



Medical technologies and abortion care in Eastern Uganda

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ABSTRACT

Manual Vacuum Aspirators (MVA), Dilation and Curettage (D&C), and medical abortifacients (Misoprostol, Mifepristone and Divabo) are available in clinical settings that offer abortion and post-abortion care in Uganda. While these technologies imply appropriate and safe abortion care, legal and policy ambiguities impact health outcomes. In this article, we draw on an ethnography of abortion care delivery practice conducted in one district in Eastern Uganda between August 2018 and March 2019, with data from interviews and observations, both of interactions and during quality of care improvement and training meetings. We illuminate how, in the context of a financialized healthcare system and legal restrictions, the meanings and use of medical technologies and abortion care vary across different health facility types. In public health facilities, health workers become state agents in the control of women's bodies. In private health facilities, they become transgressors, who use medical technologies to help women attain termination surreptitiously. Health workers offset risks associated with any involvement in termination, such that pecuniary interests dominate their motivation. Normalized and disciplinary power enact and reproduce unsafe and risky conditions, leading to poor abortion care outcomes. We illustrate the mechanisms of domination and tactics of resistance in abortion care, and expose conditions upon which unsafe and risky outcomes are contingent.

Safety and riskiness in abortion care practice are contentious in debates on how to scale-up quality abortion care service where medical technologies occupy centre stage. Many scholars assert that the use of technologies which are classified as 'safe' reduces risks and produces better maternal and infant outcomes (Ganatra et al., 2017; WHO, 2015). Others argue that better outcomes are contingent on scaling up the capacities and broadening the levels of health workers involved in abortion care (Abdella et al., 2013; WHO, 2015). A third group advance the need to liberalize restrictive laws to allow safe abortion practice (Mishtal, 2018). In sub-Saharan Africa, law reform, medical technologies and the integration of nurses and midwives in abortion care delivery can all be critical in reducing poor maternal health outcomes.

What is inadequately understood, however, is what 'safety' and 'riskiness' represent in abortion care and the conditions that produce them. Some studies classify medical technologies as 'safe' and others as 'risky' and inappropriate to use in primary care settings (Ansari and Abbas, 2017; Ara et al., 2018; Benson et al., 2017; WHO, 2015; Ganatra et al., 2017). However, even safe technologies can result in risk and injury such as perforations of the uterus (Bechem et al., 2016; Dao et al., 2007; Sayami, 2019). Moreover, not all practices involving 'risky' technologies, such as Dilation and Curettage (D&C), actually result in

poor abortion care outcomes, and in eastern and southern Africa, D&C remains the preferred method of post-abortion care in hospitals (Aantjes et al., 2018). What is also missing is knowledge about how risk and safety arise in abortion care practice. Many studies in this field ignore the choice and application of medical technologies in healthcare practice. Although the notion of neutrality and objectivity in reproductive technology has been questioned (Eklund, 2017; Payne, 2016; Powell-Jackson et al., 2015), how technologies shape abortion care practice remain unknown.

In addition, there has been little work on how elusive structures of power play out in abortion care practice in legally restrictive environments. Foucauldian scholars show that power is highly complex and perpetually in motion, and normalized in ways which require neither fuel nor direction from those holding it (Deacon, 1998). Power is also hidden in language, formal knowledge and text (Manderson et al., 2015), in the form of mental dispositions and discursive practices in which tension plays out, transgressing social norms and values (Hodge, 2014; King, 2013). Although the disciplinary effect of the law is considered a barrier to the access to and delivery of abortion care (Suh, 2014), the mechanisms through which power operates in abortion care, and how these interact with power tied to class, remain underexplored.

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Thus, in both its normalizing and disciplinary effects, the mechanisms and conditions by which power shapes technological outcomes need to be adequately examined.

Although the integration of midwives and nurses in abortion care delivery, in many contexts, lead to better abortion care outcomes (WHO, 2015; Cleeve et al., 2016a, 2016b; Bain and Kongnyuy, 2018; Mandira et al., 2014), their practices are not immune to unsafe and risky conditions, particularly in legally restrictive environments, within institutions as well as outside of health facilities. Yet this may help uncover conditions and mechanisms through which risky outcomes emerge even when 'safe' and 'appropriate' technologies such as Manual Vacuum Aspirators (MVA) and D&C are applied in a timely fashion. While abortifacients are effective for the medical termination of pregnancy, MVA and abortifacients have gestational age restrictions, and the meanings and interests they represent for health workers involved in abortion care are inadequately understood. If institutionalized abortion care is immune to risk, how do we explain the poor health outcomes which some researchers report (Bechem et al., 2016; Ganatra et al., 2017)? Why would there be a decline in the use of medical technologies which are classified 'safe', and a shift towards those known to be 'risky' (Cook et al., 2017; Odland et al., 2014)?

In this article, we examine how medical technologies and abortion care are shaped in a restrictive legal context, drawing on research conducted in southeast Uganda. In exploring the factors that influence the high rate of maternal deaths from abortion (Ziraba et al., 2015), we show that safety and risk are emergent features of healthcare practice. This is institutionally dependent and contextually contingent on Uganda's restrictive moral and legal context and the financialized healthcare system. We transcend the normative classifications of 'safe' and 'risky', 'legal' and 'criminal' to uncover hidden meanings and interests. These classifications, together with medical technologies and the law, are conceptualized as embedded with inscriptions of power but are also contested through healthcare practice. In this article, abortion care is conceptualized comprehensively to capture both 'safe abortion' and post-abortion care practice in which medical technologies are used.

1. Methods

1.1. Study sites

The findings we present below draw from a larger ethnographic study of abortion care delivery practice in one district in Eastern Uganda between August 2018 and March 2019. Ethical approval was obtained for the study from the Human Research Ethics Committee (Medical) of the University of the Witwatersrand, and the Uganda National Council of Science and Technology (UNCST).

The study was conducted in four health facilities in Iganga district, Eastern Uganda. The selected facilities were identified through an entry meeting when the study was introduced to key actors in the delivery and regulation of sexual and reproductive health services in the district. During this meeting, stakeholders identified one public health centre (level III) and one private, non-profit health centre (also level III), both with a high volume of maternal reproductive health cases reported to the district. The latter facility, located about 3 km out of the town, did not provide induced abortion, but offered post-abortion care for women who had attempted a termination elsewhere and required follow-up care. We also included one private profit-making health facility located in the town, where most cases of induced abortion were reported to take place, and where cases of incomplete abortion were referred and managed. Finally, the district referral hospital was selected to specifically explore the referral and handling of patients with post abortion care needs. The selected sites represented the different categories of health facilities in Uganda, and allowed inquiry into induced abortions, post abortion care and the referral pathway.

1.2. Study participants

Within each health facility, the different categories of health workers directly involved in abortion care delivery, including nurses, midwives and doctors, were identified by the health facility in-charge. In total, 16 health workers (seven female, nine male) were selected because of their involvement in delivering abortion care services. In addition, eight participants from government, and local and international non-government organizations working on sexual and reproductive health matters in the region, were selected because of their stake in quality of care regulation. In total, 24 participants participated in this study.

2. Data collection

2.1. Ethnographic observations

The first author conducted participant observation in two regional training and quality of care improvement meetings organized for health workers, private health facility owners and district health administrators. The first meeting comprised health workers in and owners of private health facilities; the second regional training meeting comprised health workers in public health facilities and district health administrators. Both meetings were organized and facilitated by a non-government organization (NGO) working in sexual and reproductive health. In these meetings, the first author documented the medical technologies discussed, the discursive interactions between facilitators and participants, and narratives about abortion care, the law and medical technologies. In addition, gestures and speech style – silences, laughter and various facial and body expressions – were documented. In-depth interviews were used to follow-up on some of the issues observed.

2.2. In-depth interviews

Interviews were conducted to explore with health workers what happens during abortion care, and how they navigated the restrictive legal context. In addition, we explored how members of the quality assurance team regulated abortion care practice and what they regarded as critical concerns relating to regulation. All interviews were conducted in English at sites that guaranteed privacy; these were audio-recorded and then transcribed by an independent person. The transcripts were reviewed by the first author and all personal identifiers removed and unique identifiers assigned to the transcripts.

2.3. Data processes and analysis

Transcripts from in-depth interviews were imported into N-Vivo 11 software, where data were inductively coded, generating a hierarchy of nodes. From this we developed subthemes for each technology used in abortion, then merged similar subthemes to generate themes that were both exhaustive and mutually exclusive for analysis. We compared data from transcripts of health workers from the same health facility and analyzed findings within the specific health facility conditions. We then compared findings on the different technologies across health facilities and analyzed those findings within the broader moral and legal restrictions, and a financialized healthcare system.

3. Results

3.1. The context

Ugandan institutions and everyday morality attaches strong value to the sanctity of life. Article 22(2) of the constitution of the Republic of Uganda prohibits the termination of the life of an unborn child except as provided by the law (Government of Uganda, 2006). However, in the

absence of a statutory instrument enacted by parliament to enable the operationalization of this provision, the penal code is used by law enforcement officers to arrest and prosecute health workers caught in conflict with the law on abortion (Ngwena, 2014). Under the penal code, both the health worker and the woman who terminates pregnancy are criminalized. The Uganda Penal Code criminalizes any person who aids a woman to procure abortion, and that person is liable for imprisonment for 14 years (Mulumba et al., 2017). Lack of harmonization between the constitution and the penal code creates a vacuum in abortion care delivery, which consequently occurs in a misty legal environment.

Uganda's law on abortion is anchored in secular English common law codified in the penal code (HRAPF, 2016) and in traditional moral precepts, both of which have historically regulated women's sexual and reproductive health. However, religion strongly influences the legal and policy context. Uganda is predominantly a Christian country, with eighty percent of the population being Christian (Larsson et al., 2015), and this has shaped how actors respond to and represent abortion. In 2015, the guidelines on the prevention of maternal mortality due to unsafe abortion were withdrawn after strong resistance from the religious bodies (Cleeve et al., 2016a, 2016b; Mulumba et al., 2017). Similarly, "teachers' manuals on safer sex to avoid abortions were withdrawn from school curriculum in the face of advocacy" (Larsson et al., 2015:2).

Nevertheless, the provision of post abortion care is allowed under the national health guidelines for sexual and reproductive health (MoH, 2016) and complications from induced abortion may qualify women to access post abortion care service. Yet even within this policy provision, "women and girls, and health workers remain vulnerable to law enforcement personnel and face arrest, prosecution and imprisonment" (HRAPF, 2016:5). A significant portion of women who seek abortion care delivery services are young, with restrictions on their movement from both schools and home. In addition, many private clinics and drug shops are operated by attendants with varying backgrounds, experience and medical knowledge. Although the Council of the Pharmaceutical Society of Uganda is expected to regulate pharmacy practice, Uganda's health system is characterized by a "brain drain of highly-skilled health workers, low uptake of trained pharmacists into jobs" (Imbi et al., 2019: 608). In this context, we examine how medical technologies shape and are shaped in abortion care practice.

3.2. Gestation and ultrasound

Gestational age is key to understanding the choice of technology for abortion. Gestational age is conventionally estimated as the number of completed days after the onset of the last normal menstrual period, and this is important for two reasons. First, the medical technologies accessible at primary care level are designed to induce and complete abortion of a fetus under 12 weeks. Although the concept of abortion is used for terminations of pregnancy up to 28 weeks in Uganda (Kiggundu et al., 2008), fetuses above 12 weeks are, personified as human beings and are protected by the state. This point was reiterated by health workers in in-depth interviews: "For me, it is worse when it is more than 12 weeks because I feel it is a real human being in existence but the other one [under 12 weeks], it is still in formation and some things are not yet" (Agnes, midwife, health centre III). According to many health workers, fetuses above 12 weeks represent bodies closer to full humanity and need to be protected, and accordingly, gestational age serves a moral as well as technical control limiting the application of medical technologies for abortion. However, determining gestational age is challenging as most health workers rely on patients' reports. Ultrasound technology allows for greater certainty of gestational age (Kimport and Weitz, 2015; Wanyonyi et al., 2017), but only two of the four health facilities had ultrasound technology on site; and health workers from one of these had access only once a week, on the day allocated for maternal healthcare.

In general, ultrasound was used for emergency abortion care rather than prior to abortion to determine method of termination. Patients were referred for ultrasound as an out-of-pocket expense to detect retained products of conception and uterine perforation, conditions associated with the prior use of MVA and D&C respectively. Ultrasound was also used to complement history notes in emergency cases where concealment of information was suspected. As one health provider noted, it was "tricky" to solicit information from women seeking abortion care: "Remember they are young people; they would not like to disclose that they are getting such conditions from this [abortion] problem. History taking becomes very tricky, they will never disclose. And if someone is not very good at doing physical examination, they may miss it [the complication resulting incomplete abortion]" (Kizza (pseudonym), medical worker, district hospital). Without access to ultrasound, health workers relied on physical examination to identify possible incomplete abortion and uterine perforations. Some health workers also felt that scanning was a waste of time and money for already impoverished patients, and they preferred to rely on experiential knowledge: "You go and do an abdominal ultrasound to see whether it is this or that, so those investigations take time. With my experience I can say this one, no, let us just go direct to evacuation" (Dembe, health worker, district hospital).

3.3. Drugs

Three pharmacological drugs are used in abortion care: Misoprostol, Mifepristone and Divabo. Misoprostol in Uganda is licensed to manage post-partum hemorrhage, to treat ulcers, and for abortion. Misoprostol is intended to be used independently and was most commonly reported by health workers as ideal for completing abortion and removing retained products of conception, especially after MVA: "When she has just been bleeding, that is when you give Misoprostol so that it clears all products" (Peace, medical officer, public health centre III). Health workers across different health facilities and participants in the regional training meetings all supported its use.

Misoprostol and emergency contraceptive pills were accessible through the open market. Many women purchased Misoprostol from a pharmacy for personal use to secure an abortion. However, purchase was constrained by lack of privacy at access points, as one respondent explained: "Remember a pharmacy is an open place. People who come for Panadol are also listening to somebody asking for them. It is a problem both to the clients seeking for it and to the dispenser giving that service, because he/she wouldn't want to be known to provide the service" (Sarah, regional quality assurance officer). Once a woman had self-initiated termination by taking the drug, she would then seek post abortion care at a public health facility. Some health workers considered this a misuse of the drug: "We got Misoprostol for managing PPH [post-partum hemorrhage] which is the biggest cause of maternal mortality here, and if we used it that way then it would be OK. Unfortunately, people are using it for abortion" (district health official).

Mifepristone and Divabo are used together as a combination drug therapy for termination. These were less commonly reported, but were said to be very effective. One health worker recounted that she had "administered the first tablet and before the client came for the second dose, the thing [conceptus] was already out, meaning it works effectively" (Teddy, regional quality assurance officer). However, government facilities were not supplied with Divabo because of the government policy on abortion, and it was available only in private health facilities and social franchise clinics, the latter a network of health facilities established and supervised by non-government organizations to scale-up quality and cost-effective sexual and reproductive healthcare.

3.4. Complications in abortion

Misoprostol was associated with failure to complete abortion after induction, sometimes due to errors in dosage: "It does not actually

complete the abortion; it stops on the way because the dosage is not right. So, many clients are ending up with incomplete abortions resulting from use of Misoprostol” (Jane, regional quality assurance officer). Errors in dosage were associated with lack of adequate knowledge about the correct dosage by women self-administering the drug. In addition, although health workers – enrolled nurses, clinicians, and pharmacists – insisted that they had adequate knowledge about dosage, this was not always the case: “Okay, Misoprostol is very effective in inducing abortion, but what I have found is that people [health workers] do not know the right dosages of Misoprostol to give to induce abortion. A lot of Misoprostol is being used wrongly” (Jane, regional quality assurance officer). Complications from the unsuccessful use of Misoprostol led to the need for other technologies.

3.5. Manual vacuum aspiration (MVA)

MVA was mainly used in public health facilities and the non-profit health facility, and was regarded as very effective for pregnancies under 12 weeks, especially with an incomplete abortion with retained products. Private health facility workers, however, felt that it was ineffective and that the available technology lacked aspiration capacity, particularly when gestational age was over 12 weeks: “For us, we go for Continuous Medical Education (CMEs) and they want us to use MVA for abortion. But MVA cannot work well if the pregnancy is over three months. We do not use this system because it cannot aspirate the contents from the uterus” (Suzan, nurse, private health facility). Health workers relied on information provided by patients to establish gestational age, and when this was inaccurate, the outcomes of the MVA were compromised.

On the other hand, MVA was considered very inexpensive for both the health facility and patients, since no drugs are used and a patient does not need hospitalization. However, some health workers considered it to be time-consuming, tedious and inefficient. Most reported that it took from 30 min to an hour, depending on whether tissue was retained in the uterus. Without adequate time and patience, the abortion would remain incomplete, with the risk of septicaemia. Some patients returned to the health facility with complications as a result:

You may think everything has been sucked out but you may find three to four days later, a patient comes back with lower abdominal pain, with labor-like contractions, and says that ‘I am bleeding things which are clots’. If there are no retained products, the patient would not have labor-like contractions (Walter, medical officer, private health facility).

Health workers also reported serious concerns relating to the sterilization and use of MVA equipment, as some could not assemble the MVA to create the vacuum needed for aspiration. At regional quality assurance trainings, there was no discussion of signs of incomplete evacuation of products of conception from the uterus, and very few participants could assemble, use and disassemble the MVA to the satisfaction of the quality assurance officers. This was despite that this was follow-up training on skills which, in theory, health workers already possessed. If MVAs were sterilized according to the protocol, infection would be avoided, but this also required experience and adherence to a systematic process: “If one misses one step, then infection arises. If someone is not experienced in doing that, then incomplete abortion occurs” (medical worker, district hospital). Some health workers sterilized the MVA by boiling. According to the quality assurance team, high level decontamination following the standards requires letting the instrument stay in a highly concentrated disinfectant for at least 20 min, and then washing it in sterilized or boiled water. However, few health workers could conduct adequate high-level decontamination to ensure that the MVA was safe to use on the next woman. They did not use timers when disinfecting and, at times, MVAs were left for too long in boiling water or in *jik* (disinfectant). Consequently, the plastic technology lost its effectiveness: “Last week

when we went for an outreach in a public facility, I saw a health worker trying to heat [the MVA] and then it was shrinking” (Sarah, regional quality assurance officer). Further, in public health facilities, sterilization was contingent on the availability of disinfectants, but supplies were irregular and well below facility needs based on activities: “Here, we are expected to use at least 5 L of *jik* every day because we have to decontaminate everything; because you find we are having fluids and blood all the time. But we are given only 2 L. Sometimes you get 5 L in a week” (Loy, medical worker, district hospital). Consequently, health workers sometimes asked patients and their caregivers to bring their own supplies, thereby transferring the maintenance costs to the women.

3.6. Dilation and Curettage (D&C)

D&C is a surgical procedure that involves the use of a set of instruments to remove the products of conception from the uterus. A health worker uses a dilator to open the cervix and then a curette to scrape the walls of the uterus and scoop out the products of conception. In social franchise health facilities, health workers had phased out this technology and did not use it for abortion care. In public health facilities, D&C was undertaken only by medical doctors, and at health centre III level, interviewees reported that it was used before MVA was introduced. Like the MVA, its effectiveness was contested. Health workers in the private health facilities considered the technology effective because it could be used regardless of gestational age, in contrast to MVA which should only be used on first trimester pregnancies. D&C was also considered speedy and effective: “It is faster and it removes tissues very well” (midwife, private health facility). Time-saving was critical in induced abortion services for several reasons:

We have many of these cases because, to tell you the truth, we welcome them because we expect, to be straightforward, to get a lot of money. There is a lot of money in these cases more than other cases; we would not handle these cases if it were not for money, but because of the conditions in which we live, they bring money and we handle the cases. But when we begin to operate, you find that they are very difficult cases, what we expected it to be is not what it is (Jacob, medical officer, private health facility).

3.7. Another respondent added

The reasons for doing this on side of health workers is money. This is a very big issue. Not that I am helping her just to abort. But a way of helping, hoping that you are going to get something [money]. Those who come, we do not call them, no. They also come when they have their burdens, which they would like you to help them offload. So even you who is helping her to offload the burden, you also expect something in return. This, in a way, I am earning a living (Dan, male nurse, Private health facility).

Health workers who provided induced abortion care services did so for financial reasons, despite the risk of arrest and loss of their practicing license. Although induced abortions were solely reported in the private health facility, health workers from public health facilities transferred patients with induced abortion care needs to their own private health facilities, where they delivered the service.

In the private health facility, a patient's financial ability also determined the medications received. For poor patients, painkillers were given and they were told to buy other medications from pharmacies once they had money. “After the removal of the ‘things’, we treat the patient and give her all the necessary help. But this depends on the ability of the patients” (James, medical officer, private health facility). Records of payments by a patient were used to determine if complete treatment with drugs could be provided; however, many young girls who presented for care had no money.

3.8. Perforations

The use of D&C in abortion care risked uterine perforation, depending on the competency of the health worker. Without adequate knowledge of the anatomy of the uterus, chances of perforation were very high, particularly because the depth of the uterus was difficult to determine: “You do it blindly; you do not do it in unaided way, you use a curette, push it inside, you scrub and remove the things from the uterus” (Henry, medical officer, public health centre III). Perforation was reported even when an abortion was performed by a highly skilled doctor: “We normally have these cases. They are very many. Even now we have a case on our ward. And it was done by a doctor who we know was trained ... when they did an ultrasound, they realized she had perforations” (Jacob, medical officer, private health facility). Perforations resulted in poor health outcomes, depending also on timely detection and identification of signs. Clients typically returned home after the operation, leading to delayed reporting with sepsis and necrosis, when the uterus then had to be removed to prevent loss of life. Often delayed cases were very young women who feared reporting, could not easily get permission from their parents, and lacked the resources for medical attention. During the study, vivid cases of the consequences of perforation presented at the district referral hospital. The following case is illustrative:

This was a 16-year-old girl. She got pregnant. But she went and had an abortion from wherever she went and she kept quiet, not knowing that the person who did it was maybe not skilled in it and they perforated the uterus. I think she stayed in the village for around a week. By the time she came here, she was discharging pus down her [vagina]. The uterus was perforated. She came with signs of intestinal obstruction, because, I think, in the process of conducting it [abortion], the *thing* (curette) passed through the uterus and someone pulled the guts. And by the time we intervened, she was already toxic. They resuscitated her, and they did an operation on Monday but she passed away yesterday. Part of the gut was cut off. It was terrible!” (Faith, midwife, district hospital).

3.9. Managing adverse events

Many health workers stressed that they helped a woman abort only because of the money. Financial motivation meant that the more cases they handled, the greater the financial benefits to both the facility and the provider, and this changed how abortion care delivery was understood. Some health workers at public health facilities transferred patients to private health facilities where they were able to deliver services. In the private health facility, abortion care was seen as a business and health workers were paid based on the number of patients received.

Although considered efficient, D&C was linked to excessive bleeding, and all health workers in the private health facility saw this as a real challenge: “What disturbs us most in this thing [abortion] is excessive bleeding. It is a very big issue. (The patient) has left school without parent's knowledge. So when she begins to bleed so much, it is our problem to handle” (Suzan, nurse, private health facility). In some cases, bleeding needed immediate attention. Where caregivers had money, clinic staff used local networks to secure blood for transfusion at the private health facility. However, some health workers were concerned about this strategy:

You cannot do blood transfusion. You have not done grouping and cross-matching; you have not done HB or a complete blood count to know the parameters of the hemoglobin, and yet things have gone beyond this. She will not stop bleeding and maybe there are some injuries in the uterus (Jacob, medical officer, private health facility).

If a patient could not be managed at the local health facility, she would be referred to the district referral hospital, but typically without formal documentation of her history and medical care. Informal

interactions with non-medical workers at the facility indicated cases where patients in severe condition were whisked from the private facility on a *bodaboda* (motorcycle) to the gates of the main hospital, where they would be left to find their own way to receive care.

In the event of death from complications at the primary facility, sometimes – respondents reported – the body would be left at the gate of the mortuary: “Others even can just be dumped on the roadside when somebody on who she was conducting abortion died. Things didn't turn out the way they expected” (Moses, medical officer, private health facility). Corpses of women who had died before intervention were similarly handled: “In the process of giving the drug, the anesthesia, if somebody has a heart problem, they may just die in the process, even before the abortion had been conducted. Somebody gets a cardiac arrest and now how are you going to answer for that? So you may end up just dumping the body. Yeah! (Sam, medical officer, private health facility).

Throughout the study, the private health facility was very busy, with many young men hanging around on the facility verandah, hoping to identify potential patients but also on the alert for possible law enforcement officers. The facility, with both a main entrance and a narrow side exit, allowed for the ready escape of women and providers in the event of a police raid.

4. Discussion

Our findings show that discourses of safety and risk offer international legitimacy for scaling-up the production and use of economically viable technologies while suppressing others. We highlight that pecuniary motives drive the delivery of particularly induced abortion care services in a restrictive legal environment. We also argue that medical technologies have a double effect on structures of domination, sometimes reproducing them and in other cases, disrupting and transforming them in women's interests.

Ultrasound was not a technology for which health workers received training in quality assurance and training meetings; nor was there training on the interpretation of ultrasound images despite recognition of its sensitivity in diagnosing retained products of conception or confirming completion (see also Tasnim et al., 2014; Ansari and Abbas, 2017). Although ultrasound is not needed for outcome assessment when treating incomplete abortion (Shochet et al., 2012), clinical examination is inadequate (Kurmi et al., 2015), and ultrasonography is an effective method to evaluate tissue retention in patients with post-abortion bleeding (Iqbal et al., 2019: 93). Our interviewees considered ultrasound a critical technology in improving maternal health outcomes.

The medical technologies for abortion and abortion care are inscribed with restrictions on gestational age, local mortalities and legislation. While some health workers adhere to the restrictions, others transgress them as they transgress the law on abortion. This increases risks and can lead to poor outcomes. Medical technologies and health worker actions are both interpreted according to the social and legal context in which they are used, and this explains health workers' emphasis on financial gains from abortion. That is, because abortion is criminalized, health workers offset the risks of terminating and providing care for complications by direct financial gain. As we have illustrated, power and resistance operate when abortion is criminalized. Thus, normalizing and disciplinary power were evident, and influence abortion care outcomes through several mechanisms, as we now explain.

4.1. Categorization

Categorization refers to the classification of medical technologies into classes of safe and appropriate technologies and risky technologies. Categorization is exercised by the World Health Organization and scholars through global guidelines and global standards for abortion care delivery, national policy and quality of care standards (Ansari and

Abbas, 2017; Ara et al., 2018; Benson et al., 2017; Tasnim et al., 2014; WHO, 2015). According to the guidelines, MVA, Misoprostol, Mifepristone and Divabo are safe and appropriate technologies for use in abortion care delivery, while D&C is considered a risky, unsafe and inappropriate technology primarily because of the possibility of uterine perforation, although also via risks related to anesthesia. Misoprostol is further classified according to differing levels of safety (less safe and least safe), within the spectrum of unsafe abortion (Ganatra et al., 2017). This classification, it is argued, reflects the transition from the use of dangerous technologies to the use of Misoprostol outside healthcare practices. However, although studies report a high level of effectiveness when such technologies are used (e.g. Warriner et al., 2019), health workers reported several examples where MVA and Misoprostol had failed to aspirate and evacuate all products from the uterus, resulting in incomplete abortion. This necessarily required D&C. At the same time, not all cases of the use of D&C technology resulted in excessive bleeding and perforations, nor complications from anesthesia.

While risk and lack of safety are viewed as outcomes of using unsafe technology (Unnithan and De Zordo, 2018), our findings show that risk may occur even in technologies dubbed as safe. Equally, conceptualizing risk and safety as strategies used to govern and regulate healthcare practice (Unnithan and De Zordo, 2018) misses understanding how such concepts are appropriated by health workers in a restrictive legal context. We argue that riskiness and safety are rather outcomes of technological application, contingent on specific health facility conditions, economic and legal contexts. Healthcare risk and safety theory stress the effect of interpersonal communication with patients and among professionals to prevent adverse events and improving patient safety (Severinsson et al., 2015; Tucker et al., 2008). However, this abstracts healthcare risk and safety from the restrictive legal regime governing abortion, upon which abortion care practice is contingent.

The cultural safety perspective focuses on the organizational or institutional preparedness to guarantee safety and risk-free healthcare (Groves et al., 2011). However, conceptualization of risk and safety from normalized healthcare and fails to explain and account for risks and safety issues in abortion care delivery, a practice considered to transgress institutional values, policy and legal norms regulating women's sexuality and reproductive health behaviors in Uganda. Conceptions of safety and risk abstracted from context negate the effect of global events and processes upon which local healthcare practice is contingent. Without questioning the view that health workers are always keen to deliver safe, competent, compassionate and ethical care (Harrowing et al., 2010), our findings reveal that communicative, interactive and cultural theories insufficiently account for risky and unsafe healthcare practices which are offset by panic, fear and decision-making that seek to evade state control. Definitions of risk and lack of safety depend on the exercise of power and counter-governance practices used to evade state power.

Global emphasis on using medical technologies as standard instruments (Klugman and Budlender, 2001; Klugman, 2008; Warriner et al., 2019; Tasnim et al., 2014) overlooks ways that health workers appropriate and apply technologies, the (in)adequacy of disinfection practices and the different health facility values and rules that condition abortion care delivery. Yet as indicated in this study, these constitute critical avenues through which risky outcomes arise in abortion care practice. We argue that safety and risks are contingent upon the way medical technologies are interpreted amidst the struggle to evade the disciplinary effect of institutional norms and the law. Risks and safety are outcomes of an assemblage of things (material technologies), activities, rules and mental dispositions mediated through biopolitics. Such a conception helps to uncover the social reproduction of risk and the conditions of possibility that generate them.

Categorization uses the discourses of safety and risk to offer international legitimacy to scale up the production and use of economically viable technologies while suppressing others. This level of legitimacy is

reinforced by national abortion care standards which institutionalize technologies for safe abortion care. Economically viable medico-technological innovations are accorded international legitimacy to scale-up their production and use in healthcare practices. In this context, the 'riskiness' and 'lack of safety' which arise from the use of a 'safe' technology are hidden and cease to be relevant, provided the technology promotes the instrumental needs of dominant forces in both global and local health arenas. Consequently, categorization enacts and reproduces economic interests without necessarily correcting the mechanisms through which risk is generated in abortion care practice.

4.2. Criminalization

Criminalization shapes abortion care outcomes in multiple ways in Uganda. First, health workers choose specific technologies which minimize the risk of exposure of practices that conflict with national abortion law. In health facilities where abortions were induced, health workers relied mostly on D&C technology because it was regarded as time-saving and effective. But criminalization increased the fear and tension in operations, thus affecting the efficiency and increasing the risk of an incomplete abortion or uterine perforation. Due to fear, health workers operated by stealth, limiting the possibilities of consultation when complications emerged. This deprived patients of the opportunity to benefit from wider specialist consultation, and increased the risks of severe morbidity, emergency surgery (such as hysterectomy), and death. Emergency case handling practices were designed to enable a health worker to escape the law, with the patient's health and life apparently secondary. As described above, practices such as abandoning patients, whisking them to and leaving them at the gates of hospitals, and bodies at morgues, reflect how patients are handled when abortion care is criminalized. Many young patients present to health facilities for care without the knowledge of or permission from home or school. Health workers from the private health facility acted in fear and designed strategies to evade apprehension.

Even when Misoprostol was used, open market access did not guarantee a dose appropriate to gestational age, because prescribing the drug to induce abortion is also criminal. While drug shops may be keen to avoid serious complications after abortion (Shannon et al., 2004), without adequate regulation, many categories of workers dispensing medicines in private health facilities may not have adequate knowledge of the risks involved. In Kenya, Liambila and others report that "only about half (49%) of providers whose facilities stocked Misoprostol mentioned the correct regimen for pregnancies of various gestational ages" (2015:27).

Criminalization compromises the ability of district health teams to monitor, supervise and regulate the use of medical technologies and practice of abortion and post-abortion care. The women and health workers act in collusion against state law and healthcare policy. Consequently, neither party reports the district health team, except when a woman's health condition deteriorates dramatically; and quality of care is not regulated since there is no evidence of the practice. In the private health sector where induced abortion was most common, facility norms relating to terms of payment shaped the choice of technologies, again with limited regulation, supervision and monitoring. In contrast, in the social franchise clinics and public health facilities where the practice was supervised, there were positive outcomes. Therefore, while a restrictive legal regime increases the financial value of abortion care for health workers involved in its delivery, it deepens women's vulnerability to poor health outcomes.

4.3. Motives and pecuniary interests

Financial motives shift attention from patient care outcomes to health worker interests. In applying medical technologies for induced abortion and managing complications from abortion, health workers have a range of motives and interests, including monetary. Contrary to

the idea that medical technologies are favored because of their efficiency (Bain and Kongnyuy, 2018), health workers from private health facilities preferred to use technologies with the greatest financial benefit. In this regard, despite the risk of uterine perforation, D&C was preferred. Health workers in the private health facility were paid according to the number of patients attended to per day. In addition, a patient's care package was determined based on ability to pay. Health workers employed in public health facilities transferred patients to their private clinics for financial reasons, as well as to protect the privacy of patients and to avoid their apprehension for criminal practice. In this context, spontaneous miscarriages within private and public health facilities were treated as health conditions which attracted fewer financial returns.

Financial motivations create opposing forces in abortion care practice as the duty to provide care was considered secondary to the material benefits to health workers providing abortion care. Many health workers saw service delivery as an instrument to meet financial goals, and accordingly women's bodies were objectified as a means for financial benefits. Equally, medical technologies were subjectified and interpreted in terms of their value for financial gain. The assertion that "there is no health condition which is more financially rewarding than abortion" (Suzan, midwife, private health facility) vividly illustrates that material conditions dominate the delivery of abortion care service. Financial incentives as a means of quality of care improvement have been institutionalized in maternal healthcare, through results-based financing and the introduction of voucher schemes (Ekirapa-Kiracho et al., 2011; Pariyo et al., 2011). In private healthcare facilities, institutionalization occurred through remuneration, based on the number of patients served in a day. Within the broader social and economic environment, health workers' identities were evaluated according to their ability to meet personal, familial and collective responsibilities, less so their loyalty to medical professional ethics and values. These internalized conditions were invoked in abortion care, and the restrictive environment offered health workers an opportunity to exploit women in need of care.

4.4. Control

Control refers to the internalized knowledge system relating to the law and technology that govern the self in the application of abortion care technologies. Criminalization shaped outcomes of medical technologies in subtle ways. First, gestational age ceilings determine when medical technologies can and cannot be used. Once internalized, health workers exercise self-regulation in abortion care, observing the gestational age restriction. Second, fetuses above the gestational age ceiling are made visible as human beings via the use of ultrasound, or in its absence, through discourse. Such fetuses are given entitlement to citizenship rights in the womb, which the mother is obliged to protect. This consciousness of the body invokes acts of self-regulation by health workers, which operates through their fear of contravening state regulations on technology application. Thus, normalized power turns health workers into objects of the state, which is able to regulate the rights of personified fetuses (and so act in the case of its violation). Equally, the state uses ultrasound to visualize the womb ecology and ensure that it is conducive for a healthy fetus and mother. Although personification of the growing fetus shifts attention away from the mother to the fetus (Manderson, 2016; Zechmeister, 2001), there is, in the application of the technology, the intent of a symbiotic effect from which both the fetus and the mother benefit. Studies in South Africa indicate that focusing on the fetal environment places blame on mothers, limits responsibility for the outcomes to her body, and thereby further objectifies women (Manderson, 2016; Pentecost and Ross, 2019).

In our study, we highlighted that health workers did not merely exist as objectified bodies on whom systems of control are inscribed and reproduced. In some cases, they induced abortion in pregnancies when

the gestational age exceeded the legal limit, in pursuit of financial gains. Thus, medical technologies not only carry and exert systems of control, but are used to disrupt inscribed power. This increases the risk of direct injury to the woman and the risk of an incomplete abortion, leading to the need for further medical care and further risks. Thus, since abortion addresses the needs of women who do not wish to carry a pregnancy, medical technologies have a double effect on structures of domination: sometimes reproducing them and in other cases, disrupting and transforming them in women's interests.

5. Conclusion

We have challenged the idea that the tensions of riskiness and safety are inherent features of reproductive medical technologies, and have shown that these are emergent outcomes of abortion care practice. We have also discussed how instrumental reason shifts the consciousness of health workers, from offering abortion care as a duty to offering it for personal financial gain, notwithstanding that this is a way of managing their own risks. We suggest that focus on integrating health workers to expand access to and promote quality outcomes in abortion care can only be useful if the instrumental reasoning of health workers is addressed.

We challenge the objective interpretation of medical technologies as having normative value, since this obscures the practices, processes and mechanisms that shape technologies' meanings, choice and application in abortion care. Equally, we challenge a subjective interpretation, since this inhibits exposing the internalized conditions of domination and resistance which lead to unsafe and risky outcomes and compromise women's health. As we have described, inscriptions written on medical technologies, and the narratives of health workers who use them, represent particular interests. Women are objectified in all discourses surrounding the choice and application of medical technologies. Rather than asking what medical technologies constitute, greater value lies in inquiring into what they represent to different actors in the field.

Finally, we have shown various dimensions of domination and tactics of resistance in abortion care. These include both normalizing power hidden in the categorization of medical technologies and self-regulating practices of health workers, and the disciplinary power which operates through the restrictive law on abortion. While normalized power controls health workers, the disciplinary dimension of power escalates medical and legal risks for women and health providers, offsetting dangerous tactics of evasion which compromise abortion care outcomes.

5.1. Study limitation

Our focus was on quality of care improvement meetings and abortion care practice was explored through the perspectives of health workers. Future studies could undertake health facility ethnography and incorporate perspectives of women into understating the abortion care practice, and the construction of risky outcomes.

6. Credit author statement

Alexander KAGAHA: Conceptualized the study, designed the methodological approach, collected and analyzed the data. He also drafted the original manuscript, including the subsequent revisions for the final manuscripts.

Lenore Manderson: Offered the overall scholarly supervision of the research project. She provided technical oversight, leadership and mentorship for the research project right from the conception of the research ideas to final execution and presentation of findings. In addition, she offered a critical review to the manuscript, including editing the original and revised manuscript.

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Appendix A. Supplementary data

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