

Improving access to emergency surgery in Kenya

Insufficient anaesthesia services limit access to emergency and essential surgery, causing considerable suffering and deaths. The 'Every Second Matters for Mothers and Babies – Ketamine Humanitarian Crisis (ESM-Ketamine HC)' study sought to address this issue. It evaluated a package including a five-day training programme for non-anaesthetist mid-level providers, a checklist memory aid and training manual, and an ESM-Ketamine Kit for use in crisis-affected parts of Kenya when no anaesthetists are available.

The study concluded that the package is a safe, feasible and cost-effective mechanism to address the 'anaesthesia gap' in resource-limited settings such as humanitarian crises. The project has contributed to a lasting impact on clinical practice and the knowledge and understanding of practitioners, enabling 1,989 emergency and life-improving surgeries (including 236 caesarean sections)¹ in the 12 facilities in Kenya that received ESM-Ketamine training. Improved hospital services and staff morale were also reported by study centres. The study team has since received a further grant, enabling the package to expand initially to 15 further facilities, and now to 17 countries.

Title: Every Second Matters for Mothers and Babies – Ketamine Humanitarian Crisis (ESM-Ketamine HC)

Location: Kenya

Study type: Mixed-method stepped wedge evaluation

IMPACTS

- Thousands of successful, safe operations performed where no anaesthetist was available
- Formal endorsement of ESM-Ketamine training by the Kenyan Ministry of Health
- Further funding secured for scale up in Kenya, ongoing use in crisis-affected counties: new training site established

RESEARCH IMPACT LEARNING

- Positioning with key stakeholders and contextual expertise
- Importance of long-term relationships and partnerships

BACKGROUND



Two-thirds of the world's population does not have access to emergency and essential surgery when necessary – primarily due to insufficient access to anaesthesia services. This is a particular challenge across Africa. In Kenya, there are just 0.44 anaesthesiologists per 100,000 people, significantly less than the recommended world standard of five. This 'anaesthesia gap' causes considerable suffering and deaths. In resource-limited settings, ketamine has for decades been recognised and used as an anaesthetic, but only in an informal, unregulated manner, without structure, protocols or guidelines.

The challenges presented by the lack of anaesthetists in Kenya was already well recognised prior to the study, and there was established country and regional interest in the issue. This presented an ideal opportunity to study the safety, feasibility and cost-effectiveness of a package of training (including a training manual), checklist memory aid, and equipment to enable surgeries to be performed using ketamine as an anaesthetic in resource-limited settings where no anaesthetic is available, including humanitarian crises.

“As an [obstetrician-gynaecologist] you handle all emergencies. But you cannot operate on people when fully awake. I am not an anaesthesiologist but a doctor. This was a struggle for me. I would lose patients because I could not help them.”

– Dr Khama Rogo, Obstetrician-gynaecologist, Co-Principal Investigator from the African Institute for Health Transformation.

THE STUDY



The ESM-Ketamine HC study sought to assess the safety profile of the package when administered by non-anaesthetists in four crisis-affected counties in Kenya – Mandera, Wajir, Garissa and Turkana. These were identified as particularly rural and resource-constrained settings, with large refugee camps and nomadic populations. The study aimed to quantify the change in access to emergency and life-improving surgery as a result of the ESM-Ketamine HC package and accompanying training, and to identify barriers to and facilitators of its implementation.

The study team, leveraging existing collaborations with partner organisations, implemented the package in 12 facilities with operating theatres between 2016 and 2019. The study used a mixed-method approach including key informant interviews with facility staff such as surgeons, obstetrician-gynaecologists and emergency physicians. They explored the demand, acceptability and practicality of the package and training. Importantly, the study also assessed patient satisfaction as a result of having access to a procedure with ketamine.

FINDINGS



The study found the package to be a safe, feasible and cost-effective mechanism to address the 'anaesthesia gap' in resource-limited settings such as humanitarian crises. It found the package provided effective guidance on the use of ketamine in emergency and essential surgery, with particular application potential for caesarean sections. During the study period, results showed over 1,200 emergency and life-improving surgeries were performed using the ESM-Ketamine HC package that otherwise would not have proceeded, 401 of which were emergency caesarean sections. Of the patients who received surgery supported by the package, 85% reported a positive experience and 95% would recommend ketamine as an anaesthetic to a friend. As such, the study found that ketamine may provide a solution to the anaesthesia gap, with particular application in emergency caesarean sections.



Operating theatre during a 'ketamine week', Sagam Community Hospital, Kenya. Credit: Dr Thomas Burke

COMMUNICATIONS AND ENGAGEMENT



Local partnerships were essential to the impact of the research on policy and practice, and a longstanding relationship between the Massachusetts General Hospital and the African Institute for Health Transformation was a key enabling factor. The study team also developed a comprehensive stakeholder engagement strategy, enabled by existing relationships with key policymakers in Kenya and the World Health Organisation (WHO), ensuring the study team was well positioned to influence and engage with a sophisticated understanding of the external context.

A project inception meeting for the study included all partners and stakeholders. This included a lead health specialist at UNICEF and representatives from other international stakeholders such as the International Federation of OBGYN; the College of Surgery for East, Central and Southern Africa; the International Confederation of Midwives; US Agency for International Development; the UK's Department for International Development; United Nations Population Fund; and Jhpiego. Kenyan county and national leaders in health attended, including ministries of health, medical societies (eg, Kenya Obstetrical Gynaecological Society) and councils and commissions (eg, Nursing Council of Kenya). The African Institute for Health Transformation led the engagement activities across Kenya, having the connections and influence to convene the most relevant medical and policy communities. Even after the study, it continues to lobby locally for the ESM-Ketamine HC package to be used in Kenyan hospitals.

The study results were published in *World Journal of Surgery*, the official publication of the International Society of Surgery, the *African Journal of Emergency Medicine*, the *African Journal of Reproductive Health*, and the *International Journal of Gynaecology and Obstetrics*. The World Federation of Societies of Anesthesiologists provided input and verbal positive feedback throughout the study, as did the global medical community in responses to published journal articles. For example, a team of rural Canadian nurses reading about the study communicated that they plan to use ketamine in their work.

The study team also engaged with WHO's Head of Emergency and Essential Surgical Care Programme, and Thomas F. Burke, the Principal Investigator, was a speaker at two WHO meetings to highlight the potential of ketamine as an anaesthetic. He was part of a global lobby to ensure the benefits of ketamine in low-resource settings are well known and, as part of this work, he highlighted the ESM-Ketamine HC study's results. Ketamine remains on the Essential Drug List, despite lobbying from some countries to remove it.

UPTAKE AND IMPACT



The project has contributed to a lasting impact on clinical practice and the knowledge and understanding of practitioners, enabling 1,989 emergency and life-improving surgeries (including 236 caesarean sections) in the 12 facilities in Kenya that received ESM-Ketamine training. Lives were saved or improved in crisis-affected counties of Kenya as a result of the ESM-Ketamine HC package.

The ESM-Ketamine package received a formal endorsement by the Kenyan Ministry of Health. The study team report continued use of the package in the counties engaged in the study and that they have established an active second training site in Turkana at Lodwar Hospital. There is continued uptake of the package by regional practitioners who remain influential – which may facilitate further uptake.

“Ketamine is useful and can be applied anywhere. It makes it possible for any caregiver to intervene. It is absolutely basic, simple to use once trained.”

– Dr Solomon Otieno-Orero, obstetrician/gynaecologist, founder of Kisumu Medical Education Trust (KMET), Kenya

In Sagam Community Hospital, a key study partner, practitioners continue to use the package, providing training to staff and reporting a range of benefits for the local community, in particular woman and girls. Sagam Community Hospital also reported improved services, especially in the wake of COVID-19, and positive impacts on staff.

“We have made it safe for mothers and babies to come here and give birth [...] Our patient outcomes and satisfaction have increased.”

– General Manager, Sagam Community Hospital

The ESM-Ketamine HC package is included in the College of Surgeons of East, Central and Southern Africa’s Anaesthesia Course for Emergencies programme.

Beyond Kenya, since completion of the study in 2019, over 17 countries are now using the ESM-Ketamine HC package, thanks to the contribution of this study and subsequent grant-funded projects.

The evidence and experience generated through the research project was instrumental in Massachusetts General Hospital securing the Saving Lives at Birth (SLAB) Transition to Scale grant (having previously received seed funding from the same source prior to the R2HC research grant), which enabled it to formally expand the study to 15 further facilities across Kenya. The package can build the evidence necessary to strengthen the case for using ketamine as an anaesthetic, which could save more lives in low resource and humanitarian settings where anaesthetists are not available. There is the potential for the package to be applied to global humanitarian responses using the learnings from this study.

RESEARCH IMPACT LEARNING



POSITIONING WITH KEY STAKEHOLDERS AND CONTEXTUAL EXPERTISE

Key individuals on the study had existing links with policymakers and practitioners in the relevant setting, which enabled a sophisticated engagement strategy that was appropriate for the context and took local priorities into account.

IMPORTANCE OF LONG-TERM RELATIONSHIPS AND PARTNERSHIPS

The two co-Principal Investigators have worked together previously and share broader long-term goals for delivering evidence-based change in the relevant settings. The team also learned that evidence alone, even very strong evidence, is not enough to change behaviour, particularly where there are strong incentives to continue the status quo. Perseverance and long-term relationship building are critical to build trust, shared knowledge and lead to sustained impacts over time.

PARTNERS

Massachusetts General Hospital; UNICEF; Kenya County Ministries of Health; African Institute for Health Transformation at Sagam Community Hospital; Maseno University School of Medicine Department of Surgery and Anesthesiology; College of Surgeons of East Central and Southern Africa; Kisumu Medical Education Trust (KMET)

¹ Data provided by study team in March 2023

ABOUT ELRHA

Elrha is a global organisation that finds solutions to complex humanitarian problems through research and innovation. This study was funded by Elrha's Research for Health in Humanitarian Crises (R2HC) Programme which aims to improve health outcomes by strengthening the evidence base for public health interventions in humanitarian crises.

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R2HC captures detailed case studies through a process that triangulates and validates evidence on uptake and impact. The case study methodology and full version of this summary case study including references are available on request.



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