The value of time: Evaluating the impact of three years of the Global Action in Nursing project on select patient outcomes in Blantyre district, Malawi

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GAIN Global Action in Nursing

GAIA global health

Background

There is a global shortage of nurses and midwives. The unequal distribution of skilled providers leaves low- and middle-income countries, particularly in sub-Saharan Africa, with the greatest need.

To address this critical need, University of California San Francisco **Global Action in Nursing (GAIN) partnered with Malawian colleagues to improve maternal and neonatal outcomes through clinical training and mentorship**. Specifically, GAIN combines intensive short course trainings with longitudinal bedside mentorship by expert midwives.

Short-course trainings range from five to ten days. Topics include maternal and neonatal care and leadership skills, in accordance with national guidelines. Following trainings, providers receive a minimum of 12 months of weekly mentorship at the bedside by an expert nurse-midwife.

Table 1: Summary of Health Facility Characteristics

Health Centre	Distance to Central Hospital (km)	Average births per month	Configuration of providers*
Bangwe	9.2	185	2 RNMs, 16 NMTs
Chileka	22.6	151	2 RNMs, 14 NMTs, 3 CMAs
Limbe	5.6	170	5 RNMs, 20 NMTs, 1 CMA
Lirangwe	34.3	91	9 NMTs
Ndirande	5.4	203	3 RNMs, 22 NMTs
South Lunzu	13.0	149	3 RNMs, 18 NMTs, 5 CMAs
Zingwangwa	3.6	141	2 RNMs, 17 NMTs
Chilomoni**	7.1	99	2 RNMs, 25 NMTs
Mpemba**	13.2	79	4 RNMs, 14 NMTs, 3 CMAs

*Registered Nurse Midwives (RNMs), Nurse-Midwife Technicians (NMTs), and Community Midwife Assistants (CMAs). At GAIN facilities, RNMs, NMTs, and CMAs received training and mentorship

**Indicates control facilities

Methods

Data Collection

All maternal and neonatal variables between 2019 and 2022 were extracted from the Malawi District Health Information System 2 (DHIS2). Data from seven intervention facilities which received the intervention at staggered intervals as well as two control non-intervention facilities were included (Table 1).

Data Analysis

We used R statistical software v. 3.6.0 and the NLQMM package version 1.5.6. Data were first explored using univariate descriptive statistics followed by binary comparisons and into six-month intervals. Finally, we used nonlinear quantile mixed model (NLQMM) to account for potential confounding variables and the potential for clustering of patient characteristics, baseline behaviors, and behavior changes at each site. Median estimates were reported at tau (τ) level, 50%.

Results

Overall, 44,565 patients were seen from 2019 to 2022 at nine facilities in Blantyre district, Malawi, with between 31 and 36 month-year observations per facility. Patient volume ranged from a low of 34 to a high of 303 patients per month, with an overall median of 154 patients per month.

- **Obstetric Complications:** Intervention facilities saw a significant increase in reporting of prolonged labor, pre/eclampsia, fetal distress, retained placenta, and premature labor.

- **Emergency Obstetric Care**: There were significant increases in the reporting of emergency obstetric care at intervention facilities. Specifically, the reporting of antibiotic use, anti-convulsive use, manual removal of the placenta, and oxytocin all significantly increased.

- **Neonatal Complications:** The reporting of 'No Complication' significantly decreased at intervention sites, while the reporting of premature birth and asphyxia both significantly increased. The reporting of birthweights under 2500g also significantly increased with each six months of the GAIN intervention.

- **Delivery Related Variables**: Despite the increased reporting of complications at both the obstetric and neonatal level, there was no statistically significant increase in referral rates to hospitals for advanced care.
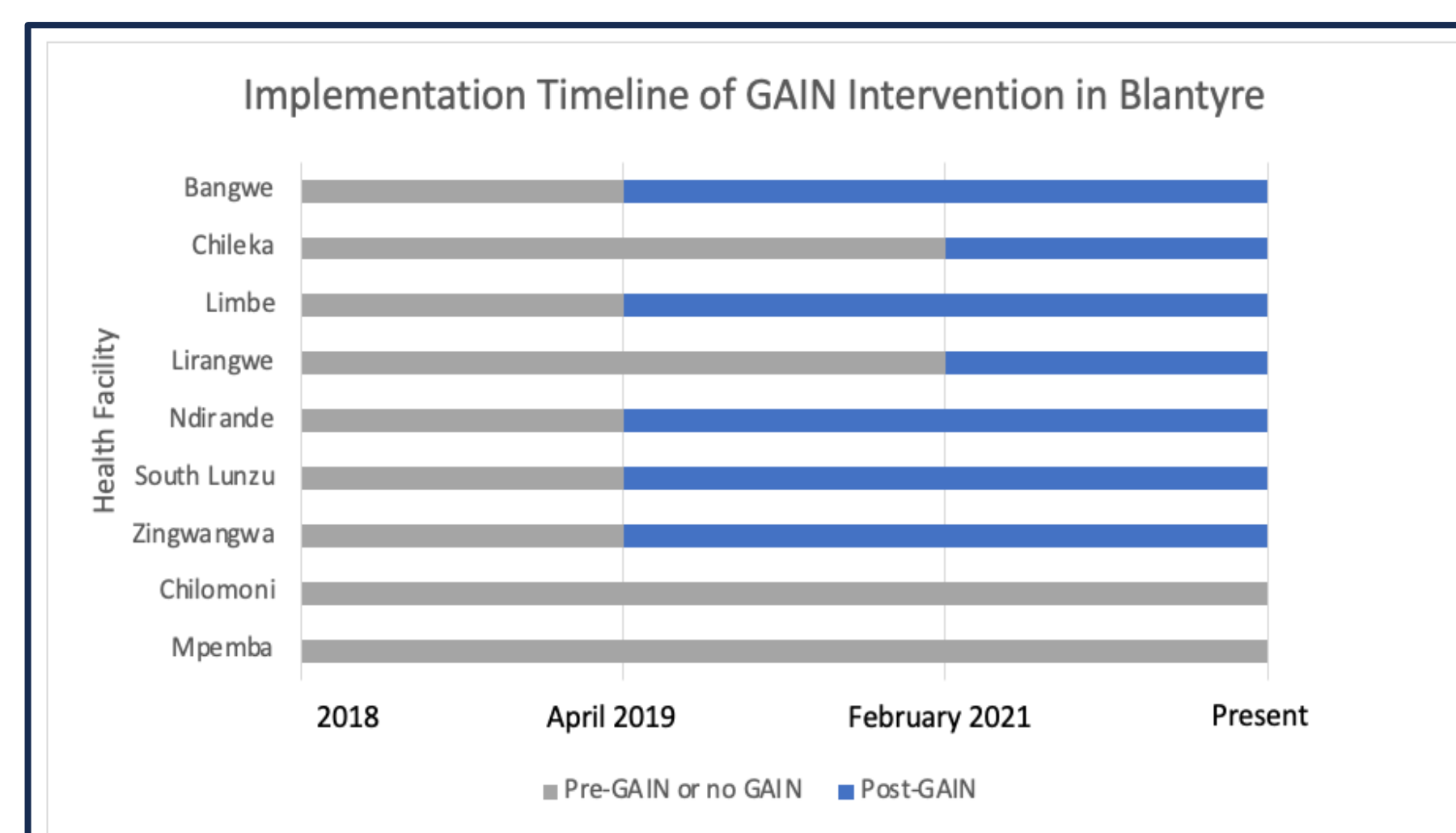
Table 2: Results of NLQMM showing percent change in prevalence of select birth-related variables per six months of ongoing GAIN mentorship adjusted to time and facility-level correlations at τ=0.5

| | | | τ=0.5 | | |
| | | | 95% CI | | |
		Est.	lower bound	upper bound	p-value
Obstetric Complications	Prolonged Labor	0.4	-0.1	0.9	0.08
	Pre/Eclampsia	0.3	-0.2	0.7	0.22
	Antepartum Hemorrhage	<0.01	<-0.01	<0.01	0.92
	Fetal Distress	0.4	0.1	0.6	<0.01
	Sepsis	<0.01	<-0.01	<0.01	1.00
	Retained Placenta	0.1	0	0.2	0.09
	Post-Partum Hemorrhage	<0.01	-1	0.1	0.90
	Other	-0.2	-1.6	1.2	0.81
	Premature Labor	0.7	0.1	1.2	0.01
	None	-0.2	-0.7	0.1	0.14
Obstetric Care	Antibiotics	0.002	-0.001	0.005	0.22
	Anticonvulsive	0.002	0.001	0.004	0.01
	Blood Transfusion	<-0.001	<-0.001	0	1.00
	Manual placenta removal	<0.001	<-0.001	0	1.00
	Oxytocin	0.159	0.023	0.295	0.02
Neonatal Complication	None Reported	-0.001	-0.01	0.006	0.08
	Other	<-0.001	-0.002	0.002	0.77
	Premature birth	<0.001	-0.001	0.002	0.03
	Sepsis	<-0.001	<-0.001	<0.001	1.00
	Weight Under 2500g	0.002	-0.002	0.006	0.28
Delivery Location	This facility	0.001	-0.002	0.005	0.47
	Other facility	<-0.001	<-0.001	<0.001	1.00
	In transit	-0.002	-0.003	0.001	0.05
	Home/TBA	0.001	-0.001	0.002	0.53
Birth Outcomes	Live birth	0.001	-0.001	0.003	0.42
	Still birth	-0.001	-0.002	0.001	0.29
	Neonatal death	<-0.001	-0.001	<0.001	-0.31
	Referred to Hospital	0.5	-0.8	1.8	0.45

Implementation Timeline of GAIN Intervention in Blantyre

Health Facility: Bangwe, Chileka, Limbe, Lirangwe, Ndirande, South Lunzu, Zingwangwa, Chilomoni, Mpemba

2018 — April 2019 — February 2021 — Present

▪ Pre-GAIN or no GAIN ▪ Post-GAIN

Discussion and Conclusion

Over time, the biggest impact of the GAIN intervention was the identification and reporting of complications. Improved reporting of neonatal asphyxia and premature birth should be of particular note, as both are leading causes of neonatal death in Malawi. **Increased reporting of complications did not correspond with increases in maternal death, neonatal death, or the referral of patients to higher level facilities.** Findings align with previous evidence suggesting mentorship increases provider confidence and the ability to identify complications and emergent issues in their patients.

This study highlights the unique strength of the GAIN approach, with longitudinal mentorship preventing regression in traditional training-only approaches.

Many global health programs and interventions seek to reduce rates of maternal and neonatal complications. While that is an important goal, there is first a need to accurately define and document baseline rates of complications. **Findings from this study support growing evidence that mentorship is key to sustaining provider skills, competence, and ultimately, quality of care.**

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