

# Quality of Surgical Care in the Lake Zone of Tanzania: A Quasi-Experimental Baseline Assessment

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## Background

- Safe Surgery 2020 (SS2020) is a multi-partner collaboration aiming to strengthen the quality of surgical and anesthesia services in LMICs.
- SS2020 partners include Dalberg, Jhpiego, G4 alliance, Assist International, and Program in Global Surgery and Social Change (PGSSC) at Harvard Medical School.
- SSIs and sepsis are a major cause of morbidity and mortality in Tanzania.<sup>1,2,3,4</sup>
- Baseline assessment was conducted to allow for pre-post comparison of SSI/sepsis rates to examine the impact of SS2020 suite of interventions.
- In the baseline assessment we answered the following questions:
  - Do the rates of SSIs, maternal sepsis and post-operative sepsis differ intervention vs. control sites?
  - What are the risk factors for development of SSIs, maternal and post-operative sepsis?

## Methods

### Design and setting

- Quasi-experimental, pre-/post study in 10 intervention and 10 control facilities in the Lake Zone.

### Study population

- All surgical and post-natal inpatients followed for 30 days post-operatively.

### Data collection

- 25 local physician data collectors followed inpatients Feb. 2018-Apr. 2018 for SSIs, post-operative and maternal sepsis.

### Data analysis

- Two-sample T test and Chi-square tests.
- Mixed effects logistic regression.

## Results

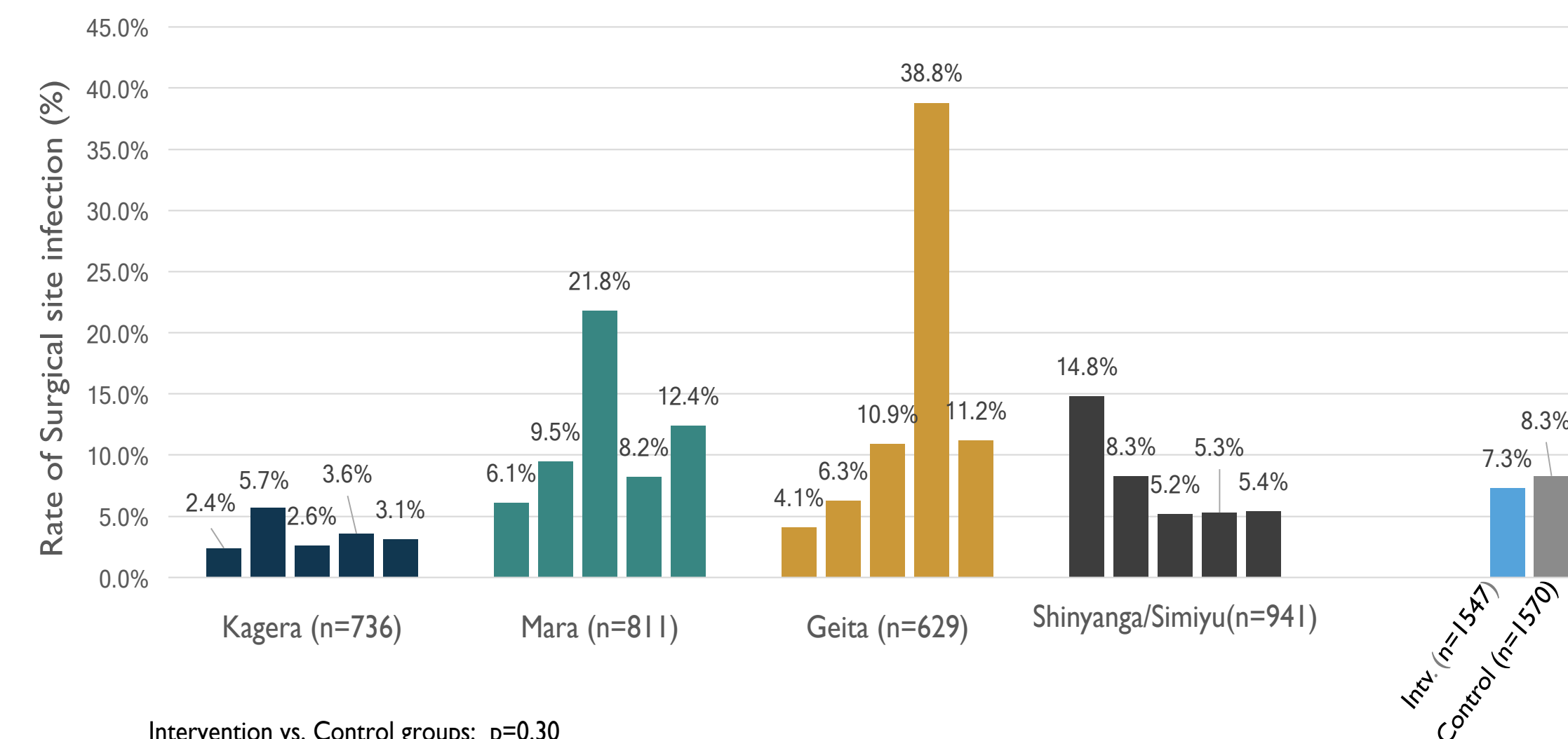


Figure 1. Surgical site infection rates were comparable between the two regions and aligned with previously published studies in Tanzania

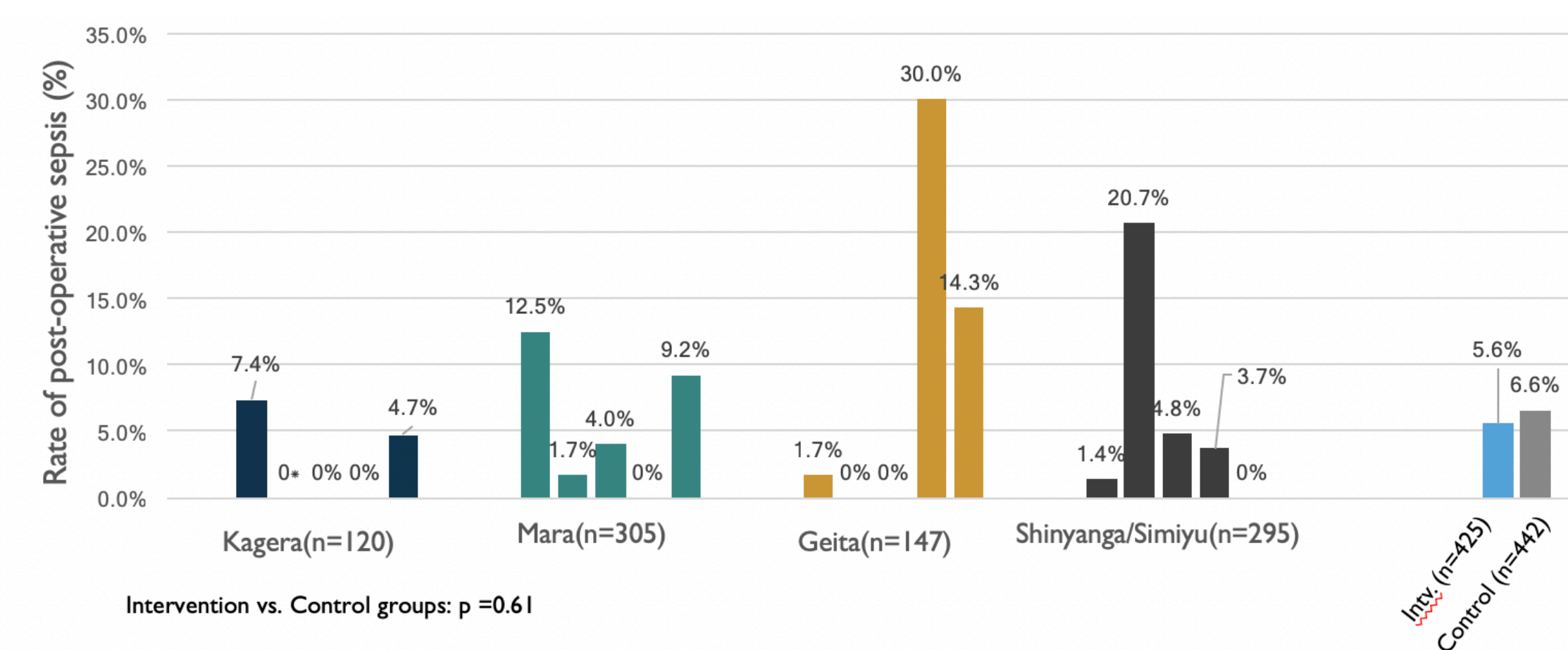


Figure 2. Post-operative sepsis rates were high and comparable between the two regions but the denominators were small due to the nature of the surgical procedures performed

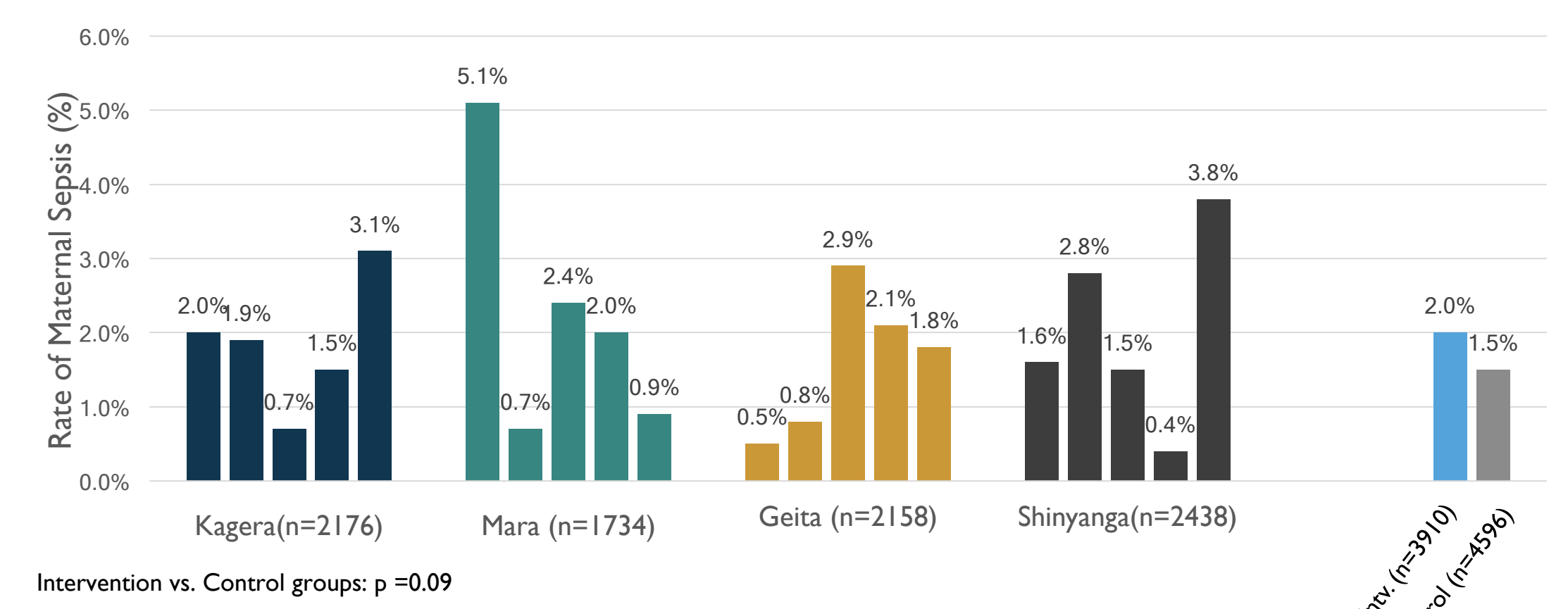


Figure 3. Maternal sepsis rates were comparable between the two regions with most complications occurring among women who underwent C-sections

## References

- Allegranzi, B., Aiken, A. M., Kubilay, N. Z., Nthumba, P., Barasa, J., Okumu, G., ... & Musowoya, J. (2018). A multimodal infection control and patient safety intervention to reduce surgical site infections in Africa: a multicentre, before–after, cohort study. *The Lancet infectious diseases*, 18(5), 507–515.
- Mawalla, B., Mshana, S. E., Chalya, P. L., Imirizaliglu, C., & Mahalu, W. (2011). Predictors of surgical site infections among patients undergoing major surgery at Bugando Medical Centre in Northwestern Tanzania. *BMC surgery*, 11(1), 21.
- Mpogoro, F. J., Mshana, S. E., Mirambo, M. M., Kidneya, B. R., Gumodoka, B., & Imirizaliglu, C. (2014). Incidence and predictors of surgical site infections following caesarean sections at Bugando Medical Centre, Mwanza, Tanzania. *Antimicrobial resistance and infection control*, 3(1), 25.
- Eriksen, H. M., Chugulu, S., Kondo, S., & Lingaas, E. (2003). Surgical-site infections at Kilimanjaro Christian medical center. *Journal of Hospital Infection*, 55(1), 14–20.

Table 1. Lack of vaginal preparation post- C-sections was associated with an increased risk of SSIs

Variable	Surgical Site Infections		OR	95% CI	P
	Yes (n(%) or mean (SD)) n=243	No (n(%) or mean (SD)) n=2874			
<b>Procedure type</b>					
C-section	166 (68.3%)	2084 (72.5%)	1.14	(0.72, 1.83)	0.574
Gynecologic	4 (1.6%)	189 (6.6%)	0.12	(0.04, 0.39)	<0.001***
Abdominal	52 (21.4%)	330 (11.5%)	Reference		
Inguino-scrotal	7 (2.9%)	198 (6.9%)	0.26	(0.10, 0.70)	0.007**
Skin, Soft tissue and Bone	7 (2.9%)	23 (0.8%)	0.32	(0.09, 1.21)	0.094
Prostatectomy	7 (2.9%)	19 (0.7%)	0.83	(0.25, 2.76)	0.767
Other	0(0%)	31(1.1%)	NA**	NA	NA
<b>Vaginal cleansing (No)</b>	87 (96.7%)	1057 (92.7%)	3.97	(1.13, 13.88)	0.031*

Table 2. Patients whose procedures were longer than one hour had 3.7 times the risk of developing sepsis as compared to those with shorter procedures

Variable	Post-operative Sepsis		OR	95% CI	P
	Yes (n(%) or mean (SD)) n=24	No (n(%) or mean (SD)) n=456			
<b>Lack of surgical site cleansing</b>	5 (20.8%)	201 (44.1%)	0.31	(0.11, 0.84)	0.022*
<b>Length of procedure (&gt; 1 hour)</b>	17 (70.8%)	195 (42.8%)	3.66	(1.45, 9.23)	0.006**

Table 3. Lack of vaginal cleansing as well as the length of procedure was associated with an increased risk of maternal sepsis

Variable	Maternal sepsis		OR	95% CI	P
	Yes (n(%) or mean (SD)) n=147	No (n(%) or mean (SD)) n=8359			
<b>Procedure type</b>					
C-section	102(69.4%)	2148(25.7%)	6.56	(4.60, 9.34)	<0.001***
<b>Surgical site cleansing</b>					
(No)	16 (40.0%)	309 (43.2%)	0.78	(0.78, 0.78)	<0.001***
<b>Vaginal cleansing (No)</b>	39 (97.5%)	630 (88.1%)	16.07	(16.01, 16.12)	<0.001***
<b>Length of procedure (&gt; 1 hour)</b>	8 (20.0%)	95 (13.3%)	1.01	(1.00, 1.01)	<0.001***

## Conclusion

- Post-operative complication rates are high in Tanzania
- Co-ordinated interventions of infection prevention and safe peri-operative practices as part of the SS2020 suite of interventions have the potential to improve the quality of surgical care in Tanzania.
- If proven effective to reduce SSIs and sepsis, SS2020 suite of interventions have the potential to influence outcomes in millions of surgeries in Tanzania