

Epidemiology and delays in surgical care for obstetric patients in rural Uganda

McKayla Poppens^{1,2}, Rasheedat Oke³, Melissa Carvalho³, Yeranui Ledesma⁴, Silas Okullu⁵, Marissa Boeck⁴, Catherine Juillard³, Mary Margaret Ajiko⁵, Rochelle Dicker³

¹David Geffen School of Medicine at UCLA, ²Charles R. Drew University of Medicine and Science, ³Program of the Advancement of Surgical Equity, Department of Surgery, University of California Los Angeles,

⁴Department of Surgery, University of California San Francisco, ⁵Department of Surgery, Soroti Regional Referral Hospital, Soroti, Uganda

Introduction

Maternal mortality in Uganda is 375 per 100,000 live births, which ranks 30th worse worldwide. High maternal mortality rates highlight existing disparities in global health care delivery. The “3 Delays Model” proposes that pregnancy-related mortality is due to a delay in deciding to seek medical care for an obstetric emergency, reaching an appropriate care facility, and receiving adequate care once a facility is reached. The first delay, seeking timely care, can be related to sociocultural factors, care provider shortage, and poverty, among other reasons. The second delay occurs when travel to a facility that provides emergency obstetric care is delayed or unavailable. The last delay occurs in the health facility and evidence emphasizes that reducing this delay may have the greatest impact on maternal outcome.

Primary data characterizing the burden of injury and clinical factors of obstetrics care in rural Uganda is limited. Hospital-based obstetric and gynecology registries are critical tools for characterizing obstetrics and gynecological injury patterns and outcomes, as well as informing quality of care for clinicians, researchers, and policymakers.

A prospective obstetric and gynecology non-trauma surgical registry was established in 2017 between Ugandan and American partners at a regional hospital in eastern Uganda. This study aims to characterize the patterns of demographics, clinical factors, and outcomes of obstetric surgical patients presenting to Soroti Regional Referral Hospital (SRRH) in order to identify factors associated with delays in receiving obstetrics care in rural Uganda.

Methods

Study setting & data collection

Data were collected between January 2017 and August 2020 at SRRH, one of 13 public regional hospitals in Uganda. Inclusion criteria for the registry included patients receiving an operation for an obstetrics or gynecological condition. A structured questionnaire based on literature review and discussions with hospital doctors was developed for the survey. Trained healthcare workers at SRRH completed the questionnaire at the time of patient encounter or retrospectively from medical records to collect data on demographics, prenatal care, preliminary clinical assessment and vital signs, operation, interventions, and outcome. Delays in surgical care were defined when surgery was recommended by a surgeon, but lack of necessary factor(s) delayed operation.

Data analyses

Analyses were performed using Stata, version 16.1. Tabulations and descriptive statistics were used on demographic and clinical data. Chi-square tests of independence were used to investigate associations between district of residence, diagnosis, or operation with surgical delay. An alpha value of 0.05 was set as the threshold for measuring statistical significance for analyses.

Ethical approval

Oral informed consent was obtained for all adult patients during their hospital encounter, with permission from guardians obtained for all patients under 18 years of age. This study protocol was approved by the Soroti Regional Referral Hospital administration and the Institutional Review Board of the University of California, Los Angeles.

Results

CHARACTERISTIC		FREQUENCY (%)
Age* (N=3204)		23 (19, 28)
Active labor (N=3405)		3213 (94.36)
G*		2 (1.4)
P*		1 (0.2)
A*		0 (0.0)
Gestational age (N=3192)	Preterm	75 (2.35)
	Term	3108 (97.37)
	Post-term	9 (0.28)
Prenatal visits (N=3167)	0	7 (0.22)
	1	34 (1.08)
	2	181 (5.74)
	>3	2824 (89.62)
	Unknown	105 (3.33)
Pregnancy induced condition (N=3213)	Total	92 (2.66)
	DIC	3 (3.26)
	Hypertensive disorders of pregnancy	72 (81.52)
	Abortion	15 (6.30)
	Gestational diabetes	1 (1.09)
	Rhesus incompatibility	1 (1.09)
Infection acquired during pregnancy (N=2502)	Total	2502 (77.87)
	Malaria	505 (20.18)
	UTI	1991 (79.58)
	Other	6 (0.24)
Abx** administered (N=3190)	Yes	3179 (99.66)
Length Abx treatment (N=3167)	3-5 days	2934 (92.64)

*Median (IQR), **Abx = Antibiotics; varying sample N reflects registry completeness

Figure 2. Top eight clinical indications for surgery for patients in active labor at SRRH. Thirty-four percent of patients had a prolonged or obstructed labor and 21% of patients were indicated for surgery due to a previous Caesarean section (N=3176).

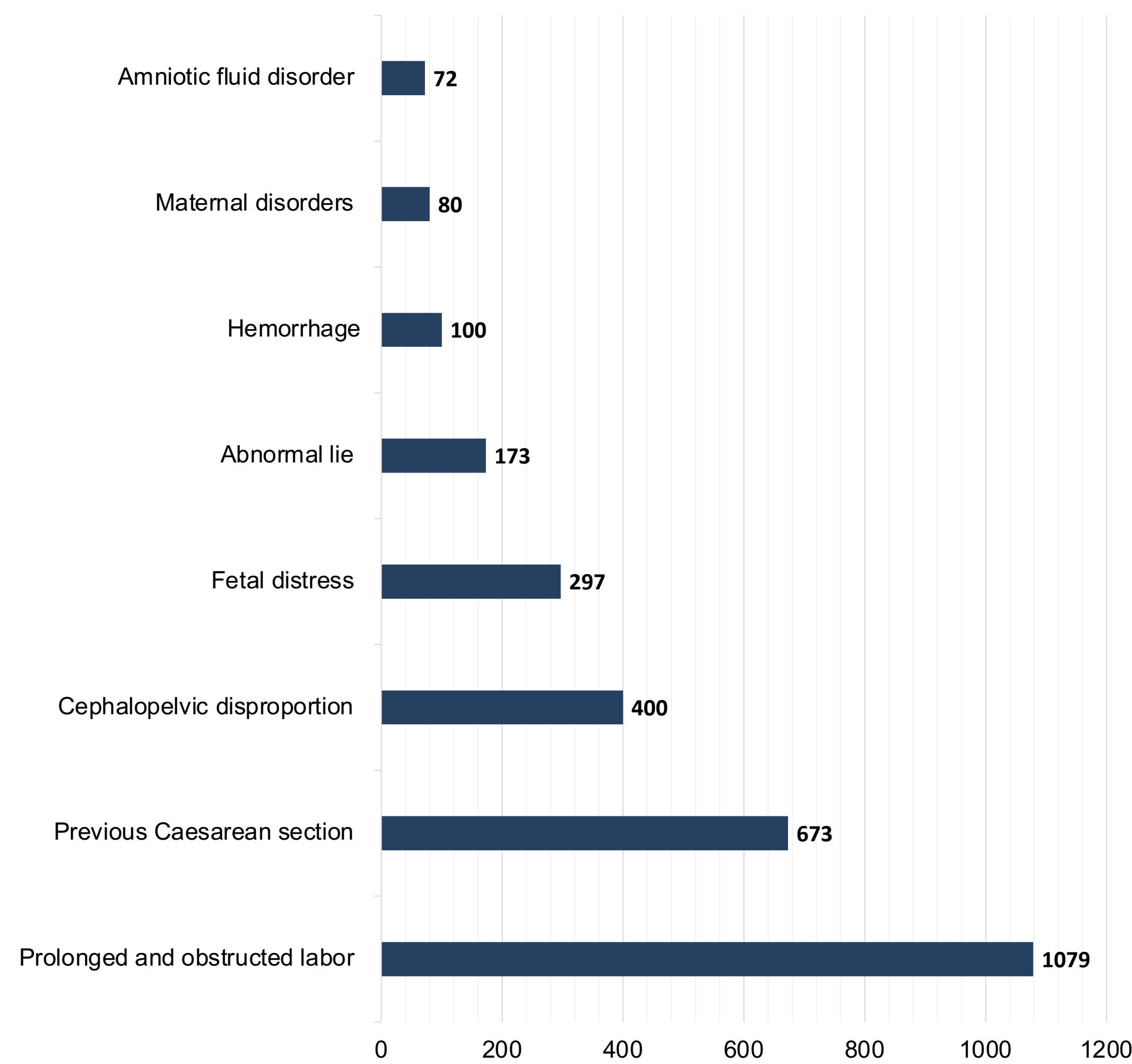


Figure 1. Map of Uganda showing district of residence for obstetric patients treated at SRRH.

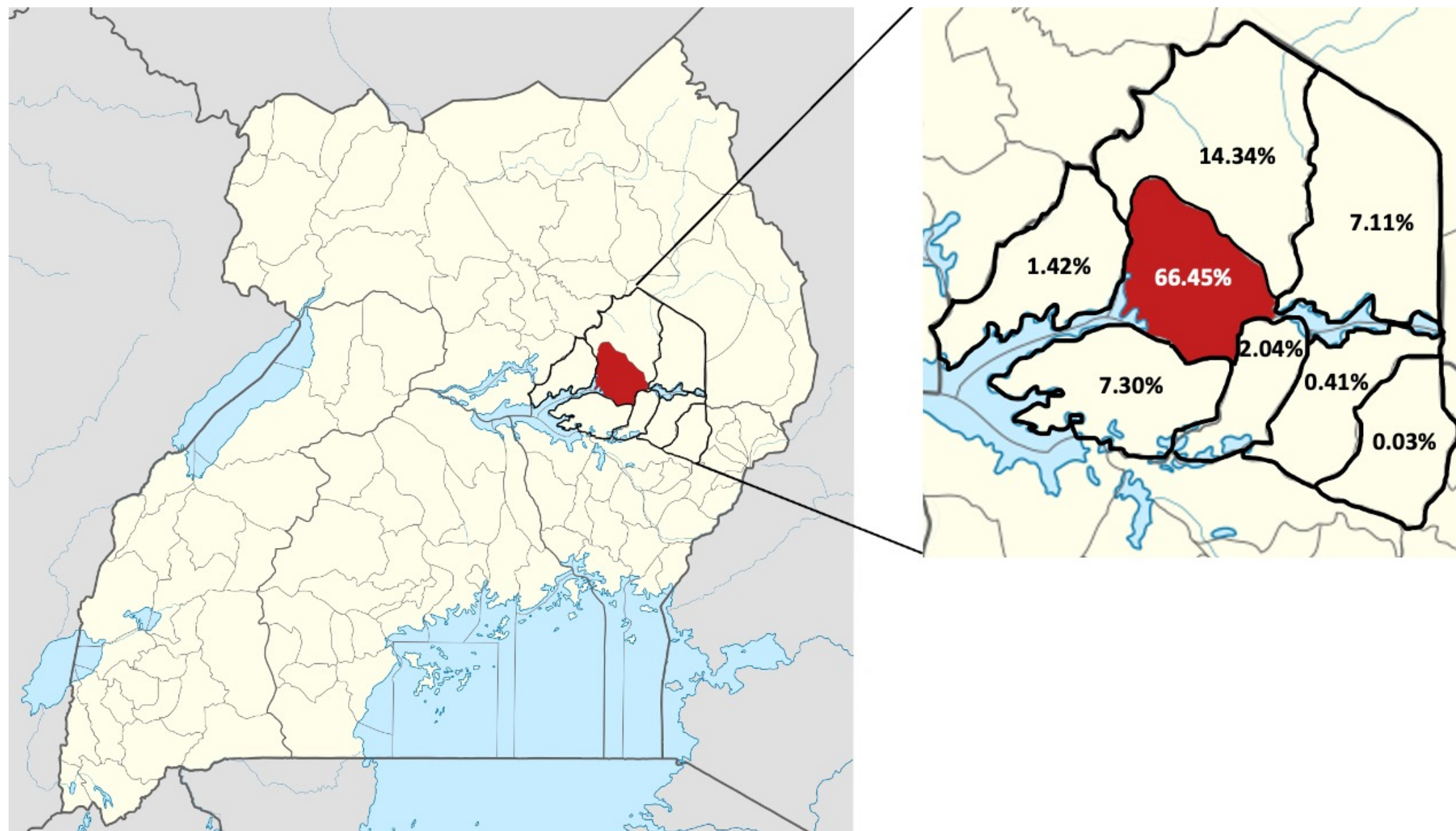


Table 2. District of residence for obstetric patients treated at SRRH. Sixty-six percent of patients live in Soroti, while 34% traveled from neighboring districts.

District (N=3180)		
Amuria	456	(14.34)
Bukedea	1	(0.03)
Katakwi	226	(7.11)
Kumi	13	(0.41)
Kaberamaido	45	(1.42)
Serere	232	(7.30)
Soroti	2133	(66.45)
Ngora	65	(2.04)
Other	29	(0.91)

Figure 3. Surgical operations performed for patients in active labor at SRRH.

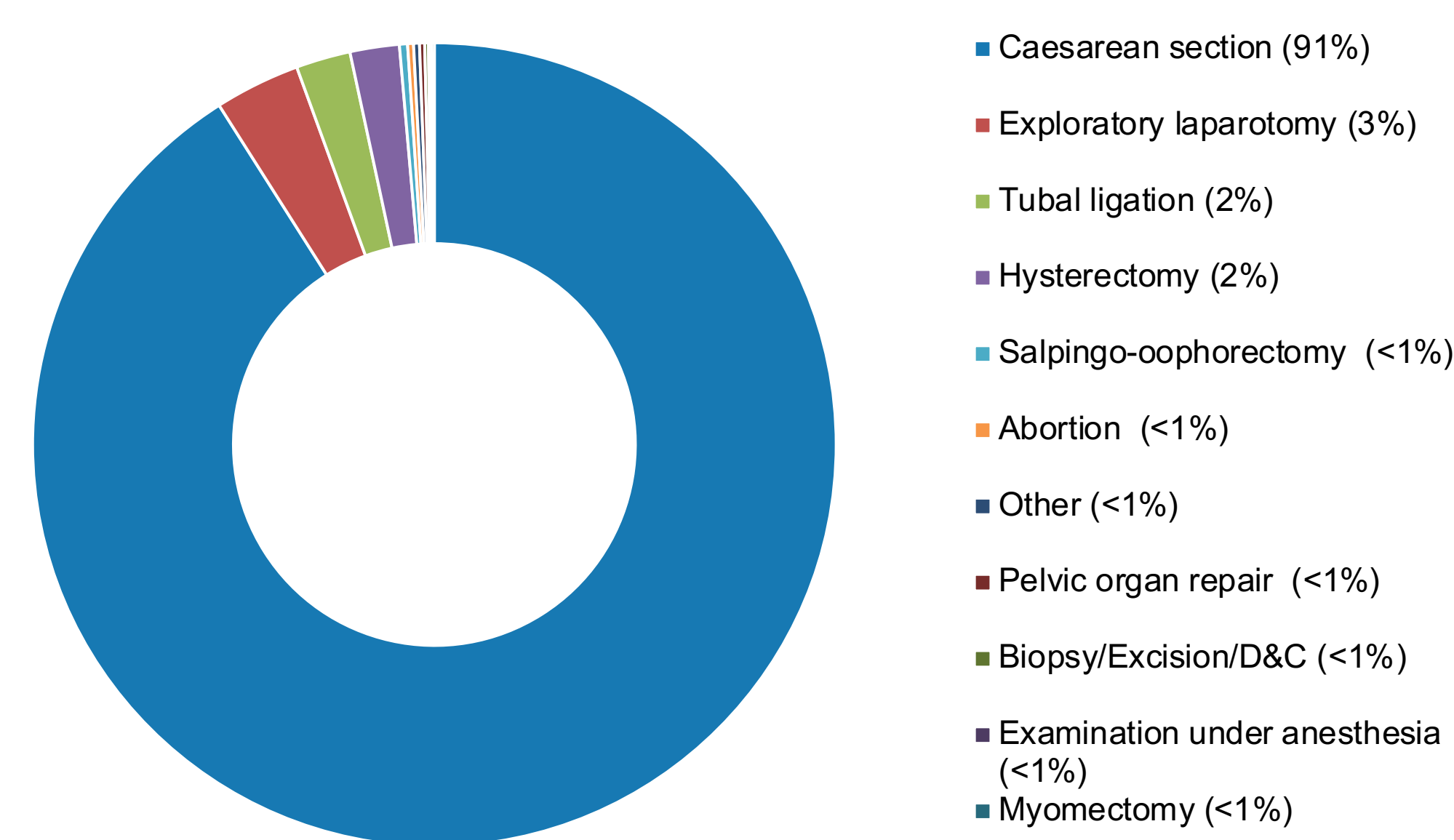
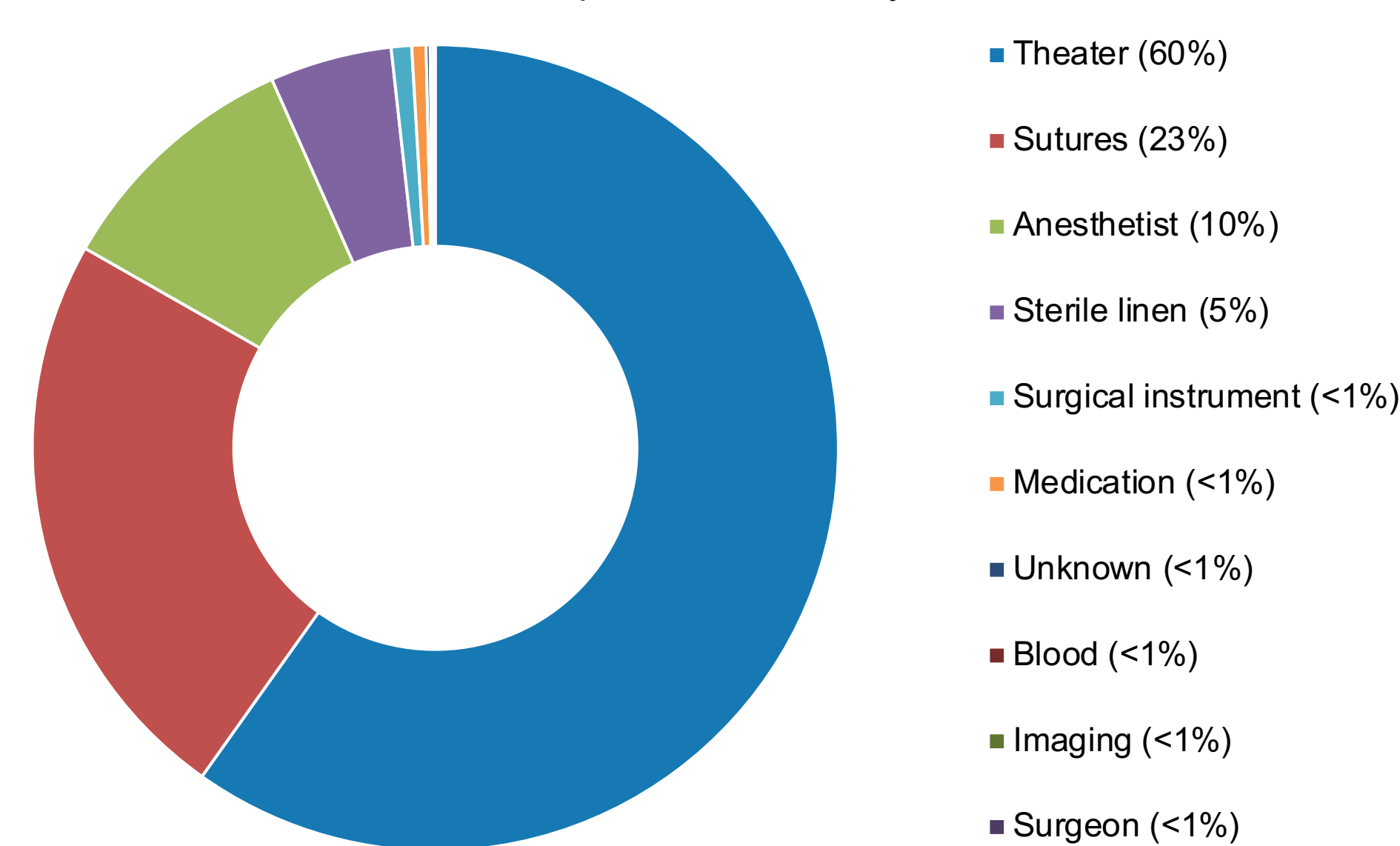


Figure 4. Surgical delays for patients in active-labor undergoing an operation at SRRH. Theater space, followed by lack of sutures and unavailability of a trained anesthetist encompassed most delays.



- During the 43-month study period, 3204 patients were entered into the obstetrics surgical registry. The median age was 23 (IQR 19-29) years.
- Although few patients reported pregnancy-induced conditions (3%) or comorbidities (3%), an infection acquired during pregnancy afflicted most patients (73%), with a urinary tract infection (80%) or malaria (20%) being causal for most patients.
- The leading indication for surgery was prolonged and obstructed labor (34%), followed by previous Caesarean section (21%) and cephalopelvic disproportion (13%).
- Chi-squared tests of independence were performed to examine the relationship between district of residence and surgical delay χ^2 , (7, N=1179, p=0.06), diagnosis and surgical delay χ^2 , (20, N=1183, p=0.435), and operation and surgical delay χ^2 , (8, N=1,183 p=0.811). District of residence, clinical diagnosis, or performed operation were not found to have a significant association to a delay in operation.

Limitations

Use of a single hospital-based registry subjects our study to selection bias for the sample population seeking care are SRRH. Comorbidities and pregnancy-induced conditions were reported by patients and likely underestimates their frequencies in our sample. Pregnancy-related mortality in our study is likely an underestimate since pre-hospital and post-hospital deaths could not be captured.

Conclusion

This study characterizes the demographic, clinical factors, and delays to surgical care for obstetrics patients treated at SRRH, as well as demonstrates the use of an obstetrics and gynecology registry for documenting complication trends affecting pregnant women in Soroti. Characterizing patient demographics and clinical care can aid in prioritizing treatment for patients. Furthermore, this registry data highlights the challenges that arise with rural maternal care in low- and middle-income countries.

Addressing maternal delays to care within the hospital setting may provide a tangible improvement in the maternal mortality rate in rural Uganda. Additionally, this study highlights the possible use of registries to guide and improve maternal health care throughout sub-Saharan Africa. Further collection and analysis of delays to maternal health care can inform public policy initiatives and development of quality improvement programs to address healthcare needs for pregnant mothers. Future research will include investigating additional delays to obstetrics surgical care at SRRH.

Acknowledgements

We would like to acknowledge the contributions of the patients and staff at Soroti Regional Referral Hospital, as well as the global surgery research teams at the University of California, San Francisco, and the University of California, Los Angeles.