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# Pioneering urogynecology fellowship training in a low resource setting, East-Africa, and its short-term impact: A mixed-methods implementation and program evaluation study

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## Abstract

**Objective:** This study describes the establishment and assesses the early outcomes of a novel urogynecology fellowship training program in a low-resource setting at Mbarara University of Science and Technology (MUST), with the aim of informing similar efforts in other low-resource settings.

**Methods:** We conducted a mixed-methods implementation and program evaluation study. Quantitative service delivery indicators were assessed using a quasi-experimental before–after design, and qualitative data were derived from descriptive trainee narratives. The intervention consisted of a competency-based 2-year, part-time modular fellowship integrating supervised clinical and surgical apprenticeship. It blended local and international didactic instruction that required scholarly output. Fellows' competencies were assessed using the Performance-Based Assessment method from the FIGO Global Competency-Based Fistula Surgery Training Manual. Primary outcomes included changes in fellows' competencies, urogynecology surgical volumes, geographical service coverage, and research output. Quantitative outcomes were summarized descriptively, and qualitative data were analyzed using inductive thematic analysis.

**Results:** Five fellows (four from Uganda and one from South Sudan) were selected from 22 applicants. At evaluation, fellows had completed 25% of the curriculum. Performance-based assessments demonstrated progressive improvement in fellows' clinical and surgical competencies. Training sites expanded from four to 11, and annual urogynecology surgical volume increased from 300 procedures in 2024 to 548 in 2025. Program-associated research output rose from two to eight peer-reviewed publications. Infrastructure upgrades were achieved at some of the training sites.

**Conclusion:** The MUST urogynecology fellowship demonstrates that partnerships enable establishment of subspecialty training programs addressing workforce gaps and improving access to specialized surgical care in low-resource settings.

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**KEYWORDS**
competency-based, fellowship, low resource setting, training, urogynecology

## 1 | INTRODUCTION

Pelvic floor disorders (PFDs), including urinary incontinence, pelvic organ prolapse (POP), and obstetric fistula, are major yet underrecognized contributors to poor quality of life among women in Sub-Saharan Africa.[1] These conditions cause chronic pain, stigma, social isolation, reduced productivity, and loss of dignity, adversely affecting physical, mental, and social well-being.[1,2] They account for up to 40% of gynecological consultations in the region.[1–3]

Sub-Saharan Africa, particularly Uganda, bears a disproportionate burden. Obstetric fistula prevalence is estimated at up to 1%, largely due to obstructed labor, with approximately 1900 new cases annually; iatrogenic fistula accounts for up to 49% of cases, reflecting gaps in surgical training, although this is being addressed through implementation of the Essential Training in Operative Obstetrics program, which targets lower-cadre surgical providers and general obstetric surgical teams to strengthen safe cesarean section skills and recognition of urinary tract injuries.[4–6] POP affects nearly one in four women, a burden expected to rise with increasing life expectancy.[7] Other childbirth-related injuries, including obstetric anal sphincter injuries and stress urinary incontinence, are also common.

Despite this burden, access to specialized care remains limited. Uganda has only five certified urogynecologists serving 24 million women, supplemented intermittently by visiting surgeons.[8,9] Consequently, most PFDs are managed by non-specialists,[3] with delayed care, prolonged suffering, and marked rural inequities frequently observed.[1–3] Women with obstetric fistula wait an average of 9 years for treatment, with only 26% receiving surgery within 1 year.[8–10]

This shortage reflects the absence of regional training programs. Overseas fellowships are costly, inaccessible, and poorly aligned with local needs.[11–13] Globally, residency exposure to PFDs is limited,[14] with declining procedural experience even in high-income settings.[15] Regional surveys confirm inadequate training, workforce shortages, and limited diagnostic and surgical capacity across Sub-Saharan Africa.[1–3]

To address this gap, Mbarara University of Science and Technology (MUST) established East Africa's first fellowship in Urogynecology and Female Pelvic Floor Surgery. This study describes its development and early implementation to inform similar initiatives in Sub-Saharan Africa.

## 2 | MATERIALS AND METHODS

### 2.1 | Study design and setting

This is a mixed-methods implementation and program evaluation study describing the development, establishment, and early impact of a urogynecology fellowship program in a low-resource East African setting. Quantitative service delivery indicators were assessed using a quasi-experimental before–after design, while qualitative data were collected using a descriptive design based on trainee narratives.

The fellowship was established at Mbarara University of Science and Technology (MUST) in southwestern Uganda, with Mbarara Regional Referral Hospital (MRRH) serving as the primary clinical training site. The program is embedded within the Department of Obstetrics and Gynecology and implemented through routine urogynecology services and structured outreach surgical camps conducted at selected hospitals in Uganda and South Sudan, which function as satellite training sites.

This study analysis covered fellowship development, implementation, and early evaluation. Fellowship development was assessed from June 2021 to March 2025, covering curriculum development, stakeholder engagement, approval, and accreditation processes. Early fellowship implementation was evaluated from May 2025 to December 2025, including recruitment, commencement of training in July 2025, and 6-month competency assessment. Urogynecological surgical service trends were assessed from 2019 to 2025 using theater and admission records from the primary and satellite training sites.

### 2.2 | Fellowship development and structure

Curriculum development followed needs assessment and stakeholder consultations identifying gaps in urogynecology training and service delivery. MUST, Uganda and partners (including the University of California Los Angeles, USA; the University of Basel, Switzerland; and the Bay Area Pelvic Surgery Center, USA) co-developed a competency-based curriculum integrating didactics and apprenticeship, benchmarked to established programs and adapted to local disease patterns, constraints, and resources (June 2021–January 2022). The curriculum was approved by MUST's Faculty of Medicine Curriculum Committee, Quality Assurance Committee, Senate, and Council and accredited by the National Council for Higher Education with the Uganda Medical and Dental Practitioners Council after document review and site inspections (March 2025). It covers pelvic anatomy, physiology, epidemiology, and urodynamic/radiologic evaluation; using predicate learning guides.[16] Modules cover urinary/fecal incontinence, fistulae, prolapse, congenital abnormalities, pelvic oncology, minimally invasive surgery, and male urology (Table 1).

### 2.3 | Fellowship program structure and training sites

The fellowship is a 2-year, four-semester, part-time modular blended program. Fellows undertake 2 weeks per month of clinical

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**TABLE 1** Core components of the curriculum.

| Course name |
|---|
| Applied pelvic anatomy and embryology |
| Applied physiology |
| Epidemiology of female pelvic disorders |
| Urodynamic, endoscopic, neurophysiologic, and radiologic studies (vaginal, perineal, abdominal ultrasound) in urogynecology |
| Voiding disorders and their management |
| Prevention and management of genitourinary fistulae |
| Stress urinary incontinence and its management |
| Fecal incontinence and defecation disorders |
| Disorders of pelvic organ support |
| Surgical complications and their management |
| Introduction to basic techniques in common pelvic oncology surgery |
| Advances in female pelvic medicine and reconstructive surgery |
| General and male urology for urogynecologists |
| Complex, last resort and plastic surgery techniques in female pelvic surgery |
| Clinical research |

and surgical training at MRRH and satellite outreach camps, complemented by online didactic instruction. During non-rotation periods, fellows remain clinically active at their primary workplaces, ensuring continuity of service delivery. All fellows are required to complete a research project resulting in at least one peer-reviewed publication. The fellowship is housed within the Department of Obstetrics and Gynecology at MUST, which includes five local urogynecologists and delivers care through routine services and specialized surgical camps supported by visiting international surgeons. Fellows are trained and supervised primarily by the five urogynecologists based at MUST/MRRH. Satellite outreach sites are used as additional training locations to increase surgical exposure and geographic service coverage. At these sites, fellows travel together with the qualified trainers as part of supervised outreach teams comprising local urogynecologists and visiting surgeons where available. Therefore, fellows performed clinical assessments and surgical procedures under direct supervision.

## 2.4 | Target group and fellow selection

The program targets practicing obstetrician–gynecologists working in public and private not for profit hospitals to enhance post-training service availability, recognizing that most women with pelvic floor disorders seek care in these facilities.

An announcement inviting eligible candidates was disseminated through multiple media platforms in April 2025. Selection followed a competitive, structured evaluation based on residency cumulative grade point average, surgical operative performance, duration of obstetrics and gynecology practice, level of health facility, and ability to secure sponsorship or self-funding. Candidates were ranked by total score, and the top four applicants from Uganda and the top one from the rest of East Africa were selected. The fellowship launched in May 2025, with training commencing in July 2025.

## 2.5 | Evaluation of short-term fellowship impact

### 2.5.1 | Training and competency assessment

All fellows in the inaugural cohort were enrolled to assess clinical and surgical skills attained within the first 6 months of training. Competency was evaluated for common pelvic floor disorders, including pelvic organ prolapse, genitourinary fistula, obstetric anal sphincter injuries, urinary incontinence, and structural genitourinary abnormalities, using the Performance-Based Assessment (PBA) tool from the FIGO Global Competency-Based Fistula Surgery Training Manual.[16] The PBA grades competency as standard, advanced, or expert; this evaluation focused on attainment of standard competency. Assessments were conducted during patient evaluation, surgery, postoperative care, and follow-up visits. Ratings were coded on an ordinal scale (unsatisfactory = 1, satisfactory = 2, good = 3). During surgical training, the fellows initially observed and assisted the qualified urogynecologists and visiting surgeons, then progressively performed selected surgical steps or complete procedures under direct supervision, depending on case complexity and demonstrated competency. During the 6-month evaluation period, fellows did not operate independently without supervision; qualified trainers were present on site to provide intraoperative guidance and immediate assistance when needed. Data were entered into Redcap and exported to Stata 17 (StataCorp, LLP, College Station, TX, USA) for analysis. Results were summarized as percentages at baseline and 6 months, with percentage-point changes calculated. Statistical significance of changes was assessed using the Wilcoxon signed-rank test at a two-sided $\alpha = 0.05$.

The qualitative component comprised written reflective narratives collected as part of structured fellowship activities, focusing on motivations for specialization, training experiences, and anticipated impact. Fellows were assigned study identification numbers to maintain confidentiality.

### 2.5.2 | Access to urogynecological services

We included all women who received urogynecological surgical services for pelvic organ prolapse, obstetric anal sphincter injuries, genitourinary fistula, and other pelvic floor disorders at the primary training site and affiliated satellite sites before and during the study period. Data were extracted from institutional operating theater and admission registers.

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### 2.6 | Research and infrastructure development

Research output and infrastructure development were assessed to capture the broader institutional impact of the fellowship program beyond trainee competency and surgical volume. Research output was included because one aim of the fellowship is to build local academic capacity and generate context-specific evidence on pelvic floor disorders in Sub-Saharan Africa. Infrastructure development was assessed because safe specialist training and surgical care require adequate ward space, operating theater capacity, equipment, and supportive clinical systems. We therefore searched PubMed for urogynecology and pelvic floor disorder studies conducted at MUST/MRRH before and after June 2021, when fellowship development began. Infrastructure assessment included evaluation of gynecology ward bed capacity and operating theater infrastructure at training sites during the same period.

### 2.7 | Outcome measures and data analysis

Primary outcomes included surgical volume, procedure distribution, geographic service coverage, infrastructure development, and fellow competency. Secondary outcomes included scholarly output associated with the fellowship program.

Quantitative data were analyzed with Stata 17 (StataCorp, LLP, College Station, TX, USA) and summarized using descriptive statistics, including counts and proportions, with longitudinal trends assessed graphically and in tables. Qualitative data underwent thematic analysis.

### 2.8 | Ethical considerations

The fellowship evaluation was approved by the Mbarara University of Science and Technology Research Ethics Committee (No. 17/08-18), and the Uganda National Council of Science and Technology (No. HS368ES). Informed consent from fellows for narrative use was obtained.

## 3 | RESULTS AND ACHIEVEMENTS

### 3.1 | Training

#### 3.1.1 | Clinical and surgical exposure of the fellows

The inaugural fellows completed the first semester, achieving 25% of the curriculum through online learning. Over 6 months, each fellow completed six bi-weekly rotations at MRRH and at least three outreach surgical camps, performing or assisting in approximately 40 surgeries. All procedures were systematically documented in logbooks.

### 3.2 | Competency

Competency ratings improved across all five fellows after 6 months of fellowship training. At baseline, the proportion of assessments rated as unsatisfactory ranged from 15.8% to 73.7%. By 6 months, unsatisfactory ratings had fallen to 0% for four fellows and to 5.6% for one fellow. Correspondingly, the proportion of assessments rated as competent, defined as either satisfactory or good performance, increased in all fellows, reaching 94.5% to 100% at 6 months. The reduction in unsatisfactory ratings and increase in competent ratings were statistically significant for all fellows using the Wilcoxon signed-rank test (Table 2).

### 3.3 | Access to urogynecological care

#### 3.3.1 | Satellite urogynecology fellowship training sites

At fellowship initiation, routine urogynecology services were largely confined to Mbarara Regional Referral Hospital, with intermittent outreach to Bwindi, Nakaseke, and Lira hospitals. Since inception, seven additional sites in Uganda and South Sudan expanded services to a total of 11 facilities, including Juba Teaching Hospital, Wau Teaching Hospital, and Torit State Hospital (Figure 1).

**TABLE 2** Change in fellows' competency ratings at baseline and 6 months.

| Fellow | Pre-training unsatisfactory rating (%) | Pre-training competent rating (%) | 6-month unsatisfactory rating (%) | 6-month competent rating (%) | Δ unsatisfactory change | Δ competent change | *P*-value |
|---|---|---|---|---|---|---|---|
| Fellow 1 | 73.7 | 26.3 | 5.6 | 94.5 | −68.1 | 68.2 | 0.0001 |
| Fellow 2 | 15.8 | 84.2 | 0.0 | 100.0 | −15.8 | 15.8 | 0.0005 |
| Fellow 3 | 36.8 | 63.2 | 0.0 | 100.0 | −36.8 | 36.8 | 0.0004 |
| Fellow 4 | 26.3 | 73.7 | 0.0 | 100.0 | −26.3 | 26.3 | 0.0027 |
| Fellow 5 | 36.8 | 63.2 | 0.0 | 100.0 | −36.8 | 36.8 | 0.0100 |

*Note*: *P*-value: comparison of baseline and 6-month competency ratings using the Wilcoxon signed-rank test.

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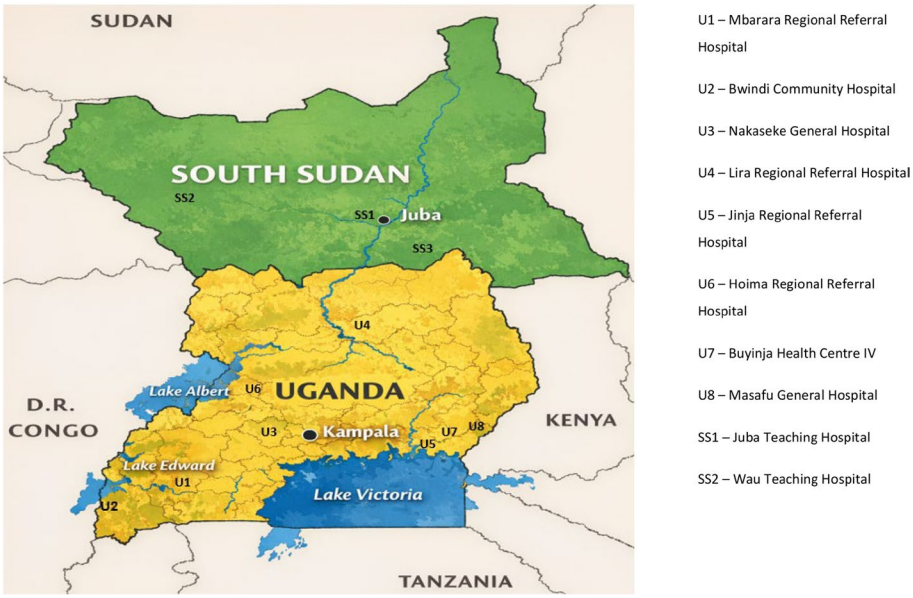



FIGURE 1 Training sites in Uganda and South Sudan.

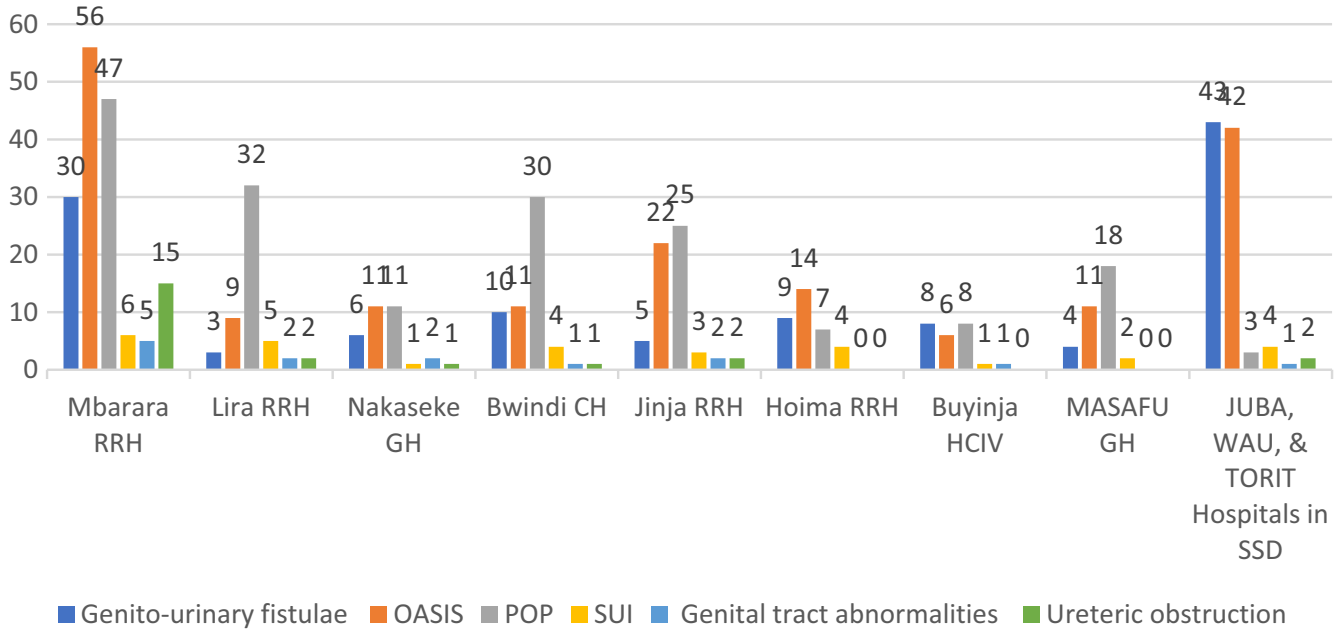



FIGURE 2 Spectrum of urogynecological surgeries performed across training and outreach sites.

### 3.3.2 | Urogynecological surgeries

A total of 548 surgeries were perfomed across 11 sites in 2025, mainly at MRRH (159, 29.0%) and South Sudan (95, 17.3%), for OASIS (182), prolapse (181), and fistulae (118) (Figure 2).

The trend of surgeries shows increased procedures from 2019 to 2025, with a COVID-19–related decline (2020–2021) and a marked rise in 2025 following fellowship launch (Figure 3).

## 3.4 | Urogynecology infrastructure development and upgrade

### 3.4.1 | Expansion of gynecology wards

At MRRH and Lira Regional Referral Hospital, gynecology wards expanded from 10 to 45 beds, increasing admission capacity and reducing overcrowding.

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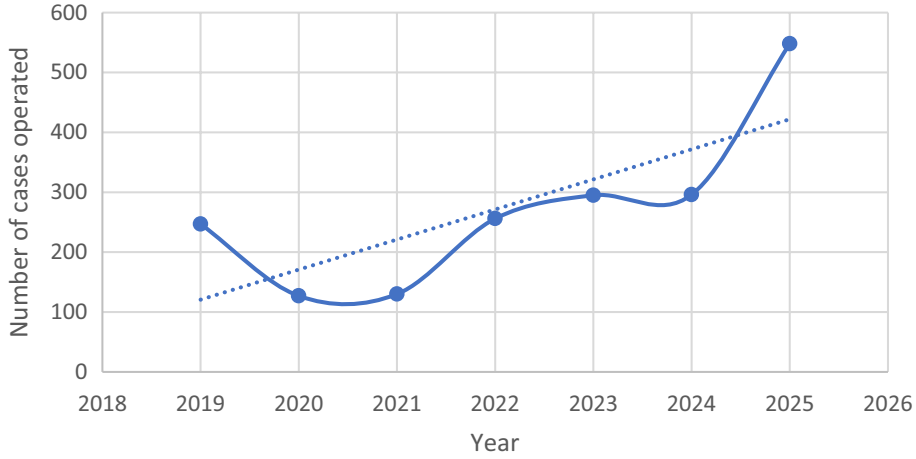



FIGURE 3 Trends of number of urogynecological surgeries over a 7-year period.

#### 3.4.2 | Upgrading and equipping of operating theaters

Operating theaters at MRRH, Lira, and Nakaseke were renovated and equipped with modern anesthesia, lighting, surgical tables, suction, and infusion systems, enhancing patient safety, surgical outcomes, and fellowship training.

### 3.5 | Research

The fellowship generated six peer-reviewed publications, 16 international conference abstracts presented at meetings (including the International Urogynecological Association and International Society of Fistula Surgeons), and over 20 local abstracts presented at national conferences, advancing evidence on pelvic floor disorders in Sub-Saharan Africa.

### 3.6 | Partnerships/collaborations

The program established partnerships with the Uganda Ministry of Health, the Association of Obstetricians and Gynecologists of Uganda, the United Nations Fund for Population Activities, the Else Kroner Fresenius Foundation, the Dr. Rau Foundation, Medlend Medical Missions, Medicine for Humanity, the Musa Project, University of Basel, University of California Los Angeles, CORDAID South Sudan, AMREF South Sudan, Marie Stopes Uganda, and Pathfinder International, supporting outreach, training, sponsorship, equipment, and infrastructure development.

### 3.7 | Qualitative thematic analysis of urogynecology fellowship narratives

Analysis of five fellows' narratives identified themes of specialization motivation, training experiences, and anticipated impact, highlighting specialized training's transformative role. The transcribed verbatim report was subjected to the steps of thematic analysis, which included reading and familiarization with data, coding, defining and naming themes, and finally interpreting and reporting the findings.

#### 3.7.1 | Unmet needs in women's health as a catalyst for specialization

Fellows described emotional distress from inability to treat pelvic floor disorders due to limited training, motivating specialization. CM stated, "I kept seeing women with complex pelvic floor disorders … but I lacked the necessary skills." BW noted, "Referring an 18-year-old with obstetric fistula was one of the most painful moments of my career."

#### 3.7.2 | Professional transformation through specialized training

The fellowship drove profound growth, shifting fellows from generalists to empowered specialists and leaders. SA shared, "This has been an incredible learning journey. The diverse case mix, supportive mentors, and structured learning have made it a deeply enriching experience." HM added, "The clinical exposure has been broader and more complex than I expected. I've grown not just in surgical skill but also in communication, empathy, and leadership. It's been a truly holistic transformation."

#### 3.7.3 | Vision for impact: Expanding access and building capacity

Each fellow aims to apply new expertise to decentralize services, mentor colleagues, and improve care in underserved areas,

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contributing to sustainable women's health systems. HM stated, "I want to deliver evidence-based, compassionate care and help build sustainable urogynecological services in South Sudan. No woman should have to suffer in silence because there are no specialists nearby." CM added, "My goal is to bring these services closer to the people, reduce delays in care, and mentor colleagues and students at Soroti University. I want to inspire more professionals to enter this vital field." OJ emphasized, "This training allows me to respond to a real crisis in women's health in my region. I am grateful to be part of a program that equips me to make lasting change."

## 4 | DISCUSSION

The Urogynecology Fellowship at MUST addresses a neglected women's health need in Sub-Saharan Africa by strengthening specialist skills, expanding access to care, advancing research, improving infrastructure, and fostering partnerships to support equitable and sustainable urogynecology services.

### 4.1 | Training and workforce development

Sub-Saharan Africa faces a critical shortage of urogynecologists, most of whom are concentrated in urban centers, creating a mismatch between the rising burden of pelvic floor disorders and access to skilled care, particularly in rural and underserved areas.[3,17] The MUST fellowship addresses this gap by training practicing obstetrician–gynecologists from diverse regions of Uganda and East Africa through a flexible, modular program. Prior to its establishment, Uganda had only five urogynecologists serving 24 million women, a ratio of one specialist per 5 million females,[18] reflecting a severe capacity deficit. By training five fellows annually, the program aims to increase the workforce to at least 25 urogynecologists within 5 years, substantially improving provider availability. Selecting fellows within public hospitals decentralizes services, reduces travel to urban centers, supports affordability and equity consistent with national policy, and strengthens regional capacity. The part-time model enables fellows to remain clinically active at their primary institutions, ensuring continuity of care, minimizing service disruptions, promoting public-sector retention, and expanding timely access to high-quality pelvic health services amid rising obstetric and age-related pelvic floor conditions.[19]

### 4.2 | Skills development and competency

The fellowship was associated with marked improvements in clinical and surgical competencies, demonstrated by reductions in "unsatisfactory" ratings and increases in "satisfactory" and "good" performance. these findings underscore the value of structured, competency-based training in rapidly strengthening urogynecology capacity in low-resource settings.

#### 4.2.1 | Improving access to urogynecological care through a satellite training model

The fellowship employs a satellite training model integrating education and service delivery. Initially limited to three sites, the network expanded to 11 sites across Uganda and South Sudan. These sites serve as training hubs and outreach centers for urogynecology surgical camps, enabling women with long-neglected conditions, including obstetric fistula, pelvic organ prolapse, and obstetric anal sphincter injuries, to access specialized surgical care. This dual-purpose model builds specialist capacity, increases surgical volume and case diversity for fellows, and improves population-level access to advanced pelvic surgery.[20]

The increase in urogynecological surgical volume should be interpreted in the context of a collaborative service delivery model involving local qualified urogynecologists, supervised fellows, and visiting surgeons during selected outreach camps. The observed rise in surgical volume might also reflect expansion of outreach sites, improved infrastructure, and recovery of surgical services following COVID-19-related disruptions.

#### 4.2.2 | Infrastructure and systems-level improvements

Specialist training requires adequate health system infrastructure. Historically, gynecology wards at MRRH and LRRH lacked dedicated urogynecology space, leading to overcrowding during surgical camps,[21] which has been associated with poor outcomes, including postoperative infections and premature discharge.[22] Expansion of gynecology wards at Lira and Mbarara to 45 beds improved postoperative care, safety, and patient dignity. Upgrading operating theaters at Nakaseke and MRRH enhanced surgical quality and safety, with shared facilities generating broader system-wide benefits. These investments reflect a holistic approach addressing long-standing structural constraints beyond human resources.

### 4.3 | Clinical research

Research is a core fellowship component supporting professional development and evidence-based care.[23] Prior to the fellowship, pelvic floor disorder research in Uganda was limited to two publications from MUST.[24,25] Since launch, output increased to eight peer-reviewed publications and 16 international abstracts, strengthening clinical practice, program visibility, and MUST's academic standing. Research from low-resource settings remains essential where global evidence insufficiently reflects Sub-Saharan Africa, enabling

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contextualized guidelines, improved protocols, surgical safety, resource allocation, and patient education.[26]

### 4.3.1 | Comparison with similar training programs in low-resource settings

The MUST urogynecology fellowship program shares several features with other specialist training programs developed in low-resource settings. Similar to the laparoscopic skills training initiatives in Namibia, urology training programs in Sub-Saharan Africa, and the establishment of the first obstetrics and gynecology residency program in Botswana, this fellowship was developed through international and local partnerships, adapted to local disease burden and resource constraints, and designed to strengthen specialist surgical capacity within the region.[11–13] Local competency-based training can reduce dependence on overseas fellowships, improve retention of specialists, and build services that are more responsive to local population needs.

These findings should be interpreted as early implementation outcomes rather than final measures of fellowship effectiveness. The 6-month competency and service delivery outcomes might not fully reflect the eventual impact of the program. A long-term comprehensive evaluation is needed in future to assess sustained competency, independent surgical practice, long-term service expansion, and patient outcomes. Another limitation is that the qualitative analysis did not include standardized scaled measures of confidence, readiness, and perceived preparedness for independent practice. Future evaluations should include Likert-scale assessments on these components.

## 5 | CONCLUSION AND RECOMMENDATIONS

The Urogynecology Fellowship at Mbarara University of Science and Technology addresses pelvic health specialist shortages in Sub-Saharan Africa. Through mentorship, outreach-based training, infrastructure development, and research, it strengthens capacity, expands access through partnerships, and offers a scalable model for low-resource health systems. The MUST urogynecology fellowship demonstrates early feasibility and promising short-term outcomes as a partnership-based model for developing specialist pelvic floor surgical capacity in a low-resource setting, although longer-term evaluation is needed to assess sustained impact.

### AUTHOR CONTRIBUTIONS

**Musa Kayondo:** Design, planning, Data collection, analysis, writing. **Christopher Tarnay**, **Paul Kato Kalyebara**, **Onesmus Byamukama**, **Richard Mwesigwa**, **Brenda Ainomugisha:** Design, data collection, editing. **Joseph Ngonzi**, **Joseph Njagi**, **Rogers Kajabwangu:** Manuscript writing, editing. **Michael Thomas Margolis**, **Verena Geissbühler:** Design, Data collection.

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This study did not receive any external funding.

### CONFLICT OF INTEREST STATEMENT

The authors report no conflicts of interest related to the publication of this work.

### DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

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