health workers at maternity ward because we wanted to maximize the number of study participants since the health workers in the health centres are not many. We felt that the sample size was enough since the participants had rich information and professional experience on the topic of maternal referral process and therefore very minimal numbers were required to reach saturation of the required codes.²⁵

Data Management and Analysis

For quantitative data, a completed dataset was imported from Redcap into STATA version 13.0 for cleaning and analysis.

The sociodemographic and obstetric characteristics of all referred mothers from Isingiro HC IVs to Mbarara Regional Referral Hospital were described using frequency tables, mean or median for continuous variables and proportions for categorical data.

For qualitative component, the characteristics (demographics, qualification and professional experiences) of referring healthcare workers at Rwekubo and Kabuyanda HC IVs involved in the study were described using appropriate summary statistics, ie, frequency tables, mean or median for continuous variables and proportions for categorical data.

All the interviews were transcribed verbatim. The PI cross checked the transcribed interview and audio recordings to ensure accuracy. We used deductive-inductive analysis to generate codes, subthemes and themes. Deductive method was used for the prior-generated themes, but for codes and subthemes, we used an inductive approach and followed the six steps of thematic analysis.²⁶ The prior themes were informed by the findings from the quantitative data but also according to components of an efficient referral chain.⁶ KH and JK coded the transcripts independently, compared them and there was agreement.

Rigor Consideration for the Qualitative Study

We followed four-dimension criteria for assessing rigor in qualitative research of credibility, dependability, confirmability and transferability.²⁷ Credibility was ensured by engaging the health care workers for enough time during the interviews, testing the interview guide, using experienced research assistants who work with Mbarara University of Science and Technology (MUST) in the same area of conducting qualitative research. These were also trained on the data collection tools so that accurate information was captured. We also had regular debriefing with the co-authors. For dependability, we developed a detailed study protocol, described our study participants in detail, KH and JK did the coding process independently and the data were repeatable. We ensured confirmability by triangulating the information collected through: use of both qualitative and quantitative techniques, targeting health workers from both the initiating and receiving health facilities, and involving cadres at different levels including in-charges, midwives and doctors who were interviewed separately during in-depth and FGDs. Reflexivity was by using interviewers who were not health workers and had no personal experience in maternal referral process. The PI used a "sit back" approach during the interview process in order to avoid bias which could arise from his professional experience of dealing with obstetric referrals. Transferability was ensured by purposively choosing study participants and making sure that we reached saturation of data codes.

Results

For the quantitative component, we recruited a total of 161 emergency obstetric referrals. None of the approached eligible participants refused to participate. Of the 161 participants, 91% (n=146) were married, 65% (n=104) were below 26 years of age, 65% (n=105) had attained primary education, 79% (n=118) were employed in subsistence farming and

7% (n=11) reported no any source of income. Forty percent (40% [n=64]) were prime-gravidas, while 22% (n=35) were at least gravida 5. (Table 1)

With regard to emergency obstetric referral processes and diagnoses, of the 161 participants, 94% (n=151) were referred without being escorted by a health worker and 100% (n=161) had no prior communication before referral. Most of the mothers in labour traveled from the health centre IVs to the regional referral hospital by regular public taxis (85% [n=137]) and only 15% (n=24) used ambulance vehicles. We also found that majority of referrals (96% [n=151]) are taken care of and referred by midwives from HC IVs to MRRH. The main reasons for delays included waiting for a referral letter at the health centre IV after the decision to refer had been made (27% [n=36]), waiting for transport means to the referral hospital (27% [n=36]), awaiting doctor's review (22% [n=30]) and long queues (16% [n=22]) (Table 2).

Table 1 Participants' Characteristics

Characteristics	Total, N=161	
	Number	Percent
Age		
17–25 years	104	65
26–35 years	44	27
>35 years	13	8
Gravidity		
I	64	40
2–4	62	39
>5	35	22
Gestational age in complete weeks		
28–36 weeks	18	11
37–40 weeks	107	66
>40 weeks	36	22
Marital status		
Single	5	3
Married	146	91
Divorced	10	6
Level of education		
None	16	10
Primary	105	65
Secondary	35	22
Tertiary	5	3
Religion		
Protestant	99	61
Catholic	44	27
Muslim	12	7
Other	6	4
Employed		
No	11	7
Yes	150	93
Type of employment*		
Business	15	10
Subsistence Farming	118	79
Others	17	11
Level of monthly income in shillings[¶]		
<150k	86	54
150–210k	65	40
>210k	10	6

Notes: *Assessed among employed participants (n=150), [¶]1k=1000 Ugandan shillings.

Table 2 Profile of Emergency Obstetric Referral Processes and Diagnoses

Characteristics	Total, N=161	
	Number	Percent
Referral escorted by health worker		
No	151	94
Yes	10	6
Transport means for referral		
Private means (Taxi)	137	85
Facility ambulance	24	15
Communication to higher facility before referral		
No	161	100
Yes	0	0
Cadre in charge of referral (n=157)		
Doctor	6	4
Midwives	151	96
Main reason for delay at referring facility (n=135)		
Waiting for transport means	36	27
Waiting for referral letter	36	27
Waiting for the doctor's review/decision	30	22
Many patients with few attending staff	22	16
Others	11	8
Main reason for referral		
Power outages	79	49
No doctor to operate on the patient	64	40
Requiring specialized care	14	9
Not indicated (Further management)	4	2
Main referral diagnosis		
Previous scar(s)	39	24
Prolonged labour	33	21
Malpresentations	17	11
Obstructed labour	14	9
PROM and Preterm labour	14	9
Contracted pelvis	11	7
Preeclampsia/eclampsia	9	6
Others	12	8
Not indicated	12	8

Notes: Others among referral diagnoses=antepartum hemorrhage n=5(3%), fetal distress n=3(2%), cardiac disease in pregnancy n=2(1%) and urinary tract infection n=2(1%).

Abbreviation: PROM, premature rupture of membranes.

The main reason for referral was electricity outages (49% [n=79]), followed by no doctor at the facility (40% [n=64]). The main maternal referral diagnoses included previous cesarean section scar (24% [n=39]), prolonged labour (21% [n=33]), malpresentations (11% [n=17]), obstructed labour (9% [n=14]), premature rupture of membranes and preterm labour (9% [n=14]) (Table 2).

Findings of Qualitative Component

A total of 33 health care workers participated in the qualitative interviews with 22 (66.7%) females and 11 (33.3%) males. Twenty-seven constituted the three FGDs while five had in-depth interviews. The five participants for in-depth interviews were in-charges of Kabuyanda and Rwekubo HCIVs, district health officer of Isingiro district, head of department of MRRH and in-charge of outreach services at MRRH. The age of participants ranged between 26 and 50 years. Being maternity ward, majority (48%) were midwives and the rest were doctors (21%), nurses (1%), clinical

officers (1%) and anesthetic officers (0.6%). The doctors at the HCIVs do work on other wards (male ward, and general ward) in addition to maternity ward.

The results are presented according to prior generated themes. The themes were informed by the results from the findings of the quantitative study. These were 1) Health workers' knowledge on maternal referral, 2) Challenges in implementation of maternal referral process and 3) Health workers' self-reported solutions to the challenges.

Health Workers Knowledge on Maternal Referral

The following subthemes were generated; Cadre in-charge of referral, referral diagnoses and reasons for referral, and these reflected whether the health care workers knew what ought to be done in emergency referral process.

Cadre In-Charge of Referral

Health workers knew that the doctor should be responsible for assessing and deciding which patient and health condition should be referred to regional referral hospital. However, most of intrapartum referrals are taken care of by midwives implying that the midwives are usually the first to detect labor complications. This being an emergency and the fact that the doctors may not be available in hospital premises, the midwives refer most of the obstetric cases but once the doctor is available then he takes the decision.

Usually it is the midwife in the labor suit, if the mother requires referral she examines her and then makes a referral to be managed from Mbarara Regional Referral Hospital a midwife reported. [FGD1-HCWs-HCIV-1]

Also, the participants reported that the doctors tend to be more involved when the mother has a severe complication

Ideally it should be the medical officer to refer but sometimes especially at night when cases come up, nurses refer but it wouldn't be her role but that of a medical officer especially complicated case a doctor in-charge of HCIV mentioned. [IDI-3-IC]

Common Referral Diagnoses

Participants mentioned prolonged labour, obstructed labour, previous cesarean sections scars, severe anemia and prematurity as the common referral diagnoses.

For example, mothers who are severely obstructed, with severe pre-eclampsia or with severe anemia and we don't have blood, we end up referring them to regional referral hospital One of the doctors at HCIV stated. [FGD-1 HCWs HCIV-1]

Reasons for Referral

The common reasons for referral relate to having no functional theatre. Majority of the emergency maternal referrals are referred for delivery by cesarean section, and this is mainly when theatre at the HCIV is out of function. The participants reported the following as the common reasons why theatre may not be functional: power outages, shortage of theatre linen and sundries, inconsistent availability of anesthetic officer in theatre and no doctor at the facility.

Some statements from the participants included;

The first problem can be power. You see UMEME (hydroelectric power) is not reliable. Secondly, generator can be there but with no fuel, even when the staff is around but when the electricity is off then theatre cannot be operational said a midwife. [FGD-2 HCWs HCIV-2]

Then when we come to theater itself, you know our standard there of the level 4, when we look at the average operations in a month, and the resources we have, they are few. At the moment there are only 15 Linen packs for theatre, so when they are used up for example at night, you cannot go ahead, you refer to regional referral hospital said a theatre nurse. [FGD-1 HCWs HCIV-1]

Health workers at the HCIVs complained of having to work with one anesthetic officer at the health centre. When he is off duty or when he is tired, all obstetric emergencies that require an operation have to be referred to the regional referral hospital. One doctor narrated,

We have one anesthetic officer and as a human being, he cannot work week after week, therefore, we always refer cases when the anesthetic officer is off. [IDI-1-HCIV-DR]

At times the doctor is out of station because the medical officer is both the manager and also the same doctor to work on patients. Due to this administrative work, the doctors go for meetings and workshops out of the health centre confines leaving no one to do operations at the health centre IVs.

There are times when a doctor on duty has to attend workshops and again cover the maternity ward. This stretches us because then you work day and night, and most patients have to be referred said in-charge of HCIV. [IDI-3-IC]

In addition to theatre challenge, mothers are referred when they require specialized care due to a health condition that they are suffering from. Some of the health workers explained,

Mostly, we refer patients whom we think their health conditions are too complicated beyond our capacity to manage. [FGD-3 HCWs HCIV-2]

Shortage of blood was another reason mentioned as the reason for referral

For cases that require blood, we refer some of them because usually we run short of blood" said a doctor. [IDI-3-IC]

Challenges Faced During the Implementation of Maternal Referral Process

Healthcare workers reported the following challenges: 1) .lack of professional escort of emergency maternal referrals, 2) harassments of lower level health facility workers by health workers at the referral hospital, 3) lack of communication between the initiating-health facility and the receiving health facility, 4) poor and inadequate documentation, 5) lack of maternal referral audit meetings, 6) late referrals and 7) transport challenges.

Lack of Professional Escort of Emergency Maternal Referrals

Majority of emergency maternal referrals from health centre IVs to regional referral hospital are not escorted. This makes them lack health care during the transit and when they reach the referral hospital, there is no one to hand over the patient to the team at the regional referral hospital. For this reason, they lack continuity of care and health workers feel that their patients are lost within the referral chain. Participants explained reasons why they do not escort the referrals as; having one midwife on duty and lack of ambulance.

Another challenge you find mothers are many with one mid-wife on ward who has to attend to all mothers and their neonates on antenatal and postnatal wards, so the midwife cannot escort the referred mother to referral hospital and leave many others unattended said a midwife. [FGD-2 HCWs HCIV-2]

The professional escort has been left for the very sick obstetric referrals. One midwife narrated,

It is very rare to escort a referral, unless you see that the patient is really in critical condition. [FGD-1 HCWs HCIV-1]

Sometimes the midwives fail to escort due to transportation challenges. Most of the maternal referrals use taxis and not ambulance which makes it difficult for midwives to escort mothers through referral. The taxis are over squeezed but also there is no assurance for a return journey for the health worker

The other challenge is means of transport, we don't have the ambulance; the patient has hired a taxi and the driver is going to sleep in town at the referral hospital. So, the mid wife cannot go to sleep in Mbarara town too. [FGD-2 HCWs HCIV-2]

Harassment by the Health Workers at Referral Hospital

This seems to be a multifaceted challenge causing multiplier effects. It affects most especially escort of patients but also communication between health workers and patient management. Midwives from referring health centres fear escorting maternal referrals because of the harassment they go through. They feel they are not respected and are abused by fellow

midwives at the regional referral hospital. Instead of supporting them and giving feedback they blame them for not working on the patients or for missing a diagnosis. The mid wife expressed her experience;

The way we are handled at the admission desk of the referral hospital, the way the fellow midwives handled us, I don't know!!!! It wasn't good", "what do you want me to do, are you not a midwife like me, a fellow midwife is asking me like that. [FGD-1 HCWs HCIV-1]

Another mid wife also shared her experience

We fear to escort, like to my experience now, am in 3 years without escorting. First, the way I would go, the way they would receive you, you say am not going back, what am I gaining from escorting, that fear comes in. so when the referral comes, you say the ambulance is there, the driver will take you, just out of the fear of what you will face from the fellow health workers at the referral hospital. [FGD-1 HCWs HCIV-1 Midwife]

One of the doctors talked about how the harassment and poor attitude affects patient care. He believes it affects patients' triage and therefore the delays in providing appropriate care,

We sent a mother and eventually a mother delayed to go to theater and died because the case was not prioritized by Mbarara team, yet this side we sent a mother as a very serious emergency, ... I think this goes back to how this patient was received and the attitude that was between the health workers receiving the patient and the midwife that had escorted the patient. [FGD-1 HCWs HCIV-1]

Lack of Communication Between the Initiating-Health Facility and the Receiving Health Facilities

We found that the health workers at both the referring and receiving health facilities are all stranded due to the lack of means to communicate to each other. At the health centre IVs they want to tell their challenges the team at the referral hospital especially concerning patient care, they want to learn from them, they want to be supervised and they want to get feedback on how well or bad they have managed the case for subsequent improvement of care for emergency maternal referral.

One of the midwives at a health centre IV said,

To me, the best way should be getting feedback. Because if you refer a mother to a referral hospital, you need to know delivery outcomes and the gaps in your pre-referral management, so that next time when you get a similar case, you can know how to manage better and refer early before complications. [FGD-3 HCWs HCIV-2]

Supervisors at the referral hospital want the referring facilities to first notify them of the incoming maternal referral so that they can prepare better to handle those referrals with complications.

We have challenges mainly in the referral system, one is that; we don't get notifications of when and what mothers in labor are being referred to us, this brings about challenges in organizing and preparing to receive a referral in order to get adequate care said a doctor at MRRH. [IDI-2 –MRRH]

Poor and Inadequate Documented Information on Referral Letters

Sometimes referrals come in with incomplete referral forms lacking key information which could have helped in health interventions. The challenge seems to be worsened by the lack of professional escort because the escorting midwife would have explained, but patients are just brought in the referral hospital with no details. A doctor at MRRH stated repeatedly

The documentation process is also poor, because some people are ideally referred and just dumped at the referral hospital ...they just dump their patient at the referral hospital, without any clear referral information, sometimes even when they have a referral letter, it is incomplete. [IDI-2 –MRRH]

Lack of Planned Audit Meetings to Discuss Maternal Referrals

Health centres IVs do not have scheduled meetings to specifically discuss obstetric referrals. They feel they need to have regular planning meetings other than meeting only to discuss crisis already at hand or postmortem meetings.

If there was an audit on maternal referrals every month, that would even work better because every facility would be able to know what is happening to their patients and how to improve their patient care. [IDI-1-DR]

Late Referrals and Delays in the Referral Chain

Referrals reach late at the referral hospital when they have already developed severe obstetric complications which lead to adverse outcomes. The health workers at referral hospital complained that the mothers are delayed at the lower centres.

You find that the patient has been at that facility for the last 6hours on labor augmentation with oxytocin said a doctor at MRRH. [IDI-2 –MRRH]

At HCIVs, the health workers report that the delays are sometimes due to shortage of sundries but also due to lack of ambulance services.

You find that you have delayed because of stock out of sundries and drugs, for example there could be no intravenous fluids, or catheter. So, you find that things are hard, causing problems to mothers being referred in labour said midwife at HCIV. [FGD-3 HCWs HCIV-2]

Transport Challenge

Generally, health care workers at both the referring and the referral hospital reported that there are no reliable ambulance vehicles to transport the emergency maternal referrals.

Then of course ambulance and fuel are a big challenge, the poor family is made to suffer the burden of buying fuel for the ambulance vehicle. The process of mobilizing transport funds creates delays which impacts on the outcomes of delivery, stated one of the doctors at MRRH. [IDI-3 MRRH]

Health Care Workers' Self-Reported Solutions to Challenges in the Emergency Maternal Referral Process

Under this theme, seven subthemes emerged as health care workers self-reported solutions to the challenges they face while referring mothers in labour from HCIVs to regional referral hospital. They are 1) phone call communication from initiating facility to the receiving facility before referral, 2) regular Feedback from the receiving facility to initiating facilities, 3) scheduled maternal referral audit meetings, 4) support supervision and in-service training of health care workers from lower health facilities, 5) improved transport means, 6) improve on allocation of supplies, and 7) recruitment of more staff.

Phone Call Communication to the Receiving Facility Before Referral

Both the referring and the receiving facilities request for iterative communication before referral of maternal emergency. The health workers at HCIVs feel safe and assured of continuity of health care if they confirm that the maternal referral is going to find the required health services at the referral hospitals before the referral is flagged off their health centre. They are also optimistic that this will help them have a consultative communication on prereferral management and further improve their confidence and patient care

I think before you refer a client, you must communicate to those health workers where you are referring to inquire whether that health service that the client needs will be provided by the receiving health facility said a clinical officer. [FGD-3 HCWs HCIV-2]

We need at least a dedicated official line for maternity ward so that we know every time you refer a patient, you call to inform the referral hospital that you have referred the patient so and so, for these reasons and when the patient reaches, the referral hospital takes the initiative of calling back to inform us of the patient's arrival and the delivery outcomes a doctor stated. [IDI-1- DR]

A doctor at MRRH explained what he thinks could be a solution to communication challenge

So personally, I think we should get contacts of our facility in the maternity ward and give it to the different health facilities that refer to us, such that they can always call and inform us before sending in a patient, and also even us, when we get a referral from a particular place and we want further clarification, we are able to call that number such that we know what's on board. [IDI-2 -MRRH]

Having Feedback from Referral Hospitals to Lower Health Facilities

Health centre IVs want to get feedback from referral hospitals concerning the outcomes of the referrals. They are also interested in knowing the gaps so that they improve on the next case management

Once you get feedback, you will know where to improve, even she (midwife) will be open to receiving feedback about referral outcomes. So, improve on communication. [FGD-3 HCWs HCIV-2]

For communication before referral and feedback, the health workers suggest that a phone-based communication can suffice to give detailed information.

People should look at using a phone but it should have all the subscriptions and airtime so that we make a follow up on these patients and we get the appropriate information we want concerning feedback from regional referral hospital -Mbarara. [FGD-1 HCWs HCIV-1]

I will not write every detail that I have done for the patient before referral but it can come out through a phone call conversation a midwife stated. [FGD-3 HCWs HCIV-2]

Maternal Referral Audit Meetings

Participants suggested that the health centre managers should plan to have regular scheduled meetings specific for maternal referrals. This would enable them to recognize areas to improve as a team

We need maternal referral audit meetings to discuss what went wrong and what we would have done to save the situation. But otherwise we don't get meetings occasionally to discuss that information of referrals. [FGD-1 HCWs HCIV-1]

Provision of Support Supervision and in-Service Training

Health workers at the lower units feel that they need to gain more skills from their supervisors from the referral hospital. They feel it would be better if specialists visited and spent days working with them at the HCIV.

We feel we need to have a specialist of anesthesia and obstetrics visiting and helping us to improve our skills. They can visit for one week and go back. [IDI-3-IC]

Statements from participants revealed that some health workers need in-service training to acquire more skills in handling obstetric conditions.

Some of the midwives are not well skilled to either anticipate when to and when not to refer [IDI-1- DR]

Health workers from both the regional referral hospital and HCIVs agree that in-service training is needed in order for health workers at HCIVs to improve on patient care and general management of maternal referrals including documentation of referral and pre-referral treatment.

We need to train them on pre-referral management and how to refer a patient. [IDI-2 -MRRH- DR]

Improve on Transport Means

Health workers recommended the use of ambulance and not taxis for transportation of maternal referrals. They think that the population should be made to understand the benefits of ambulance and dangers of using taxis so that the patients and caretakers can always feel motivated to facilitate the ambulance when necessary.

We should always encourage the patients to use the ambulance because it is the only reliable means of transport for referring mothers in labour. Much as sometimes they also don't have fuel, patients should understand and buy the fuel so that the midwife escorts the maternal referral and comes back with the ambulance. [FGD-1 HCWs HCIV-1]

Improve on Supplies

Participants suggested that much as the supplies are not enough, the managers can keep some sundries for emergencies. They also suggested allowing re-allocation of drugs and sundries from facilities that may not be having high patient turn up

Each facility should make sure that they maintain a good store system to keep in stock some items for emergencies like bleeding mothers who cannot wait for the health worker to mobilize sundries and drugs before they die. [IDI-1-DR]

Recruitment of More Staff

Health workers suggest that district health administration should consider recruiting more staff for health centre IVs. They recommend that the HCIV should have at least two anesthetic officers so that when one is not on duty, then another one can offer the service thus reducing on the traffic of maternal referrals from HCIVs to MRRH.

We wish we had another anesthetic officer attached to each of the two busy health facilities in our district. With that I think we may see few maternal referrals sent to the regional referral hospital compared to the high number that we refer currently due to lack of anesthesia. [IDI-3-IC]

Discussion

This study aimed at describing the profile of emergency maternal referrals in south western Uganda, challenges experienced by health workers in the implementation of emergency obstetric referral processes from health centre IVs to regional referral hospital and health worker self-reported solutions to the challenges.

We found that the emergency obstetric referrals in our study were vulnerable young mothers with poor education status and low levels of income. Most are referred for emergency cesarean section due to non-functioning theatre at HCIVs. They are referred with no prior communication and most do not have a professional escort. The referral system has no feasible communication system between the lower health facility and the regional referral hospital, suffers harassment among health workers and also faces transport challenge, power outages, shortages of health workers, drugs and sundries.

Health workers reported that mobile phone communication innovation may help overcome barriers of iterative communication and feedback between the health centre IVs and regional referral hospital, and they elaborated the need for improved leadership with support supervision, maternal referral audit meetings, revised health resource allocation, and increasing on the number of midwives and anesthetic officers.

Our finding that most of the study participants were young mothers of low social economic status is in agreement with a study done in Mulago, Kampala, Uganda where they found that most intrapartum referrals were below 30 years with little or no formal education and unemployed.¹⁰ This shows that for the past 20 years the situation has not improved where teenage pregnancies are still more prevalent and associated with complications which make referral inevitable.²⁸

In this study, majority (94%) of mothers referred in labour were not escorted to the regional referral hospital. During qualitative interviews, health workers in the referring facilities in our study explained that failure to escort referrals is because of having one midwife on duty who cannot leave the maternity ward unmanned to escort the referred mothers. This agrees with the finding in a systematic review that investigated maternal referral practices in sub-Saharan Africa and

found that most articles reported women were not accompanied to higher health centres for care.⁵ A qualitative study done in a tertiary health facility in Ghana also found that the lack of professional escort was due to staff shortage and was a barrier to improvement in emergency obstetric referrals.² We think that we got similar findings because of being in the same region of sub-Saharan Africa which shares similar challenges of low staffing levels and inadequate ambulance services.

As explained by health workers during the interviews, most mothers (85%) hire taxis to the referral hospital. The taxis do not commit to bring the escorting midwife back to the health centre IV. Therefore, midwives fear to be abandoned at MRRH after escorting mothers in labour. This finding compares with one in Ghana by Nuamah that 88.2% of the obstetric referrals used commercial vehicles and only 6.6% used ambulances.²⁹ Other studies especially in developing countries reported the use of public vehicles for mothers in labour.^{2,30} We share the same finding possibly because these settings have limited ambulance services in their referral systems.

A new finding by this study is that one of the major problems failing health workers to escort referrals is fear of harassment by fellow health workers at the referral hospitals. Although there is literature on harassment of health workers at a tertiary hospital on wards,³¹ we have not come across studies indicating harassment by fellow health workers as a barrier to professional escort during maternal referral from lower health centres to regional referral hospital. The health workers emphasized that this was a big challenge which affects their communication relationships and consequently the holistic care to the patients.

We found that prior to referral, there would be no any communication between the referring health centres and MRRH for all the patients, and whereas the protocol requires that referral hospitals give regular feedback to referring facilities by use of a referral letter, we found that for all the referred mothers during the study period, there was no feedback from MRRH to the health centres in Isingiro district. A systematic review on obstetric referrals in India also showed the lack of communication between the referring centres and the receiving hospitals.¹⁵ Similarly, a retrospective study in Honduras found no system in place for health facilities to communicate to each other.³² In Malawi, a criteria audit reported a poor feedback of 1.7% from district hospital to lower health centres.³³ Fortunately after the maternal audits study in Malawi, the feedback improved to above 90% which means that the feedback issue even in a low resource setting can be addressed with minimal interventions, and the same was demonstrated in the audit study in Ghana.³⁴ The World Health Organization (WHO) recommends that for appropriate referral, there must be feedback communication between the lower health units and the referral hospitals.³⁵

In Uganda, the Ministry of Health recommends Referral Notes (HMIS FORM 32) for use by health centres while referring a patient through different levels of health care to the regional referral hospital. The regional referral hospital is supposed to use the last section of the same referral note to give feedback to the lower health facilities after the referred patient has been managed and discharged.³⁶ This is a challenge because when a patient is discharged from the regional referral hospital, the patient goes home but does not return to the referring lower health facility. Ideally, the health workers at referral hospitals would routinely visit the lower health facilities to carry out support supervision and feedback, but this never happens in our setting because of financial and human resource shortages, as elicited during qualitative interview at MRRH. Respondents reported that the zero feedback to lower health facilities is because the mechanism of giving feedback is not feasible.

In this study, a self-reported solution by the health workers at health centre IVs and regional referral hospital is that use of phone technology can help the lower health facilities to communicate prior referral but at the same time, the phone can help the referral hospitals to give feedback to the lower health facilities. Mobile phone interventions have been found to be helpful in improving utilization of health care services and improving maternal-fetal outcomes.^{37,38} A pilot study done in the same health facilities revealed that health workers were more than willing to call MRRH before referring a mother in labour.³⁹ However, the pilot study did not assess the possibility of using a phone to give feedback to lower units. Feedback on patient management especially highlighting the gaps in signal functions and outcomes after referral can help improve on case management by lower health units and subsequent better maternal and perinatal outcomes.⁵

We found that the common reasons for referral were power blackouts and lack of a doctor at the station. Studies done in a national referral hospital in Uganda-Mulago identified that doctors being out of station is a big concern and contributes to delay and adverse maternal and perinatal outcomes.^{40,41} During the qualitative interviews, we noticed

that many of the health centre IVs have one or two doctors employed to serve at each of the health centre IVs. These doctors are for both administrative and clinical work. Therefore, when a doctor is for a meeting or has traveled for a workshop, during that period the midwives will have to refer all the mothers who require emergency operations especially caesarian sections. We also found that the health centres in western Uganda have inadequate facilities especially electricity, and this finding is supported by another study.⁴² When there is no electricity at the health centre IVs, the theatres are non-functional so all the mothers in labour who require caesarian section have to be referred. Mothers in labour are referred and may suffer adverse outcomes not because they have developed a rare or special obstetric complication but because of being in underserved facility with poor referral systems.

On the other hand, the common referral diagnosis was previous caesarian section (24%), followed by prolonged labour (21%). In a study of maternal mortality and near-misses, Kaye et al found that the majority of participants had been referred with prolonged labour.¹⁰ By implicit, the greatest proportion are referred to have a caesarian section done at MRRH. While one would expect comprehensive emergency obstetric care at health centre IVs and district hospitals, a number of health centre IVs cannot perform caesarian section.^{43,44} A mother in labour with a previous scar may easily get a ruptured uterus if delayed in the referral system. In this study, one participant was referred because of ruptured uterus.

Mothers in labour reported causes of delay at the health centre IVs. Majority (27%) delayed because they were waiting for a referral letter to go to the regional referral hospital. Another big proportion (16%) delayed because there were many patients to attend to while 27% delayed because they had to wait for a car to transport them to MRRH. These delays depict a picture of a big work load at the health centre IVs and the lack of organized ambulance services. This is emphasized by the fact that 22% of the patients reported delays at health centre IVs because of no doctor to review and refer them to MRRH, while 16% admitted that even when the health worker was there, he was overwhelmed by long queues leading to the delays. This agrees with the findings of the multicenter study in Brazil which identified delays related to the lack of trained human resource.⁴⁵ A prospective observational study in South Africa found out that delaying to refer patients from lower health units was one of the barriers to access obstetric care among the maternal near-misses.⁴⁶ A systematic review also found the lack of vehicles and the lack of trained staff to be barriers to accessing emergency obstetric care in sub-Saharan Africa.⁴⁷

There is evidence that timely access to appropriate care reduces patient morbidity and mortality.^{48,49}

During qualitative interviews, respondents reported that quality improvement of human resource through in-service training and support supervision would improve emergency-obstetric referral process and health care of referrals. This agrees with a study in rural Eastern Uganda which found that support supervision improved provision of maternal health services.⁵⁰ This would help them identify obstetric complications and refer early but also acquire more skills to manage the complications. A systematic review revealed that support supervision improves the effectiveness and the compliance of health workers to clinical care processes.⁵¹

Consistent with other studies,^{52,53} we found the great challenge of shortage of anesthetic officers at HCIV. One of the self-reported solutions was having two anesthetic officers at an HCIV. This has a multiplier effect whereby theatre at the HCIV would be functional most of the time which would reduce on the number of referrals to the regional referral hospitals, decongest the referral hospitals and reduce delays to accessing emergency cesarean section both at HCIV and regional referral hospital, with possible improvement in maternal-fetal outcomes.

Limitations and Strengths of the Study

The limitation during the study was that definition and causes of delays depended on participants' time estimate which could have caused a bias but this was minimized by interviewing the participants immediately on arrival at the referral hospital. Our strength is that we used mixed methods study design and during the interviews with health workers, we were able to elicit and triangulate information regarding causes of delays in the emergency maternal referral, but additionally we were able to explain certain challenging findings in the quantitative study. Therefore, we achieved more than what quantitative and qualitative would reveal if done separately.⁵⁵ Consequently, this study has come up with health care worker self-reported solutions to the identified gaps unlike other studies which documented barriers in implementation of the referral standards without efforts to elicit stakeholder practical solutions to the barriers.

Conclusion

The majority of women referred in labour from lower health centres are incapacitated with poor economic and education levels, are not escorted, travel by regular taxes and are referred by midwives. The common indication for emergency-obstetric referral is to have a caesarian section done, with the high proportion having previous caesarian section scar and prolonged labour as referral diagnoses. The lower units lack full-time coverage by doctors, anesthetic officers and suffer blackouts of power which force the midwives to refer the women in labour. The referral system is also faced with the great challenge of unannounced referrals, harassment of health workers and no feedback from the referral hospital to the lower health centres. It is not feasible for the health workers to use the referral forms for feedback to lower health centres. As such the referral process is never complete. This implies that the lower health centres never improve on referral management which increases the chances of maternal and fetal complications.

Therefore, we need to experiment whether the health worker self-reported solution of mobile phone technology could solve the communication gap thereby strengthening the referral system. This will help the lower health facilities improve on case management at their lower health facilities both during labour and treatment prior to referral with possible improvement in maternal and perinatal outcomes among obstetric referrals.

Abbreviations

HCIV, health centre IV; HMIS, Health Management Information System; HCWs, health care workers; VHT, village health team; DHO, district health officer; FGD, focus group discussion; IDI, in-depth interview; APH, antepartum haemorrhage; PPH, post-partum haemorrhage; PROM, premature rupture of membranes; MRRH, Mbarara Regional Referral Hospital; MUST, Mbarara University of Science and Technology; MUST REC, Mbarara University of Science and Technology Research Ethical Committee; UNCST, Uganda National Council for Science and Technology.

Ethical Considerations

This study was approved by the Institutional Review Committee of MUST (Ref: MUREC 1/7, No 08/08-19) and we registered the study with Uganda National Council for Science and Technology (UNCST-HS543ES).

Administrative clearance was obtained from the Director MRRH and District Health Office, Isingiro district. A written informed consent to participate in the study and for publication of anonymized responses was obtained from all study participants in the language that they understand. Study participants were identified by numbers and not names. Interviews were conducted with privacy and we maintained confidentiality. Data collected are accessed only by authorized personnel. We complied with the Helsinki declaration while conducting this study.

Acknowledgment

We are grateful for the technical support received from MicroResearch International, MUST through Health Child Uganda, Obstetrics and Gynecology Department of Mbarara University of Science and Technology and Mbarara Regional Referral Hospital management. We also thank all the women and health care workers who fully accepted to participate in this study.

Author Contributions

All authors (HK, JK, JN, YF and EM) made substantial contributions to: conception and design of the study, acquisition, analysis and interpretation of the data. All the authors took part in drafting and revising the article critically for important intellectual content; agreed to submit to the current journal; gave final approval of the version to be published; and agree to be accountable for all aspects of the work.

Disclosure

The authors declare that they have no competing interests with regard to publication of this work.

References

- Murray SF, Pearson SC. Maternity referral systems in developing countries: current knowledge and future research needs. *Soc Sci Med*. 2006;62(9):2205–2215. doi:10.1016/j.socscimed.2005.10.025
- Daniels AA, Abuosi A. Improving emergency obstetric referral systems in low and middle income countries: a qualitative study in a tertiary health facility in Ghana. *BMC Health Serv Res*. 2020;20(1):1–10. doi:10.1186/s12913-020-4886-3
- Ameyaw EK, Njue C, Tran NT, Dawson A. Quality and women's satisfaction with maternal referral practices in sub-Saharan African low and lower-middle income countries: a systematic review. *BMC Pregnancy Childbirth*. 2020;20(1):682.
- Bailey P, Lobis S, Maine D, Fortney JA. *Monitoring Emergency Obstetric Care: A Handbook*. World Health Organization; 2009.
- Ameyaw EK, Njue C, Tran NT, Dawson A. Quality and women's satisfaction with maternal referral practices in sub-Saharan African low and lower-middle income countries: a systematic review. *BMC Pregnancy Childbirth*. 2020;20(1):1–16. doi:10.1186/s12884-020-03339-3
- Cardno Emerging Markets USA Ltd. Draft national referral guidelines-USAID. Uganda; 2017.
- Mubiri P, Kajjo D, Okuga M, et al. Bypassing or successful referral? A population-based study of reasons why women travel far for childbirth in Eastern Uganda. *BMC Pregnancy Childbirth*. 2020;20(1):1–10. doi:10.1186/s12884-020-03194-2
- Tashobya CK, Sengooba F, Cruz VO. Health systems reforms in Uganda: processes and outputs. Makerere University, Uganda: Institute of Public Health, Makerere University, Uganda; 2006.
- Pattinson R, Kerber K, Buchmann E, et al. Stillbirths: how can health systems deliver for mothers and babies? *Lancet*. 2011;377(9777):1610–1623. doi:10.1016/S0140-6736(10)62306-9
- Kaye D, Mirembe F, Aziga F, Namulema B. Maternal mortality and associated near-misses among emergency intrapartum obstetric referrals in Mulago Hospital, Kampala, Uganda. *East Afr Med J*. 2003;80(3):144–149. doi:10.4314/eamj.v80i3.8684
- Agaba E, Mugisha J, Atuhairwe C, Farjando Y, Ngonzi J. Factors associated with stillbirths at Mbarara regional referral hospital. *J Health Med Nurs*. 2016;24:35.
- Mengesha MB, Weldegeorges DA, Hailesilassie Y, et al. Determinants of uterine rupture and its management outcomes among mothers who gave birth at public hospitals of Tigray, North Ethiopia: an unmatched case control study. *J Pregnancy*. 2020;2020:1–9. doi:10.1155/2020/8878037
- Kiruja J, Osman F, Egal JA, Essén B, Klingberg-Allvin M, Erlandsson K. Maternal near-miss and death incidences—frequencies, causes and the referral chain in Somaliland: a pilot study using the WHO near-miss approach. *Sex Reprod Healthcare*. 2017;12:30–36. doi:10.1016/j.srhc.2017.02.003
- Thaddeus S, Maine D. Too far to walk: maternal mortality in context. *Soc Sci Med*. 1994;38(8):1091–1110. doi:10.1016/0277-9536(94)90226-7
- Singh S, Doyle P, Campbell OM, Mathew M, Murthy G. Referrals between public sector health institutions for women with obstetric high risk, complications, or emergencies in India—A systematic review. *PLoS One*. 2016;11(8):e0159793. doi:10.1371/journal.pone.0159793
- Austin A, Gulema H, Belizan M, et al. Barriers to providing quality emergency obstetric care in Addis Ababa, Ethiopia: healthcare providers' perspectives on training, referrals and supervision, a mixed methods study. *BMC Pregnancy Childbirth*. 2015;15(1):74. doi:10.1186/s12884-015-0493-4
- Dahab R, Sakellariou D. Barriers to accessing maternal care in low income countries in Africa: a systematic review. *Int J Environ Res Public Health*. 2020;17(12):4292. doi:10.3390/ijerph17124292
- Mselle L, Sirili N, Anaeli A, Massawe S. Understanding barriers to implementing referral procedures in the rural and semi-urban district hospitals in Tanzania: experiences of healthcare providers working in maternity units. *PLoS One*. 2021;16(8):e0255475. doi:10.1371/journal.pone.0255475
- Tibaijuka L, Bawakanya SM, Owaraganise A, et al. Incidence and predictors of preterm neonatal mortality at Mbarara Regional Referral Hospital in South Western Uganda. *PLoS One*. 2021;16(11):e0259310. doi:10.1371/journal.pone.0259310
- Nabyonga-Orem J, Karamagi H, Atuyambe L, Bagenda F, Okuonzi SA, Walker O. Maintaining quality of health services after abolition of user fees: a Uganda case study. *BMC Health Serv Res*. 2008;8(1):102. doi:10.1186/1472-6963-8-102
- Tashobya CK, Sengooba F, Cruz VO, Yates R, Murindwa G, McPake B. *Health Systems Reforms in Uganda: Processes and Outputs*. Christine Kirunga Tashobya FS, Cruz VO, editors; 2006.
- Wickström G, Bendix T. The “Hawthorne effect”—what did the original Hawthorne studies actually show? *Scand J Work Environ Health*. 2000;26:363–367. doi:10.5271/sjweh.555
- Cochran WG. *Sampling Techniques*. John Wiley & Sons; 2007.
- Murray SF, Davies S, Phiri RK, Ahmed Y. Tools for monitoring the effectiveness of district maternity referral systems. *Health Policy Plan*. 2001;16(4):353–361. doi:10.1093/heapol/16.4.353
- van Rijnsoever FJ. (I Can't Get No) Saturation: a simulation and guidelines for sample sizes in qualitative research. *PLoS One*. 2017;12(7):e0181689. doi:10.1371/journal.pone.0181689
- Clarke V, Braun V, Hayfield N. Thematic analysis. *Qual Psychol*. 2015;222:248.
- Forero R, Nahidi S, De Costa J, et al. Application of four-dimension criteria to assess rigour of qualitative research in emergency medicine. *BMC Health Serv Res*. 2018;18(1):1–11. doi:10.1186/s12913-018-2915-2
- Kirbas A, Gulerman HC, Daglar K. Pregnancy in adolescence: is it an obstetrical risk? *J Pediatr Adolesc Gynecol*. 2016;29(4):367–371. doi:10.1016/j.jpag.2015.12.010
- Nuamah GB, Agyei-Baffour P, Akohene KM, Boateng D, Dobin D, Addai-Donkor K. Incentives to yield to obstetric referrals in deprived areas of Amansie West district in the Ashanti Region, Ghana. *Int J Equity Health*. 2016;15(1):117. doi:10.1186/s12939-016-0408-7
- Nkyekyer K. Peripartum referrals to Korle Bu teaching hospital, Ghana—a descriptive study. *Trop Med Int Health*. 2000;5(11):811–817. doi:10.1046/j.1365-3156.2000.00640.x
- Ogbonnaya G, Ukegbu A, Aguwu E, Emma-Ukaegbu U. A study on workplace violence against health workers in a Nigerian teaching hospital. *Niger J Med*. 2012;21(2):174–179.
- Josyula S, Taylor KK, Murphy BM, Rodas D, Kamath-Rayne BD. Obstetric referrals from a rural clinic to a community hospital in Honduras. *Midwifery*. 2015;31(11):1054–1059. doi:10.1016/j.midw.2015.07.002
- Kongnyuy EJ, Mlava G, Van Den Broek N. Criteria-based audit to improve a district referral system in Malawi: a pilot study. *BMC Health Serv Res*. 2008;8(1):1–5. doi:10.1186/1472-6963-8-190

34. Awoonor-Williams JK, Bailey PE, Yeji F, et al. Conducting an audit to improve the facilitation of emergency maternal and newborn referral in northern Ghana. *Glob Public Health*. 2015;10(9):1118–1133. doi:10.1080/17441692.2015.1027247
35. World Health Organization. Standards for improving quality of maternal and newborn care in health facilities; 2016.
36. Uganda MOH. Health management information system, health unit procedure Manual; 2010.
37. Oyeiyemi SO, Wynn R. Giving cell phones to pregnant women and improving services may increase primary health facility utilization: a case-control study of a Nigerian project. *Reprod Health*. 2014;11(1):1–8. doi:10.1186/1742-4755-11-8
38. Lund S, Rasch V, Hemed M, et al. Mobile phone intervention reduces perinatal mortality in Zanzibar: secondary outcomes of a cluster randomized controlled trial. *JMIR mHealth uHealth*. 2014;2(1):e2941. doi:10.2196/mhealth.2941
39. Kanyesigye H, Muhwezi O, Kazungu C, Kemigisha E, Woolcott C. Will district health centres use preloaded cell phones for pre-referral phone calls for women in labour: a randomized pilot study at Mbarara Regional Referral Hospital in southwest Uganda. *Can J Public Health*. 2019;110(4):520–522. doi:10.17269/s41997-019-00222-3
40. Ackers L, Ioannou E, Ackers-Johnson J. The impact of delays on maternal and neonatal outcomes in Ugandan public health facilities: the role of absenteeism. *Health Policy Plan*. 2016;31(9):1152–1161. doi:10.1093/heapol/czw046
41. Balikuddembe MS, Byamugisha JK, Sekikubo M. Impact of decision–operation interval on pregnancy outcomes among mothers who undergo emergency caesarean section at Mulago hospital. *J US-China Med Sci*. 2011;8(9):571–575.
42. Gabriel M. Health service provision and performance of selected grade III health centres in Butambala District. Nkumba University; 2018.
43. Orinda V, Kakande H, Kabarangira J, Nanda G, Mbonye A. A sector-wide approach to emergency obstetric care in Uganda. *Int J Gynecol Obstet*. 2005;91(3):285–291. doi:10.1016/j.ijgo.2005.07.023
44. Pearson L, Shoo R. Availability and use of emergency obstetric services: Kenya, Rwanda, Southern Sudan, and Uganda. *Int J Gynecol Obstet*. 2005;88(2):208–215. doi:10.1016/j.ijgo.2004.09.027
45. Pacagnella RC, Cecatti JG, Parpinelli MA, et al. Delays in receiving obstetric care and poor maternal outcomes: results from a national multicentre cross-sectional study. *BMC Pregnancy Childbirth*. 2014;14(1):1–15. doi:10.1186/1471-2393-14-159
46. Soma-Pillay P, Pattinson RC. Barriers to obstetric care among maternal near-misses. *South Afr Med J*. 2016;106(11):1110–1113. doi:10.7196/SAMJ.2016.v106i11.10726
47. Geleto A, Chojenta C, Musa A, Loxton D. Barriers to access and utilization of emergency obstetric care at health facilities in sub-Saharan Africa: a systematic review of literature. *Syst Rev*. 2018;7(1):1–14. doi:10.1186/s13643-017-0670-9
48. Campbell OM, Graham WJ. Strategies for reducing maternal mortality: getting on with what works. *lancet*. 2006;368(9543):1284–1299. doi:10.1016/S0140-6736(06)69381-1
49. Essendi H, Mills S, Fotso J-C. Barriers to formal emergency obstetric care services' utilization. *J Urban Health*. 2011;88(2):356–369. doi:10.1007/s11524-010-9481-1
50. Kisakye AN, Muhumuza Kananura R, Ekirapa-Kiracho E, et al. Effect of support supervision on maternal and newborn health services and practices in Rural Eastern Uganda. *Glob Health Action*. 2017;10(sup4):1345496. doi:10.1080/16549716.2017.1345496
51. Snowdon DA, Leggat SG, Taylor NF. Does clinical supervision of healthcare professionals improve effectiveness of care and patient experience? A systematic review. *BMC Health Serv Res*. 2017;17(1):1–11. doi:10.1186/s12913-017-2739-5
52. Epiu I, Tindimwebwa JVB, Mijumbi C, et al. Challenges of anesthesia in low-and middle-income countries: a cross-sectional survey of access to safe obstetric anesthesia in East Africa. *Anesth Analg*. 2017;124(1):290. doi:10.1213/ANE.0000000000001690
53. Dubowitz G, Detlefs S, Kelly McQueen K. Global anesthesia workforce crisis: a preliminary survey revealing shortages contributing to undesirable outcomes and unsafe practices. *World J Surg*. 2010;34(3):438–444. doi:10.1007/s00268-009-0229-6
54. Tashobya CK, editor. *Health Systems Reforms in Uganda: Processes and outputs*. Uganda: Development Programme, London School of Hygiene & Tropical Medicine, UK; 2018. Available from: https://assets.publishing.service.gov.uk/media/57a08c2940f0b652dd00115a/Uganda_book.pdf
55. Fetters MD, Freshwater D. *The 1+1=3 Integration Challenge*. Vol. 9. Los Angeles, CA: Sage Publications Sage CA; 2015:115–117.

Risk Management and Healthcare Policy

Dovepress

Publish your work in this journal

Risk Management and Healthcare Policy is an international, peer-reviewed, open access journal focusing on all aspects of public health, policy, and preventative measures to promote good health and improve morbidity and mortality in the population. The journal welcomes submitted papers covering original research, basic science, clinical & epidemiological studies, reviews and evaluations, guidelines, expert opinion and commentary, case reports and extended reports. The manuscript management system is completely online and includes a very quick and fair peer-review system, which is all easy to use. Visit <http://www.dovepress.com/testimonials.php> to read real quotes from published authors.

Submit your manuscript here: <https://www.dovepress.com/risk-management-and-healthcare-policy-journal>