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Post-abortion contraceptive use among women purchasing medication abortion from pharmacies vs. clinics: Evidence from Cambodia and Ghana☆,☆☆

Erin Pearson [a,*], Jamie Menzel [a], Bunsoth Mao [b], Caesar Agula [c], Samuel Antobam [c], Elisabeth Eckersberger [d], Ayaga Bawah [c], Vonthanak Saphonn [b], Nathalie Kapp [e]

[a] Center on Gender Equity and Health, Department of Medicine, University of California, San Diego, La Jolla, CA, United States
[b] Medical College, University of Health Sciences, Phnom Penh, Cambodia
[c] Regional Institute for Population Studies, University of Ghana, Accra, Ghana
[d] Technical Excellence Team, Ipas, Chapel Hill, NC, United States
[e] International Planned Parenthood Federation, London, United Kingdom

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ABSTRACT

Objective: To understand differences in post-abortion contraceptive use between women accessing medication abortion (MA) in pharmacies compared to clinics.
Study design: We conducted secondary analysis of data from two non-randomized non-inferiority trials that compared MA outcomes for pharmacy and clinic clients in Cambodia (2018–2019) and Ghana (2019–2021). A total of 3791 MA clients (clinic: n = 1966, pharmacy: n = 1825) were recruited from 60 urban sites (24 clinics, 36 pharmacies). We used Poisson models to assess differences in post-abortion contraceptive use between pharmacy and clinic clients and mediation analyses to explore the mechanisms through which MA purchase location influences post-abortion contraceptive outcomes.
Results: Contraceptive use 30 days post-abortion was reported by approximately half of clinic clients (Cambodia: 51.9%; Ghana 41.3%) and somewhat fewer pharmacy clients (Cambodia: 43.0%; Ghana: 27.0%), but this difference was not statistically significant (Cambodia: adjusted risk difference [aRD] = −6.6%; 95% CI: −16.4% to 3.3%; Ghana: aRD = −10.1%; 95% CI: −23.4% to 3.2%). Though overall post-abortion contraceptive use was comparable, pharmacy clients used less effective contraceptive methods than clinic clients. Offer of contraceptive information and methods at the point of MA purchase were significantly higher in clinics, and mediation analyses demonstrated that this explained differences in post-abortion contraceptive outcomes between pharmacy and clinic clients.
Conclusions: Use of more effective post-abortion contraceptive methods may be facilitated by offering contraceptive information and methods in pharmacies at the point of MA purchase, but further research and monitoring is required to ensure that these interventions are client-centered and not coercive.
Implications: Greater access to contraceptive information and methods in pharmacies at the point of MA purchase may facilitate use of effective post-abortion contraceptive methods for those self-managing their abortions via pharmacy purchase of MA.

1. Introduction

Fertility can return within three weeks of medication abortion (MA) [1], and offer of post-abortion contraceptive counseling and methods at the time of the abortion has been identified as a family planning high-impact practice to prevent unwanted pregnancy [2]. Two recent systematic reviews have shown that integration of contraceptive services in clinic-based abortion care increases post-abortion contraceptive use [3,4]. One study of post-abortion contraceptive use across 10 low- and middle-income countries found

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* Corresponding author.
E-mail address: eepearson@health.ucsd.edu (E. Pearson).

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that over 75% of abortion clients chose a method when it was offered at the clinic as part of their abortion care [5]. However, less is known about post-abortion contraceptive use among those self-managing their abortions with MA purchased from pharmacies [6].

Abortion is legal on request in Cambodia and for a wide range of legal grounds in Ghana [7], and induced abortion is available in the public and private sectors, including the combined MA regimen of mifepristone and misoprostol. MA is available in pharmacies in both countries without a prescription, typically at a lower cost compared to clinics [8]. The cost of contraception is under $2 for commonly used methods such as oral contraceptive pills and injectables in both countries [9,10], and contraceptive costs are comparable between clinics and pharmacies in Cambodia [9].

This study examined differences in post-abortion contraceptive use between MA users who accessed the pills from pharmacies compared to clinics across urban settings in Ghana and Cambodia. We also explored mechanisms explaining differences in post-abortion contraceptive use by MA purchase location (pharmacy or clinic).

2. Materials and methods

This study conducted a secondary analysis of data from two observational, non-randomized non-inferiority trials conducted in Cambodia and Ghana in 2018–2021, which assessed whether MA outcomes (no additional treatment to complete the abortion and complications) were non-inferior for MA users obtaining MA from pharmacies compared to those obtaining MA from clinics (clinicaltrials.gov ID: NCT03727308). The main trials found comparable MA outcomes among pharmacy and clinic clients; results are published elsewhere [11,12].

2.1. Data collection

In both countries, abortion clinics with the highest volume of MA clients were identified in urban areas based on clinic caseload data, including 15 clinics from four regions in Ghana (Greater Accra, Western, Ashanti, and Eastern) and nine clinics from three provinces in Cambodia (Phnom Penh, Siem Reap, and Preah Sihanouk). Pharmacies with a high volume of MA sales (combipack of mifepristone and misoprostol) were then identified near selected clinics; the study included 24 pharmacies in Ghana and 12 pharmacies in Cambodia. Trained female research assistants (RAs) were posted in selected clinics and pharmacies, and clinic and pharmacy staff referred MA clients to the RA to learn about the study after they purchased MA. Eligibility criteria included being at least 16 years of age in Ghana and 15 in Cambodia, residing in the country of recruitment, obtaining MA combipack (confirmed by observing the MA package purchased) for their personal use, and self-reporting a gestational duration of less than nine weeks, the recommended maximum gestational duration for home administration of MA at the time the study was conducted. Exclusion criteria were contraindications to MA, which were assessed by the RA. The RA did not provide counseling on MA or contraception, but if the RA identified contraindications to MA, they notified the client and referred them to a nearby clinic. Those who agreed to participate in the study provided written informed consent and completed four surveys. A brief baseline survey to capture socio-demographic characteristics was completed in-person in a private location at the recruitment site (typically a private room within the clinic or pharmacy, just after obtaining MA), and three follow-up surveys were completed via phone after prompting the participant to confirm she had privacy (three days after purchasing MA to establish abortion initiation and the date of mifepristone administration and 10 and 30 days after taking mifepristone). Additional details about data collection can be found in the main trial papers [11,12].

2.2. Measures

The primary outcome of the present study was post-abortion contraceptive use 30 days after initiating the abortion by taking mifepristone. The outcome was assessed on the 30-day follow-up survey by asking, “Are you currently using a contraceptive method?”. Any type of method reported was considered post-abortion contraceptive use, including traditional methods (e.g., withdrawal) and fertility awareness methods (e.g., rhythm method).

Secondary outcomes included type of post-abortion contraception and reason for contraceptive non-use, both ascertained on the 30-day follow-up survey. Type of post-abortion contraceptive method was analyzed in four categories: (1) traditional methods (withdrawal, herbal or other medication), (2) fertility awareness-based methods (lactational amenorrhea [LAM], rhythm, calendar), (3) short-term methods (STM) (injectable, oral contraceptive pill, condom, emergency contraception [EC], diaphragm), and (4) long-acting or permanent methods (LAPM) (intrauterine device [IUD], implant, sterilization). Reason for contraceptive non-use was assessed among those who reported no current contraceptive use on the 30-day follow-up survey. The outcome was analyzed in four categories: no need for contraception (reported no need, wanted to get pregnant, or infrequent sex), contraceptive method-related reasons (reported disliking/not wanting to use contraception or side effects), contraceptive access or decision-making reasons (reported inability to get desired method, needing more time/information to decide, or wanting to involve their partner), and abortion-related reasons (reported waiting for their period to return or until the abortion was complete).

The study also assessed contraceptive use at the time of pregnancy and contraceptive services offered at the point of MA purchase on the 30-day follow-up survey. To assess contraceptive services offered, participants were asked “Were you offered information about contraception when you got the medical abortion pills?” and “Were you offered any contraceptive methods when you got the medical abortion pills?”. Participants who reported being offered contraceptive methods were asked which method(s) they were offered. Type of post-abortion contraception offered was analyzed in three categories: (1) STM only, (2) LAPM only, and (3) both STM and LAPM (offered at least one STM and LAPM as categorized above). Socio-demographic characteristics were measured on the baseline survey using standard Demographic and Health Survey (DHS) questions [13,14].

2.3. Data analysis

To assess differences in post-abortion contraceptive use between pharmacy and clinic clients, we calculated crude and adjusted risk differences using Poisson generalized estimating equation (GEE) models with identity link and cluster robust variance estimation to account for site-level clustering. For the secondary outcomes, which were categorical, we calculated crude and adjusted risk differences based on average marginal effects from multinomial logit models using cluster robust variance estimation to account for clustering at the site level. As the trials were non-randomized, adjusted models included socio-demographic covariates that were significantly different between MA purchase locations ($p < 0.05$) in each country (Cambodia: age, education, gravidity; Ghana: gravidity). Sankey diagrams were used to visualize changes in the type of contraception used at the time of pregnancy and 30 days post-abortion by MA purchase location (pharmacy or clinic) and country.

We conducted a mediation analysis using the approach described by Buis [15] to explore the mechanism through which MA purchase location influences post-abortion contraceptive outcomes. The two

Table 1
Sociodemographic characteristics and reproductive history of medication abortion (MA) users in Cambodia and Ghana (2018–2021) by MA purchase location (n = 3791)

	Cambodia (n = 1835)					Ghana (n = 1956)				
	Pharmacy (n = 909)		Clinic (n = 926)		p-value[a]	Pharmacy (n = 916)		Clinic (n = 1040)		p-value[a]
	n	(%)	n	(%)		n	(%)	n	(%)	
Age										
Mean (SD)	*30.2*	*(6.14)*	*28.3*	*(5.70)*	< 0.001	*26.4*	*(5.78)*	*25.7*	*(5.56)*	0.143
15–24 y	184	(20.2)	276	(29.8)	0.002	396	(43.2)	507	(48.8)	0.069
25–49 y	725	(79.8)	650	(70.2)		520	(56.8)	533	(51.2)	
Missing	0	(0)	0	(0)		0	(0)	0	(0)	
Education					0.029					0.888
None/some primary	290	(31.9)	119	(12.9)		17	(1.9)	14	(1.4)	
Completed primary	445	(49.0)	356	(38.4)		295	(32.2)	202	(19.4)	
Completed secondary or higher	173	(19.0)	451	(48.7)		603	(65.8)	824	(79.2)	
Missing	1	(0.1)	0	(0)		1	(0.1)	0	(0)	
Marital Status					0.957					0.743
Not currently married	135	(14.9)	144	(15.6)		745	(81.3)	861	(82.8)	
Currently married	772	(84.9)	780	(84.2)		170	(18.6)	179	(17.2)	
Missing	2	(0.2)	2	(0.2)		1	(0.1)	0	(0)	
Residence					0.130					0.893
City/Town	843	(92.7)	882	(95.3)		874	(95.4)	1006	(96.7)	
Countryside	66	(7.3)	44	(4.7)		42	(4.6)	34	(3.3)	
Missing	0	(0)	0	(0)		0	(0)	0	(0)	
Employment					0.092					0.275
Currently working	697	(76.7)	740	(79.9)		650	(71.0)	674	(64.8)	
Not currently working	212	(23.3)	186	(20.1)		266	(29.0)	366	(35.2)	
Missing	0	(0)	0	(0)		0	(0)	0	(0)	
Parity										
Mean (SD)	*1.6*	*(1.20)*	*1.2*	*(1.16)*	0.456	*1.0*	*(1.30)*	*0.7*	*(1.20)*	0.741
0	191	(21.0)	329	(35.5)	0.918	460	(50.2)	675	(64.9)	0.446
1–2	537	(59.1)	453	(48.9)		330	(36.0)	255	(24.5)	
3+	181	(19.9)	144	(15.6)		125	(13.7)	110	(11)	
Missing	0	(0)	0	(0)		1	(0.1)	0	(0)	
Gravidity										
Mean (SD)	*2.5*	*(1.89)*	*1.6*	*(1.53)*	0.014	*1.6*	*(1.66)*	*1.1*	*(1.49)*	0.064
0	137	(15.0)	272	(29.4)	0.021	312	(34.1)	525	(50.5)	0.020
1–2	385	(42.4)	429	(46.3)		382	(41.7)	358	(34.4)	
3+	385	(42.4)	224	(24.2)		221	(24.1)	157	(15.1)	
Missing	2	(0.2)	1	(0.1)		1	(0.1)	0	(0)	

[a] p-values based on bivariate regression models accounting for site-level clustering.

intervening variables of interest were offer of information on contraception and offer of contraceptive methods at the point of MA purchase. We decomposed the effect of MA purchase location (pharmacy or clinic) on three post-abortion contraceptive outcomes: (1) use of any contraceptive method, (2) STM use, and (3) LAPM use 30 days post-abortion. All mediation models used bootstrap standard errors and adjusted for the same set of covariates listed above. All analyses were conducted using Stata/SE version 17.0 (Stata Corp), and statistical significance was assessed at $p < 0.05$.

3. Results

A total of 3791 MA users were included in the analysis, including 1835 from Cambodia (909 purchasing MA from pharmacies and 926 purchasing MA from clinics) and 1956 from Ghana (916 purchasing MA from pharmacies and 1040 purchasing MA from clinics). The analytic sample was based on the sample for the main outcome papers [11,12] and additionally excluded 14 participants not reporting post-abortion contraceptive outcomes (12 from Cambodia, two from Ghana). Most MA users were aged 25 or older, but there was a larger proportion of women under age 25 in Ghana (Table 1). Most MA users had completed secondary or higher education, but pharmacy clients in both countries had less education than clinic clients. Most were living in urban areas and were currently working. In Cambodia, most had 1–2 children, while in Ghana most had no children. A similar pattern emerged for gravidity, but in both countries, pharmacy clients had higher gravidity compared to clinic clients.

3.1. Post-abortion contraceptive outcomes by MA purchase location

In Cambodia, approximately half (51.9%) of clinic clients reported post-abortion contraceptive use compared to 43.0% among pharmacy clients (adjusted risk difference [aRD]: −6.6%; 95% CI: −16.4% to 3.3%) (Table 2). A similar pattern was observed in Ghana; 41.3% of clinic clients reported post-abortion contraceptive use compared to only 27.0% among pharmacy clients (aRD: −10.1%; 95% CI: −23.4% to 3.2%). Though post-abortion contraceptive use was lower among pharmacy compared to clinic clients in both countries, the differences were not statistically significant.

Significant differences were observed in the type of post-abortion contraception used by MA purchase location (Table 2). Most post-MA contraceptive users in both countries were using STMs at 30 days post-abortion, primarily oral contraceptive pills in Cambodia (58.5%) and injectables in Ghana (37.3%) (data not shown). However, in Cambodia, pharmacy clients were significantly more likely to be using a traditional method (24.0% in pharmacies vs. 3.1% in clinics; aRD: 18.2%; 95% CI: 9.0% to 27.5%) and less likely to be using a STM (70.8% in pharmacies vs. 88.0% in clinics; aRD: −16.4%; 95% CI: −25.8% to −7.0%). In Ghana, pharmacy clients were significantly more likely to be using a STM (86.3% in pharmacies vs. 76.0% in clinics; aRD: 16.3%; 95% CI: 7.3% to 25.3%) and less likely to be using a LAPM (2.8% in pharmacies vs. 21.9% in clinics; aRD: −21.3%; 95% CI: −30.3% to −12.3%).

There were also differences in reasons for non-use by MA purchase location, and this varied by country (Table 2). In Cambodia, pharmacy clients were significantly more likely to report non-use for abortion-related reasons (33.0% in pharmacies vs. 13.5% in clinics;

Table 2
Crude and adjusted risk differences for post-abortion contraceptive outcomes of medication abortion (MA) users in Cambodia and Ghana (2018–2021) by MA purchase location (n = 3791)

	Cambodia (n = 1835)						Ghana (n = 1956)					
	Pharmacy (n = 909)		Clinic (n = 926)		Crude risk difference (95% CI)	Adjusted risk difference[a] (95% CI)	Pharmacy (n = 916)		Clinic (n = 1040)		Crude risk difference (95% CI)	Adjusted risk difference[b] (95% CI)
	n	(%)	n	(%)			n	(%)	n	(%)		
Using contraception 30 d post-abortion	391	(43.0)	481	(51.9)	−7.5% (−18.9% to 3.9%)	−6.6% (−16.4% to 3.3%)	247	(27.0)	429	(41.3)	−7.5% (−21.1% to 6.2%)	−10.1% (−23.4% to 3.2%)
Type of post-abortion contraception												
Traditional method (withdrawal, herbal and other medicines)	94	(24.0)	15	(3.1)	18.4% (8.7% to 28.1%)	18.2% (9.0% to 27.5%)	9	(3.6)	3	(0.7)	–	–
Fertility awareness-based method (LAM, rhythm, calendar)	1	(0.3)	0	(0)	–	–	18	(7.3)	6	(1.4)	4.4% (−0.5% to 9.3%)	5.0% (−0.4% to 10.5%)
Short-term method (injectable, pill, condom, EC, diaphragm)	277	(70.8)	423	(88.0)	−16.6% (−26.4% to −6.9%)	−16.4% (−25.8% to −7.0%)	213	(86.3)	326	(76.0)	17.0% (7.8% to 26.2%)	16.3% (7.3% to 25.3%)
Long-acting or permanent method (IUD, implant, sterilization)	19	(4.9)	41	(8.5)	−1.8% (−6.7% to 3.1%)	−1.8% (−7.0% to 3.3%)	7	(2.8)	94	(21.9)	−21.4% (−30.4% to −12.3%)	−21.3% (−30.3% to −12.3%)
Missing	0	(0)	2	(0.4)	–	–	0	(0)	0	(0)	–	–
Reason for contraceptive non-use 30 d post-abortion												
No need for contraception	85	(16.4)	64	(14.4)	6.1% (−3.0% to 15.3%)	10.0% (−0.1% to 21.0%)	173	(25.9)	154	(25.2)	3.3% (−2.3% to 8.8%)	6.1% (−0.02% to 12.2%)
Contraceptive method-related reasons	167	(32.2)	178	(40.0)	−15.2% (−33.3% to 2.9%)	−16.1% (−35.4% to 3.1%)	234	(35.0)	140	(22.9)	7.2% (1.8% to 12.6%)	7.2% (1.4% to 13.1%)
Contraceptive access or decision-making reasons	88	(17.0)	140	(31.4)	−7.2% (−17.1% to 2.8%)	−6.7% (−16.5% to 3.0%)	155	(23.2)	210	(34.4)	−8.5% (−15.0% to −2.0%)	−10.0% (−17.5% to −2.6%)
Abortion-related reasons	171	(33.0)	60	(13.5)	16.3% (6.3% to 26.2%)	12.8% (3.3% to 22.4%)	103	(15.4)	91	(14.9)	−2.0% (−5.1% to 1.2%)	−3.3% (−6.7% to 0.05%)
Missing	7	(1.4)	3	(0.7)	–	–	4	(0.6)	16	(2.6)	–	–

EC, emergency contraception; IUD, intrauterine device; LAM, lactational amenorrhea.
Crude percentages are reported.
[a] Adjusted for age, education, and gravidity.
[b] Adjusted for gravidity.

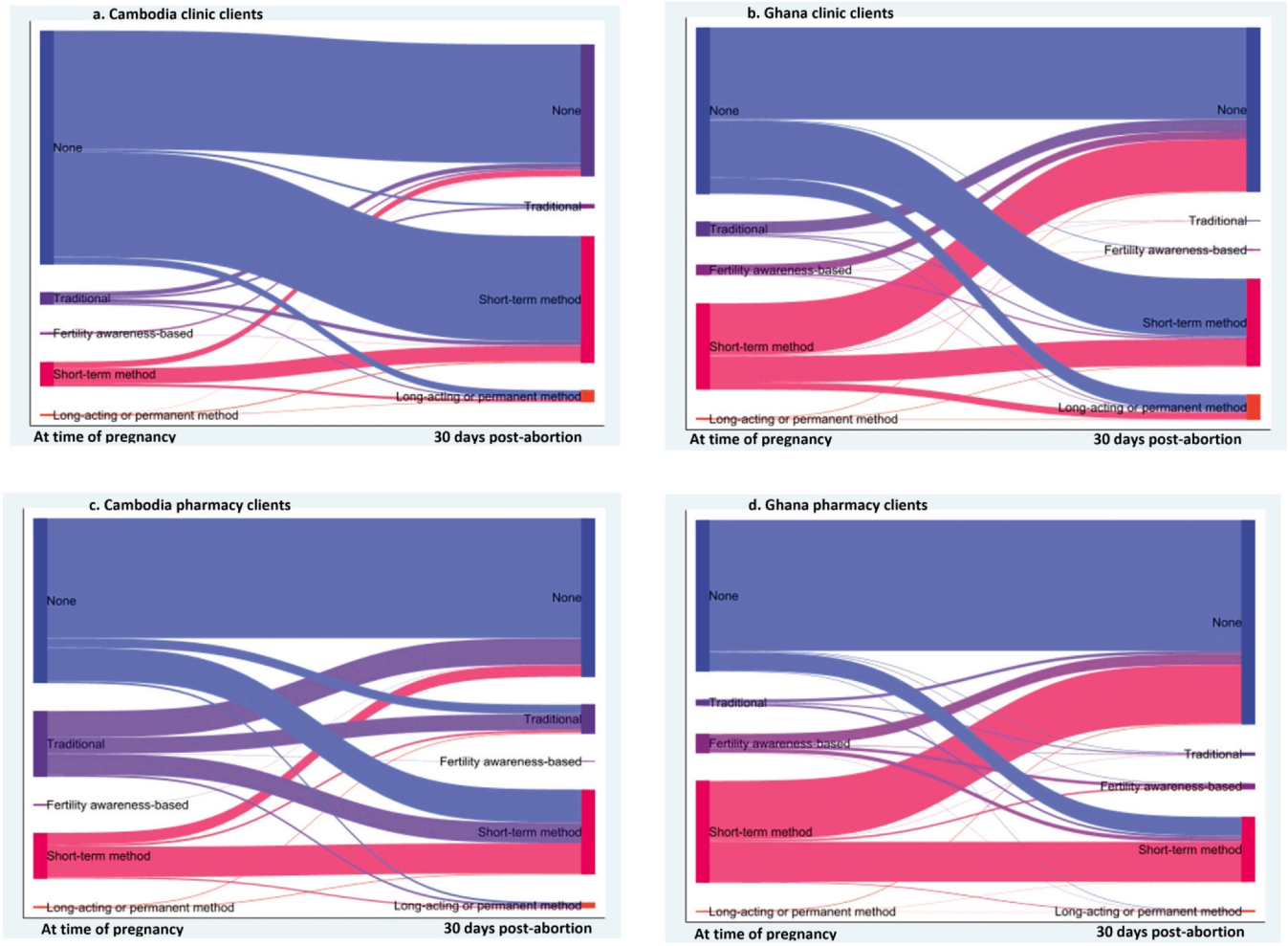

Fig. 1. Sankey diagrams of change in contraceptive use pre- and post-abortion among medication abortion (MA) users in Cambodia and Ghana (2018–2021) by MA purchase location. Footnote: Crude percentages are reported.

aRD: 12.8%; 95% CI: 3.3% to 22.4%). In Ghana, pharmacy clients were significantly more likely to report non-use for contraceptive method-related reasons such as side effects (35.0% in pharmacies vs. 22.9% in clinics; aRD: 7.2%; 95% CI: 1.4% to 13.1%) and less likely to report non-use for access or decision-making reasons (23.2% in pharmacies vs. 34.4% in clinics; aRD: −10.0%; 95% CI: −17.5% to −2.6%).

3.2. Changes in contraceptive use pre- and post-abortion by MA purchase location

Contraceptive use increased pre- to post-abortion primarily among clinic clients in Cambodia (+37% points [pp]). Modest increases were observed among pharmacy clients in Cambodia (+2 pp) and clinic clients in Ghana (+0.6 pp), and a decrease was observed among pharmacy clients in Ghana (−19 pp). Sankey diagrams demonstrate that clinic clients in Cambodia transitioned from non-use pre-abortion primarily to STM use and to a lesser extent LAPM use post-abortion (Fig. 1a). There was a similar pattern among clinic clients in Ghana, but the overall proportion of non-users was similar pre- and post-abortion because many STM users pre-abortion transitioned to non-use post-abortion (Fig. 1b). Among pharmacy clients in Cambodia, STM use increased, but non-use remained approximately the same because many traditional and STM users pre-abortion transitioned to non-use (Fig. 1c). Among pharmacy clients in Ghana, non-use increased post-abortion because a large proportion of STM users pre-abortion transitioned to non-use (Fig. 1d).

3.3. Mechanisms through which MA purchase location influences post-abortion contraceptive outcomes

The vast majority of clinic clients in both Cambodia and Ghana (> 90%) received information on contraception during their initial visit to receive MA, compared to only 31.1% of pharmacy clients in Cambodia and 6.5% of pharmacy clients in Ghana (Table 3). Similarly, most clinic clients were offered contraceptive methods (Cambodia: 74.6%; Ghana: 82.0%), while few pharmacy clients were offered methods (Cambodia: 18.4%; Ghana: 4.7%). Among those who were offered methods, most were offered both STMs and LAPMs in pharmacies and clinics.

Mediation analyses demonstrated that both offer of information and offer of contraceptive methods at the point of MA purchase mediated the effect of MA purchase location on post-abortion contraceptive outcomes. The adjusted odds ratios for the indirect effects were between 1.6–3.2 for offer of contraceptive information and between 1.5–3.7 for offer of contraceptive methods, indicating that pharmacy clients would have had a higher odds of post-abortion contraceptive use if they had been offered contraception information and methods at the same rate as clinic clients (Table A.1). The intervening variables (offer of contraceptive information and offer of contraceptive methods) fully mediated the relationship between MA

Table 3
Contraceptive services offered to medication abortion (MA) users in Cambodia and Ghana (2018–2021) by MA purchase location ($n = 3791$)

	Cambodia ($n = 1835$)					Ghana ($n = 1956$)				
	Pharmacy ($n = 909$)		Clinic ($n = 926$)		p-value*	Pharmacy ($n = 916$)		Clinic ($n = 1040$)		p-value*
	n	(%)	n	(%)		n	(%)	n	(%)	
Offered information on contraception										
Yes	283	(31.1)	883	(95.4)	< 0.001	60	(6.5)	956	(91.9)	< 0.001
No	621	(68.3)	41	(4.4)		849	(92.7)	83	(8.0)	
Missing	5	(0.6)	2	(0.2)		7	(0.8)	1	(0.1)	
Offered contraceptive methods					0.136					< 0.001
Yes	167	(18.4)	691	(74.6)		43	(4.7)	853	(82.0)	
No	738	(81.2)	231	(25.0)		865	(94.4)	184	(17.7)	
Missing	4	(0.4)	4	(0.4)		8	(0.9)	3	(0.3)	
Post-abortion contraceptive methods offered					< 0.001					< 0.001
Short-term methods only (injectable, pill, condom, EC, diaphragm)	13	(7.8)	110	(15.9)		0	(0)	70	(8.2)	
Long-acting or permanent methods only (IUD, implant, sterilization)	0	(0)	8	(1.2)		2	(4.6)	23	(2.7)	
Both short-term and long-acting and permanent methods	154	(92.2)	569	(82.3)		41	(95.4)	755	(88.5)	
Missing	0	(0)	4	(0.6)		0	(0)	5	(0.6)	

IUD, intrauterine device.
Crude percentages are reported.
*p-values based on bivariate regression models accounting for site-level clustering.

purchase location and post-abortion contraceptive outcomes in most of the mediation models. A notable exception was that in Ghana, there was a significant direct effect of MA purchase location on LAPM use; clinic clients would still have had a higher odds of LAPM use compared to pharmacy clients holding offer of contraceptive information and methods constant at the level of clinic clients. This finding suggests that there is another unmeasured mechanism explaining the relationship in addition to the mechanisms explored here.

4. Discussion

Overall, this study found that post-abortion contraceptive use was comparable between clinic and pharmacy clients, but pharmacy clients used less effective contraceptive methods. Mediation analyses suggested that use of more effective methods would have been higher among pharmacy clients if they had been offered information and methods at the same rate as clinic clients.

In line with existing literature, we found comparable post-abortion contraceptive use between those accessing MA from pharmacies and clinics [16]. However, overall use of post-abortion contraception was lower in this study compared to others [5,16–18], which may reflect that the cost of contraception was not included in the MA service in some of the clinic recruitment sites. We also found that pharmacy clients used less effective contraceptive methods than clinic clients. This study does not clarify whether post-abortion contraceptive use was in alignment with contraceptive use preferences; it may be that pharmacy clients reveal true post-abortion contraceptive preferences among MA users and the higher rates of modern method use among clinic clients reflect pressure or coercion from clinic-based providers, which has been documented in other settings [19,20]. Mediation analyses demonstrated that with comparable levels of offering contraceptive information and methods, pharmacy clients would have had higher rates of post-abortion contraceptive use, but whether that use would be pressured or coerced is unknown.

Previous studies have demonstrated higher levels of contraceptive use post-abortion compared to pre-abortion [17,21,22], and this study found that by 30 days post-abortion, increases were concentrated among clinic clients in Cambodia who shifted from non-use pre-abortion to use of STMs and LAPMs post-abortion. Sankey diagrams demonstrated that the overall proportions of users pre- and post-abortion masked movement between groups, and among Ghana clinic clients and Cambodia pharmacy clients, nearly equal numbers of non-users became users and users became non-users between the two timepoints.

This study also found that in Cambodia, abortion-related reasons for contraceptive non-use were more common among pharmacy clients compared to clinic clients. A study in India found that MA users who self-assessed abortion completion delayed contraceptive initiation until after menstruation returned, while those who had an in-clinic assessment of abortion completion had no delay [23]. This suggests that uncertainty about abortion completion may contribute to delayed contraceptive initiation for MA users, which is supported by our findings. Other studies have documented delayed initiation of contraception for MA clients [17,18], and it may be that women receiving MA in pharmacies are further delayed in initiating contraception because they are not counseled on methods that can be initiated immediately or on fertility return prior to menstruation [1,24]. In Ghana, non-use among pharmacy clients was primarily for contraceptive method-related reasons, which suggests counseling could have been beneficial.

Limitations of this study include a lack of generalizability as selected study sites were primarily in urban areas and dispensed high volumes of MA. In addition, MA clients were eligible only if they met MA eligibility criteria, which excluded some MA users such as those beyond nine weeks gestation. Contraceptive outcomes were self-reported, and may have been affected by social desirability bias. No data on quality of contraceptive counseling was collected, and we are unable to differentiate between the quality of contraceptive information provided in pharmacies compared to clinics. In addition, no site-level data on contraceptive method availability was collected, and it is unclear whether the methods offered were available at the site or via a referral. Finally, no data on desire for post-abortion contraception was collected, and it is unclear whether use of contraception was desired or pressured by the MA provider or pharmacist.

This study demonstrates that in two disparate settings, Cambodia and Ghana, post-abortion contraceptive use was comparable between clinic and pharmacy clients, but that pharmacy clients used less effective methods. Offering contraceptive information and methods in pharmacies at the point of MA purchase may facilitate access to more effective methods, but further research and

monitoring is required to ensure that interventions seeking to improve pharmacy provision of post-abortion contraception are not coercive.

Ethical approvals

All study participants provided written informed consent. This study was approved by the following ethical review committees: National Ethics Committee for Health Research in Cambodia (#296NECHR), University of Ghana (ECH 034/19-20), Ghana Health Service Ethics Review Committee (012/07/19), and Marie Stopes International Ethics Review Committee (025-19).

CRediT authorship contribution statement

Ayaga Bawah: Writing – review & editing, Supervision, Investigation, Conceptualization. **Vonthanak Saphonn:** Writing – review & editing, Supervision, Investigation, Conceptualization. **Samuel Antobam:** Writing – review & editing, Supervision, Methodology, Investigation. **Elisabeth Eckersberger:** Writing – review & editing, Supervision, Project administration, Investigation. **Erin Pearson:** Writing – review & editing, Writing – original draft, Supervision, Methodology, Investigation, Formal analysis, Conceptualization. **Nathalie Kapp:** Writing – review & editing, Supervision, Project administration, Methodology, Investigation, Conceptualization. **Jamie Menzel:** Writing – review & editing, Validation, Formal analysis, Data curation. **Bunsoth Mao:** Writing – review & editing, Supervision, Project administration, Methodology, Investigation. **Caesar Agula:** Writing – review & editing, Validation, Supervision, Project administration, Methodology, Investigation, Data curation.

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Appendix A. Supporting material

Supplementary data associated with this article can be found in the online version at doi:10.1016/j.contraception.2025.111243.

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