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Who pays more? Exploring cost disparities in medication abortion access across socio-demographic groups in Ghana

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Abstract

Background Medication abortion (MA) may be accessed covertly in private pharmacies and clinics due to abortion-related stigma. Stigmatization may lead to information asymmetry, resulting in price discrimination. The existing literature on abortion in Ghana has primarily focused on factors associated with abortion stigma. However, the potential variations in MA cost have not been explored. Thus, we aim to explore the potential disparities in MA cost based on women's socio-demographic status in Ghana.

Methods We used data from a study that recruited women who accessed MA using mifepristone and misoprostol combination from selected private pharmacies and clinics in Ghana. The study employed a non-inferiority and prospective design, and women were recruited as they exited the selected facilities after obtaining the MA pills. Our final analysis included 929 pharmacy clients and 1,045 clinic clients. To understand the variability in MA cost, we initially conducted two decomposition analyses using the variance and Blinder-Oaxaca techniques, followed by linear regressions to identify the socio-demographic factors that predict MA cost.

Results The average costs of MA were approximately US$ 46.00 and US$ 24.00 for the clinic and pharmacy groups, respectively. Additionally, the cost varied between pharmacy and clinic groups and within each group. A greater segment of the variation among the clinic group stemmed from between facilities (78 percent), whereas, among the pharmacies, the bigger share came from within facilities (57 percent). Regression results further indicate that the cost of MA increased among women with higher education, those who have not been in a union with a partner and those who accessed MA in clinics.

Conclusions MA cost in Ghana is largely based on providers' discretion and at the facility's management level. Additionally, the cost differs by women's socio-demographic attributes. To reduce the disparities in MA costs, developing guidelines to address the health system challenges regarding MA provision and access is important. Educational programs on MA access, provision and legal framework could also reduce abortion-related stigma and cost variations.

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Highlights

■ The cost of accessing medication abortion differs based on women's socio-demographic status.

■ Health professionals may use discretion in determining medication abortion prices due to health system challenges related to provision and access.

Keywords Socio-demographic, Price discrimination, Healthcare disparities, Medication abortion, Stigmatization

Introduction

It is estimated that six in ten unintended pregnancies result in abortion worldwide [1], highlighting the significance of abortion in women's healthcare [2]. In sub-Saharan Africa (SSA), a relatively smaller proportion (37 percent) of unintended pregnancies are terminated [1]. However, accessing safe abortion in most SSA countries remains challenging due to a combination of factors, including legal restrictions and stigma [3]. In these contexts, many women resort to self-managing abortions using medication abortion (MA) pills when available [4].

Medication abortion, particularly the combination of mifepristone and misoprostol, is safe and effective for managing pregnancies in early gestation [5, 6]. Beyond safety, MA could enhance women's autonomy over their abortion decisions and might help them navigate abortion-related stigma [5, 7]. For example, they can choose a clinic or private pharmacy to access MA and decide when and where to take the pills [7]. Additionally, be able to mitigate stigma from abortion providers and people close to them [8].

As in other SSA countries, abortion is a critical maternal health issue in Ghana, with an estimated rate of 44 abortions per 1,000 women aged 15–49 [9]. Research indicates that MA pills are increasingly used in the country [10, 11]. Although Ghana's abortion law permits abortion under conditions of rape, incest, fetal impairment and/or risk to a woman's psychological or physical health, it restricts abortion to be performed by health professionals in licensed health facilities such as hospitals and clinics (referred to as clinic) [11–13]. Despite these provisions, MA pills are accessible in some private pharmacies without prescriptions, even though pharmacies are not sanctioned to offer abortion services in Ghana [10, 11, 14, 15].

The healthcare system in Ghana faces additional challenges in MA provision, including the unavailability of MA pills in some clinics [16, 17]. To manage these challenges, some clinic-based health professionals sometimes privately procure MA pills and sell them to clients seeking MA [18]. Furthermore, elective abortions performed in both public and private clinics are not covered by Ghana's national health insurance scheme [19], increasing the financial burden of vulnerable women seeking abortion services.

Existing studies, largely from the United States and Asia, highlight cost disparities in accessing abortion, with younger women and those unmarried likely to pay more [20–23]. In SSA, limited evidence exists on how the cost of abortion differs based on women's socio-demographic characteristics. The few studies in Zambia [24] and Burkina Faso [25] indicate that poorer women based on their household wealth index tend to pay higher prices to obtain abortion services. However, these studies lack focus on MA, a method commonly used in SSA, and do not compare abortion costs across different service delivery points, such as clinics versus pharmacies.

Notably, the stigma associated with abortion access in most developing countries, including Ghana, enables disparities in MA costs, as these barriers create an opportunity for price discrimination [26–29]. For example, MA providers in pharmacies and clinics can exploit women, especially those desperate and lack sufficient information on abortion cost [20]. In Ghana, weak regulatory oversight of abortion access could further enable such practices [27, 28, 30]. Providers may charge inflated prices due to information asymmetry [31]. The inelastic demand for abortion services further allows providers to charge higher prices without a significant demand reduction [32].

Considering these factors, this paper aims to explore potential disparities in the cost of accessing MA services by socio-economic status. Understanding cost disparities across socio-demographic groups is essential to promote equity, guide policy decisions, formulate strategies to reduce barriers and enhance equal access to safe abortion care. These efforts may not only help to reduce the incidence of unsafe abortion-related fatalities, but may contribute to improved public health outcomes. Moreover, they may aid in alleviating the financial burden disproportionately borne by vulnerable population groups.

Methods and materials

Study settings

This research utilized data from a project titled Medication Abortion Out of Clinic in Ghana (MOC-Ghana). The project was spearheaded by the Regional Institute for Population Studies (RIPS) and Ipas International (Ipas) with support from Marie Stopes Ghana Reproductive Choices. The overarching objective of the MOC-Ghana study was

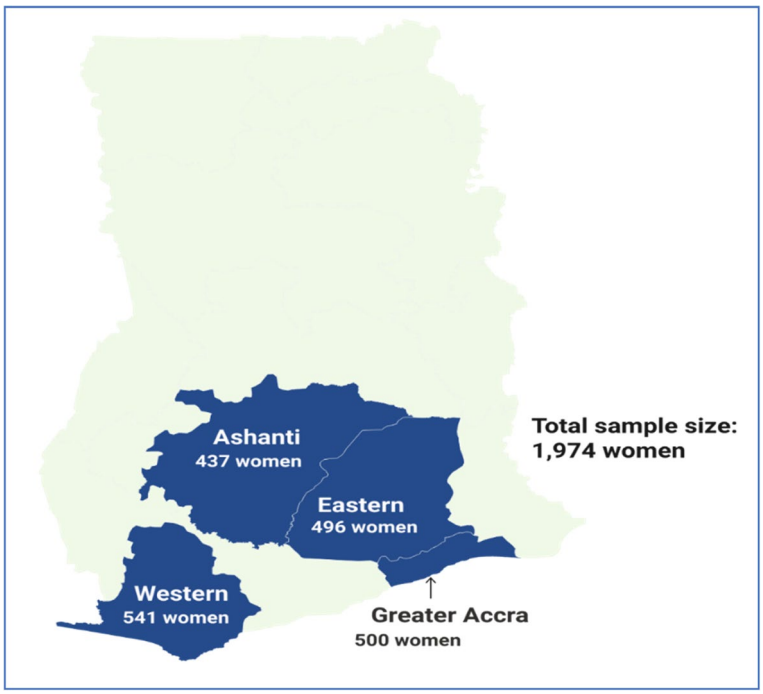

Fig. 1 A map of Ghana with study regions and the analytic sample. Source: Authors' construction (2023)

to test the null hypothesis that the clinical outcome (completed abortion) of the use of mifepristone and misoprostol combination pills (Mariprist or MM combi kit) among clients who accessed services from pharmacies is no worse than those who accessed services from clinics [14]. The project was carried out in four regions in Ghana, namely Greater Accra, Ashanti, Western (now Western North and Western) and Eastern regions (see Fig. 1). These regions were selected because they are more diversified in culture and have a high prevalence of abortion [33].

Design

The MOC-Ghana project employed a prospective and non-inferior design to recruit pharmacies and licensed clinics providing MA with mifepristone and misoprostol combination pills, specifically Mariprist and MM combi kit. Only women with pregnancies less than 9 weeks gestation were recruited after obtaining MA pills and exiting the facilities. A woman's last menstruation period was used to determine/confirm pregnancy gestation. As part of the recruitment process, the contact information of these women was collected and used to conduct phone interviews after the recruitment. Three sequential prospective surveys were conducted at 3–7 days, 10–29 days and 30–35 days after the recruitment. The first survey, 3–7 days post-recruitment, primarily aimed to confirm whether the woman had initiated the termination process by taking the MA pills and to gather information on the cost of MA. The subsequent surveys at 10–29 days and 30–35 delved into understanding the experiences of women after taking the medication.

Sample size

The MOC-Ghana study used a multi-level procedure to determine its sample size. Initially, a power calculator for a binary outcome non-inferiority design was used to calculate the sample size, resulting in 1,108 women [34]. This calculation was based on 80 percent power ($\beta = 0.2$), a one-sided confidence level of 97.5 percent ($\alpha = 0.025$) and a primary outcome (need for a repeat abortion after using MA pills) of 6 percent, based on a previous study [35]. To address potential cluster effects within facilities, the sample size was increased. An intra-cluster correlation coefficient (ρ) equal to 0.01 and cluster size (m) of 50 were used, resulting in a design effect of 1.49. Further, the design effect and a 20 percent attrition were applied to the initial sample size (1108*1.49*1.2), resulting in a total sample size of 1,981 women. However, 1,974 women (1045 from clinics and 929 from pharmacies) had complete data from all the follow-up surveys and were used for analysis.

Sampling procedure

To ensure robust design while maintaining feasibility, the MOC-Ghana employed a two-stage sampling approach to recruit facilities and participants. At the first stage, the study purposively targeted and recruited facilities that

offer MA with Mariprist/MM combi kit. To recruit facilities, the research team carried out an initial exploratory visit to the study areas to assess facilities that met certain criteria. These criteria included: 1. providing MA with Mariprist/MM combi kit, 2. having demand for MA pills, 3. not requiring a physician's prescription (especially for pharmacies) and 4. being located near another facility that allows women to choose from. For example, a clinic should have at least one nearby (about 1-km distance) pharmacy that provides similar services to give clients more options. All facilities in the study regions that met these criteria and agreed to participate in the study were recruited.

In the second stage, a total enumeration approach was used to gather data from the facilities (both clinics and pharmacies). All women with pregnancy gestations less than nine weeks who independently obtained MA from the study's facilities were recruited after giving their consent to participate in the research study. Research Assistants (RAs) with at least a first degree were trained by RIPS and assigned to the recruited pharmacies and clinics in the study areas. Women who came to obtain MA were briefly informed about MOC-Ghana by the service providers and referred to the RAs for recruitment. The RAs then provided the clients with in-depth information about the study. They also collected clients' background information such as phone number, age, and gestational age of pregnancy for follow-up phone interviews. To ensure that follow-up phone interviews were conducted for actual recruited women, an easy memorable security code was established between the RAs and respondents.

Data collection

Data for MOC-Ghana were collected between the periods December 2019 to March 2020 and July 2020 to April 2021. There was a break in data collection due to the COVID-19 pandemic. The RAs collected data through electronic questionnaires programmed in tablets, utilizing CommCare software. To ensure that data collected are reliable and accurate, questions in the instrument were adapted from well-established global tools for population and health studies such as the Demographic and Health Survey and Maternal Health Survey [33, 36]. The instrument was successfully used in a similar study conducted in Cambodia [37] and piloted in Ghana before the main data collection to ensure contextual appropriateness and accuracy. The data collected during the interview include socio-demographic characteristics of women, their previous abortion background, the cost of purchasing MA pills and the average time spent in accessing MA pills. Aside from the face-to-face recruitment of women, all follow-up interviews were conducted through phone calls. Further details on the design, sample size calculation, sampling procedure and the data collection processes are found in Kapp et al. [14].

Measures

Dependent variable

There are several material and immaterial cost components associated with accessing MA. These include the cost of MA pills, ultrasound screening, transportation, productive time lost, and social stigma. There are also varying perspectives on estimating abortion costs [38, 39]. This could be from the standpoint of the client, provider, payer, society, etc. [39]. For this study, MA cost was estimated from the client's perspective. Due to data constraints, the total MA cost (in Ghana cedi) comprised two cost components: 1. the amount paid by women for MA pills and 2. the time spent waiting at the facility to access the service (opportunity cost). During the survey, clients were asked about the cost of MA pills purchased at a specific site, and the amount (in Ghana cedi) was recorded. The average waiting time clients spent to access MA was collected, and the cost (in Ghana cedi) was estimated. The waiting time cost was estimated based on the per-capita income of Ghana for the year 2020. The year 2020 was used because over 90 percent of the interviews were conducted during that year. The amount (cedi value) a Ghanaian contributes every 1 min was calculated from the per-capita income and used to estimate the cost of waiting time for the clients in each facility. This is a standard approach for estimating healthcare costs for economic evaluations [40].

Independent variables

Based on the abortion literature in Ghana [11, 14, 15, 41], we conceptualized women's socio-demographic characteristics as the main predictors of MA cost. Specifically, the woman's age group (< =24 years and >24 years), marital status (never in union and currently/formerly in union), number of live births, level of education (no formal education, basic-primary/junior high school, secondary and tertiary/higher) and occupation (professional/managerial, service, skilled manual, unskilled manual, student and unemployed) were used as the main predictors.

In addition, we considered and controlled for other observable factors that may mediate between the main independent variables and the dependent variable or may directly affect the dependent variable. These factors include place of residence (city, town and village/rural area), study region (Ashanti, Eastern, Greater Accra and Western), clinic access (yes and no), learning about MA from a friend (yes and no), learning about MA from a

family member (yes and no), learning about MA from the internet (yes and no) and previous abortion history (yes-with medication, yes-with surgical method and no previous abortion).

Data on women's wealth index scale and religion were not collected. As such, these variables were not included in the analysis.

Analysis

First, descriptive analysis of the cost of MA was conducted for every facility. For the convenience of exposition, we present them in groups: clinic and pharmacy. Substantial differences in MA cost were observed among facilities of each group, whether clinics or pharmacies. The variance in MA cost was analyzed for each facility group, decomposing it into its within-group and between-group components, utilizing the standard ANOVA method.

Moreover, substantial difference in MA cost was observed between clinics and pharmacies. To shed light on the cost difference between accessing MA from clinic and pharmacy providers, a decomposition analysis was conducted using the Blinder-Oaxaca two-fold pooled approach [42, 43]. The Blinder-Oaxaca decomposition analysis dissects the average cost difference between clinic and pharmacy access, revealing the contributions of group differences in women's attributes, such as socio-demographic and geographic location. Additionally, it identifies the remaining cost that is unexplained by women's characteristics. See Additional file 1 for details on the theory underpinning the Blinder-Oaxaca decomposition analysis.

Finally, we employed a multivariate linear regression model to investigate the relationship between women's socio-demographic attributes and the cost of MA. The most comprehensive specification of the model is outlined below:

$$CT_{ij} = \delta+\beta_1 AG_i+\beta_2 MS_i+\beta_3 LB_i+\beta_4 ED_i+\beta_5 OC_i+\gamma_1 RE_i+\gamma_2 RG_i+\pi_1 CL_i+\varphi_1 FD_i+\varphi_2 FM_i+\varphi_3 IN_i+\varphi_4 PA_i+\alpha_j+\varepsilon_i, \quad (1)$$

where CT_{ij} – is the cost of MA pill paid by the woman i at the facility j, δ – is the constant term, AG_i – is individual's age, MS_i – is dummy for marital status, LB_i – number of live births, ED_i – set of dummies for education, OC_i – set of dummies for occupation, RE_i – set of dummies for place of residence, RG_i – set of dummies for study site, CL_i – dummy for clinic access, FD_i – dummy for learning about MA from a friend, FM_i – dummy for learning about MA from a family member, IN_i – dummy for learning about MA from the internet, PA_i – set of dummies for previous abortion methods used, α_j – facility fixed effect (set of dummies for each of the facilities), ε_i – error term.

To gain better understanding of the factors contributing to the variations in cost in each group, disaggregated regression analyses were conducted for clinic and pharmacy clients. In addition, for robustness, we run the regression only with those facilities that have substantial variations in MA cost.

Furthermore, we augmented our dataset by incorporating contextual information to investigate whether the variations in MA cost across the various facilities could be explained by local factors. The collected data includes the district in which each facility is located (11 districts identified), districts' population density (number of people per km^2), proximity of the facility to a major road (categorized as < = 100 m, 101 m-500 m, > 500 m), nature of area in which the facility is located (low-income, middle-income, or central business) and availability of nearby competitors. Bivariate linear regression analyses were conducted using coefficient of variation in MA cost estimated for each facility from the MOC-Ghana data as the outcome variable, against the context information collected.

In this study, covariates deemed statistically significant were identified based on probability values less than 5 percent. Additionally, post-estimation tests, including assessments for heteroskedasticity and multicollinearity, were conducted to ensure our estimates are reliable.

Results

Background characteristics of women

Table 1 shows descriptive statistics on women's socio-demographic, geographical location and abortion-related characteristics, overall and by type of service provider. Approximately 46 percent of the women were identified as young (< =24 years), with a greater share of these young women (56 percent) obtaining MA from clinics. The majority (69 percent) of women were never in union with a partner. Disaggregated data reveals a higher proportion (55 percent) of those who had never been in union being clinic clients. The average number of live births among the entire sample was about one, driven largely by the pharmacy group. Furthermore, almost all women had some form of formal education. Notably, a greater share (69 percent) of the higher-educated women received MA in clinical settings. About 19 percent of the women were identified as students, with 59 percent of them obtaining MA in clinics. A few of the women (4 percent) reported living in villages, and a bigger share (55 percent) of them received MA from pharmacy providers.

Table 1 Women's socio-demographic, geographic location and abortion-related attributes-total sample and by type of MA provider

Variable	Total sample (n/%)	By type of MA provider	
		Pharmacy (n/%)	Clinic (n/%)
Age category**			
< = 24 years	914 (46.3)	403 (44.1)	511 (55.9)
> 24 years	1060 (53.7)	526 (49.6)	534 (50.4)
Marital status**			
Currently/formerly in union	613 (31.1)	314 (51.2)	299 (48.8)
Never in union	1361 (68.9)	615 (45.2)	746 (54.8)
Number of live births, mean (SD)***	0.9 (2.6)	1.1 (3.5)	0.7 (1.2)
Level of education***			
No education	33 (1.7)	19 (57.6)	14 (42.4)
Basic: Primary/JHS	501 (25.4)	298 (59.5)	203 (40.5)
Secondary	737 (37.3)	392 (53.2)	345 (46.8)
Tertiary/higher	703 (35.6)	220 (31.3)	483 (68.7)
Occupation***			
Professional/managerial	359 (18.2)	135 (37.6)	224 (62.4)
Service	560 (28.3)	312 (55.7)	248 (44.3)
Skilled manual	221 (11.2)	100 (45.3)	121 (54.7)
Unskilled manual	203 (10.3)	115 (56.7)	88 (43.3)
Student	379 (19.2)	156 (41.2)	223 (58.8)
Unemployed	252 (12.8)	111 (44.1)	141 (55.9)
Place of residence***			
City	549 (27.8)	321 (58.5)	228 (41.5)
Town	1349 (68.3)	566 (42.0)	783 (58.0)
Village/Countryside/Rural	76 (3.9)	42 (55.3)	34 (44.7)
Study site/region***			
Ashanti	437 (22.2)	201 (46.0)	236 (54.0)
Eastern	496 (25.1)	309 (62.3)	187 (37.7)
Greater Accra	500 (25.3)	191 (38.2)	309 (61.8)
Western	541 (27.4)	228 (42.1)	313 (57.9)
Previously had abortion			
Yes, with medication	421 (21.3)	248 (58.9)	173 (41.1)
Yes, through surgical	166 (8.4)	77 (46.4)	89 (53.6)
No previous abortion	1387 (70.3)	604 (43.6)	783 (56.4)
Learned about MA from friend			
Yes	1054 (53.4)	529 (50.2)	525 (49.8)
No	920 (46.6)	400 (43.5)	520 (56.5)
Learned about MA from family member			
Yes	269 (13.6)	177 (65.8)	92 (34.2)
No	1705 (86.4)	752 (44.1)	953 (55.9)
Learned about MA from internet			
Yes	366 (18.5)	117 (32.0)	249 (68.0)
No	1608 (81.5)	812 (50.5)	796 (49.5)
Observations	*1974*	*929*	*1045*

JHS Junior High School, *SD* Standard deviation, *MA* Medication abortion, *n* Number of women

*Chi-square test- *p < 0.1, **p < 0.05, ***p < 0.01. Note that mean comparison t-test was performed for number of live births*

Table 2 Components of MA cost

Variable	Total sample (Mean/SD)	By type of MA provider	
		Pharmacy (Mean/SD)	Clinic (Mean/SD)
Total cost* **	205.2 (103.8)	138.9 (44.8)	264.2 (105.8)
Cost of pills***	203.5 (103.3)	138.3 (44.8)	261.5 (106.0)
Cost of time spent at facility***	1.7 (1.2)	0.5 (0.1)	2.7 (0.8)
Observations	*1974*	*929*	*1045*

MA Medication abortion, *SD* Standard deviation, Mean comparison t-test- *$p < 0.1$, **$p < 0.05$, ***$p < 0.01$

Additionally, results in Table 1 show that about 21 percent of the sample previously had MA before their recent MA. About 6 in 10 of those who previously had MA received the service from pharmacy providers. A little over half of the women (54 percent) learned about MA from their friends, and 50 percent of them obtained MA in pharmacies.

Cost of accessing MA and variations in cost

The primary cost component incurred by women for MA was the cost of the pills (see Table 2). The average cost of obtaining MA, for the entire sample, was about GH₵ 205.00 (equivalent to US$ 35.80 in June 2020), comprising costs of pills (GH₵ 203.00 (US$ 35.60)) and time spent at the facility (GH₵ 2.00 (US$ 0.30)). Results further showed that women who sought MA from clinics incurred an additional cost of GH₵ 125.00 (US$ 21.90) compared to their counterparts who went to pharmacies.

Furthermore, results from the box and whisker plots suggest that the cost of obtaining MA differs across the facility types and within each specific facility (see Fig. 2). Upon further examination of the variance decomposition, it becomes evident that a substantial portion of the variance among clinics stems from differences between facilities (78 percent). In contrast, among the pharmacies, the predominant source of variation is within facilities, accounting for 57 percent of the total variance (see Fig. 3).

To delve deeper into understanding the source of disparity across types of facilities, a Blinder-Oaxaca decomposition analysis was conducted (see Table 3). This analysis shows how much of the difference in the average cost of obtaining MA from either a clinic or pharmacy could be explained by women's attributes,

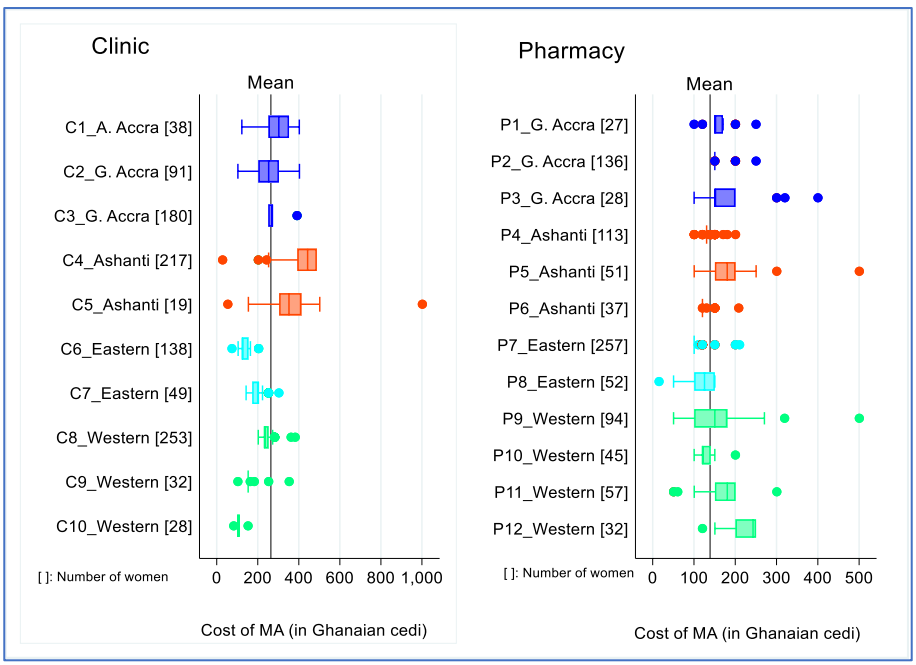

Fig. 2 Distribution of MA cost in facilities

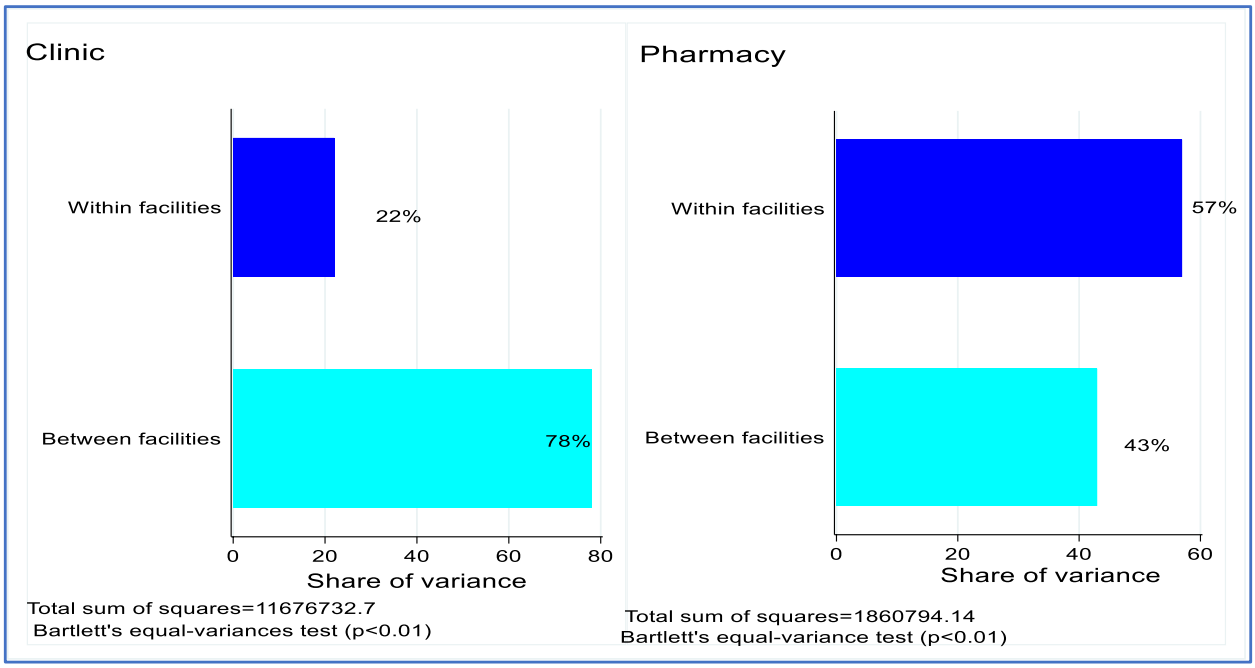

Fig. 3 Variance decomposition of MA cost: within and between facilities

Table 3 Blinder-Oaxaca two-fold decomposition analysis

Type of provider	Estimate (95% CI)
Pharmacy ($n = 929$)	138.9 (136.0, 141.8)***
Clinic ($n = 1045$)	264.2 (257.8, 270.7)***
Difference	−125.4 (−132.4, −118.3)***
Explained (endowments effect)	−19.9 (−51.5, 11.8)
Unexplained	−105.5 (−137.6, −73.5)***

CI Confidence intervals; *n* Number of women. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

as well as the share that cannot be explained. About 16 percent (GH₵ 19.9 (US$ 3.5)) of the average cost difference (GH₵ 125.4 (US$ 21.9)) in accessing MA at a clinic is explained by differences in women's characteristics, although this is not statistically significant. The 84 percent (GH₵ 105.5 (US$ 18.4)) cannot be explained by differences in women's attributes. See Additional file 2 for the full results.

Determinants of MA cost

Table 4 presents the multivariate regression results detailing the factors associated with cost of obtaining MA for the entire sample and across different levels. Postestimation heteroskedasticity and multicollinearity test results are available in Additional file 3.

Generally, the results suggest that it is important to take differences across facilities into account. Beyond the primary independent variables, controlling exclusively for geographic location factors reveals that socio-demographic characteristics-such as the number of live births, level of education and employment in manual (skilled/unskilled) jobs- significantly predict the cost at which women obtain MA (see model 1 of Table 4). However, after accounting for facility fixed effect (see models 3 and 4 of Table 4), the number of live births, having basic education and never being in union with a partner were found to significantly predict MA cost. After incorporating facility fixed effect, the significance of having a manual job and having no education disappears, while the variable 'never in union' becomes statistically significant. This suggests that there may be a form of selection occurring across distinct facilities. The results from our most comprehensive model (4) suggest that, on average, women who were never in a union, compared to those currently/formerly in union, incurred about GH₵ 5.1 (US$ 0.9) more to obtain MA, holding other factors constant ($p < 0.05$). In contrast, women with basic education, compared to those with tertiary education, incurred a lower cost (GH₵ −7.1/US$ −1.2) to access MA ($p < 0.05$). An additional live birth from a woman also reduces her cost by GH₵ −0.9/US$ −0.2 ($p < 0.05$).

Apart from socio-demographic factors, geographic location, MA access at a clinic and exposure to MA information from the internet were found to significantly predict the cost of obtaining MA, even after accounting for facility-fixed effects (see model 4 of Table 4). The results indicate that clinic clients, compared to pharmacy

Table 4 Multivariate regression result of the predictors of MA cost-total sample

Variable (reference category)	Model 1 Estimate (95% CI)	Model 2 Estimate (95% CI)	Model 3 Estimate (95% CI)	Model 4 Estimate (95% CI)
Age (< = 24 years)				
> 24 years	−3.9 (−13.0, 5.2)	3.5(−3.8, 10.7)	−0.1 (−5.2, 5.0)	−0.5 (−5.4, 4.4)
Marital status (Currently/formerly in union)				
Never in union	5.6 (−3.4, 14.7)	3.9 (−3.1, 10.9)	4.8 (0.2, 9.4)**	5.1 (0.5, 9.6)**
Number of live births	−2.7 (−4.2, −1.2)***	−2.0 (−3.3, −0.7)***	−0.8 (−1.7, −0.0)**	−0.9 (−1.7, −0.0)**
Education (Tertiary/higher)				
No education	−47.4 (−79.6, −15.2)***	−23.3 (−52.6, 6.0)	9.8 (−14.4, 34.0)	8.6 (−15.5, 32.7)
Primary/JHS	−61.6 (−73.8, −49.3)***	−31.9 (−41.4, −22.5)***	−5.9 (−12.4, 0.6)*	−7.1 (−13.7, −0.6)**
Secondary	−41.2 (−52.1, −30.3)***	−15.2 (−23.7, −6.7)***	−1.4 (−6.7, 4.0)	−2.5 (−7.8, 2.8)
Occupation (Professional/managerial)				
Service	5.8 (−7.2,18.7)	4.4 (−5.2, 14.0)	−0.9 (−6.8, 4.9)	−1.9 (−7.8, 4.0)
Skilled manual	28.6 (12.4, 44.8)***	19.0 (6.5, 31.6)***	3.6 (−4.9, 12.0)	2.8 (−5.8, 11.3)
Unskilled manual	18.0 (0.1, 35.9)**	16.9 (1.7, 32.0)**	−1.7 (−14.1, 10.7)	−2.7 (−15.2, 9.8)
Student	2.9 (−10.7, 16.4)	3.7 (−6.5, 13.8)	−3.6 (−10.3, 3.0)	−4.2 (−10.9, 2.5)
Unemployed	6.1 (−8.1, 20.4)	2.6 (−7.8, 12.9)	−2.8 (−9.2, 3.5)	−3.7 (−10.1, 2.7)
Woman's place of residence (City)				
Town	32.7 (25.0, 40.5)***	12.4 (6.2, 18.6)***	9.2 (3.7, 14.8)***	9.2 (3.7, 14.8)***
Village/rural	30.4 (14.8, 46.0)***	14.5 (−0.4, 29.4)*	2.8 (−10.4, 16.1)	2.8 (−10.4, 16.1)
Study site/region (Greater Accra)				
Ashanti	55.2 (40.7, 69.7)***	70.1 (59.6, 80.5)***	−58.3 (−83.7, −32.9)***	−59.5 (−85.2, −33.8)***
Eastern	−86.2 (−93.7, −78.7)***	−67.5 (−73.9, −61.0)***	−63.8 (−90.4, −37.2)***	−64.5 (−91.4, −37.7)***
Western	−32.6 (−41.0, −24.1)***	−26.0 (−32.9, −19.2)***	37.1 (9.8, 64.3)***	36.4 (9.0, 63.7)***
Clinic (Pharmacy)		108.6 (102.2, 114.9)***	106.2 (73.8, 138.6)***	105.5 (73.1, 137.9)***
Facility fixed effect			√	√
Learned about MA from a friend (No)				
Yes				−0.3 (−5.4, 4.8)
Learned about MA from a family member/relative (No)				
Yes				−1.3 (−8.1, 5.4)
Learned about MA from the internet (No)				
Yes				−7.7 (−13.6, −1.8)**
Previously had an abortion (No previous abortion)				
Yes: MA				1.2 (−4.9, 7.3)
Yes: Surgical procedure				−0.2 (−6.6, 6.1)
Constant	224.5 (209.6, 239.4)***	152.6 (140.9, 164.4)***	178.2 (151.6, 204.8)***	181.6 (154.2, 209.0)***
Observations	*1974*	*1974*	*1974*	*1974*
Prob > F	*0.00*	*0.00*	*0.00*	*0.00*
R^2	*0.4*	*0.6*	*0.8*	*0.8*

JHS Junior High School, *CI* Confidence intervals. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

clients, incurred an additional GH₵ 105.5 (US$ 18.0) to obtain MA on average ($p < 0.01$). Women who live in towns, compared to city dwellers, incurred extra cost (GH₵ 9.2/US$ 1.5, $p < 0.01$) to access MA. In addition, compared to Greater Accra, women who obtained MA in the Western region averagely incurred extra cost (GH₵ 36.4/US$ 6.0, $p < 0.01$) for MA. Conversely, women who accessed MA in Ashanti (GH₵ −59.5) and Eastern (GH₵ −64.5) regions incurred lesser costs compared to their counterparts who obtained similar services in Greater Accra. Women who learned about MA from the internet also spent less (GH₵ −7.7) to obtain MA.

Additional results from the breakdown analysis based on type of provider are shown in Table 5. We performed separate regressions for women who received MA from pharmacies and for those who obtained the service from clinics on the most comprehensive model (model 4 of Table 4). After this, we limited the samples for the

Table 5 Multivariate regression result of the predictors of MA cost-segregated sample

Variable (reference category)	All facilities		Only facilities with disparities in MA cost	
	Pharmacy	Clinic	Pharmacy	Clinic
	Estimate (95% CI)	Estimate (95% CI)	Estimate (95% CI)	Estimate (95% CI)
Age (< = 24 years)				
> 24 years	−0.5 (−6.3, 5.4)	2.8 (−5.8, 11.4)	5.5 (−9.3, 20.3)	4.7 (−6.2, 15.7)
Marital status (Currently/formerly in union)				
Never in union	7.7 (2.8, 12.6)***	−1.9 (−9.8, 6.1)	10.9 (−1.4, 23.1)*	−1.4 (−11.0, 8.2)
Number of live births	−0.6 (−1.2, −0.1)**	−4.1 (−7.0, −1.3)***	−9.0 (−14.6, −3.3)***	−5.3 (−8.9, −1.7)***
Education (Tertiary/higher)				
No education	23.4 (−10.4, 57.2)	−6.0 (−36.4, 24.3)	68.2 (−16.6, 153.1)	−3.2 (−35.0, 28.6)
Primary/JHS	−0.0 (−7.7, 7.7)	−12.6 (−23.6, −1.5)**	7.3 (−9.3, 23.9)	−14.3 (−27.0, −1.5)**
Secondary	−1.0 (−8.4, 6.4)	−2.4 (−9.9, 5.0)	−0.2 (−16.9, 16.0)	−2.2 (−11.2, 6.7)
Occupation (Professional/managerial)				
Service	1.1 (−6.4, 8.6)	−3.1 (−12.2, 6.1)	4.1 (−14.9, 23.1)	−5.0 (−16.5, 6.4)
Skilled manual	9.1 (−3.5, 21.7)	−3.3 (−14.6, 8.0)	15.8 (−9.8, 41.5)	−4.8 (−17.2, 7.6)
Unskilled manual	−5.4 (−15.6, 4.7)	1.5 (−22.6, 25.6)	−5.2 (−26.1, 15.8)	1.0 (−27.6, 29.6)
Student	−0.5 (−9.8, 8.8)	−5.7 (−14.9, 3.6)	−4.4 (−29.1, 20.3)	−7.8 (−19.5, 3.9)
Unemployed	1.3 (−7.4, 10.1)	−7.2 (−16.3, 1.8)	5.9 (−14.0, 25.8)	−10.6 (−22.5, 1.4)*
Woman's place of residence (City)				
Town	0.7 (−6.2, 7.5)	14.7 (6.8, 22.7)***	1.3 (−16.8, 19.3)	20.1 (10.2, 30.0)***
Village/rural	1.9 (−8.2, 12.1)	−2.8 (−28.8, 23.2)	−10.1 (−34.6, 14.4)	0.4 (−26.7, 27.6)
Study site/region (Greater Accra)				
Ashanti	−35.3 (−48.5, −22.1)***	74.7 (−7.8, 157.2)*	15.2 (−4.2, 34.7)	73.8 (−8.3, 155.8)*
Eastern	−42.7 (−58.3, −27.1)***	−91.7 (−114.9, −68.4)***	−38.8 (−57.0, −20.5)***	−91.2 (−114.7, −67.8)***
Western	63.3 (47.1, 79.5)***	−184.9(−206.5,−163.4)***	65.3 (46.8, 83.8)***	−55.2 (−77.0, −33.4)***
Facility-level effect	√	√	√	√
Learned about MA from the internet (No)				
Yes	−0.3 (−8.4, 7.8)	−13.4 (−21.2, −5.6)***	−3.3 (−20.2, 13.6)	−13.4 (−23.4, −3.4)***
Constant	155.7 (140.2, 171.2)***	295.7 (271.0, 320.4)***	152.5(124.1, 180.9)***	294.2 (267.5, 320.9)***
Observations	*929*	*1045*	*386*	*805*
Prob > F	*0.00*	*0.00*	*0.00*	*0.00*
R^2	*0.45*	*0.79*	*0.33*	*0.78*

JHS Junior High School; *CI* Confidence intervals. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

pharmacy and clinic groups to only those facilities for which we observed substantial variation in cost (excluding those that do not have within-facility variation in MA cost). The results, overall, are robust to sample selection. Running the analysis based on these samples, the results overall suggest disparities in cost of accessing MA in both pharmacies and clinical settings based on women's sociodemographic attributes. The cost of accessing MA significantly varies among clinic clients based on the number of live births a woman had and her educational level. The cost of obtaining MA reduces by about GH₵ −4.1 (US$ −0.7) with an additional live birth for clinic clients. Similarly, the cost reduces by GH₵ −12.6 (US$ −2.0) for clinic clients with a basic level of education compared to those with tertiary education. The cost reduction is even higher (GH₵ −14.3/US$ −2.4) for those with a basic level of education when the regression is limited to facilities with greater variation in cost. Also, the internet lowered the cost of MA only for clinic clients (GH₵ −13.4/US$ −2.3).

On the other hand, MA cost significantly varies among pharmacy clients based on marital status and number of live births. For example, women never in union versus those currently/formerly in union spent about GH₵ 7.7 (US$ 1.4) more to obtain MA. The cost of obtaining MA also falls (GH₵ −0.6/US$ −0.1, $p < 0.05$) with an additional live birth, and the marginal effect is even higher when pharmacies without substantial variations in cost are filtered out (GH₵ −9.0/US$ −1.6, $p < 0.01$).

Table 6 Results of bivariate regressions on predictors of variations in facilities' MA cost

Variable (reference)		Estimate (95% CI)
Facility district (Ablekuma West)		
	Ashaiman	18.1 (−26.3, 62.4)
	Bosomtwe	26.9 (−17.5, 71.2)
	Effia-Kwesimintsim	9.3 (−26.9, 45.5)
	Ga West	24.5 (−13.9, 63.0)
	Kumasi Metro	16.7 (−18.4, 51.7)
	La Dade-Kotopon	12.5 (−31.9, 56.8)
	La Nkwantanan-Madina	2.7 (−41.6, 47.1)
	New Juaben South	14.7 (−21.5, 50.9)
	Sekondi-Takoradi Metro	18.3 (−16.8, 53.3)
	Suhum	7.5 (−36.8, −51.9)
Population density of district (population per km^2)		0.0 (0.0, 0.0)
Facility closeness to a major road (> 500 m)		
	101–500 m	−18.5 (−55.0, 17.9)
	< = 100 m	−16.7 (−43.2, 9.7)
Location of facility (Low-income area)		
	Middle-income	2.5 (−11.8, 16.9)
	Central business area	2.0 (−11.9, 15.9)
Close competitors (No)		
	Yes	−7.6 (−18.7, 3.4)

CI Confidence intervals; * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Note that none of the variables were statistically significant

Overall, the disaggregated results on geographic location, facility level and other abortion-related factors support the findings for the entire sample.

Context analysis

The primary objective of the context analysis is to determine if the differences in MA costs among different facilities can be attributed to their locations. Contextual information about each facility's location, such as proximity to major roads, characteristics of the surrounding area, presence of nearby competitors, and population density of the facility's district, was gathered for the analysis. Table 6 presents bivariate regression results on the predictors of variations in MA cost from the context data. The results suggest that the variation in MA cost between the various facilities cannot be explained by the local context of the facilities. Specifically, factors such as district where facility is located, population density of district, facility proximity to a major road, nature of the area where the facility is located and availability of close competitors do not explain the variations in cost of MA service.

Discussion

This study showed that the cost of accessing MA services, estimated from the client's standpoint, can vary between facilities and even within the same facility. For pharmacy clients, the disparities in MA cost mainly stemmed from within facilities, while for clinic clients, substantial variations were observed between facilities. These findings suggest that MA prices remain at the discretion of the provider and/or the facility's management level. Previous studies, although not specifically focused on MA, have reported disparities in abortion costs in some developing countries [22–25], aligning with this study's findings. In Ghana, the stigma associated with abortion coupled with the weak regulatory framework for MA access [26, 27, 29, 30], may have created information asymmetry [31, 44], enabling providers to vary the prices of MA pills among clients.

Furthermore, findings suggest that the average cost of accessing MA in a clinical setting is almost twice as high as the cost at a pharmacy. The regression analysis, which accounted for facility fixed effect and other observable factors, confirmed that clinic clients incurred higher costs. It is important to note that elective abortions are not covered by Ghana's national health insurance scheme [19], and the healthcare delivery system faces challenges [16, 17], including the unavailability of MA pills in some clinics. To navigate these health system challenges, some clinic-based health providers privately procure MA pills and manage the sales to clients outside of the facilities management system.[1]

[1] This insight was obtained after sharing the results with the health professionals who participated in the MOC-Ghana study.

This could be grounds for some of the clinic providers to sell MA pills directly to clients at above-market prices. Generally, clients feel their safety is guaranteed in clinical environments [41, 45] and may be willing to accept higher prices in such facilities.

One may argue that the higher price in clinical settings stems from value-added services such as counselling. However, it is worth indicating that guidelines from the Ghana Health Service mandate that women seeking abortion in a clinical environment, regardless of whether their health insurance is active, be provided with free sufficient information and counselling on the various abortion methods, their costs, accessibility and contraception before terminating the pregnancy [19]. Another argument is that the cost in clinical settings may be high because of overhead costs. However, the rationale for overhead cost is unclear since selling MA pills to clients often occurs outside the facility's management information system (MIS).

Regarding socio-demographic characteristics, our findings show that women who are not married or in union with a partner incur more cost to obtain MA, as mainly driven by pharmacy clients. Engaging in premarital sex is considered immoral behaviour in most Ghanaian communities [46]. As such, some unmarried women may travel farther distances for abortion to avoid local stigma, incurring higher transportation costs. Our finding aligns with evidence from India, which suggests that unmarried women seeking abortion services are charged higher prices [23]. However, the context is different, and the methods used in the study on India were manual vacuum aspiration and dilation and curettage [23]. Additionally, a study in Kenya and India suggests that unmarried women who desire to induce abortion often have the feeling that they would be judged and prefer to keep the process a secret [47]. In keeping the process secret, these women risk missing out on important information, such as the cost of abortion service, and ultimately paying more for the service. It is important, however, to note that the construction and enactment of stigma surrounding abortion may differ from one society to another [20]. Therefore, married women or single women may also face similar stigma related to abortion. For example, studies in Ghana and Uganda have shown that married women may also have the feeling of being judged on fidelity grounds [48, 49].

We also observed that the cost of obtaining MA decreases as the number of live births increases, which is consistent with the findings of Ely and colleagues [21]. Although the context and abortion methods in our study differ, Ely and colleagues similarly found that low-income abortion patients with one live birth incurred higher cost to end pregnancy than those with multiple births in the United States [21]. Women with more live births in this study were relatively older and possibly better equipped to navigate abortion-related stigma. This may have shaped their decisions regarding where, when and from whom MA was obtained, ultimately impacting the overall cost.

Additionally, we observed that women with a higher level of education spent more to access MA services. Generally, education impacts significantly on health, including decision-making processes and choices that people make regarding their health [50, 51]. With this backdrop, we anticipated that women with higher education would have more information about MA and may be able to access MA services at relatively cheaper prices. However, it appears safety is of higher priority among educated women in their decision-making to obtain MA. About seven (7) in ten (10) women with tertiary/higher education obtained MA from clinical settings, where the cost is notably higher. In support of this hypothesis, we observed that the positive relationship between education and MA cost is driven by the clinic group. For the pharmacy group, MA cost did not significantly vary by education.

Apart from socio-demographic factors, we have observed that MA cost varies across different geographic locations in Ghana. Except for the Western region, the cost of MA was higher in Greater Accra than in the other regions. This could be attributed to the high cost of living in Greater Accra [52]. One plausible reason for the high cost of MA in Western region is that most of the facilities are in Sekondi-Takoradi, where many tourists and expatriates who work in the region's mining sites prefer to stay. The presence of these expatriates and tourists has also impacted the cost of living in Sekondi-Takoradi.

In addition, learning about MA from the internet is associated with lower cost of MA, particularly for clinic clients [53]. With the abundance of health information available online, these women may had obtained firsthand information that empowers them to negotiate for better prices. However, it is worth indicating that information from unreliable sources may provide misleading information on MA cost. The utilization of the internet for obtaining MA information also presents an opportunity to explore the use of mobile health (mHealth) and telemedicine in delivering abortion services in the country [54]. Apart from providing women with accurate information, the adoption of mHealth and telemedicine has the potential to minimize the stigma women encounter in accessing abortion services [54].

Limitations of the study

This study estimated the cost of MA using the amount women paid to obtain MA pills and the productive time lost at the facility. Other components of MA cost were

not considered in this study. Nevertheless, the cost components considered in this study enable a realistic comparison of findings between pharmacy and clinic clients.

In addition, the literature shows that the household wealth index of women is associated with the cost of abortion in countries like Zambia and Burkina Faso. Unfortunately, we could not include this variable in our analysis due to data limitations. However, with a high R squared value of over 80 percent, we are confident that we have considered the key variables that explain the variations in the cost of medical abortion.

Furthermore, this study exclusively consists of women who opted for MA. Those who wish to have an MA, but cannot afford it, are not represented in our data. Depending on the characteristics of these excluded women, our findings might be subject to change. However, if we include women who cannot afford MA in our sample, we expect our results to be even stronger. This is because, potentially, women who cannot afford an abortion are from more remote areas and less likely to be married and are less educated. Their inclusion could magnify socio-economic disparities in the cost of MA abortion.

Conclusions

In conclusion, the findings of this study indicate that the cost of obtaining MA varies by women's socio-demographic attributes such as their marital status, number of live births and level of education. The cost also differs based on the type of provider, clinic or pharmacy, and the specific facility where the service is obtained. The study suggests that the discretion of providers plays a significant role in determining the prices of MA pills. Furthermore, the findings show that individuals seeking MA may encounter unequal access to the procedure, which could result in the use of unsafe methods by vulnerable women who are billed higher prices and are unable to afford. To reduce the disparities, Ghana Health Service and relevant stakeholders need to develop guidelines to address the health system challenges regarding MA provision and access in Ghana. In addition, Ghana's Ministry of Health and non-governmental organizations can promote access to educational programs on MA access, provision and legal framework to reduce abortion-related stigma and cost variations. Programs such as telemedicine and mHealth could also help alleviate the cost disparities in accessing medication abortion services. This is because findings suggest that women are utilizing the internet for MA services, which are even at a cheaper cost.

Abbreviations

ANOVA	Analysis of Variance
CI	Confidence Interval
GH₵	Ghanaian Cedi
JHS	Junior High School
MA	Medication Abortion
MOC	Medication Abortion Out of Clinic
MIS	Management Information System
RA	Research Assistant
SSA	Sub-Saharan Africa
US$	United States Dollar

Supplementary Information

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Additional file 1.

Additional file 2.

Additional file 3.

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Authors' contributions

C.A. conceptualized the study, wrote the full draft and contributed to reviewing the manuscript. Y.K., O.P. and M.K. contributed to the methods, analysis and reviewed the manuscript for important intellectual content. A.D., P.A. and P.K. contributed to the analysis and reviewed the manuscript for important intellectual content. AAB provided leadership and reviewed the manuscript review. A.A.B. is also the Principal Investigator for MOC-Ghana and provided the data used for this paper. All authors read and approved the final manuscript.

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Data availability

The datasets used and/or analysed during the current study are available from the corresponding author on reasonable request.

Declarations

Ethics approval and consent to participate

Approvals from the Ghana Health Service Ethics Review Committee (GHS-ERC012/07/19), University of Ghana Ethics Committee for the Humanities (ECH 034/19–20) and Marie Stopes International Ethics Review Committee (025–19) were obtained for the MOC-Ghana study. Before women were recruited to participate in the MOC-Ghana study, written consent was obtained from them. The Participant Information Sheet (translated into various Ghanaian languages), which contained detailed information about the study, including the potential risks and benefits of participating in the study, was given to each woman to read before providing consent to be interviewed. For those who could not read, the information sheet was read to them in their preferred language.

Consent for publication

Not applicable.

Competing interests

The authors declare no competing interests.

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References

1. Bearak J, Popinchalk A, Ganatra B, Moller AB, Tunçalp Ö, Beavin C, et al. Unintended pregnancy and abortion by income, region, and the legal status of abortion: estimates from a comprehensive model for 1990–2019. Lancet Glob Health. 2020 Sep 1;8(9):e1152–61. https://doi.org/10.1016/S2214-109X(20)30315-6.
2. Kapp N, Lohr PA. Modern methods to induce abortion: Safety, efficacy and choice. Vol. 63, Best Practice and Research: Clinical Obstetrics and Gynaecology. Bailliere Tindall Ltd; 2020. p. 37–44. https://doi.org/10.1016/j.bpobgyn.2019.11.008.
3. Bankole A, Remez L, Owolabi O, Philbin J, Williams P. From Unsafe to Safe Abortion in Sub-Saharan Africa: Slow but Steady Progress. 2020Dec. https://doi.org/10.1363/2020.32446.
4. Conti J, Cahill EP. Self-managed abortion. Vol. 31, Current Opinion in Obstetrics and Gynecology. Lippincott Williams and Wilkins; 2019. p. 435–40. https://doi.org/10.1097/GCO.0000000000000585.
5. WHO. Abortion care guideline. 2022. Available from: https://www.who.int/publications/i/item/9789240039483. Cited 2022 Oct 14
6. WHO. Safe abortion : technical and policy guidance for health systems. 2012. 123 p. Available from: https://www.ncbi.nlm.nih.gov/books/NBK138196/. Cited 2022 Aug 11
7. LaRoche KJ, Foster AM. "It gives you autonomy over your own choices": A qualitative study of Canadian abortion patients' experiences with mifepristone and misoprostol. Contraception. 2020Jul 1;102(1):61–5. https://doi.org/10.1016/j.contraception.2020.04.007.
8. Biggs MA, Brown K, Foster DG. Perceived abortion stigma and psychological well-being over five years after receiving or being denied an abortion. PLoS ONE. 2020Jan 29;15(1): e0226417. https://doi.org/10.1371/journal.pone.0226417.
9. Keogh SC, Otupiri E, Chiu DW, Polis CB, Hussain R, Bell SO, et al. Estimating the incidence of abortion: a comparison of five approaches in Ghana. BMJ Glob Health. 2020;5(4):e002129. https://doi.org/10.1136/bmjgh-2019-002129.
10. Otsin MNA, Black K, Hooker L, Taft AJ. Pharmacy dispensing of abortion pills in Ghana: experiences of pharmacy workers and users. BMJ Sex Reprod Health. 2023 Mar 21;bmjsrh-2022–201674. https://doi.org/10.1136/bmjsrh-2022-201674.
11. Agula C, Henry EG, Asuming PO, Agyei-Asabere C, Kushitor M, Canning D, et al. Methods women use for induced abortion and sources of services: insights from poor urban settlements of Accra, Ghana. BMC Womens Health. 2021 Dec 1;21(1). https://doi.org/10.1186/s12905-021-01444-9.
12. Aniteye P, Mayhew SH. Globalisation and transitions in abortion care in Ghana. BMC Health Serv Res. 2019 Mar 21;19(1). https://doi.org/10.1186/s12913-019-4010-8.
13. Morhee RAS, Morhee ESK. Overview of the law and availability of abortion services in Ghana. Ghana Med J. 2006;40(3). Available from: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1790853/pdf/GMJ4003-0080.pdf. Cited 2024 Jan 7
14. Kapp N, Bawah AA, Agula C, Menzel JL, Antobam SK, Asuming PO, et al. Medical abortion in Ghana: a non-randomized, non-inferiority study of access through pharmacies compared with clinics. Contraception. 2024 Jul;110538. https://doi.org/10.1016/j.contraception.2024.110538
15. Ganle JK, Busia NT, Maya E. Availability and prescription of misoprostol for medical abortion in community pharmacies and associated factors in Accra, Ghana. Int J Gynecol Obstet. 2019Feb 1;144(2):167–73. https://doi.org/10.1002/ijgo.12717.
16. Ashigbie PG, Azameti D, Wirtz VJ. Challenges of medicines management in the public and private sector under Ghana's National Health Insurance Scheme – A qualitative study. J Pharm Policy Pract. 2016Feb 24;9(1):6. https://doi.org/10.1186/s40545-016-0055-9.
17. Atiga O, Walters J, Pisa N. Challenges of medical commodity availability in public and private health care facilities in the Upper East Region of Ghana: a patient-centered perspective. BMC Health Serv Res. 2023Jul 1;23(1):719. https://doi.org/10.1186/s12913-023-09717-9.
18. Mflathelwa Dube E, Memory ZS. Professional nurses' challenges regarding drug supply management in the primary health care clinics. Int J Afr Nurs Sci. 2022;16: 100398. https://doi.org/10.1016/j.ijans.2022.100398.
19. Ghana Health Service. National reproductive health service policy and standards: Third edition. Accra; 2014 Dec. Available from: https://platform.who.int/docs/default-source/mca-documents/policy-documents/policy/gha-cc-10-01-policy-2014-eng-national-reproductive-health-service-policy-and-standards.pdf. Cited 2024 Jan 4
20. Moore B, Poss C, Coast E, Lattof SR, van derMeulen Rodgers Y. The economics of abortion and its links with stigma: A secondary analysis from a scoping review on the economics of abortion. Vol. 16, PLoS ONE. Public Library of Science; 2021. https://doi.org/10.1371/journal.pone.0246238.
21. Ely GE, Hales T, Jackson DL, Maguin E, Hamilton G. The undue burden of paying for abortion: An exploration of abortion fund cases. Soc Work Health Care. 2017 Feb 7;56(2):99–114. https://doi.org/10.1080/00981389.2016.1263270.
22. Coast E, Lattof SR, Rodgers YVDM, Moore B, Poss C. The microeconomics of abortion: A scoping review and analysis of the economic consequences for abortion care-seekers. PLoS One. 2021 Jun 1;16(6 June). https://doi.org/10.1371/journal.pone.0252005.
23. Sundar R. Abortion costs and financing: a review. 2003. Available from: https://api.semanticscholar.org/CorpusID:53620332. Cited 2023 Sep 13
24. Leone T, Coast E, Parmar D, Vwalika B. The individual level cost of pregnancy termination in Zambia: a comparison of safe and unsafe abortion. Health Policy Plan. 2016Sep 1;31(7):825–33. https://doi.org/10.1093/heapol/czv138.
25. Ilboudo PGC, Greco G, Sundby J, Torsvik G. Costs and consequences of abortions to women and their households: A cross-sectional study in Ouagadougou. Burkina Faso Health Policy Plan. 2015May 1;30(4):500–7. https://doi.org/10.1093/heapol/czu025.
26. Rominski SD, Lori JR. Abortion Care in Ghana: A Critical Review of the Literature. Vol. 18, African Journal of Reproductive Health. 2014. https://pmc.ncbi.nlm.nih.gov/articles/PMC4465587/pdf/nihms698615.pdf.
27. Lithur NO. Destigmatising abortion: expanding community awareness of abortion as a reproductive health issue in Ghana. Afr J Reprod Health. 2004Apr;8(1):70–4. https://doi.org/10.2307/3583308.
28. Payne CM, Debbink MP, Steele EA, Buck CT, Martin LA, Hassinger JA, et al. Why women are dying from unsafe abortion: narratives of Ghanaian abortion providers. Afr J Reprod Health. 2013 Jun;17(2):118–28. https://www.jstor.org/stable/23485926.
29. Sorhaindo AM, Lavelanet AF. Why does abortion stigma matter? A scoping review and hybrid analysis of qualitative evidence illustrating the role of stigma in the quality of abortion care. Soc Sci Med. 2022Oct;311:115271. https://doi.org/10.1016/j.socscimed.2022.115271.
30. Aniteye P, O'Brien B, Mayhew SH. Stigmatized by association: Challenges for abortion service providers in Ghana. BMC Health Serv Res. 2016 Sep 10;16(1). https://doi.org/10.1186/s12913-016-1733-7
31. Mishra A, Pandey N. Pricing information asymmetry in healthcare: stakeholder analysis and research insights. Int J Pharm Healthc Mark. 2023 Nov 16;17(4):539–63. https://doi.org/10.1108/IJPHM-01-2023-0010.
32. Rothstein DS. An economic approach to abortion demand. Am Econ. 1992 [cited 2025 Jan 10];36(1):53–64. Available from: https://www.jstor.org/stable/25603912.
33. GSS, MoH, ICF. Ghana Maternal Health Survey 2017 [Internet]. 2018. Available from: www.DHSprogram.com.
34. Walker J. Non-inferiority statistics and equivalence studies. Vol. 19, BJA Education. Elsevier Ltd; 2019. p. 267–71. https://doi.org/10.1016/j.bjae.2019.03.004.
35. Kahn JG, Becker BJ, Macisaa L, Amory JK, Neuhaus J, Olkin I, et al. The Efficacy of Medical Abortion: A Meta-Analysis. Vol. 61, CONTRACEPTION. 2000. https://doi.org/10.1016/S0010-7824(99)00115-8.
36. GSS, ICF. Ghana demographic and health survey 2022. Accra; 2023 May. Available from: https://www.statsghana.gov.gh/gssmain/fileUpload/pressrelease/Ghana%20DHS%202022%20FINAL.pdf. Cited 2025 Jan 5
37. Kapp N, Mao B, Menzel J, Eckersberger E, Saphonn V, Rathavy T, et al. A prospective, comparative study of clinical outcomes following clinic-based versus self-use of medical abortion. BMJ Sex Reprod Health. 2023Oct;49(4):300–7. https://doi.org/10.1136/bmjsrh-2022-201722.

38. Kim DD, Silver MC, Kunst N, Cohen JT, Ollendorf DA, Neumann PJ. Perspective and Costing in Cost-Effectiveness Analysis, 1974–2018. Pharmacoeconomics. 2020Oct 20;38(10):1135–45. https://doi.org/10.1007/s40273-020-00942-2.
39. Garrison LP, Pauly MV, Willke RJ, Neumann PJ. An Overview of Value, Perspective, and Decision Context—A Health Economics Approach: An ISPOR Special Task Force Report [2]. Value in Health. 2018Feb;21(2):124–30. https://doi.org/10.1016/j.jval.2017.12.006.
40. Johannesson M. Theory and methods of economic evaluation of health care. 1996. https://books.google.com.gh/books?id=3ZLK28lY1WkC&printsec=frontcover#v=onepage&q&f=false
41. Klu D, Yeboah I, Kayi EA, Okyere J, Essiaw MN. Utilization of abortion services from an unsafe provider and associated factors among women with history of induced abortion in Ghana. BMC Pregnancy Childbirth. 2022 Dec 1;22(1). https://doi.org/10.1186/s12884-022-05034-x.
42. Jann B. A Stata implementation of the Blinder-Oaxaca decomposition [Internet]. Vol. 8, The Stata Journal. 2008. https://doi.org/10.1177/1536867X0800800401.
43. Rahimi E, Hashemi Nazari SS. A detailed explanation and graphical representation of the Blinder-Oaxaca decomposition method with its application in health inequalities. Emerg Themes Epidemiol. 2021 Dec 1;18(1). https://doi.org/10.1186/s12982-021-00100-9.
44. Barber SL, Lorenzoni L, Ong P. Price setting and price regulation in health care Lessons for advancing Universal Health Coverage. 2019. Available from: https://www.oecd.org/health/health-systems/OECD-WHO-Price-Setting-Summary-Report.pdf. Cited 2023 Sep 13
45. Gbagbo FY. Profile of abortion seekers and their views on financial cost of induced abortions: implications for preventing unsafe abortions among young people in Accra. Ghana Public Health. 2020Jun;1(183):112–7. https://doi.org/10.1016/j.puhe.2020.04.008.
46. Hall KS, Manu A, Morhe E, Dalton VK, Challa S, Loll D, et al. Bad girl and unmet family planning need among Sub-Saharan African adolescents: the role of sexual and reproductive health stigma. Qual Res Med Healthc. 2018 May 30;2(1). https://doi.org/10.4081/qrmh.2018.7062.
47. Makleff S, Wilkins R, Wachsmann H, Gupta D, Wachira M, Bunde W, et al. Exploring stigma and social norms in women's abortion experiences and their expectations of care. Sex Reprod Health Matters. 2019 Nov 29;27(3). https://doi.org/10.1080/26410397.2019.1661753.
48. Moore A, Jagwe-Wadda G, Bankole A. Men's attitudes about abortion in uganda. J Biosoc Sci. 2011 Jan;43(1):31–45. https://https://doi.org/10.1017/S0021932010000507.
49. Mote C V, Larsen-Reindorf R, Otupiri E, Hindin M. Factors associated with induced abortion among women in Hohoe, Ghana. African Joornal of Reproductive Health. 2010;14(4):115–21. Available from: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4181373/pdf/nihms630328.pdf. Cited 2023 Sep 15
50. Raghupathi V, Raghupathi W. The influence of education on health: An empirical assessment of OECD countries for the period 1995–2015. Archives of Public Health. 2020 Apr 6;78(1). https://doi.org/10.1186/s13690-020-00402-5.
51. Zajacova A, Lawrence EM. The Relationship between Education and Health: Reducing Disparities Through a Contextual Approach. Vol. 39, Annual Review of Public Health. Annual Reviews Inc.; 2018. p. 273–89. https://doi.org/10.1146/annurev-publhealth-031816-044628.
52. Ghana Statistical Service. Ghana living standards survey (GLSS) 7. Accra; 2019 Jun. Available from: https://www.statsghana.gov.gh/gssmain/fileUpload/pressrelease/GLSS7%20MAIN%20REPORT_FINAL.pdf. Cited 2023 Sep 15
53. Johnson DM, Madera M, Gomperts R, Aiken ARA. The economic context of pursuing online medication abortion in the United States. SSM - Qualitative Research in Health. 2021Dec;1:1. https://doi.org/10.1016/j.ssmqr.2021.100003.
54. Adu J, Roemer M, Page G, Dekonor E, Akanlu G, Fofie C, et al. Expanding access to early medical abortion services in Ghana with telemedicine: findings from a pilot evaluation. Sexual and Reproductive Health Matters. 2023;31(4):1–12. https://doi.org/10.1080/26410397.2023.2250621. Cited 2024 Sep 17

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