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Impact of the global gag rule on women's contraceptive use and reproductive health outcomes in Ethiopia: a pre–post and difference-in-difference analysis

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ABSTRACT

Objective To assess the impacts of the Protecting Life through Global Health Assistance policy (otherwise known as the expanded global gag rule (GGR)) on women's sexual and reproductive health (SRH) in Ethiopia. The GGR prohibits all non-US non-governmental organisations (NGOs) receiving US Government global health funding from providing, referring or advocating for abortion.

Design Pre–post analysis and difference-in-difference analysis.

Setting Six regions of Ethiopia (Tigray, Afar, Amhara, Oromiya, SNNPR and Addis Ababa).

Participants Panel of 4909 reproductive-age women recruited from the Performance Monitoring for Accountability 2018 survey, administered face-to-face surveys in 2018 and 2020.

Measures We assessed impacts of the GGR on contraceptive use, pregnancies, births and abortions. Due to the 2019 'Pompeo Expansion' and widespread application of the GGR, we use a pre–post analysis to investigate changes in women's reproductive outcomes. We then use a difference-in-differences design to measure the additional effect of NGOs refusal to comply with the policy and the resulting loss in funding; districts are classified as more exposed if organisations impacted by lost funding were providing services there and women are classified based on their district.

Results At baseline, 27% (n=1365) of women were using a modern contraceptive (7% using long-acting reversible contraceptive methods (LARCs) and 20% using short-acting methods. The pre–post analysis revealed statistically significant declines from 2018 to 2020 in the use of LARCs (−0.9, 95% CI: −1.6 to −0.2) and short-acting methods (−1.0, 95% CI: −1.8 to −0.2). These changes were deviations from prior trends. In our difference-in-differences analysis, women exposed to non-compliant organisations experienced greater declines in LARC use (−1.5, 95% CI: −2.9 to −0.1) and short-acting method use (−1.7, 95% CI: −3.2 to −0.1) as compared with less-exposed women.

Conclusions The GGR resulted in a stagnation in the previous growth in contraceptive use in Ethiopia. Longer-term strategies are needed to ensure that SRH progress globally is protected from changes in US political administrations.

STRENGTHS AND LIMITATIONS OF THIS STUDY

⇒ This study is the first to quantitatively assess the impacts of the Protecting Life through Global Health Assistance policy, which expanded the global gag rule (GGR), on women's reproductive health outcomes in a country where abortion care is broadly available.

⇒ Using a unique panel study design enabled us to track changes in women's contraceptive use and reproductive outcomes during the time in which the policy was in effect.

⇒ While we initially planned to analyse the data using a quasi-experimental difference-in-difference design, the further expansion of the policy in 2019 resulted in large-scale implementation and removed the geographical variation in overall policy exposure necessary for causal inference. We therefore had to employ a pre–post design, though we were able to estimate the additive impacts of the policy among women residing in areas where non-governmental organisations (NGOs) that had lost US funding had been previously providing services.

⇒ Further population-based impacts of the GGR may not be identifiable within the 2-year follow-up period. It is possible that there will be greater downstream impacts of changes in contraceptive use on pregnancy, birth, and abortion outcomes that our study was not able to capture.

⇒ There were critical efforts by NGOs and other donor governments to mitigate the impacts of the GGR, including the provision of substantial stop-gap funding. Our estimates are likely a lower-bound estimate of the impact of the policy and the true impact would likely have been much larger in the absence of such efforts and funds.

INTRODUCTION

The global gag rule (GGR) is a US policy that prohibits all non-US non-governmental organisations (NGOs) that are receiving US Government funding from providing or referring for abortion services or advocating for safe abortion care. GGR restrictions apply to programmes in all countries, regardless of

the legal status of abortion. Versions of the GGR have been active under all Republican administrations since President Reagan, and President Trump reinstated the most recent iteration (known as the Protecting Life in Global Health Assistance (PLGHA) policy) on 23 January 2017. Under the PLGHA version of the GGR, the scope of the policy was expanded to restrict all US global health assistance, whereas previous administrations only restricted funding for family planning. This change resulted in an increase in funds restricted by the policy from US$600 million to US$12 billion in 2018.[1] The policy was further expanded in 2019 through the Pompeo Expansion; this formal guidance issued by the Department of State stipulated that compliant organisations must additionally require compliance of all subgrantees they work with, regardless of whether that subgrantee received US funding.[2 3] Together, these expansions to the GGR impacted the number of organisations whose funding would be subject to the terms of the policy.

Early evidence has already shown negative impacts of the PLGHA policy across different contexts. Quantitative research has documented decreases in community health workers engaged in family planning and outreach in several countries,[4–6] reductions in sexual and reproductive health (SRH) counselling and education,[7] and premature termination of contraceptive provision programmes.[5] In Ethiopia, recent work has also documented reductions in mobile outreach, higher levels of contraceptive commodity stock-outs and reductions in the integration of family planning and post-abortion care services after the PLGHA came into effect.[6] Several qualitative studies have also described changes in the SRH service delivery environment; regular supportive activities between NGOs and the public health sector, such as trainings and technical assistance, have changed, and in some cases ended, due to the policy and its potential over-interpretation.[8 9] Other programme closures, staff shortages and increased stock-outs of family planning methods and safe abortion supplies have also been documented.[10–12] Qualitative research has also suggested that women experienced increased difficulties obtaining their preferred method after the policy's implementation.[10]

While these recent studies and reports are a useful starting point to track changes in the SRH service provision landscape attributable to the expanded GGR, the population-level impact of the policy on women's SRH outcomes remains largely undocumented. Some previous work investigating prior iterations of the GGR has suggested that countries receiving more US family planning assistance per-capita experienced an increase in pregnancies and abortions and a decrease in modern contraceptive use.[13–15] Similar outcomes were found in a study investigating the impact of the policy within Ghana, where women in rural areas were more negatively impacted by the policy than their urban counterparts.[16] However, the impact of the current iteration of the GGR may differ given the increased scale of impacted funding and larger range of affected partnerships.

Over the past several decades, the government of Ethiopia has made substantial progress in meeting women's sexual and reproductive needs, and the GGR had the potential to disrupt these recent improvements. The Ethiopian government introduced abortion legislation in 2005 that makes safe abortion services widely and legally accessible, and Ethiopia has seen substantial decreases in maternal mortality due to unsafe abortion as well as decreases in unmet need for modern contraception.[17–21] The USA is the largest donor of global health funding to Ethiopia and the second-largest donor for Ethiopia's family planning budget, contributing US$45 million in FY2018.[22] This funding environment makes Ethiopia uniquely susceptible to changes in US global health funding policy. The integral role that NGOs play in providing family planning services in Ethiopia suggests that the policy may have wide reaching impacts on women's contraceptive use and reproductive outcomes. Women who receive family planning services directly from NGOs could experience service disruptions due to programme cuts or staff shortages. In addition, while the majority of women obtain family planning services through the public sector (77% in 2018),[21] NGOs support the public sector through ongoing technical assistance and trainings for SRH providers, empowering local providers to meet peoples' reproductive needs.[9] Additionally, mobile outreach services run by NGOs provide services to public sector clientele, such as access to contraceptive methods requiring insertion or removal by a trained provider.

The purpose of this study is to assess the impacts of the expanded GGR on women's SRH outcomes in Ethiopia. The GGR may impact reproductive outcomes by disrupting family planning provision through two main mechanisms: (1) the discontinuation of US funding to non-compliant organisations or (2) the discontinuation of restricted activities in favour of receiving further US funding among compliant organisations. Through these mechanisms, we hypothesise that the GGR could negatively impact women's access to SRH services, resulting in a decrease in modern method use, followed by an increase in unintended pregnancies and unplanned births, as well as abortions. We conduct a pre–post analysis to investigate changes in these outcomes during the time the GGR policy was in effect. We also use a quasi-experimental design that compares outcomes over time between women living in areas that are more-exposed or less-exposed to non-compliant organisations. Documenting the impact of the GGR on women's health outcomes is essential to show how constraining the funding and/or programming of NGOs in one area of SRH can potentially have far reaching consequences, not only across the health system but also in the overall health of the population.

METHODS
Study design and data collection
We use data from a panel of women covering six regions in Ethiopia (Tigray, Afar, Amhara, Oromiya, SNNPR and
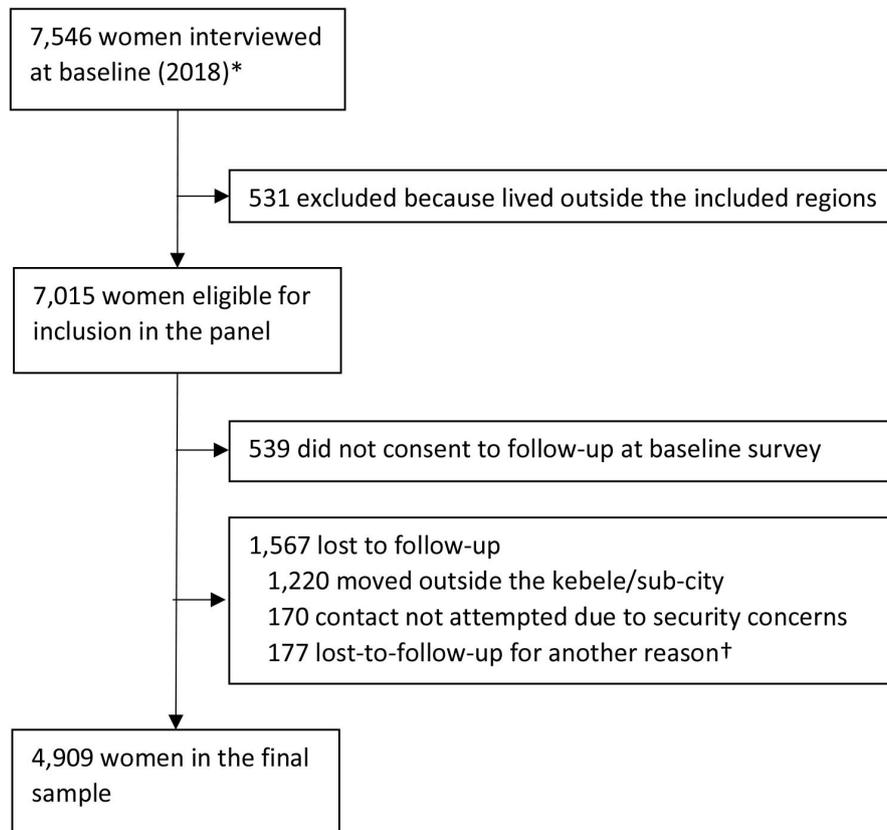
Figure 1 Sample inclusion and loss-to-follow-up. *Baseline survey included all regions in Ethiopia. †Refused at follow-up (n=65), not at home (n=50), could not locate respondent or get information on current residence (n=14), died (n=11), incapacitated (n=4), other (n=33).

Addis Ababa), where 90% of the population live.[23] Baseline data were collected from June to July in 2018 through the Performance Monitoring for Accountability (PMA) platform, which includes a nationally representative survey of women selected using a two-stage cluster sample design.[24–26] In March 2020, we followed-up with respondents in selected regions who previously consented to participate in the panel. Respondents residing in the same kebele or subcity (Addis Ababa only) at the time of follow-up were eligible for inclusion in the panel, (a kebele is the smallest administrative unit in a woreda, similar to a ward or neighbourhood. A woreda is the administrative division in Ethiopia equivalent to a district.). All surveys were administered face-to-face by resident enumerators using Open Data Kit software on Android smart phones. The baseline sample included 7546 women (figure 1). Of the 7015 women who lived in one of the six regions included in the 2020 panel sample, 539 (8%) did not consent to be recontacted for a follow-up survey at baseline, 1567 (22%) were lost-to-follow-up (LTFU) and 70% (n=4909) were included in the final sample. We used bivariate χ^2 tests and t-tests to examine differences between panel respondents and those LTFU, finding that panel respondents are more likely to be younger, never married, have completed more schooling, live in a richer household and reside in an urban area (online supplemental appendix A).

To create measures of exposure to the GGR, we collected data on organisations and programmes affected by the policy through in-person meetings with key stakeholders from March to November 2018. These data were updated in September 2020 to capture additional funding or service provision changes. Stakeholders included US and non-US NGOs, donor governments, foundations, USAID and the Ethiopia Ministry of Health.

Patient and public involvement
Key stakeholders, including civil society organisations, the Ministry of Health and donor government representatives were consulted in the early stages and design of this study. They provided input on the context and informed the key variables of interest in the analysis. These same stakeholders will be engaged in dissemination activities related to the findings of this study.

Measures
The pre-period for this analysis is defined as 2018. While the GGR was signed in January 2017 and went into effect in May 2017, implementation was not instantaneous. Organisations were only required to sign the policy when renewing or entering a new contract, which in many cases was months (or years) after policy implementation. Prior research on the GGR in Ethiopia found that as of 2018 very few organisations had been asked to comply with

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the policy, and organisations that chose not to comply had received unrestricted and matched stop-gap funding from another donor.[6] In addition, the Pompeo Expansion did not take effect until May 2019, greatly expanding the scope and reach of the policy in Ethiopia. Moreover, there is likely a delay between funding loss/policy signing and when the effects of these changes will be detectable among women in the community. While the GGR was in effect in 2018, it had not yet fully rolled out in Ethiopia, and can thus be considered a pre-period before the effects of the policy occurred.

We first examine impacts of the GGR looking at changes overall between the pre (2018) and post (2020) periods. With the Pompeo Expansion requiring compliance of all subgrantees to organisations receiving US Government global health funding, there was effectively no geographical variation within Ethiopia to compare woredas.

An indicator was created to examine the additive impacts on women residing in woredas where non-compliant organisations were providing services. In Ethiopia, two large SRH NGOs refused to comply with the GGR and lost US funding. Using monitoring and evaluation data provided by these NGOs, we classified woredas as exposed to non-compliant organisations if services were reduced in that woreda after US funding was lost. This includes woredas that lost services entirely, saw a decrease in facilities served by NGOs, and/or saw a decrease in visits to facilities. A detailed overview of how NGO services changed due to the GGR is provided elsewhere.[6] By 2020, 26% (n=43) of woredas are classified as more exposed to non-compliant organisations. A respondent's exposure status is coded based on her woreda of residence, which resulted in 23% of our sample (n=1112) being categorised as more exposed to GGR non-compliance.

We measured several SRH outcomes that we hypothesised might be impacted by the GGR. We categorised current contraceptive method use into three groups: long-acting reversible contraceptives (LARCs) (implants and intrauterine devices), short-acting methods (injectables, pills, emergency contraception, male and female condoms, standard days/cycle beads and the lactational amenorrhoea method) and traditional/no method use. Women who reported female sterilisation as their main method at baseline (n=15) were excluded from the analysis given that their future method was not susceptible to policy-related changes. Monthly contraceptive and pregnancy calendar data was also collected. In line with previous research, these data showed consistent under-reporting of contraceptive use further back in time compared with baseline data.[27 28] As such, we do not use these data to model contraceptive trends over time between pre-GGR and post-GGR periods

Among women who reported using an LARC/short-acting method, we created a method source indicator based on whether she obtained that method at a public or non-public facility when she first began using. Public sources included a government facility, community health volunteer, health extension worker or other public source.

Non-public sources included a private facility, NGO or mobile clinic, pharmacy, shop/market, friend/relative or other non-public source. We also assessed whether this method was the respondent's preferred method.

We measured several reproductive outcomes, including all pregnancies, unintended pregnancies, all births, unplanned births and abortions. All of these reproductive outcomes were measured for the 12 months prior to each interview (Outside the contraceptive and pregnancy calendar module, the survey only included questions detailing whether women were currently pregnant (and the intention status of current pregnancies). As such, we use reports from the calendar data to identify additional pregnancies and their associated intention status over the 12 months prior to each survey round.). An unintended pregnancy was one where the woman reported that, at the time she became pregnant, she wanted to become pregnant 'later' or 'not at all'. Unplanned births were defined as a birth where the woman reported wanting to wait to have a(nother) child or not wanting a(nother) child at the time she became pregnant. Abortions were measured as women who self-reported intentionally and successfully ending a pregnancy.

Finally, we measured individual-level controls, including region, urban/rural residence, age, marital status, household wealth quintile and educational attainment. We also measured the woreda-level modern contraceptive prevalence rate (mCPR).

Statistical analysis

We first present descriptive statistics of our sample. Next, we assess the overall changes in women's reproductive health outcomes that occurred pre-GGR versus post-GGR. Multivariable regression models were fitted for each outcome using the following equation:

$$Y_{ij} = \beta_0 + \beta_1 T_j + \beta_2 I_{ij} + \beta_3 C_{ij} + \beta_4 R_i + \mathcal{E}_{ij} \quad (1)$$

where Y_{ij} denotes the outcome of interest for respondent i during period j, T_j indicates the time period (pre, post), I_{ij} represents a vector of individual-level controls, C_{ij} is a vector of community-level controls and R_i represents region. All regression models used panel weights to account for sample design and loss-to-follow-up, making results representative for the six study regions.

As causal inference is limited using this pre–post analysis approach, we additionally investigated trends in key outcomes prior to the study period using cross-sectional PMA data collected in our study regions from 2014 to 2016 to determine whether observed pre–post changes are a continuation or departure from pre-GGR trends.

Next, we assessed whether there were differences in key socio-demographic characteristics by non-signing exposure status in the baseline period using bivariate χ^2 tests and t-tests (online supplemental appendix B). To balance observed differences, we calculated inverse probability propensity score weights using age, urban/rural status, education, marital status and household wealth. We assessed covariate balance using the standardised bias approach.[29]

Table 1 Weighted baseline differences in socio-demographic characteristics and sexual and reproductive health outcomes, 2018

	Total (N=4909)	
Socio-demographic characteristics	n	%
Region		
Addis Ababa	582	5
Afar	164	1
Amhara	1000	28
Oromiya	1195	39
SNNPR	1135	21
Tigray	833	7
Residence		
Rural	2361	76
Urban	2548	24
Age		
15–19	939	23
20–24	783	16
25–29	940	18
30–34	781	14
35+	1466	28
Marital status		
Currently married/living with man	3078	65
Divorced/widowed	578	10
Never married	1252	25
Wealth quintile		
Lowest	707	19
Lower	654	19
Middle	597	19
Higher	834	20
Highest	2117	22
Education		
Never attended	1566	40
Primary	1730	40
Secondary or above	1605	20
Woreda characteristics		
Modern contraceptive prevalence rate, median (IQR)	0.25	(0.16–0.34)
Women's contraceptive outcomes		
Current modern method user*	1365	27
Type of contraceptive method currently used		
Long-acting modern†	378	7
Short-acting modern	972	20
Traditional or no method	3543	73
Obtained current method from a public source§‡	436	76

Continued

Table 1 Continued

	Total (N=4909)	
Obtained preferred method when got current method‡	602	96
Women's pregnancy, birth and abortion outcomes		
All pregnancies	1200	27
Unintended pregnancy	390	10
Gave birth in the last 12 months	649	14
Unplanned birth in the last 12 months	200	5
Abortion in the last 12 months	13	0.2

%, weighted; Ns, unweighted.
*Sterilisation (female/male), implant, IUD, injectables, pill, EC, male/female condom, standard days/cycle beads, LAM.
†Implant, IUD.
‡Among women who started using their current modern method <12 months prior to the baseline survey (n=629).
§Public=government facility, community health volunteer, health extension worker. Not public=private facility, NGO, mobile clinic, pharmacy, shop-market, friend/relative, other.
EC, emergency contraception; IUD, intrauterine device; LAM, lactational amenorrhoea method; LARC, long-acting reversible contraception; NGO, non-governmental organisation.

We use a quasi-experimental difference-in-difference design to test for additional impacts of the policy due to exposure to non-compliant organisations. We calculate doubly robust estimates using our inverse probability propensity score weights in combination with multivariable regression models that control for potential confounding factors. Multivariable regression models were fitted for each outcome of interest using the following equation:

$$Y_{ij} = \beta_0 + \beta_1 E_i + \beta_2 T_j + \beta_3 (E_i * T_j) + \beta_4 I_{ij} + \beta_5 C_{ij} + \mathcal{E}_{ij} \quad (2)$$

The main differences between the pre–post and difference-in-differences models are the inclusion of E_i, which represents exposure to the GGR, and $E_i \times T_i$, which denotes the interaction between exposure and time-period. Our key measure of interest in this model is the difference in the differences from the pre-period to post-period by exposure groups, which we estimate from the interaction term. Region controls were not included in the difference-in-difference models as they were collinear with exposure.

For all models, dichotomous outcomes were fitted using logistic and probit regression models, and ordinal outcomes were fitted using ordered logistic regression models. Analyses were conducted in Stata V.16.0.[30]

RESULTS

At baseline, 76% (n=2361) of our sample lived in rural areas. The majority were currently married (65%, n=3078), and 40% (n=1566) never attended school (table 1). Approximately 27% (1365) of women were using a modern contraceptive method (7% (n=378)

Table 2 Pre–post differences once the GGR came into effect in Ethiopia (pre=2018, post=2020)

Outcome	Estimated adjusted proportion in pre-period (2018)*	Estimated adjusted proportion in post-period (2020)*	Pre/post difference	
			Difference	95% CI
Contraceptive outcomes				
Long-acting reversible contraceptives†	9.2	8.3	−0.9	(−1.6 to 0.2)
Short-acting modern‡	21.9	20.8	−1.0	(−1.8 to 0.2)
Traditional or no method	68.9	70.9	2.0	(0.5 to 3.5)
Current modern method user	29.7	27.9	−1.8	(−3.5 to 0.1)
Obtained current method at a public source	72.8	71.8	−1.0	(−6.3 to 4.3)
Obtained preferred method	95.7	97.6	2.0	(−0.5 to 4.4)
Birth outcomes				
All pregnancies	23.5	22.1	−1.4	(−3.3 to 0.5)
Unintended pregnancy	7.8	6.0	−1.8	(−2.9 to 0.7)
Gave birth in the last 12 months	12.5	14.3	1.8	(0.2 to 3.5)
Unplanned births	4.0	3.9	−0.1	(−1.1 to 0.8)
Abortions	0.2	0.2	−0.1	(−0.2 to 0.1)

*All models adjusted for residence, region, age, marital status, educational attainment, wealth and district-level mCPR.
†IUD or implant.
‡Injectables, pill, emergency contraception, male or female condom, diaphragm, foam/jelly, LAM or standard days/cycle beads.
GGR, global gag rule; IUD, intrauterine device; LAM, lactational amenorrhoea method; mCPR, modern contraceptive prevalence rate.

using LARCs, 20% (n=972) using short-acting methods). Among women that had started using their method in the 12 months prior to the baseline survey (n=629), 76% (n=436) obtained their current method from a public source, and 96% (n=602) reported obtaining their preferred method. Twenty-seven per cent (n=1200) of women reported ever being pregnant in the 12 months prior to the baseline survey, 10% (n=390) reported an unintended pregnancy, 14% (n=649) had given birth and 5% (n=200) reported an unplanned birth. Self-reported abortions in the last 12 months were rare (<1%, n=13).

In our pre–post analysis, we observed statistically significant declines from 2018 to 2020 in both LARC use (−0.9% points; 95% CI: −1.6% to −0.2%) and short-acting method use (−1.0% points; 95% CI: −1.8% to −0.2%) (table 2). Among all modern method users, we did not observe pre–post differences in where contraceptive methods were obtained or whether women obtained their preferred method. We observed a decline in unintended pregnancies (−1.8% points; 95% CI: −2.9% to −0.7%) from pre-GGR to post-GGR. Births increased by 1.8% points (95% CI: 0.2% to 3.5%). There was no change in the proportion of women reporting an unplanned birth or an abortion. All significant pre–post analysis findings appear to be a deviation from prior trends, suggesting that observed changes may be related to the GGR (figure 2). Modern contraceptive use (and LARC use in particular) had been increasing, unintended pregnancies remained relatively flat and births had been steadily decreasing from 2014 to 2017.

Figure 3 displays the results of our difference-in-differences analysis, which revealed significant impacts on contraceptive use among women living in woredas where non-compliant organisations had impacted services (see online supplemental appendix C for point estimate values, and 95% CIs). More exposed women experienced greater declines in LARC use (−1.5% points; 95% CI: −2.9% to −0.1%) and short-acting method use (−1.7% points 95% CI: −3.2% to −0.1%) as compared with their less exposed counterparts. We did not observe significant differences in method source, obtaining a preferred method, pregnancy or birth outcomes by non-compliant exposure status.

DISCUSSION

Overall, the results from this analysis suggest that the GGR has impacted women's SRH in Ethiopia. We observed robust impacts of the policy on contraceptive use; our pre–post analysis revealed that contraceptive use declined after the GGR came into effect. This finding is a departure from prior trends in Ethiopia, as evidenced by our own analysis of previous rounds of PMA data, as well as recent reports of the Ethiopia Demographic and Health Survey data.[31 32] Further, our causal, difference-in-differences analysis suggests that impacts were particularly acute in the areas of Ethiopia that were additionally exposed to the programming and service changes that occurred as a result of organisation's refusal to comply with the GGR. Taking the two analyses together, it appears that less exposed women experienced a stagnation in the previous growth in contraception use experienced by women in Ethiopia, with the proportions of less exposed women reporting LARC or short-acting contraceptive use
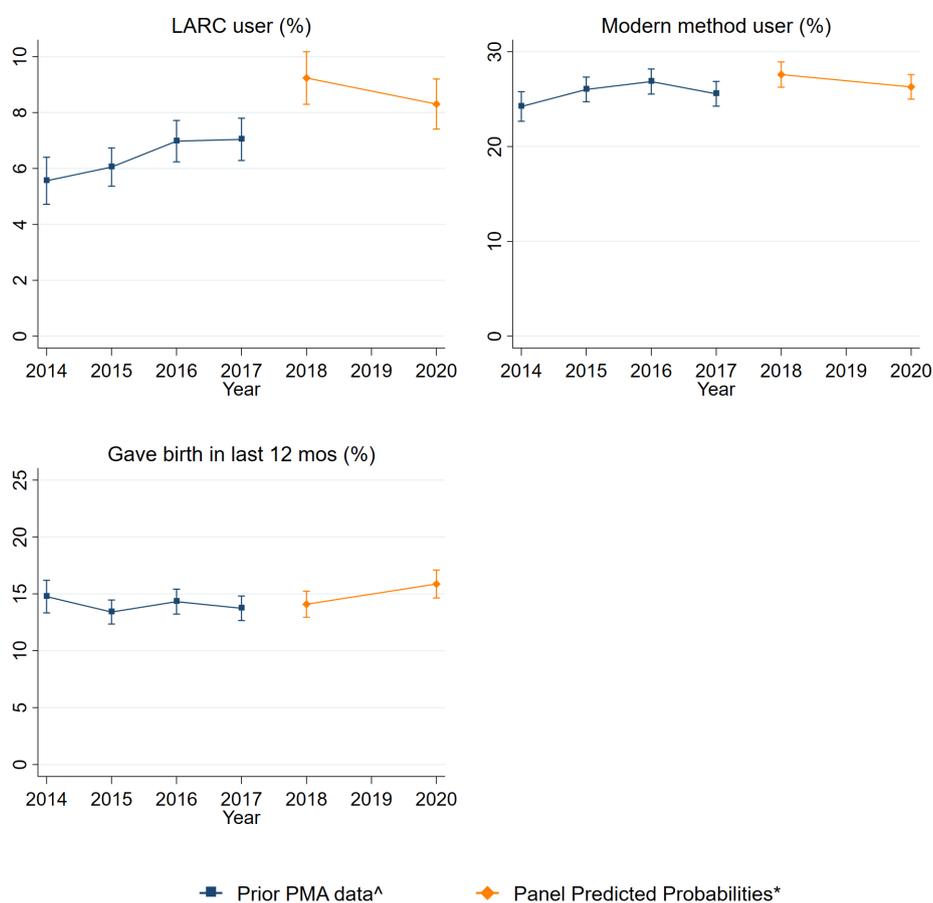
Figure 2 Pre–post estimates of the impact of the global gag rule on contraceptive use and births in Ethiopia (2018–2020) and prior trends in PMA data (2014–2017). Unintended pregnancy was excluded due to inconsistent measurement of pregnancy between prior PMA data and out study. Prior PMA data only accounts for women's pregnancy status at the time of the interview. Our analysis uses data from a contraceptive calendar to account for all reported pregnancies and their intention status in the 12 months prior to the survey interview. As a result, we are unable to look at prior trends in unintended pregnancy that would be comparable to our pre–post model predicted probabilities. LARC, long-acting reversible contraceptive; PMA, Performance Monitoring for Accountability.

declining only slightly (0.2% points) from the pre-period to post-period. If there had been no impact of the GGR on these less exposed women, we would have expected to see an increase in contraceptive use, given the steady improvements in mCPR in Ethiopia over the past 20 years. Instead, the majority of the declines in contraceptive use observed in the pre–post analysis appear to be driven by women who were more exposed to the non-compliant organisations. Contrary to our initial hypotheses, we did not observe significant impacts on contraceptive method source or preference. This may suggest that the policy is not resulting in an increase in method switching but instead limiting contraceptive access altogether.

Our contraceptive use findings are consistent with research investigating the impact of previous iterations of the GGR on women's outcomes. A cross-national study investigating the Bush-era GGR in sub-Saharan Africa found a 3.15% point decline in modern contraceptive use in countries more exposed to the GGR,[14] and an in-depth study in Ghana found a 12% increase in traditional

method use.[16] Further, a companion study to this analysis found that the PLGHA policy was associated with declines in family planning services provided through community health volunteers, a decrease in mobile outreach, higher levels of stock-outs of contraceptive methods and a reduction in the integration of family planning with post-abortion care services in Ethiopia.[6] Given these wide-ranging impacts, the findings of this analysis are expected and consistent with our hypothesised causal pathway.

It is also not surprising that our most robust findings were associated with contraceptive use, given the critical role that NGOs in Ethiopia play in contraceptive provision, both directly and in support of public sector family planning programmes. It has also been well documented that the GGR resulted in organisations losing funding and therefore reducing mobile outreach services in Ethiopia, which are a critical part of LARC provision.[6 33] In addition, our pre–post analysis suggests that the mechanisms through which the GGR impacts contraceptive use are not simply the loss of US funding; the GGR may be
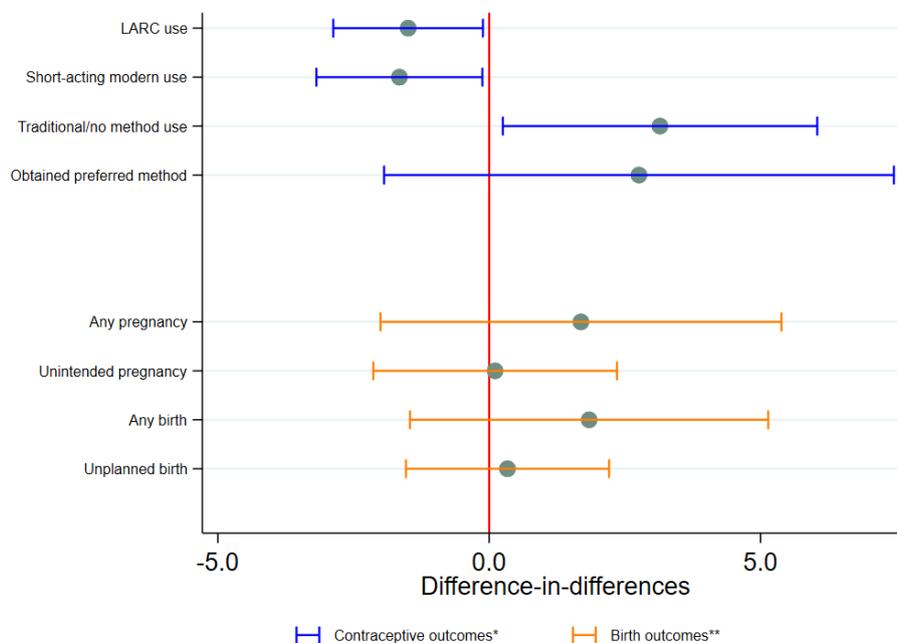
Figure 3 Difference-in-difference estimates of the impact of the global gag rule on contraceptive use and births in Ethiopia, 2018–2020. LARC, long-acting reversible contraceptive.

reducing contraceptive access through NGOs' compliance with the terms of GGR, which could result in losses in partnerships, trainings and in-kind transfers of contraceptive commodities between organisations that are also subject to the GGR.

This study's results regarding pregnancy, birth and abortion outcomes are more difficult to interpret. Our hypothesised causal pathway would suggest that a decrease in contraceptive use would lead to an increase in pregnancies, which would ultimately lead to either an increase in births and/or induced abortions. However, our causal difference-in-difference analysis did not reveal statistically significant impacts on any of our pregnancy and birth outcomes. It may be that it is too soon to detect changes in these outcomes on a population level, as we would expect a lag between reductions in contraceptive use and increases in either unintended pregnancy, abortion or unplanned births. For example, one of the largest non-signing NGOs did not lose their US funding until 2019; while we find impacts on contraceptive use, downstream effects on pregnancy, birth and abortion may not have occurred by the second round of data collection in 2020. Alternatively, our non-causal, pre–post analysis revealed a decrease in unintended pregnancies, yet a significant increase in births. A possible explanation is that the GGR may have amplified existing abortion stigma and decreased access to abortion care, which could result in a larger proportion of pregnancies ending in a birth as opposed to an abortion. We may also have been underpowered to detect changes in pregnancy outcomes, given the smaller sample size of pregnant women (n=1200 compared with the full sample of n=4909). Given the

lack of significant findings in our difference-in-difference analysis and the uncertainty surrounding other influences on our non-causal pre–post results, it may be too soon to make causal conclusions regarding the impact of the GGR on pregnancy, birth and abortion outcomes in Ethiopia.

There are several important limitations to our analysis. Our initial study design was predicated on the assumption that there would be variation to policy exposure within the country. However, we found that the complicated nature of the policy roll-out, the changing influence of stop-gap funding and the Pompeo Expansion eventually led to an environment where all regions of Ethiopia could be considered 'exposed' to compliant organisations. As such, we were forced to rely on a less rigorous, pre–post analytical design for some analyses. However, while we investigated other potential changes during this same period that could have driven our contraceptive and birth results, we could not identify any. In fact, during this same time frame, other donors had substantially increased their investments in SRH in Ethiopia.[34] Despite the varied sources of evidence in support of the conclusion that observed pre–post changes may be associated with the GGR, we are unable to state definitively that the GGR caused these changes.

Our analysis has several limitations related to representativeness. Our sample was limited to six regions of Ethiopia, although these regions account for 90% of the population. We also observed differential LTFU in 2020. As such, these results may not be representative of the full impact of the policy in Ethiopia. In addition, LTFU limits comparability between our pre–post results

to the previous trends in key outcomes observed in the 2014–2017 PMA data. However, it is unlikely that these differences would account for the changing trends over time given the large share of the population that our data represent.

Another complicating factor is the influence of reporting biases that are likely present in the self-reported pregnancy and abortion data. Pregnancy and induced abortion are notoriously under-reported in community-based surveys of women.[35–39] To this point, few women self-reported an abortion in either round of our of study, despite the fact that other studies suggest that the annual abortion incidence rate in Ethiopia is at least 28 per 1000 women of reproductive age.[18] Under-reporting of these outcomes limits our statistical power to detect changes related to the GGR between exposure groups or over time. As such, our inability to detect causal changes in pregnancy and abortion outcomes may be partially due to women's tendency to under-report these outcomes, which the GGR may have additionally amplified.

Finally, our study was focused on women's SRH outcomes, but the PLGHA version of the GGR was expanded to impact health areas beyond SRH that previous iterations of the policy had not targeted. As such, our findings only offer a limited assessment of PLGHA's impact, given that we were not able to assess changes on other health outcomes.

Conclusions

This study adds to the growing body of evidence of the negative impacts of the GGR on SRH outcomes. In the context of Ethiopia, it appears the GGR disrupted the many years of substantial progress that the country has made in meeting women's contraceptive needs. Although this most recent version of the GGR was rescinded by the Biden administration in January 2021, it is possible that the impact of these disruptions could be felt for years to come. Future research should continue to evaluate both the shorter-term and longer-term impacts of this policy on SRH service delivery and women's outcomes. However, it is clear that the GGR is counterproductive to efforts to improve the SRH of women, and longer-term strategies are needed to ensure that SRH progress globally is protected from changes in US political administrations.

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