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CLINICAL ARTICLE

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# Examining reuse and replacement procedures for Ipas manual vacuum aspiration and cannulae in nine countries

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## Abstract

**Objective:** To determine how many times Ipas manual vacuum aspiration (MVA) instruments are reused, for what reasons, when the instruments are replaced and/or discarded, and what the barriers are to replacing them.

**Methods:** We conducted a mixed-methods cross-sectional study of health care providers who provide MVA services and key stakeholders in the supply chain to understand reuse and replacement of Ipas MVA aspirators and cannulae. Qualitative interviews focused on procurement and replacement of Ipas MVA instruments.

**Results:** The authors interviewed 352 health care providers from nine countries from 2019 to 2021. Providers reported reusing MVA instruments an average of 34.4 times (standard deviation, 45). The reuse averages ranged from one time (Democratic Republic of the Congo) to 500 times (India), with figures varying between providers within the same country. Instrument malfunctioning rather than a specific number of uses drove reuse and subsequent replacement. The decision to replace was most commonly made by the provider during use. Half of the providers said that they knew of no issues with the supply chain, and 85% said they were always able to replace Ipas MVA instruments when needed.

**Conclusion:** Tracking reuse of MVA instruments was uncommon at participating providers' health facilities. Providers' estimates revealed great variability in reuse frequency and tracking procedures.

KEYWORDS
abortion, cannulae, global, manual vacuum aspiration, reuse

## 1 | INTRODUCTION

Vacuum aspiration is a safe procedure for uterine evacuation (UE) and major complications are rare.[1–4] Ipas manual vacuum aspiration (MVA) instruments are used in over 100 countries and are designed for reuse, meaning they can be used more than one time after reprocessing. Ipas MVA aspirators and cannulae retain functionality for at least 25 uses with proper reprocessing and where regulations

allow reuse,[5] but anecdotal evidence suggests that providers use them more often. Not much is known about how often MVA instruments are routinely used or reused and what drives replacement.

This study was a collaboration between Ipas and DKT International. Ipas, a global nonprofit that works to improve sexual and reproductive rights, is the original developer of the MVA device and has guided the manufacturing, distribution, training, use, and improvement of these devices for over 45 years. DKT seeks to increase access to abortion care by ensuring that abortion-related products and technologies are widely available, as well as implementing education and outreach campaigns that reach women, especially in poor and rural areas. DKT began distributing the Ipas MVA instruments in 2017.

We aimed to estimate the mean number of times providers are reusing MVA instruments, at what rates individual elements such as the aspirator or cannulae are being reused, and what triggers replacement.

## 2 | MATERIALS AND METHODS

We conducted a mixed-methods cross-sectional study using abortion and postabortion care providers in nine countries and key informant interviews with MVA supply chain stakeholders in two countries. We defined supply chain as the network that works to ensure that medicines and health care supplies are manufactured, distributed, and available to patients. The structured questionnaire was administered among MVA providers in Bolivia, Pakistan, India, Nigeria, Ghana, the Democratic Republic of the Congo (DRC), Ethiopia, Mozambique, and Kenya. It included questions about the reuse of the MVA instruments, providers' role in reprocessing, decision-making around discarding and replacement, practices at their facility for using and reprocessing the instruments, and barriers to procuring new instruments.

Countries were selected to represent varying levels of restrictions on abortion access and where both DKT and Ipas had offices, with the exception of Bolivia, where Ipas has an office while DKT operates through a distributor. The sampling frame was compiled from lists of Ipas-trained providers and DKT's customer/sales lists where available. Lists were combined, deduplicated, and provider's affiliation with DKT or Ipas removed. A total of 14 114 providers were included in the final list: Bolivia (626), Pakistan (341), India (3034), Nigeria (3121), Ghana (660), DRC (154), Ethiopia (5772), Mozambique (151), and Kenya (282). The order of the sampling frame for each country was randomized and providers were contacted in their randomly assigned order until the desired sample size was reached. We calculated a minimum sample size of 35 providers per country, 315 providers in total: $n=(t^*\text{sd}/\text{MOE})^2$, where $t=1.96$, standard deviation = 3, and margin of error = 1. Inclusion criteria included: currently performs MVA services; received their first MVA training at least 12 months prior to the survey; and either worked at a facility that provided at least 25 MVAs in the past year or performed at least 25 MVAs since their training. Enumerators were trained to conduct the phone-based surveys in English or local languages using an Open Data Kit Collect.

In Mozambique and Kenya, initial surveys showed a high number of providers who had answered "Do not know" in response to the average number of times each MVA instrument is reused: 36 (97%) and 29 (78%), respectively. Enumerators followed up with these providers to ask whether they could provide an estimate. Data presented include 15 providers from Mozambique and 20 providers from Kenya who offered estimates during this second call. In Mozambique, some providers gave a reuse range, and the median was used. Where providers gave a date range (e.g., MVA reused for 3 months), this was not included in the analysis. Unless specified, the term "MVA instruments" refers to all parts required for UE, including aspirator and cannula.

We also conducted qualitative interviews via mobile phone with key stakeholders in Bolivia and Ethiopia to give insight into procurement and replacement of MVA instruments, decision-making around reordering, and barriers to replacement. Ipas staff in Ethiopia and Bolivia purposively selected stakeholders each for the qualitative interviews: 10 in Ethiopia and 14 in Bolivia.

Participants were not compensated and the benefits to the respondents were explained as only for the purposes of the pursuit of a broader understanding of the uses of the MVA instruments. We obtained approvals from an institutional review board in the United States and local ethics review boards and relevant health systems authorities where required (Table 1). In India, all providers were Ipas-trained and the survey was part of their regular contact and support. We obtained a waiver of written documentation of consent, and enumerators only interviewed providers who gave verbal consent and agreed to participate following the informed consent process.

Survey results were analyzed using Stata SE version 16.1 (StataCorp LLC, College Station, TX, US). All data were analyzed by country and overall. We created frequency tables for categorical

**TABLE 1** Ethics approvals obtained.

| Country | Institutional or ethics review board |
|---|---|
| United States | Allendale Investigational Review Board |
| Bolivia | Allendale Investigational Review Board |
| Ethiopia | Ethiopian Public Health Institute Institutional Review Board (EPHI-IRB) |
| Ghana | Health Service Ethics Review Committee |
| Pakistan | Government of Pakistan Ministry of National Health Services, Regulations and Coordination, Health Services Academy |
| Democratic Republic of the Congo | Republique Democratique du Congo—Ministere de la Sante Publique—Comité National d'Ethique de la Sante |
| Nigeria | National Health Research Ethics Committee of Nigeria (NHREC) |
| Kenya | Kenyatta National Hospital and University of Nairobi College of Health Sciences Ethics Review Committee (KNH-UoN ERC) |
| Mozambique | Ministério de Saúde Comité Nacional de Bioética para Saúde (CNBS) |

**TABLE 2** Characteristics of surveyed providers.

| Provider characteristics | Providers (*N* = 352) Number | Percentage (SD) |
|---|---|---|
| Country | | |
| Bolivia | 38 | 11 |
| Democratic Republic of the Congo | 40 | 11 |
| Ethiopia | 40 | 11 |
| Ghana | 37 | 11 |
| India | 36 | 10 |
| Kenya | 37 | 11 |
| Mozambique | 37 | 11 |
| Nigeria | 41 | 12 |
| Pakistan | 46 | 13 |
| Profession | | |
| Specialist[a] | 64 | 18 |
| General practitioner[b] | 80 | 23 |
| Midlevel provider[c] | 199 | 57 |
| Nonmedical[d] | 3 | 1 |
| Other[e] | 6 | 2 |
| Number of facilities where the provider works | | |
| One | 311 | 88 |
| Two | 41 | 12 |
| Source of first MVA training[f] | | |
| MVA training by Ipas | 313 | 89 |
| MVA training by DKT | 17 | 5 |
| MVA training by other[g] | 32 | 9 |
| MVA training by unknown | 6 | 2 |
| Number of MVA refresher trainings since initial training | | |
| 0 | 152 | 44 |
| 1 | 90 | 26 |
| 2 | 42 | 12 |
| 3 to 5 | 56 | 16 |
| 6 or more | 9 | 3 |
| Average number of UEs performed by provider per month | | |
| Total UE services | 8.6 | (8.9) |
| UE services using MA | 3.4 | (5.0) |
| UE services using MVA | 4.9 | (5.5) |

*Note*: Some items' percentages may sum to more than 100% due to rounding.

Abbreviations: MA, medical abortion; MVA, manual vacuum aspiration; SD, standard deviation; UE, uterine evacuation.

[a]Specialists include gynecologists and obstetricians.

[b]General practitioners include nonspecialized doctors such as family doctors.

[c]Midlevel providers include nurses and midwives.

[d]Nonmedical staff includes community health workers and those types of roles and also pharmacists.

[e]Other professions include five community midwives in Pakistan and licensed midwives in Mozambique.

[f]Multiple responses were allowed. Percentages do not sum to 100%.

[g]Other trainers included specialist doctors (Bolivia), Marie Stopes International in Ghana and Ethiopia, UNICEF and Pathfinder (Democratic Republic of the Congo), other hospitals, specific doctors, or provincial health departments (Mozambique).

**TABLE 3** Characteristics of surveyed providers' primary health facility.

| | Providers (*N* = 352) Number | Percentage (SD) |
|---|---|---|
| Facility sector | | |
| Private | 39 | 11 |
| Public | 313 | 89 |
| Number of UEs provided at facility per month | | |
| Mean monthly UE services | 22.2 | (43.4) |
| Mean monthly UE services using MA | 7.4 | (13.4) |
| Mean monthly UE services using MVA | 14.5 | (38.2) |
| Average number of MVA instruments in active stock | | |
| Total instruments | 8.6 | (9.2) |
| Ipas MVA Plus aspirator | 2.9 | (2.3) |
| Single valve aspirator | 2 | (1.7) |
| Ipas EasyGrip cannulae | 9.9 | (8.9) |
| Other instruments | 2 | (1.3) |
| Average number of MVA instruments in reserve stock | | |
| Total instruments | 8.7 | (15.3) |
| Ipas MVA Plus aspirator | 2.8 | (5.6) |
| Single valve aspirator | 0.8 | (1.0) |
| Ipas EasyGrip cannulae | 9.8 | (14.5) |
| Other instruments | 0.5 | (1.0) |
| Number of staff using MVA instruments at facility | | |
| Mean | 7.7 | (13.1) |

Abbreviations: MA, medical abortion; MVA, manual vacuum aspiration; UE, uterine evacuation.

variables and descriptive statistics (mean, median, standard deviation) for continuous variables. Outliers for average MVA instrument reuse were identified using the full sample interquartile range (IQR) and quartiles: lower limit = Q1 − (1.5* IQR); higher limit = Q3 + (1.5*IQR). We used the Wilcoxon rank sum test to examine differences between public and private sector providers' reuse estimates. Qualitative interviews were recorded, transcribed in English and Spanish (languages used during interview), deidentified, and then analyzed thematically.

## 3 | RESULTS

We interviewed 352 abortion providers from nine countries between 2019 and 2021 (Table 2). Providers were most commonly midlevel providers working in only one facility and had been trained on MVA by Ipas (Table 2). Providers in our sample overwhelmingly worked in the public sector, where they reported, on average, more than one provider using the same MVA instruments in each facility (Table 3).

**TABLE 4** MVA instrument reuse frequency and tracking by country.

| | Bolivia | | Pakistan | | India | | Nigeria | | Ghana |
|---|---|---|---|---|---|---|---|---|---|
| | *n* = 38 | | *n* = 46 | | *n* = 36 | | *n* = 41 | | *n* = 37 |
| | Number | Percentage | Number | Percentage | Number | Percentage | Number | Percentage | Number |
| Number of MVA instruments reused after proper processing at facility | | | | | | | | | |
| All | 37 | 97 | 39 | 85 | 36 | 100 | 41 | 100 | 37 |
| Some | 1 | 3 | 7 | 15 | 0 | 0 | 0 | 0 | 0 |
| None | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Average number of times each MVA instrument is reused[a,b] | | | | | | | | | |
| Mean | 105.6 | | 54.7 | | 64.1 | | 21.3 | | 19.9 |
| SD | 75.3 | | 18.2 | | 84.3 | | 12.1 | | 4.7 |
| Median | 100 | | 50 | | 40 | | 23 | | 20 |
| Minimum, maximum | 10, 300 | | 8, 100 | | 20, 500 | | 2, 50 | | 6, 30 |
| Do not know | 22 | 58 | 10 | 22 | 2 | 6 | 12 | 29 | 0 |
| Someone at facility keeps track of how often the MVA instruments are reused | | | | | | | | | |
| Yes | 21 | 55 | 37 | 80 | 7 | 19.4 | 8 | 20 | 4 |
| No | 11 | 29 | 8 | 17 | 27 | 75 | 31 | 76 | 33 |
| Do not know | 6 | 16 | 1 | 2 | 2 | 5.6 | 2 | 5 | 0 |
| Tracking system, among those that track MVA instrument reuse | | | | | | | | | |
| Track reuse with paper book/tracker | 13 | 62 | 35 | 95 | 5 | 71 | 8 | 100 | 2 |
| Track reuse with computer spreadsheet | 1 | 5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Track reuse with public board | 2 | 10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| No formal system for tracking reuse | 0 | 0 | 2 | 5 | 2 | 29 | 0 | 0 | 0 |
| Other way of tracking reuse[c] | 1 | 5 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| Do not know system for tracking reuse | 4 | 19 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

*Note*: Some items' percentages may sum to more than 100% due to rounding.

Abbreviations: DRC, Democratic Republic of the Congo; SD, standard deviation.

[a]In Kenya, 29 (78%) providers did not know how many times manual vacuum aspiration (MVAs) are reused on average at their facility. Among the eight who provided an estimate, the mean was 16.5 (ranging from 3 to 36). Enumerators called providers a second time to ask whether they would be comfortable providing a rough estimate. The data presented in the table include 20 providers who offered estimates during the callback.

[b]In Mozambique, 36 (97%) providers did not know how many times MVAs were reused on average at their facility. The one provider who provided an answer reported an average reuse of 25. Enumerators called providers a second time to ask whether they would be comfortable providing a rough estimate. The data presented in the table include 15 providers who offered estimates during the callback.

[c]Other reports included using a logbook to track the number of cases, a provider's notebook, and one provider said they change the kit every 3 months if faulty.

A total of 333 (95%) reported that MVA aspirators are reused an average of 34.4 times (Table 4 and Figure 1). On average, private sector providers reused MVA instruments 13 times compared with 39 times among public sector providers ($P < 0.001$). Facilities with higher caseloads reused MVA instruments more often: facilities with ≤10 UEs per month reused about 24 times on average, facilities with 11 to 30 reused 45 times, and facilities with >30 reused about 65 times (data not shown). A total of 244 (70%) providers said that no one at their facility keeps track of how often the MVA instruments are reused (Table 4).

Providers reported that they themselves made the request to replace instruments. The decision to replace instruments mostly happened as providers were using the instrument, either immediately before or during use, or during inspection or reprocessing (Table 5). Three hundred (85%) providers said they had never been in a situation where they needed to replace MVA instruments but could not (Table 5). The remaining 52 (15%) reported problems with the order delivery and issues sourcing the instruments (Table 5 and Figure 2). Pakistan and Ethiopia also reported that they were unable to replace individual parts of the instrument or order the parts separately.

| | DRC | | Ethiopia | | Mozambique | | Kenya | | All countries | |
|---|---|---|---|---|---|---|---|---|---|---|
| | *n* = 40 | | *n* = 40 | | *n* = 37 | | *n* = 37 | | *n* = 352 | |
| Percentage | Number | Percentage | Number | Percentage | Number | Percentage | Number | Percentage | Number | Percentage |
| | | | | | | | | | | |
| 100 | 33 | 83 | 40 | 100 | 33 | 89 | 37 | 100 | 333 | 95 |
| 0 | 6 | 15 | 0 | 0 | 4 | 11 | 0 | 0 | 18 | 5 |
| 0 | 1 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| | | | | | | | | | | |
| | 4 | | 23 | | 10.4 | | 28.8 | | 34.4 | |
| | 3.3 | | 7.7 | | 8.9 | | 25.5 | | 45 | |
| | 3 | | 25 | | 5 | | 20 | | 25 | |
| | 1, 18 | | 10, 40 | | 3, 30 | | 3, 100 | | 1, 500 | |
| 0 | 5 | 13 | 1 | 3 | 21 | 57 | 9 | 24 | 85 | 24 |
| | | | | | | | | | | |
| 11 | 5 | 13 | 0 | 0 | 0 | 0 | 9 | 24 | 91 | 26 |
| 89 | 34 | 87 | 40 | 100 | 34 | 92 | 26 | 70 | 244 | 70 |
| 0 | 0 | 0 | 0 | 0 | 3 | 8 | 2 | 5 | 16 | 5 |
| | | | | | | | | | | |
| 50 | 2 | 40 | | | | | 2 | 22 | 67 | 74 |
| 0 | 0 | 0 | | | | | 0 | 0 | 1 | 1 |
| 0 | 0 | 0 | | | | | 0 | 0 | 2 | 2 |
| 0 | 0 | 0 | | | | | 3 | 33 | 7 | 8 |
| 50 | 2 | 40 | | | | | 3 | 33 | 8 | 9 |
| 0 | 1 | 20 | | | | | 1 | 11 | 6 | 7 |

Sometimes the broken part caused the entire instrument to no longer be useable, which can be the case for some specific parts.

Only 35 (10%) providers said they had ever been unable to perform services due to a lack of instruments. In most of these cases, clients were either referred elsewhere, told to come back at another time, or medical abortion was used instead. Four providers in Bolivia resorted to using sharp curettage (Table 5).

Providers gave recommendations on how MVA provisions could be improved: clearer materials on reprocessing and reuse, additional trainings for both health workers and nonclinical staff who clean and reprocess instruments, alternative tracking mechanisms such as physical tracking mechanism or by developing reuse guidelines based on time elapsed, current stock and caseload, offering the option to replace individual parts, and strengthening country-based partnerships for MVA supply chains.

We conducted qualitative interviews with 14 key stakeholders in Bolivia and nine in Ethiopia. In Bolivia, stakeholders were medical doctors or nurses who were either heads of pharmacy in hospitals, responsible for MVA materials in their departments, involved in the supply chain, or in charge of the stock and acquisitions in their

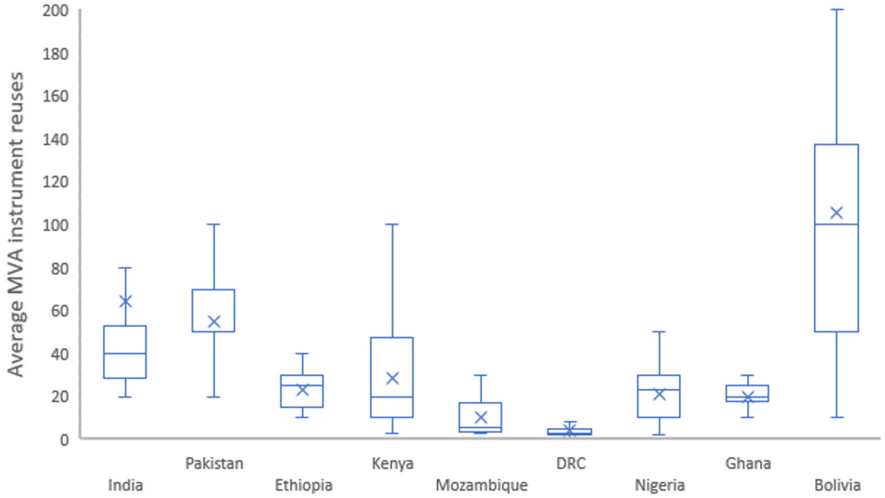


**FIGURE 1** Average manual vacuum aspiration (MVA) instrument reuses by country, excluding outliers. DRC, Democratic Republic of the Congo. *X denotes the mean.

facilities. In Ethiopia, stakeholders were pharmacists and health officers responsible for MVA requisition, procurement, and purchasing; public health specialists and pharmacists responsible for estimating and purchasing annual MVA quantities; and account managers for MVA supply and demand.

Interviews revealed different environments within which MVA instruments are used and procured. Providers in Ethiopia appeared to be overall less frustrated and less concerned with the replacement process, likely owing to fewer issues with bureaucracy and delays than in Bolivia. Bolivian stakeholders drove one central narrative: procuring MVA instruments in Bolivia is difficult in the public sector and it is laden with bureaucracy and delays. Interviewees expressed frustration at the administration and government level, where there is red tape, confusing instructions, high staff turnover, and significant delays. One stakeholder told us, "when it is an NGO (non-governmental organization) or a clinic, it is immediate. When the request is made [by] an institution that belongs to the [public sector], it takes a long time for the purchase, it's very bureaucratic".

Ethiopian stakeholders reported that procurement and ordering of MVA supplies was driven by the previous year's demand. Stakeholders expressed few complaints about the procurement process in private and NGO facilities and reported that they could obtain MVA equipment quickly and easily from the single supplier. Stakeholders from public facilities mentioned that delays in the procurement process stemmed from approvals required for instruments to be purchased. One stakeholder, a public health professional working for an NGO, noted that the "procurement processes take a long time in the public health sector. However, supply chain management like quantification, procurement and distribution is very easy for non-profit and private sectors".

Stakeholders in both countries knew instruments were being reused. In Bolivia, stakeholders reported that the condition of the instrument was the driver of reuse and the number of reuses was associated with limited resources and budgets in the public health system. As one provider noted: "We, being in the public sector, always have to try and maximize the use not only of the instruments, but also the equipment, since lately in Bolivia, and here in the hospital, we cannot afford to discard something that we can still use" (nurse, public sector). Ethiopian stakeholders described replacement being driven by the quality of the MVA and the experience level of the provider, and that a provider with little experience could cause instruments to break or be damaged during use or by reprocessing more frequently.

## 4 | DISCUSSION

Providers in all countries reported that MVA instruments were reused. Providers reported cleaning and using MVA instruments more often than the 25 times outlined in the literature.[5] Globally reuse and recycling of non-MVA medical instruments is common and facilities balance the need to benefit the greatest number of patients and patient safety.[6]

Tracking systems were not commonly used, and, globally, tracking systems are more generally associated with inventory management rather than individual instrument reuse.[7] From providers' reports, the number of reuses did not drive whether providers reused or discarded the instrument. Rather, providers focused on instrument functionality. Therefore, tracking does not seem like an intervention that would change service delivery and introducing an additional system can be challenging.

Providers instead spoke about wanting additional training for themselves and support staff. Rather than concerns about reuse, they were concerned about the skills of those cleaning and reprocessing the instruments. Taking into consideration that providers use MVA instruments until they stop working, additional guidance on how to ensure the vacuum holds and all other parts work fully

**TABLE 5** Procedures and challenges with MVA instrument processing and replacement.

| | All countries N = 352 | |
|---|---|---|
| | Number | Percentage |
| Person who cleans and processes the MVA instruments at facility[a] | | |
| Specialist | 8 | 2 |
| General practitioner | 34 | 10 |
| Midlevel provider | 314 | 89 |
| Nonmedical staff | 20 | 6 |
| Other[b] | 18 | 5 |
| Issues faced or heard of from others at facility during MVA instrument processing[a] | | |
| No issues faced or heard of from others | 68 | 19 |
| Loss of parts | 125 | 36 |
| Overdistension due to boiling | 52 | 15 |
| Melts in autoclave | 19 | 5 |
| Detergents shortage | 58 | 17 |
| Bad instructions | 7 | 2 |
| Other[c] | 11 | 3 |
| Do not know | 61 | 17 |
| Refused | 20 | 6 |
| Person involved in deciding how often MVA instruments are reused[a] | | |
| Specialist | 73 | 21 |
| General practitioner | 92 | 26 |
| Midlevel | 159 | 45 |
| Nonmedical staff | 2 | 1 |
| Other[d] | 70 | 20 |
| Do not know | 23 | 7 |
| Point at which MVA instruments are determined to need replacement[a] | | |
| During processing | 204 | 58 |
| During inspection | 163 | 46 |
| Immediately before use | 19 | 5 |
| During use | 229 | 65 |
| Other[e] | 12 | 3 |
| Do not know | 8 | 2 |
| Triggers for aspirator replacement[a] | | |
| Does not hold vacuum | 196 | 56 |
| Cylinder cracked | 190 | 54 |
| Plunger arms do not lock | 185 | 53 |
| O-ring damaged | 176 | 50 |
| O-ring lost | 173 | 49 |
| Valve parts break | 172 | 49 |
| Broken collar stop | 164 | 47 |
| Cylinder brittle | 162 | 46 |
| Plunger handle cracks | 160 | 46 |
| Mineral deposits affect plunger movement | 151 | 43 |
| Buttons broken | 148 | 42 |
| Valve parts bent | 139 | 40 |
| O-ring brittle | 136 | 39 |
| Max use reached | 105 | 30 |
| Parts go missing | 93 | 26 |
| Other[f] | 18 | 5 |
| Do not know | 11 | 3 |
| Triggers for cannulae replacement[a] | | |
| Twisted | 190 | 54 |
| Cracked | 183 | 52 |
| Bent | 183 | 52 |
| Brittle | 178 | 51 |
| Cleaning does not completely remove tissue | 166 | 47 |
| Size indicator dot fades | 141 | 40 |
| Max use reached | 108 | 31 |
| Other[g] | 31 | 9 |
| Do not know | 9 | 3 |
| Provider has ever been in a situation where he/she would like to replace an instrument but cannot | | |
| Yes | 42 | 12 |
| No | 300 | 85 |
| Do not know | 10 | 3 |
| Reason provider was unable to replace MVA instrument, among those who were in a situation where they could not replace an instrument[a] | | |
| Monetary reasons | 13 | 31 |
| Supplies | 12 | 29 |
| Facility level approval not received | 2 | 5 |
| Problems with government approvals | 1 | 2 |
| Facility management does not support replacement | 8 | 19 |
| No pharmacy support for replacement | 4 | 10 |
| MVA not priority at facility | 3 | 7 |
| Order placed but not delivered | 15 | 36 |
| Quantity delivered less than requested | 2 | 5 |
| Other[h] | 14 | 33 |
| Do not know | 1 | 2 |

(Continues)

TABLE 5 (Continued)

| | All countries N = 352 | |
|---|---|---|
| | Number | Percentage |
| Provider has ever not been able to perform services due to lack of MVA instruments | | |
| Yes | 35 | 10 |
| No | 317 | 90 |
| Outcome for clients when the provider was unable to perform MVA due to lack of instruments[a] | | |
| Provider used MA instead of MVA | 9 | 26 |
| Client was turned away without referral | 1 | 3 |
| Client was referred elsewhere | 21 | 60 |
| Other[i] | 12 | 34 |

*Note*: Some items' percentages may sum to more than 100% due to rounding.

Abbreviation: MA, medical abortion.

[a]Multiple responses allowed. Percentages may sum to more than 100%.

[b]Other includes facility cleaning staff, hospital attendants, and lady health visitor (Pakistan).

[c]Other includes delays in cleaning instruments, deterioration and breakage of parts other than melting, changing of shape and color if soaked in chlorine more than 20 minutes, and lack of a job aid for processing.

[d]Most Ethiopian and some Nigerian providers said that no one was involved in the decision-making because the manual vacuum aspiration (MVA) device is used until damaged or it stops functioning. In Mozambique, providers identified colleagues who were the head of their sector or unit in the facility (e.g. nurse in charge or person in charge of maternity sector).

[e]Providers reported determining replacement was needed based on when the instruments stopped being functional, and one said replacement happens after 10 uses.

[f]Providers reported loss of functionality in general as a trigger to aspirator replacement. A few providers had not experienced a need to replace an aspirator yet.

[g]Providers reported either not having experienced a need to replace cannulae or loss of functionality in general as a trigger to replace. One provider mentioned the cannulae changing color, and another reported a rough tip causing loss of function as triggers for replacement.

[h]Providers in Bolivia reported not being able to replace due to insufficient active and reserve stock, delivery delays, and no purchase for a new instrument being made. In the Democratic Republic of the Congo, a provider reported that there was no pharmacy that sold the instruments. In Nigeria, a provider reported that the hospital was located far from the main town where instruments were sold.

[i]Other includes telling the client to come back at a later time and, in Bolivia, using sharp curettage.

after reassembling reused MVA parts could be useful. Including nonprovider and support staff in initial trainings, such as reprocessing instruments, is performed in some Ipas countries and could be further expanded. Training or on-the-job training could be formally scheduled, including Ipas videos available in multiple languages or displaying the wall chart job aid.

Our findings suggest that providers reuse instruments more frequently when replacement is difficult. This was noted more explicitly by key informants than providers, suggesting that supply chain issues are likely resolved by other clinic personnel. Providers did note that they thought MVA instruments could only be purchased as kits rather than individual parts, pointing to a need for strengthening partnerships and building awareness and availability of alternative purchasing options where appropriate. The Ipas MVA is currently distributed through the United Nations Population Fund catalogue and Inter-Agency Emergency Health Kits, nonprofits and social sector distributors, the public sector, and the private sector, highlighting the most appropriate for each individual setting could support timely replacement to ensure that stock is available when needed.

This study has potential limitations. Due to our sampling approach, results are most representative of Ipas- and DKT-affiliated providers. The types of providers are largely representative of those legally permitted to provide abortions in their country and of Ipas trainees. We did not sample for representativeness at the sector level or by facility but at the provider level. Our data skew towards the public sector and did not distinguish between providers who hold administrative or organizational roles in their facilities and those who solely provide MVA procedures. All data were self-reported and may be affected by recall or social desirability bias, and where no tracking system was consulted relies on provider estimates. Questions where a majority of providers answered "Do not know" indicate that we may not have contacted those engaged in those actions. Analysis by country rather than by region or facility level means that we may have missed differences within countries and among larger and smaller facilities. Data from the qualitative interviews is not representative and will be affected by the decisions by the Ipas teams on which stakeholders to include in the interviews.

As a pilot study in a new area, a lack of existing data means that our discussion relied heavily on in-country staff expertise and reports rather than peer-reviewed studies. As work continues and more data are published, study results may require additional contextualization.

Future research could include investigations of functionality, efficacy, and quality of patient experience as MVA reuse beyond 25 uses. This research may not be feasible due to cost and an uncertain impact; providers are already reusing instruments more frequently than suggested by the current guidelines. A more instructive approach could include field research documenting actual reprocessing practices and outcomes. Future research could investigate the relationship between vacuum strength, instrument reuse, and quality of patient experience, and whether and how vacuum strength affects this experience if multiple suctions are needed due to a weaker vacuum. Focusing on providers' explicit concerns, increasing training, and providing materials for those who clean and process MVA equipment may be most beneficial. This seems like the


**FIGURE 2** Supply chain issues experienced by providers while replacing manual vacuum aspiration (MVA) instruments. *Other includes providers reporting that they depend on nongovernmental organization, such as Ipas or DKT, for their MVA supply. Also includes supply shortages, shipping delays, and limited/no market availability.

most accessible focus for future efforts to ensure that providers have all of the tools they need to support women, and MVA reuse is not in and of itself a barrier to women's choice.

## AUTHOR CONTRIBUTIONS

E.E. and S.D. conceived of and designed the study. E.E. led the study implementation and wrote the initial draft manuscript. S.D. conducted the data analysis, led interpretation of the data, and drafted sections of the manuscript. M.P. led the global data acquisition. T.O. made substantial contributions to the acquisition of data and interpretation of results. B.P. and N.P. made substantial contributions to the design, analysis, and interpretation of results. S.A., H.A., I.B., S.G., B.M.C., L.M., J.C.M., A.O., and M.S. implemented to study in the respective countries, and all authors gave input and critically revised the manuscript for intellectual content.

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## CONFLICT OF INTEREST STATEMENT

T.O. is employed by DKT International, which commercializes the Ipas MVA worldwide. The author receives no financial remuneration related to the outcomes of this study.

## DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available from the corresponding author upon reasonable request.

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