Characterizing the referral care continuum among complex obstetric patients in the Blantyre District of Malawi: A quantitative analysis of a midwifery-led project

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Introduction:

Despite high rates of facility delivery and skilled attendance at birth in Malawi, maternal mortality remains high. With most deaths occurring at secondary and tertiary levels of care, **we aimed to understand the characteristics of pre-referral care driving poor maternal outcomes, and to recommend midwife-led solutions for timely and comprehensive care**.

Methods:

Full cohort: Complex obstetric patient charts of women referred between March 2019 and March 2020 from seven Blantyre District primary health centers referred to Queen Elizabeth Central Hospital (QECH) were extracted and analyzed for associations between individual- and facility-level characteristics and referral care and outcomes.

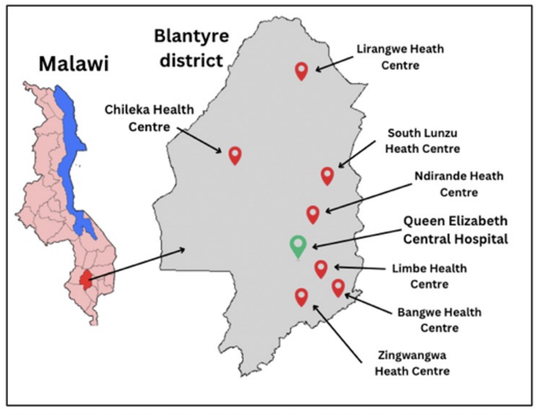


Figure 1. Map of the Blantyre District health facilities included in the study in relation to Queen Elizabeth Central Hospital (QECH)

Referral interval cohort: A subset of women for whom a "referral interval"—included time/date of their complication prompting referral *and* the time/date they were seen by a provider at QECH—could be calculated were further analyzed.

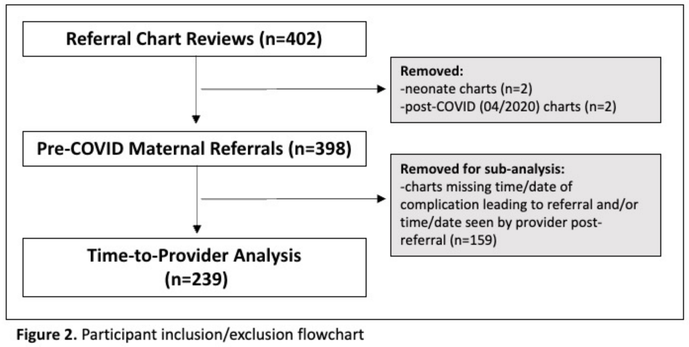


Figure 2. Participant inclusion/exclusion flowchart

Key Findings:

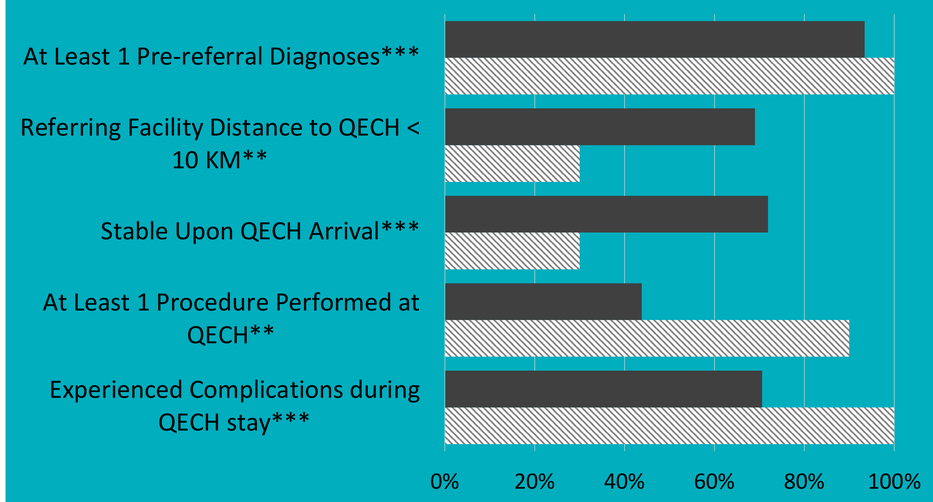
Approximately half of patients were between 18 and 24 and two-thirds were referred from a facility less than 10km from QECH. Most were referred during the intrapartum period, admitted to the labor ward, in stable condition upon arrival, discharged alive, and presented with one pre-referral condition—most commonly prolonged/obstructed labor followed by pre/eclampsia.

Full Maternal Cohort (N=398):

Compared to those who arrived to QECH in stable condition, those who arrived in critical condition were significantly ($p<0.01$) more likely to

- receive IV fluids, medications, or 2+ procedures, and
- experience a complication and/or death.

Significant Maternal Characteristics by Patient Outcomes

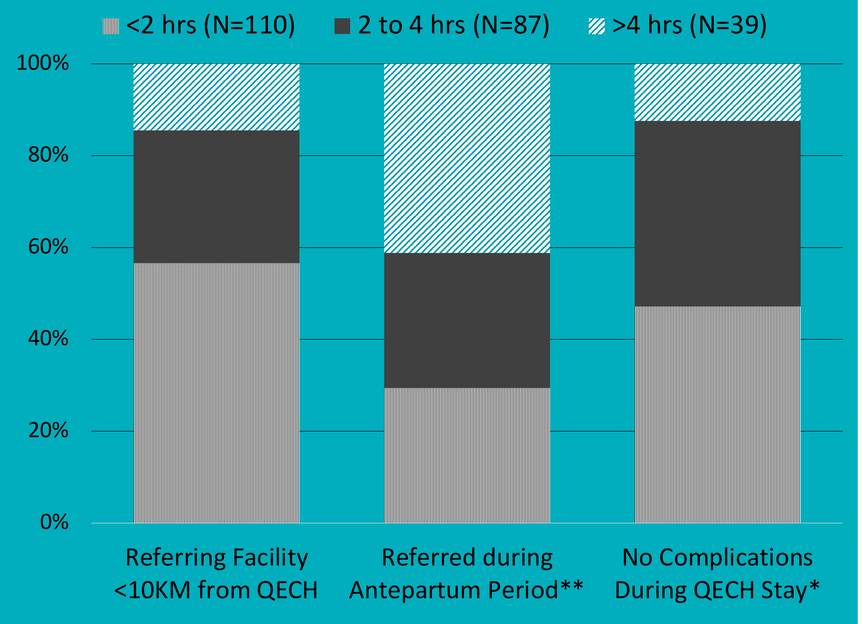


*Notes: Only statistically significant findings are shown here: *p>0.5, **p>0.1, ***p>0.001. "Pre-referral" and "Admission diagnoses" included: antepartum or postpartum hemorrhage, pre-/eclampsia, premature labor, retained placenta, ruptured uterus, sepsis, prolonged/obstructed labor, and other. "Procedures" included: catheterization, cannulation, manual removal of placenta, bimanual compulsion, tears sutured, vacuum extraction, breech maneuvers, knee-chest position, left-lateral position, NASG, bag and mask, cardiopulmonary resuscitation, and other. The outcomes of 11 patients were "unknown" and are not included here. Finally, Spearman's test revealed moderate correlation between facility distance and arrival condition (rho: 0.220, p=0.002).*

Referral Interval Sub-analysis Cohort (N=239):

Average referral interval ranged from 5.05 (SD: 7.22) hours in the furthest facility, to 1.75 hours (SD: 0.80) in the closest ($p=0.01$). Intrapartum referrals ($p<0.01$) and those with prolonged/obstructed labor had the shortest intervals ($p=0.03$).

Maternal Characteristics by Referral Interval Category



*Notes: Distance from referring facility was considered moderately significant ($p=0.058$), otherwise only statistically significant findings are shown here: *p>0.5, **p>0.1.*

Discussion & Conclusion:

Our findings confirmed that pre-referral challenges were associated with worse maternal morbidity and mortality. **A multi-pronged strategy will be necessary to improve the state of obstetric referrals in Blantyre District.** Alongside national investments in the nurse-midwifery workforce and scaling up non-urgent surgical birth at referring health facilities, we recommend:

- additional **training, support, and longitudinal mentorship** for:
  - providers across referring health facilities to improve triaging, diagnosis precision, effective preventative care, and comprehensive pre-referral management; and
  - admitting personnel and providers at referral hospitals to ensure accurate and comprehensive care for all transferred mothers;
- increased and government-maintained **transportation options**, particularly at sites further from tertiary care; and
- consistent access to **supplies for providers across the referral spectrum** to strengthen completeness of referral care documentation.

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