Before and after: a Review of the Cascade of Events before Arrival and During Admission for Obstetric Emergencies in Ilorin, Nigeria.

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Abstract

Background: Obstetric emergencies are important contributor to adverse pregnancy outcome and the cascade of events before and after hospital arrival contribute to treatment outcomes in these women.

Method: A prospective cross-sectional study was conducted at University of Ilorin Teaching Hospital, Ilorin, Nigeria between July and December 2019.Participants were 164 women admitted and managed as obstetric emergencies at the study centre. Primary outcome measures were the preadmission events (care received and mode of transportation), secondary outcomes were promptness of emergency care and maternal outcome. Data was presented as descriptive statistics in tables with percentages.

Results: The mean age of participants was 29±4 years, 124(75.6%) were of low social class, duration of the complication was <12hours in 82(50.0%) and 134(81.7%) received pread mission care. There were134(92.5%) referred cases, 96(71.6%) were health-worker-initiated, 86(64.2%) presented with referral letter and the indications for referral included lack of competence to manage the cases in 68 (50.7%) and no improvement with treatment in 26(19.4%). Also, 132(80.5%) traveled >10km before arrival, transportation was with ambulance in 2(1.2%), 156(95.1%) received no care during transportation while duration from referral-to-arrival was >60minutes in 96(70.7%). Commonest diagnosis at presentation

was severe preeclampsia/eclampsiain 50 (30.5%), 132(80.5%) were attended to by a doctor within 10 minutes of arrival while maternal mortality was 61/1000 live birth.

Conclusion: To further reduce maternal mortality, improved access to comprehensive emergency obstetric services through early referral, effective inter-facility communication and safe transportation should be prioritized.

KEYWORDS: Emergency obstetric care, pread mission events, obstetric referral, maternal health.

Introduction

Poor maternal health out come remains a challenge in maternal health services. Despite global efforts to reduce maternal mortality through the implementation of the Millennium Development Goals, a global review from1990-2015 showed a 44% reduction in maternal mortality ratio, 43% reduction in annual maternal deaths and a decrease in global lifetime risk of a woman dying from complications of pregnancy and childbirth from 1 in 73 to 1 in180[1].However, low-income countries accounted for 99% of global maternal deaths in 2015 with Sub-Saharan Africa contributing 66%of these deaths[1].A national survey of maternal deaths and near-miss in public tertiary hospitals in Nigeria reported that getting to the hospital may not be enough to save the life of the obstetric patient. In the survey, 91.8% of the women were admitted in critical condition which culminated in adverse treatment outcomes[2]. In addition the clinical state at admission of critically ill obstetric patients has been identified as a major determinant of treatment outcome as women with low oxygen saturation, multiple organ failure or those requiring mechanical ventilation contributed significantly to maternal mortality[3]. Therefore, the chain of events prior to arrival at the health facility in these obstetric emergencies is equally important in the treatment outcome irrespective of available facilities.

The study aimed to describe the cascade of preadmission events relative to care received, transportation and access to emergency care services among women who presented with obstetric emergencies at a tertiary facility in Ilorin, Nigeria.

Materials and Methods

The study was a prospective cross-sectional study conducted at the Obstetrics and Gynaecology department of the University of Ilorin Teaching Hospital, Ilorin which is a tertiary referral centre between July and December 2019.The study participants were women who were admitted as obstetric emergencies during the study period irrespective of the booking status. The inclusion criteria were admission at the study centre as a case of obstetric emergency irrespective of the booking or referral status and consent to participate in the study. Non-emergency cases and women who developed complications after admission were excluded from the study.

The sample size was determined by the formula[4]

$$n = \frac{z^2 pq}{d^2}$$

n= desired sample size

z = standard normal deviate usually set as 1.96 which corresponds to 95% confidence interval

p = proportion in the target population estimated to have a particular characteristic i.e. 0.095 (i.e. 9.5%[5]).

q = 1.0-0.095 = 0.905

d= degree of accuracy desired usually set at 0.05

n = $\underline{1.96^2 \text{ x } 0.095 \text{ x } 0.905}$ = 132 participants
$\qquad (0.05)^2$

With 10% attrition i.e. 13, the minimum sample size for the study was (132+13) 145 participants.

However, 164 participants were recruited into the study to improve the power of the study. The sampling method was purposive non-probability sampling which involved recruitment of all consecutive consenting eligible participants.

All women who were admitted as obstetric emergencies at the emergency and labour wards were screened for eligibility into the study and recruitment was after obtaining consent. Following recruitment, data collection was commenced along with resuscitation and definitive treatment using the information data sheet designed for the study. Data collection was by the researchers and trained research assistants (medical interns) and all participants were followed up till discharge from the hospital or death. Relevant information included bio-social parameters, history of the complication, its onset, care received before presentation, indication for referral, time interval from referral and presentation, mode of transportation, care during transfer and companionship during transfer to the hospital. Subsequent data included the timeline for care at the study site, opinion about level of satisfaction with the services provided and the eventual outcome (discharge or death) of the participant.

Ethical approval was obtained from the Ethical Review Committee of the University of Ilorin Teaching Hospital, Ilorin and an Informed consent was obtained from all participants; consent was obtained from the available care giver in cases of women who were unconscious at the time of presentation. The data obtained was analyzed and the results presented in tables with percentages using descriptive statistics.

Results

Table 1: Biosocial characteristics of participants

Parameter	Frequency	%
Age (years)		
<20	14	8.6
20-35	126	76.8
>35	24	14.6
Mean age	29±4 (range 17 to 40)	
Parity		
0	38	23.3
1	34	20.7
2-4	68	41.5
≥5	24	14.6
Occupation		
Artisan	22	13.4
Student	26	15.8
Civil servant	46	28.1
Trading	70	42.7
Marital status		
Divorced	2	1.2
Single	28	17.1
Married	134	81.7
Level of education		
None	10	6.1
Primary	18	11.0
Secondary	70	42.7
Tertiary	66	40.2
Partner's occupation		
Student	12	7.3
Trading	40	24.4
Artisan	50	30.5
Civil servant	62	37.8
Partner's level of education		
None	16	9.8
Primary	16	9.8
Secondary	46	28.1
Tertiary	86	52.3
Social class		
High	14	8.5
Middle	26	15.9
Low	124	75.6

Table 1 shows that among the 164 study participants, the mean age was 29±4 years (range 17 to 40), 14(8.6%) were teenagers, 38(23.3%) were nullipara, 24(14.6%) were grand multipara, 154(93.9%) had at least primary level of education while 124(75.6%) were of low socio-economic status.

Table 2: Preadmission details of participants

Parameter	Frequency	%
Duration of complication before presentation (hours)		
<12	82	50.0
12-24	38	23.2
>24	44	26.8
Pre-admission medical treatment		
Yes	134	81.7
No	30	18.3
Site of pre-admission treatment (n=134)		
Maternity home	6	4.5
Faith home	12	9.0
Private hospital	44	32.8
Public hospital	72	53.7
Type of pre-admission treatment (n=134)		
Outpatient	40	29.9
In-patient	94	70.1
Duration of pre-admission in-patient care (hours) (n=94)		
<12	56	59.6
12-24	22	23.4
>24	16	17.0
The patient was referred (n=164)		
Yes	134	92.5
No	30	7.5
Who initiated the referral? (n=134)		
Relatives	6	4.5
Patient	8	6.0
Husband	24	17.9
Healthcare worker	96	71.6
Did patient presented with a referral letter? (n=134)		
Yes	86	64.2
No	48	35.8
Was patient aware of the indication for referral? (n=134)		
Yes	98	73.1
No	36	26.9
Indication for referral (n=134)		
No blood for transfusion	2	1.5
No money for surgery	2	1.5
Patient's preference	6	4.5
No doctor to treat patient	6	4.5
No money for care	6	4.5
No facility for required surgery	18	13.4
No improvement in clinical status	26	19.4
Facility lack competence to manage the case	68	50.7

Table 2 shows that the duration of the complication was <12hours in 82(50.0%), 134(81.7%) received some care before presentation, 94(70.1%) received in-patient care while care was at a public hospital in 72(53.7%). A total of 134(92.5%) were referred, the healthcare worker initiated the referral in 96(71.6%) while 86(64.2%)were given a referral letter. The commonest indications for referral were inability of the facility to handle the case in 68 (50.7%), no improvement in the patients' clinical status despite treatment in 26 (19.4%) and lack of facility for required surgical procedure in 8(13.4%) cases respectively.

Table 3: Details of transportation to the study site

Parameter	Frequency	%
Distance travelled to arrive at the study site (km)		
≤5	8	4.9
6-10	24	14.6
>10	132	80.5
Mode of transportation to study site		
Ambulance	2	1.2
Motorcycle	14	8.5
Public transport	58	35.4
Private vehicle	90	54.9
Patient's position during transportation to hospital		
Lying down position	62	37.8
Sitting position	102	62.2
Any treatment during transportation		
Yes	8	4.9
No	156	95.1
Companion during transportation to study site		
Friends	2	1.2
Parents/ In-laws	20	12.2
Relatives	52	31.7
Husband	90	54.9
Time interval from referral to arrival at study site (minutes) n=134		
≤30	4	2.9
31-60	34	26.5
61-120	60	44.1
>120	36	26.5
Satisfaction with mode of transport (n=164)		
Yes	106	64.6
No	58	35.4

Table 3 shows that 132(80.5%) of participants traveled >10km before arrival, the modes of transportation of participants to the health facility included medical ambulance in 2 (1.2%), public transportation in 58 (35.4%) and private vehicles in 90 (54.9%) cases respectively. Only 8(4.9%) received any form of care during transfer, 90(54.9%) were accompanied by the partner while time interval from referral to arrival at study site was >60minutes in 96(70.6%).

Table 4: Details at admission and care at the study site

Parameter	Frequency	%
Time of presentation		
8am to 5.59pm	88	53.7
6pm to 7.59am	76	46.3
Period of pregnancy at presentation		
Antepartum	68	41.5
Intrapartum	66	40.2
Postpartum	30	18.3
Systolic blood pressure at presentation		
<90	4	2.4
90-139	84	51.2
≥140	76	46.4
Diagnosis at presentation		
Breech presentation in labour	12	7.3
Cephalo-pelvic disproportion	12	7.3
Obstructed labour	12	7.3
Ruptured ectopic pregnancy	14	8.5
Antepartum haemorrhage	14	8.5
Primary postpartum haemorrhage	22	13.4
Medical disorders in pregnancy	28	17.2
Severe preeclampsia/ Eclampsia	50	30.5
Time interval from arrival to review by a doctor (minutes)		
≤10	132	80.5
11-20	12	7.3
21-30	16	9.8
31-60	2	1.2
>60	2	1.2
Duration of admission at the study site (days)		
2	40	24.4
3	44	26.8
4	18	11.0
5	22	13.4
≥6	40	24.4
Perception of quality of care at study site		
Below expectation	4	2.4
Satisfactory	116	70.7
Above expectation	44	26.9
Final admission outcome		
Dead	10	6.1
Discharged home	154	93.9

Table 4 shows that 88(53.7%) presented during the day, 68 (41.5%) were in antepartum period, severe preeclampsia/eclampsia was the commonest diagnosis at presentation in 50(30.5%) cases, 132(80.5%) were attended to by a doctor within 10minutes of arrival while 10(6.1%) of participants died after admission at the study site

Discussion

Majority of participants were in the age bracket of 20 to 35years although a cumulative proportion of about a quarter were either teenagers or above 35years of age with a preponderance of low socio-economic at us. Low socio-economic status has been linked with adverse pregnancy outcomes as well as being a catalyst for teenage pregnancy and its attendant complications[2]. Therefore, it will be appropriate to re-emphasize the role of contraception especially as 17.1% of the study participants were unmarried. The high rate of preadmission care suggests an improvement in the level of health awareness and health seeking behavior among the participants. In a previous study in Ilorin, 93% of patients presented directly at the tertiary centre bypassing all other lower levels of healthcare[6]. This may place unnecessary burden on the tertiary facility and render other levels of health facility redundant.

Effective referrals remains a challenge in low-income countries as referrals are often late; however, in this study, 59.6% of referrals were within 12hours while 40.4% were referred after 12hours of previous admissions. These can at best be described as late especially in the face of most of the diagnosis made at admission which were emergencies. Previous studies in Nigeria have documented the negative impact of late referrals on treatment outcomes especially in obstetric emergencies[2,7].This corroborates the report of Bis was et al from Bangladesh that early identification of complications and prompt referrals are beneficial in averting maternal deaths[8]. In addition, there was no communication between the referring and receiving health facilities before the arrival of any of the patients. However, a previous report observed that inter-facility timeliness and communication play an important role in the prevention of maternal deaths when appropriately utilized[9]; therefore, healthcare workers should be encouraged to utilize the advantage of effective inter-facility communication on referrals. The common indications for the referrals were lack of manpower to handle the emergency, lack of facility for required surgery and no improvement in the clinical condition of the patient despite preliminary care. In about 88% of the study participants, the indications for referral were traceable to facility-based factors, thus awareness and monitoring of health facilities to ensure strict compliance with admissions based on the capacity of the health care facility should be intensified. In a similar study from India, majority of the conditions necessitating referrals were present before labour such that admission in appropriately equipped facilities would have averted the need for emergency referrals thereby improving pregnancy outcome.[10]

Whether referred or arriving from home, patients need transportation to access the health facility. For emergencies or critically ill patients, the period of transfer represents a golden period which may determine the eventual outcome of care. Therefore, the medical ambulance with its accessories is ideal for transportation because it offers the presence of medical or paramedical

personnel, equipment for monitoring as well as appropriate care while in transit. The positive impact of available, prompt and effective transportation such as equipped ambulance for obstetrics emergencies have been shown by various studies across the globe[11-17]. A report in Nigeria indicated that shortages of vehicles, fuel and high transportation fares by transporters delayed transportation of women with obstetric complications.[11] In low-income communities, attempts have been made to improve transportation for emergency medical conditions. In northwestern Nigeria, collaboration with local transport workers union with revolving emergency fuel fund was explored with some success although this could not be sustained[5]. In rural Malawi, motorcycle ambulances were improvised and found to be useful and a cheaper means of transporting obstetric emergencies to rural health facilities with reduction of median referral delay by 2 to 4.5 hours[12]. In India, state-run call-centre-based, free ambulance transport program using dial codes through public private partnership provided well equipped ambulances with trained emergency medicine technicians to provide care was explored[13]. All these various innovations showed significant impact on the overall outcome of these patients although sustainability remains a major obstacle due to inadequate government participation. In another report from Nigeria, it was observed that women who were referred for emergency caesarean delivery had poorer outcomes compared to women who developed labour complications but the surgery was performed at the facility without need forreferral[14]. Therefore, the government must take the initiative in collaboration to development partners and community leaders to explore government supported-community-ownership of medical ambulances to transport individuals requiring emergency services.

Third level delay at the health facility is a documented cause of maternal mortality and morbidity although this was not a major challenge in this study in a previous national survey in Nigeria, it was reported that the time interval from presentation to attention by a doctor as well as time to definitive intervention was critical and contributed to the severe maternal outcome[2]. While a culture of complication-readiness at our facilities will be beneficial in averting the delay, effective pre-arrival inter-facility communication will further ensure delivery of prompt appropriate and effective care. The recorded maternal mortality rate of 6.1% was lower than other reports of critically obstetric admissions; this may be related to the clinical condition at presentation, early referral and promptness of care received at presentation[2,3,9,11].

Conclusion

This study concludes that preadmission events are important in the determination of the eventual outcome of care in obstetric emergencies. Delayed referrals, inappropriate prior admission in facilities that are not equipped to manage obstetric emergencies, lack of inter-facility communication and inappropriate modes of transportation were identified as obstacles to prompt emergency obstetric service delivery. Therefore, to further reduce maternal mortality, improved access to comprehensive emergency obstetric services through early referral, effective inter-facility communication and safe transportation should be prioritized.

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