

This is a repository copy of *Faith-based provision of sexual and reproductive healthcare in Malawi*.

White Rose Research Online URL for this paper:

<https://eprints.whiterose.ac.uk/181807/>

Version: Published Version

Article:

Tafesse, Wiktorina orcid.org/0000-0002-0076-8285 and Chalkley, Martin orcid.org/0000-0002-1091-8259 (2021) Faith-based provision of sexual and reproductive healthcare in Malawi. *Social Science & Medicine*. p. 113997. ISSN 1873-5347

<https://doi.org/10.1016/j.socscimed.2021.113997>

Reuse

This article is distributed under the terms of the Creative Commons Attribution (CC BY) licence. This licence allows you to distribute, remix, tweak, and build upon the work, even commercially, as long as you credit the authors for the original work. More information and the full terms of the licence here:

<https://creativecommons.org/licenses/>

Takedown

If you consider content in White Rose Research Online to be in breach of UK law, please notify us by emailing eprints@whiterose.ac.uk including the URL of the record and the reason for the withdrawal request.



Faith-based provision of sexual and reproductive healthcare in Malawi

Wiktorja Tafesse^{*}, Martin Chalkley

Centre for Health Economics, University of York, United Kingdom

ARTICLE INFO

Keywords:
Healthcare
Ownership
Sexual and reproductive health
Faith-based providers
Least developed country

ABSTRACT

Faith-based organisations constitute the second largest healthcare providers in Sub-Saharan Africa but their religious values might be in conflict with providing some sexual and reproductive health services. We undertake regression analysis on data detailing client-provider interactions from a facility census in Malawi and examine whether religious ownership of facilities is associated with the degree of adherence to family planning guidelines. We find that faith-based organisations offer fewer services related to the investigation and prevention of sexually transmitted infections (STIs) and the promotion of condom use. The estimates are robust to several sensitivity checks on the impact of client selection. Given the prevalence of faith-based facilities in Sub-Saharan Africa, our results suggest that populations across the region may be at risk from inadequate sexual and reproductive healthcare provision which could exacerbate the incidence of STIs, such as HIV/AIDS, and unplanned pregnancies.

1. Introduction

Most health systems rely on a variety of differently owned and managed organisations to provide healthcare. The motivation, objectives and mission of these providers determine what services will be delivered, to what effect and at what cost. Faith-based providers play a particularly important role in Sub-Saharan Africa. There is little systematic and comparative data on non-governmental providers across low- and middle-income countries but it is estimated that faith-based providers deliver between 30% and 70% of all healthcare in Sub-Saharan Africa and often constitute the only available providers in rural and remote areas (Olivier et al., 2015).

Faith-based providers have been shown to be altruistic and pro-poor (Bjorvatn and Svensson, 2016; Reinikka and Svensson, 2010) and have a reputation of offering higher quality of care compared to public providers (Olivier et al., 2015). However, their religious beliefs may be in conflict with the health goals of international organisations and national governments which follow secular principles. This is of particular concern in the context of ensuring that individuals have access to family planning methods and HIV prevention (Tomkins et al., 2015). Smith and Kaybryn (2013) provide evidence that faith-based providers, do not always conform to public health policies related to Sexually Transmitted Infection (STI) prevention and have resisted condom promotion, whilst O'Brien (2017) argues they have led to a shortfall in preventing HIV/AIDS because of their focus on abstinence over condom use.

In this study we examine how faith-based providers in Malawi compare with government facilities in their provision of sexual and reproductive health services related to the prevention and counselling of STIs. Malawi is an important and relevant setting because whilst it has made great strides across several key healthcare indicators, such as the increase in the contraceptive rate from 26.1% in 2000 to 58.1% in 2015 (Devlin et al., 2017), 8.9% of the adult population lives with HIV which corresponds to one the highest HIV rates globally (UNAIDS, 2020). Moreover, 14.7% of women and 9.8% of men report having an STI other than HIV, or corresponding symptoms in 2015–2016.

We report the results of regression analysis on data detailing client-provider interactions from a facility census in Malawi and establish that faith-based organisations are less likely to ask clients about STI symptoms, discuss their partner status or promote the use of condoms. We take account of patient characteristics, health facility endowment, healthcare competition and area level characteristics in what is the first study to account for this mix of confounding factors. Our results are robust to several sensitivity checks including the application of matching methods and the inspection of selection on unobservable factors. These findings suggest that reliance on faith-based providers may be associated with inadequate provision of sexual and reproductive health services in Malawi and may, therefore, lead to unmet need for contraceptives, unintended pregnancies and adverse health outcomes.

Previous literature on faith-based providers in low-income countries has mainly focused on documenting their contribution to HIV and

^{*} Corresponding author.

E-mail address: wiktorja.tafesse@york.ac.uk (W. Tafesse).

<https://doi.org/10.1016/j.socscimed.2021.113997>

Received in revised form 14 April 2021; Accepted 2 May 2021

Available online 7 May 2021

0277-9536/© 2021 The Authors. Published by Elsevier Ltd. This is an open access article under the CC BY license (<http://creativecommons.org/licenses/by/4.0/>).

reproductive services and comprises mostly grey literature, qualitative or descriptive analysis (Olivier, 2017; Smith and Kaybryn, 2013; Tomkins et al., 2015). Barden-O'Fallon (2017) shows that faith-based providers in Kenya, Haiti and Malawi are less likely to provide family planning methods and if they do, the quality of services is lower. This literature does not account for potential confounders in isolating the effect of religious ownership and little is known about the effectiveness of faith-based involvement in providing SRHS (Smith and Kaybryn, 2013).

Faith-based providers operate on a not-for-profit basis and there is an extensive literature on not-for-profit providers in healthcare. Most of this has focused on the distinction with for-profit provision and has concerned high-income countries. Chalkley and Sussex (2018) review these issues in the context of the UK, Barbetta et al. (2007) do so for Italy, Van Biesen et al. (2007) for Belgium, Tiemann et al. (2012) for Germany and Eggleston et al. (2008) for the US. It is difficult to extrapolate these findings to low-income settings as this literature is concerned with quality of provision rather than the propensity to provide services which is the focus of our paper.

With respect to faith-based providers specifically, Hill et al. (2019) utilise changes in hospital ownership in the US to facilitate the estimation of the effect of Catholic ownership. They find that Catholic hospitals reduce tubal ligations (female sterilization) by 31%. Descriptive quantitative studies from the US, comprised mostly of staff surveys or mystery-caller investigations, confirm that Catholic hospitals provide limited reproductive services whilst provider interviews reveal that Catholic hospitals prohibit abortions. Health workers in such facilities report barriers in contraceptive provision (Hasselbacher et al., 2020; Liu et al., 2019; Thorne et al., 2019). Again, this evidence is specific to a high-income country.

2. Sexual and reproductive health services in Malawi

The majority of all healthcare in Malawi is publicly funded and provided free of charge. The government, donors, local NGOs and households contribute approximately 16%, 68%, 10% and 6% to the health sector, respectively (Ministry of Health Malawi and ICF International, 2014). The total health expenditure was equivalent to about 2.6% of gross domestic product in 2013/14 and has remained stable over time (UNICEF Malawi, 2018). 48% of all health facilities are owned by the Government of Malawi. The Christian Health Association of Malawi (CHAM) is an umbrella organisation of Christian faith-based providers and manages 17% of the country's facilities. 22% are private-for-profit, 7% are owned by companies and 6% by NGOs (Service Provision Assessment, 2014).

CHAM is estimated to serve around 37% of the total Malawian population and 75% of the population in rural and remote areas. CHAM manages 169 facilities offering care at community, primary, secondary and tertiary levels. Around half of all facilities are Catholic and the other half are Protestant. CHAM facilities are found in all districts except one - Mwanza (Christian Health Association of Malawi, 2016). An inspection of the 2010 Malawi Demographic and Health Survey indicates that child survival was marginally higher in Mwanza while fertility was similar to the rest of the country.

CHAM facilities charge user fees with the exception of, for example, community based preventive services and the treatment of specific communicable diseases including STIs (Ministry of Health Malawi and ICF International, 2014). In order to increase the access to healthcare among rural and remote populations, the government pays salaries and other allowances for staff in CHAM facilities. Service Level Agreements were introduced in 2006 and stipulate that CHAM facilities provide specific health services for free, mainly maternal and neonatal health services, in return for government reimbursement (Christian Health Association of Malawi, 2016).

59% of married women and 44% of sexually active unmarried women use family planning methods in Malawi. The majority of women

obtain modern contraceptives from the public sector and 4% from CHAM. Banja La Mtsogolo clinics, managed by MSI Reproductive Choices, an NGO focusing exclusively on family planning, provide 8% of women with contraceptives. Private providers offer 6% and 2% are obtained from other sources (National Statistical Office NSO Malawi and ICF, 2017).

The Malawi Health Sector Strategic Plan provides a framework that guides all healthcare delivery stakeholders in the country. The third edition of the Malawi National Reproductive Health Service Delivery Guidelines summarises the policy guidelines from the National Sexual and Reproductive Health and Rights Strategy 2011–2016. All providers are required to follow four stages during a family planning visit; pre-choice, method choice, post-choice and the STI/HIV prevention, risk assessment, and counselling and testing stage, irrespective of the client's background or reason for seeking care (Ministry of Health, 2012). We focus on the last stage "STI/HIV prevention, risk assessment, and counselling and testing" where the provider is advised to do the following:

- Discuss STI/HIV transmission and prevention and the client's status.
- Offer provider-initiated testing and counselling.
- Explain which contraceptives prevent and do not prevent STI/HIV transmission.
- Discuss dual protection using the appropriate counselling card. Offer male or female condoms and instruct the client in correct and consistent use.

In the next section, we outline the mapping of the guidelines to data on family planning consultations.

3. Data

The 2013–2014 Malawi Service Provision Assessment (MSPA) comprises the main data source for analysis. The MSPA is a census of all 977 health facilities in Malawi and was implemented by the Ministry of Health with assistance from the Demographic and Health Survey (DHS) (Ministry of Health Malawi and ICF International, 2014). It provides rich information from facility audit questionnaires, interviews of health service providers, observations of client-provider consultations and exit interviews with clients.

STI related service provision is derived from observations of client-provider interactions by the surveyor during family planning visits. The interviewer records details of every interaction, including the questions asked, the examinations performed and the treatment dispensed. Additionally, the client is also asked about the visit and her background during the client exit interview. Client-provider observations and client exit interviews are imperfect predictors of actual provider behaviour due to the Hawthorne effect and incorrect recall (Tumlinson et al., 2014). Provided that any bias does not differ by ownership, these caveats do not interfere with the study objectives.

We are able to link three out of four last stage family planning guidelines to binary variables in the MSPA;

- Discuss STI/HIV transmission and prevention and the client's status.
 - Whether the provider examined STI symptoms.
 - Whether the provider discussed risk of STIs in general.
 - Whether the provider discussed partner status.
- Explain which contraceptives prevent and do not prevent STI/HIV transmission.
 - Issues discussed: Use of condoms to prevent STIs.
- Guideline: Discuss dual protection using the appropriate counselling card. Offer male or female condoms and instruct the client in correct and consistent use.
 - Issues discussed: Use condoms with other method.
 - Family planning method talked about: male/female condom.
 - Family planning method provided: male condom.

Information on whether the provider talked about condoms as a potential method of family planning is retrieved from the client exit interview. All other variables are derived from the client-interaction observation module. We focus on external (male), rather than internal (female) condoms due to the low provision of internal condoms (0.59%). The MSPA family planning module does not provide information on “Offer provider-initiated testing and counselling”. Most providers in Malawi practice symptom-based provider-initiated testing and counselling (Ahmed et al., 2016). Thus, this service component is similar to the other domains of provider behaviour which we observe.

Geographic information on facility location allows us to combine facility data with area characteristics potentially affecting facility performance and demand for SRHS. To account for the presence of other providers, we have calculated the distance to the closest facility managed by another authority using the geographic information system (GIS) software QGIS. We also include data on population density and distance to roads which are associated with the burden of STIs (Djemai, 2018; Oster, 2005). We use GIS data on the estimated total number of people per grid-cell of 3 arc (approximately 100 m at the equator) for Malawi in 2013 from WorldPop (2017) to compute the average population density within a 10 km radius of a facility. We calculate the distance from each facility to the nearest major road in 2013 using the location of all major roads in Malawi from Masdap (2013).

Due to limited information on client characteristics from the MSPA, we present an additional descriptive investigation of the use of family planning services using the nationally representative 2015/2016 Malawi DHS. The DHS provides extensive information on women aged 15 to 49 including information on contraceptive services (National Statistical Office NSO Malawi and ICF, 2017).

4. Methods

We estimate the following OLS model;

$$SRHS_{fcd} = \alpha_0 + \beta Faith\text{-based}_f + \phi Facility_f + \theta Comp_f + \delta Client_c + \phi_d + \mu_{fcd} \quad (1)$$

$SRHS$ denotes the set of binary variables capturing provider adherence to guidelines related to STI/HIV prevention, assessment and counselling during family planning consultations. $Faith\text{-based}$ is a dummy variable, taking value 1 if a client visited a CHAM facility and 0 if a client visited a public facility. The coefficient β yields the association between faith-based compared to public ownership, and the delivery of STI related services. Client-provider interactions constitute the unit of analysis. Subscripts f , c and d identify variation across facilities, clients and districts respectively. Non-linear regression models are often used in the case of binary outcome variables. For ease of interpretation, we use the linear probability model which does not give rise to concerns as we are estimating the relationship between two binary variables and not forecasting probabilities.

Our aim is to identify the effect of ownership on provider behaviour given that a patient presents at the facility. However, provider behaviour is affected by the surrounding market structure (the number and type of nearby providers), institutions and payment arrangements. Facilities that differ in terms of ownership could systematically differ with respect to such characteristics and could be treating different patients either due to incentives to avoid costly patients or heterogeneous catchment populations (Chalkley and Sussex, 2013). Therefore, we control for an extensive set of confounders.

$Facility$ is a vector of covariates at the facility level. We control for facility type (central-, district-, rural/community- or other hospital, health centre, maternity facility, dispensary or clinic) to account for differences in size and scope. We include covariates for the access to plausibly exogenous infrastructure - the facility being connected to the central electricity supply and whether water is piped into the facility grounds, to account for factors which may influence provider behaviour

but are outside the facility’s control.

To account for variation in the demand for SRHS and catchment populations, the vector also includes covariates for the facility being located in a rural or urban area, the distance to the nearest major road and the population density within a 10 km radius of the facility. Population density is an important predictor of the prevalence of STIs (Oster, 2005) and distance to nearest major road has been found to explain variation in STIs/HIV as it reflects the connectedness and locations of sex workers (Djemai, 2018; Oster, 2005). $Comp$ identifies the distance to the nearest facility with different ownership following evidence that it affects the pricing behaviour of faith-based providers by Bjorvatn and Svensson (2016).

While the selection of individuals who attend family planning visits at any facility compared to the general population is not of major concern, potential client selection by ownership could result in biased estimates. The guidelines stipulate the same procedures for all consultations but client characteristics could affect provider behaviour (Solo and Festin, 2019). Populations residing near CHAM facilities could differ from those served by public providers. Faith-based facilities were often established as part of historical Christian missions which have been shown to have long-term effects on health and sexual behaviour (Cagé and Rueda, 2019; Calvi and Mantovanelli, 2018). CHAM facilities enjoy a better reputation than public facilities and charge fees which could result in differential client preferences and socio-economic status by ownership.

The vector $Client$ denotes client characteristics. We control for educational attainment as it impacts preferences for contraception and is correlated with wealth (Grépin and Bharadwaj, 2015). While the MSPA does not provide information on wealth, it has been shown that richer women are more likely to bypass their closest facility for family planning consultations (Digitale et al., 2017). We account for whether the facility is the woman’s closest facility to home. Covariates for age (and age squared), whether it is the client’s first visit to the provider and whether the client has been pregnant before, are included as these factors are likely to affect the provider’s perception of the client’s need for STI prevention and assessment. Information on marital status is not available but a previous pregnancy is strongly associated with being married in Malawi (Digitale et al., 2017).

Districts are in charge of health service delivery and disbursement of funding from the Ministry of Finance and donors to cover district level health activities (Borgi et al., 2017). Therefore, we include district fixed effects, ϕ and the heteroskedasticity-robust standard errors, μ , are clustered at the district level.

We apply propensity score kernel matching to further examine the threat of selection of observables. Matching methods reduce bias stemming from miss-specification of the functional form of covariates and the potential lack of common support. The matching algorithm uses all controls within a given distance and gives larger weight to covariates with smaller distances using an Epanechnikov kernel function to estimate the propensity score. We estimate the Average Treatment effect on the Treated (ATT) which measures the average effect of visiting a faith-based facility for individuals who attend CHAM consultations. We also present the Average Treatment Effect (ATE) describing the average over the entire population, irrespective of the facility visited.

Equation (1) attempts to avoid confounding by controlling for a rich set of covariates and unobservable factors between districts by the inclusion of district fixed effects. The controls may not capture particular within-district omitted variables, such as client preferences and communication with the health worker, access to informal and small scale SRHS providers, which might impact the provider’s adherence to guidelines. Therefore, we investigate whether omitted variable bias drives the OLS results by inspecting the stability of the coefficients. We follow Oster (2019) and examine how important the unobservables would need to be relative to the observables to eliminate the estimated effect and calculate the value of $\hat{\delta}$ which would produce $\beta = 0$ given an

assumed R_{\max} .

$$\hat{\delta} = \frac{\tilde{\beta}(\tilde{R} - R^*)}{(\tilde{\beta} - \beta^*)(R_{\max} - \tilde{R})}$$

$\hat{\delta}$ is calculated by estimating two regressions for each outcome variable: a regression which only controls for covariates which do not have a corresponding unobserved component (facility type) and a regression including all controls. The estimated coefficient from the first regression is denoted R^* and $\tilde{\beta}$ represents the parameter from the fully controlled regression. R^* and \tilde{R} are associated with the R^2 from the first and latter specifications, respectively. As in Oster (2019) we set R_{\max} from a hypothetical regression that controls for all observed and unobserved covariates to $1.3 \cdot \tilde{R}$. Effects for which $\hat{\delta} > |1|$ indicates that observables are more important than the unobservables and that omitted variable bias is likely to be limited. However, we treat the interpretation of this robustness check with caution as the MSPA provides information on a limited number of individual level characteristics which are unlikely to be representative of the full range of factors that determine the outcome of interest.

5. Results

5.1. Descriptive statistics

Fig. 1 shows the location of all facilities providing family planning on a heatmap of estimated births per location using data from WorldPop (2017). One notes a fairly even distribution of CHAM facilities across the country.

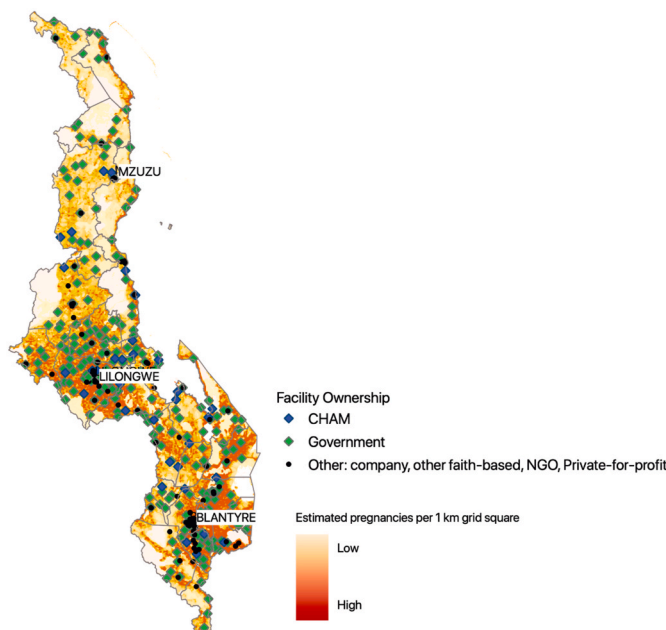
71.5% of all family planning consultations in the MSPA occurred at public facilities and 9.5% took place at CHAM facilities, see Table A1 in

the Appendix. The proportion of women attending CHAM family planning services is lower than the estimated 37% of the total catchment population served by CHAM (Christian Health Association of Malawi, 2016).

The adherence to "STI/HIV Prevention, Risk Assessment, and Counselling and Testing" guidelines across CHAM and government providers are presented in Table 1. The analytical sample consists of 146 client visits to 34 different CHAM facilities and 1101 visits to 245 different public facilities. While 40% and 48% of clients visiting CHAM and public providers, respectively, report that the provider talked about condom use, adherence to other guidelines is low. For example, only 3% and 6% of clients at CHAM and public facilities, respectively, were provided with a condom, see Table 1.

Despite the small sample size, differences in compliance with guidelines by ownership are apparent. CHAM providers are less likely to enquire about STI symptoms, discuss and encourage general condom use, or the dual use of condoms in addition to another method, to prevent STIs. We do not find differences across ownership among other aspects of STI prevention such as discussing overall STI risks or asking about partner status.

The client exit interview shows that the women seeking family planning services at religious and government facilities are similar. The average age is 25.6 years at CHAM facilities and 26.23 years at government facilities. While the proportion of women with high school attainment is the same across both organisations, CHAM clients are 3 percentage points more likely to have completed primary school. 96% and 94% of clients at CHAM and government facilities, respectively, report that the facility is their closest facility to home. The low bypassing rate suggests that distance is an important predictor of facility choice. A slightly larger proportion of women at CHAM facilities (31%) respond that it is their first visit to the facility compared to women at government facilities (27%).



The figure depicts the locations of all health care providers offering family planning services from the 2013-2014 MSPA on a heatmap of estimated pregnancies per 1 km grid square. The map also shows the position of the capital, Lilongwe, two other larger cities, Blantyre and Mzuzu and district boundaries.

Fig. 1. Facilities offering family planning services in Malawi.

Table 1
Descriptive statistics.

	CHAM			Public			Difference	
	Mean	95% CI	SD	Mean	95% CI	SD	Difference	t-statistic
Provider examined STI symptoms	0.04	[0.01,0.07]	0.2	0.08	[0.07,0.10]	0.28	0.04*	-2.35
Provider discussed STI risks	0.05	[0.02,0.09]	0.23	0.06	[0.04,0.07]	0.23	0	-0.12
Provider discussed partner status	0.05	[0.01,0.08]	0.21	0.03	[0.02,0.04]	0.17	-0.02	-0.97
Provider discussed condom use as STI prevention	0.03	[0.00,0.05]	0.16	0.1	[0.08,0.11]	0.3	0.07***	-4.25
Client reported that provider talked about condom	0.4	[0.32,0.48]	0.49	0.48	[0.45,0.51]	0.5	0.09*	-2
Condom provided during visit	0.03	[0.00,0.05]	0.16	0.06	[0.04,0.07]	0.23	0.03	-1.82
Provider discussed dual use	0.05	[0.02,0.09]	0.23	0.11	[0.09,0.13]	0.31	0.05*	-2.49
Age of client	25.63	[24.69,26.57]	5.7	26.23	[25.86,26.61]	6.14	0.6	-1.17
Client has primary school attainment	0.7	[0.62,0.77]	0.46	0.67	[0.64,0.70]	0.47	-0.03	-0.62
Client attended high school	0.19	[0.13,0.25]	0.39	0.19	[0.17,0.21]	0.39	0	-0.05
Client's closest facility	0.96	[0.92,0.99]	0.2	0.94	[0.93,0.95]	0.24	-0.02	-0.95
Client has ever been pregnant	0.98	[0.96,1.00]	0.14	0.99	[0.99,1.00]	0.1	0.01	-0.94
Client's first visit to facility	0.31	[0.23,0.38]	0.46	0.27	[0.25,0.30]	0.45	-0.04	-0.9
Facility is a Central Hospital	0.00	[0.00,0.00]	0	0.01	[0.01,0.02]	0.11	0.01***	-3.63
Facility is a District Hospital	0.00	[0.00,0.00]	0	0.13	[0.11,0.15]	0.34	0.13***	-12.97
Facility is a Rural/Community Hospital	0.12	[0.07,0.18]	0.33	0.08	[0.06,0.10]	0.27	-0.04	-1.52
Facility is a Other Hospital	0.23	[0.16,0.29]	0.42	0.00	[0.00,0.00]	0.00	-0.23***	-6.51
Facility is a Health Centre	0.65	[0.57,0.73]	0.48	0.71	[0.68,0.74]	0.45	0.06	-1.44
Facility is a Maternity Centre	0.00	[0.00,0.00]	0.00	0.00	[0.00,0.01]	0.07	0.00*	-2.24
Facility is a Dispensary	0.00	[0.00,0.00]	0	0.04	[0.03,0.05]	0.2	0.04***	-6.77
Facility is a Clinic	0.00	[0.00,0.00]	0	0.02	[0.01,0.03]	0.14	0.02***	-4.74
Facility is located in rural area	0.83	[0.77,0.89]	0.38	0.79	[0.77,0.82]	0.4	-0.03	-1.04
Facility is connected to the central electricity supply	0.73	[0.66,0.80]	0.44	0.66	[0.64,0.69]	0.47	-0.07	-1.75
Facility has water piped into facility grounds	0.71	[0.64,0.79]	0.45	0.62	[0.59,0.65]	0.49	-0.10*	-2.37
Distance from facility to any other ownership type	6.54	[5.95,7.13]	3.63	8.87	[8.43,9.30]	7.32	2.33***	-6.25
Distance from facility to major road	6.79	[5.78,7.80]	6.23	8.34	[7.74,8.95]	10.2	1.56*	-2.59
Population density surrounding the facility	2.34	[2.02,2.66]	1.98	2.76	[2.56,2.97]	3.49	0.43*	-2.19
Observations	146			1101				1247

Notes: * = $p < .1$, ** = $p < .05$, *** = $p < .01$. This table shows descriptive statistics by healthcare ownership. Data on family planning consultations from the 2013–2014 MSPA is used along with spatial data on distance to major road and population density.

The majority of all facilities are health centres but there is large variation of facility types within and across managing authorities. Religious facilities tend to have better access to infrastructure compared to public facilities. 73% of all CHAM facilities are connected to the central electricity supply compared to 66% of all public facilities. 71% of CHAM facilities have water piped into the facility grounds while the corresponding proportion of government facilities is 62%. CHAM providers are on average 6.54 km away from their nearest facility owned by a competing organisation which is closer than the average distance of 8.87 km for government facilities. While faith-based providers are also on average in closer proximity to a major road than government facilities (6.79 km compared to 8.34 km), the population density is higher surrounding public facilities as the average estimated total number of people per 100 m is 2.76 compared to 2.34 near CHAM providers.

We turn to the 2015/2016 Malawi DHS for a descriptive examination of the characteristics of women who report using CHAM and government family planning services. Summary statistics are presented in [Table A2](#) in the Appendix. CHAM clients are more likely to come from wealthier households compared to those attending government family planning consultations. This is expected as CHAM charges user fees and public facilities do not. We also observe that women who visit CHAM providers are marginally less likely to report having contracted an STI (2% compared to 3%) and are more likely to ask their husband to wear a condom if he has an STI. On the other hand, no differences are found across behaviour affecting the risk of contracting STIs (total lifetime sex partners, having sex in return for gifts, using a condom during last sexual intercourse or having heard of STIs) or for objectively assessed health status measured by BMI and the incidence of anaemia.

An important concern is whether women who seek faith-based family planning services differ in other ways which could influence the behaviour of healthcare providers with respect to STI assessment and condom promotion, such as religiosity, fertility preferences and attitudes towards HIV. No differences are found for marital status or fertility preferences. A mixed pattern of religious affiliation and the use of faith-

based family planning services is observed. Women of Muslim and Anglican faith are more likely to attend CHAM family planning services while Catholics, members of the Church of Central Africa Presbyterian and other smaller Christian denominations are more likely to attend government family planning consultations. There are no differences in 4 out of 5 measures of attitudes and stigma towards HIV across women attending CHAM and public family planning services. Women seeking contraception at public facilities are more likely to report that they would not buy vegetables from a shopkeeper or vendor who is HIV positive.

These summary statistics suggest a lack of systematic case-mix selection by ownership. Particularly, we do not find evidence suggesting that women who attend CHAM facilities differ in most characteristics related to observed needs for STI prevention. Moreover, CHAM clients do not appear to have more stigmatizing views against STIs or weaker preferences for condom use.

5.2. Regression results

The baseline model controls for facility type, the second specification incorporates district fixed effects and the third model includes the whole set of facility, market and client covariates.

CHAM providers are 6.5 percentage points less likely to examine the client's STI symptoms compared to public providers after controlling for facility type, see column 1 in [Table 2](#). The parameter of interest is robust to the inclusion of subsequent controls. The saturated model shows that faith-based providers are 7 percentage points less likely to adhere to guidelines for STI examination, see column 3 in [Table 2](#). The effect size is large as it corresponds to 89% of the sample mean.

We do not observe any association between ownership and the provider discussing the risk of STIs with the client. However, a statistically significant negative relationship is found between CHAM management and the probability of discussing the client's partner status after including district fixed effects, see columns 8 and 9 in [Table 2](#).

Table 2
Faith-based ownership and discussion of STI/HIV transmission, prevention and the client's status.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Examined STI symptoms	Examined STI symptoms	Examined STI symptoms	Discussed STI risks	Discussed STI risks	Discussed STI risks	Discussed partner status	Discussed partner status	Discussed partner status
Faith-based	-0.065*** (0.020)	-0.072*** (0.019)	-0.071*** (0.020)	0.020 (0.033)	0.006 (0.033)	0.003 (0.029)	-0.019 (0.012)	-0.028* (0.016)	-0.032* (0.018)
Rural			0.002 (0.035)			0.036 (0.053)			-0.022 (0.034)
Central electricity supply			0.035 (0.027)			0.005 (0.031)			0.006 (0.012)
Water piped into facility grounds			0.024 (0.028)			-0.003 (0.020)			-0.026 (0.018)
Distance to any other ownership			0.002 (0.002)			0.001 (0.001)			-0.001 (0.001)
Distance to major road			0.000 (0.002)			-0.000 (0.001)			-0.001 (0.000)
Population density			-0.005** (0.002)			0.008* (0.005)			-0.001 (0.003)
Age of client			0.001 (0.006)			-0.015* (0.008)			0.007 (0.005)
Age squared			-0.000 (0.000)			0.000 (0.000)			-0.000 (0.000)
Primary education			-0.032 (0.037)			0.007 (0.022)			-0.034 (0.024)
Secondary education			-0.033 (0.035)			0.006 (0.030)			-0.024 (0.026)
Closest facility			0.031 (0.024)			-0.000 (0.026)			0.026 (0.019)
Ever pregnant			-0.042 (0.131)			0.048*** (0.014)			0.023* (0.013)
First visit			0.117*** (0.035)			-0.021 (0.022)			0.016 (0.019)
Facility-type controls	✓	✓	✓	✓	✓	✓	✓	✓	✓
District fixed effects		✓	✓		✓	✓		✓	✓
Constant	0.000 (0.000)	-0.003 (0.018)	-0.025 (0.210)	0.000 (.)	-0.090*** (0.022)	0.052 (0.164)	0.000 (.)	-0.006 (0.007)	-0.075 (0.094)
Observations	1247	1247	1181	1247	1247	1181	1247	1247	1181
R-squared	0.011	0.069	0.109	0.027	0.062	0.086	0.035	0.060	0.075

Notes: This table displays results from Equation (1) using data on family planning visits at faith-based and public providers in the 2013–2014 MSPA. Robust standard errors clustered on districts are shown in parentheses. * $p < .10$, ** $p < .05$, *** $p < .01$.

CHAM providers are 3.2 percentage points less likely to discuss the client's partner status which corresponds to around 100% of the sample average.

Faith-based providers are 5.7 percentage points less likely (64.6% of mean) to discuss condom use for STI prevention, see columns 1–3 in Table 3. The estimates from columns 4–12 point to a negative but statistically insignificant association between faith-based management and the adherence to guidelines on the discussion of (dual) condom use and

provision of condoms.

Overall, CHAM providers are less likely to adhere to guidelines on STI examination, partner status discussion and the encouragement of condom use during the last stage of family planning consultations.

5.3. Robustness analyses

We investigate whether the results are driven by client selection. We

Table 3
Faith-based ownership and discussion of condoms and STI/HIV prevention.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	Discussed condom use as STI prevention	Discussed condom use as STI prevention	Discussed condom use as STI prevention	Discussed dual use	Discussed dual use	Discussed dual use	Provider talked about condom	Provider talked about condom	Provider talked about condom	Condom provided	Condom provided	Condom provided
Faith-based	-0.066*** (0.022)	-0.058** (0.024)	-0.057* (0.029)	-0.041 (0.045)	-0.031 (0.050)	-0.028 (0.051)	-0.086 (0.064)	-0.053 (0.067)	-0.084 (0.064)	-0.021 (0.025)	-0.019 (0.028)	-0.028 (0.027)
Rural			0.149** (0.057)			0.088 (0.058)			0.075 (0.089)			0.013 (0.041)
Central electricity supply			-0.007 (0.034)			0.047 (0.051)			0.067 (0.055)			0.002 (0.023)
Water piped into facility grounds			-0.021 (0.030)			-0.006 (0.039)			-0.011 (0.051)			0.012 (0.019)
Distance to any other ownership			0.001 (0.002)			0.001 (0.002)			-0.002 (0.003)			-0.002 (0.001)
Distance to major road			-0.002* (0.001)			-0.002 (0.001)			0.000 (0.002)			-0.001 (0.001)
Population density			0.020*** (0.005)			0.013* (0.007)			0.001 (0.009)			0.000 (0.003)
Age of client			-0.023** (0.010)			-0.005 (0.007)			-0.013 (0.015)			-0.009 (0.011)
Age squared			0.000* (0.000)			0.000 (0.000)			0.000 (0.000)			0.000 (0.000)
Primary education			-0.028 (0.021)			-0.017 (0.029)			0.033 (0.046)			-0.010 (0.024)
Secondary education			-0.025 (0.027)			-0.009 (0.032)			0.123** (0.053)			0.018 (0.026)
Closest facility			0.051** (0.022)			-0.031 (0.041)			0.052 (0.071)			-0.046 (0.035)
Ever pregnant			0.000 (0.071)			-0.052 (0.150)			-0.289* (0.143)			-0.065 (0.080)
First visit			0.029 (0.035)			0.061 (0.043)			0.096** (0.040)			0.079** (0.031)
Facility-type controls	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
District fixed effects		✓	✓		✓	✓		✓	✓		✓	✓
Constant	0.000 (0.000)	0.157*** (0.056)	0.408* (0.234)	0.000 (.)	0.315*** (0.067)	0.409 (0.254)	0.400*** (0.000)	0.053 (0.070)	0.376 (0.290)	0.000 (0.000)	0.045 (0.091)	0.284 (0.228)
Observations	1247	1247	1181	1247	1247	1181	1247	1247	1181	1234	1234	1168
R-squared	0.015	0.074	0.119	0.015	0.080	0.117	0.021	0.083	0.108	0.006	0.084	0.132

Notes: This table displays results from Equation (1) using data on family planning visits at faith-based and public providers in the 2013–2014 MSPA. Robust standard errors clustered on districts are shown in parentheses. * $p < .10$, ** $p < .05$, *** $p < .01$.

begin with inspecting whether ownership is associated with the type of contraception provided as differences in methods of family planning could indicate further potential differences in unobserved client characteristics. We analyse the relationship between faith-based ownership and the likelihood that the patient was provided one of the more common methods of modern family planning in Malawi; the pill, injectable, implant and sterilization, respectively, by estimating Equation (1). Regression results in Table A3 in the Appendix show that there are no statistically significant associations between FBP and contraceptive methods provided after adjusting for covariates.

Secondly, the reason for seeking family planning services could impact healthcare provider behaviour. Therefore, we re-estimate Equation (1) controlling for the reason the woman visited the facility. The following information is available from the MSPA client exit interview: resupply/routine follow-up, discuss problem with method, desire to change or discontinue the method, desire to discontinue – no specific problem, or discuss other physical problems. The inclusion of this categorical variable reduces the number of observations in our preferred model to around 850, see Table A4 in the Appendix. The results are qualitatively similar to the main results although the coefficient on discussing partner status does not reach statistical significance.

Matching yields a more balanced treatment and control group across the board, see Figure A1 in the Appendix. We also perform regression adjustment by controlling for whether the facility is located in a rural area, the client’s level of education and district of residence as the difference in rural residence and secondary school attainment increases after matching. The ATT, ATE and the raw differences are presented in Table 4. The matching estimates largely support the OLS results. The ATE and ATT on the likelihood of the provider examining STI symptoms using matching are –0.063 and –0.073, respectively. We also find evidence of CHAM providers being less likely to discuss condom use for STI prevention after matching. The ATE is –0.078 and the ATT is –0.135 which is more than twice as large as the corresponding OLS estimate. Moreover, a negative and statistically significant relationship on the provider discussing STI risk is noted. The association between faith-based management and the provider discussing partner status does not hold after matching. The ATE and ATT yield a larger negative association between CHAM ownership and discussing dual use, –0.068 and –0.094 respectively, both statistically significant at the 1 percent level. The ATE on the provider talking about condom use is small and not statistically significant while the ATT is statistically significant at the 5 percent level and larger than the OLS result (–0.148 compared to –0.084).

Moreover, given the data at hand, we cautiously infer that omitted

Table 5
Assessment of bias from unobservable factors.

Variable	$\hat{\delta}$	R_{max}
Examined STI symptoms	–188.513	0.084
Discussed STI risks	3.835	0.119
Discussed partner status	–4.494	0.099
Discussed condom use as STI prevention	5.156	0.166
Discussed dual use	4.698	0.155
Provider talked about condom	9.191	0.141
External condom provided	–15.359	0.171

variable bias is not likely to drive our OLS results after examining the stability of the estimated coefficients following Oster (2019). Values for the corresponding $\hat{\delta}$ and R_{max} for each outcome are presented in Table 5 and suggest that the results can be considered robust.

6. Discussion and conclusion

Faith-based providers are a vital part of healthcare systems in Africa delivering up to 70% of services. Religious providers also have a strong reputation in respect of the quality of care and are often better equipped and supplied relative to public facilities (Basu et al., 2012). Whilst the role of ownership and especially the distinction between for-profit and not-for-profit has long been recognised, the usual focus is upon the inherent motivation for improving the health of patients. Faith-based providers raise a different concern in that their motivation might steer them away from providing services that those who manage healthcare systems deem crucial. This is indeed arguably the case for sexual healthcare services which play a key role in strategies to limit HIV and unplanned pregnancies, but which may conflict with the mission of faith-based organisations.

Our study addresses this issue and is the first, to our knowledge, to examine the differences in the provision of SRHS across public and faith-based facilities in a low-income country accounting for different levels of confounding variation. Using data on third-party observations of client-provider interactions from a facility census in Malawi, we find that faith-based providers are less likely to adhere to national family planning guidelines compared to public providers. Faith-based ownership reduces the probability of STI examination, discussion of partner status and condom use during family planning consultations.

To enhance our understanding of whether the findings are driven solely by health worker behaviour or if there are additional facility level constraints, we assess the relationship between ownership and facility

Table 4
Kernel propensity score matching results: Faith-based ownership and SRHS provision.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Examined STI symptoms	Discussed STI risks	Discussed partner status	Discussed condom use	Discussed dual use	Provider talked about condom	Condom provided
ATE	–0.063*** (0.016)	–0.027* (0.016)	–0.004 (0.012)	–0.078*** (0.015)	–0.068*** (0.017)	–0.063 (0.063)	–0.015 (0.017)
ATT	–0.073** (0.031)	–0.058* (0.033)	–0.002 (0.027)	–0.135*** (0.033)	–0.094*** (0.033)	–0.148** (0.060)	–0.003 (0.018)
Raw mean differences	–0.039** (0.019)	–0.007 (0.020)	0.022 (0.019)	–0.073*** (0.015)	–0.049** (0.022)	–0.097** (0.044)	–0.027* (0.016)
Observations	1181	1181	1181	1181	1181	1181	1168

Notes: The table presents ATE, ATT estimates as well as raw mean differences from PSM models using Epanechnikov kernel matching with 1.5 times the 90% quantile of the (non-zero) distances in pair matching with replacement. All covariates specified in Equation (1) are used to calculate the propensity score. 135/141 of the treated observations were matched to 389/1040 control observations in models estimated in columns 1–6. 136/141 of the treated observations were matched to 390/1027 control observations in the models estimated in column 7. Standard errors are displayed in parentheses. Specifications include district fixed effects. * p < .10, ** p < .05, *** p < .01.

resources related to STI care. We estimate Equation (1) using information from the MSPA facility inventory survey and facility audits without controlling for client characteristics. Descriptive statistics by ownership are presented in Table A5 in the Appendix. Regression results in Table A6 and Table A7 in the Appendix show that faith-based facilities are for example less likely to have national STI guidelines available, have a lower proportion of health workers with training in STI related care and are 9 percentage points less likely to stock condoms, compared to public facilities. These findings support the interpretation of systematic differences in STI/HIV prevention by ownership.

Our overall findings are of potential value to those charged with the oversight of healthcare systems in low-income countries with a prevalence of faith-based providers. They indicate that policy may need to be targeted at faith-based providers. Those policies could range from nationalisation, direct regulation to instituting financial incentives, see for example Duchoslav and Cecchi (2019). The latter mechanism is one that is finding increasing favour in low- and middle-income settings and is embodied in a range of different systems for financing the delivery of services, including activity-based financing and pay-for-performance schemes. Our findings thus indicate a particular domain of healthcare, and a particular set of providers for which such mechanisms might be important.

A potential shortcoming with our study is that the nationwide facility census is limited in sample size. Thus, the coefficients on religious management do not reach statistical significance for some outcomes related to the promotion and provision of condoms using OLS. Another possible limitation is that our main outcome variables are based on information collected by third-party observations which have been shown to be at risk of low accuracy due to the Hawthorne effect (Tumlinson et al., 2014). It is difficult to assess the severity of the bias, particularly as Leonard and Masatu (2006) show that the Hawthorne effect reduces with the number of consultations. Moreover, we show that the conclusion regarding our main results holds when using data collected by other methods, for example from facility audits of condom availability which is less prone to bias as the surveyor validates the observation. Assuming that the measurement error does not differ by ownership, our results are at most underestimated. However, a concern which we are unable to rule out is that the Hawthorne effect differs by management, particularly that public facilities improve service delivery when being observed more

than religious providers.

A paramount issue is that client use of facility by ownership is not randomly assigned and we are not able to fully account for patient selection or other threats to identification permitting a causal interpretation. Our OLS models account for basic individual characteristics and additional covariates at the facility- and area level. Numerous sensitivity checks show that ownership is not related to the type of family planning provided and that the results are robust to matching on observable characteristics. Following Oster (2019), we show that selection on unobservables is unlikely to drive the estimates. However, it is important to note that our limited set of client covariates cautions us from inferring too much about selection on unobservables. A descriptive analysis of another dataset, the Malawi DHS, does not suggest systematic differences across women who report using CHAM and government family planning services. Women who attend faith-based family planning services do not have differential marital status, fertility preferences, sexual partner history, lower preferences for condom use or higher HIV/AIDS stigma. However, these descriptive statistics do not allow us to inspect the severity of omitted variable bias in our main analysis. Therefore, further research could investigate the possibility of combining facility- and rich individual-level data and preferably exploit “as if” random utilisation of healthcare services by ownership, for example by applying quasi-experimental techniques as in Hill et al. (2019). Moreover, we observe the behaviour of providers given that the clients choose to present at a certain facility. Future studies could investigate whether access to different types of ownership affects the decision to seek care and the utilisation of a wider range of SRHS.

Funding sources

The authors acknowledge funding from Global Challenges Research Fund (GCRF) funded project Thanzi la Onse (grant number MR/P028004/1).

CRedit author statement

Wiktoria Tafesse: conceptualization, methodology, formal analysis, investigation, writing, visualisation. Martin Chalkley: conceptualization, writing, supervision, funding acquisition.

Appendix. Tables

Table A1
Family planning visits by ownership.

	Number of observations	Percent
Public	1101	71.5
Faith-based provider (CHAM)	146	9.5
Private for profit	118	7.7
Faith-based provider other than CHAM	10	0.6
NGO	114	7.4
Company	50	3.2
Observations	1539	

Notes: This table shows the number of client-provider interactions by ownership of health facilities from family planning consultations in the 2013–2014 MSPA.

Table A2
Differences in client characteristics from the 2015–2016 Malawi DHS

	CHAM		Public		Difference	
	Mean	SD	Mean	SD	Difference	t-statistic
Total lifetime sex partners	2.38	5.34	2.06	4.82	-0.32	(-1.47)
Asks husband to wear condom if he has STI	0.89	0.31	0.85	0.36	-0.05***	(-3.87)
Had sex in return for gifts	0.04	0.20	0.04	0.19	-0.00	(-0.06)
Condom used during last sex	0.11	0.31	0.09	0.29	-0.01	(-1.02)

(continued on next page)

Table A2 (continued)

	CHAM		Public		Difference	
	Mean	SD	Mean	SD	Difference	t-statistic
Ever heard of an STI	0.99	0.08	0.99	0.08	0.00	(0.12)
Has had STI	0.02	0.14	0.03	0.18	0.01*	(2.25)
BMI	23.58	4.78	23.18	4.00	-0.39	(-1.21)
Anaemia	0.32	0.59	0.32	0.57	-0.00	(-0.02)
Wealth index	3.44	1.38	3.06	1.41	-0.37***	(-6.66)
Married	0.79	0.40	0.80	0.40	0.01	(0.49)
Desired fertility	3.83	1.22	3.77	1.25	-0.06	(-1.25)
Wanted last child	0.59	0.49	0.57	0.50	-0.03	(-1.15)
Catholic	0.11	0.31	0.18	0.38	0.07***	(5.47)
Church of Central Africa Presbyterian	0.10	0.31	0.16	0.36	0.05***	(4.31)
Anglican	0.28	0.45	0.04	0.19	-0.24***	(-13.77)
7th day Adventist/Baptist	0.08	0.27	0.07	0.26	-0.01	(-0.79)
Other Christian	0.29	0.46	0.46	0.50	0.17***	(8.95)
Muslim	0.13	0.33	0.09	0.28	-0.04**	(-3.04)
Would buy vegetables from HIV positive shopkeeper	0.90	0.29	0.87	0.34	-0.04**	(-3.14)
Ashamed if HIV positive family member	0.14	0.35	0.15	0.35	0.01	(0.44)
HIV positive children should not attend school	0.91	0.28	0.92	0.27	0.01	(0.68)
People talk badly about HIV positive individuals	0.67	0.47	0.65	0.48	-0.02	(-1.05)
HIV positive individuals loose respect from others	0.46	0.50	0.44	0.50	-0.01	(-0.65)
Observations	656		8062		8718	

Notes: This table shows the difference in characteristics related to sexual and overall health for women who report to use family planning services from faith-based (CHAM) and public providers. Data from the 2015–2016 Malawi Demographic and Health Survey is used.

Table A3
Faith-based ownership and the provision of family planning methods

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	Pill	Pill	Pill	Injectable	Injectable	Injectable	Implant	Implant	Implant	Sterilization	Sterilization	Sterilization
Faith-based	-0.016 (0.046)	-0.039 (0.044)	-0.045 (0.043)	-0.055 (0.066)	-0.045 (0.069)	-0.039 (0.068)	0.075 (0.077)	0.085 (0.082)	0.087 (0.087)	-0.006** (0.003)	-0.006 (0.005)	-0.002 (0.005)
Rural			-0.063 (0.053)			0.040 (0.072)			0.020 (0.050)			0.012* (0.007)
Central electricity supply			-0.048 (0.053)			0.084 (0.064)			-0.027 (0.035)			-0.013 (0.009)
Water piped into facility grounds			-0.011 (0.026)			-0.047 (0.046)			0.051 (0.031)			0.011* (0.006)
Distance to any other ownership type			-0.002 (0.002)			0.000 (0.004)			0.001 (0.003)			0.001 (0.001)
Distance to major road			-0.001 (0.001)			0.000 (0.002)			0.001 (0.002)			-0.000 (0.000)
Population density			0.001 (0.003)			0.004 (0.009)			0.001 (0.008)			0.001 (0.002)
Age of client			-0.000 (0.009)			0.001 (0.014)			0.013* (0.007)			-0.006 (0.005)
Age squared			-0.000 (0.000)			0.000 (0.000)			-0.000** (0.000)			0.000 (0.000)
Primary education			-0.047 (0.032)			0.063 (0.038)			0.005 (0.019)			0.003 (0.004)
Secondary education			-0.049 (0.047)			0.013 (0.053)			0.018 (0.038)			-0.000 (0.003)

(continued on next page)

Table A3 (continued)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	Pill	Pill	Pill	Injectable	Injectable	Injectable	Implant	Implant	Implant	Sterilization	Sterilization	Sterilization
Closest facility			0.006 (0.027)			0.001 (0.052)			0.017 (0.032)			0.009* (0.005)
Ever pregnant			-0.009 (0.081)			-0.075 (0.135)			0.135*** (0.035)			0.002 (0.005)
First visit			-0.001 (0.031)			-0.107*** (0.037)			0.032* (0.016)			0.003 (0.004)
Facility-type controls	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
District fixed effects		✓	✓		✓	✓		✓	✓		✓	✓
Constant	0.000 (.)	-0.054 (0.035)	0.090 (0.203)	1.000 (.)	0.975*** (0.044)	0.943*** (0.285)	0.000 (.)	0.093 (0.117)	-0.270* (0.136)	0.000 (0.000)	-0.020*** (0.005)	0.021 (0.074)
Observations	1243	1243	1177	1247	1247	1181	1247	1247	1181	1247	1247	1181
R-squared	0.026	0.133	0.152	0.033	0.124	0.156	0.023	0.097	0.110	0.005	0.026	0.060

Notes: This table displays regression results on the probability of the provider providing a given family planning method following the model specified in Equation (1). Data from the 2013/2014 MSPA is used. Robust standard errors clustered on districts are shown in parentheses. * $p < .10$, ** $p < .05$, *** $p < .01$.

Table A4

Faith-based ownership and SRHS controlling for the client's reason to visit

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Examined STI symptoms	Discussed STI risks	Discussed partner status	Discussed condom use as STI prevention	Discussed dual use	Provider talked about condom	Condom provided
Faith-based	-0.047*** (0.014)	-0.005 (0.034)	-0.035 (0.023)	-0.043** (0.018)	-0.029 (0.032)	-0.040 (0.097)	0.014 (0.022)
Rural	-0.001 (0.024)	-0.013 (0.049)	-0.013 (0.036)	0.076 (0.045)	0.086 (0.059)	0.089 (0.095)	0.033 (0.041)
Central electricity supply	-0.024 (0.021)	0.001 (0.027)	0.013 (0.008)	-0.028 (0.039)	0.004 (0.035)	0.124* (0.064)	-0.002 (0.011)
Water piped into facility grounds	-0.010 (0.027)	-0.001 (0.024)	-0.023 (0.017)	-0.037 (0.029)	0.026 (0.032)	-0.015 (0.058)	-0.000 (0.014)
Distance to any other ownership type	0.001 (0.002)	0.002 (0.002)	-0.002* (0.001)	0.002 (0.003)	0.001 (0.002)	-0.003 (0.003)	-0.000 (0.001)
Distance to major road	-0.001 (0.001)	0.000 (0.001)	-0.000 (0.000)	-0.002 (0.002)	-0.002 (0.001)	0.002 (0.003)	-0.001 (0.000)
Population density	-0.001 (0.003)	0.010* (0.006)	-0.000 (0.004)	0.021*** (0.005)	0.021*** (0.007)	-0.009 (0.007)	0.006 (0.004)
Age of client	0.003 (0.004)	-0.008 (0.008)	0.008 (0.005)	-0.014 (0.010)	-0.010 (0.008)	-0.005 (0.018)	-0.010** (0.005)
Age squared	-0.000 (0.000)	0.000 (0.000)	-0.000* (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000* (0.000)
Primary education	-0.031 (0.025)	0.009 (0.021)	-0.045* (0.026)	-0.035 (0.023)	-0.043 (0.027)	-0.020 (0.055)	-0.000 (0.012)
Secondary education	-0.049* (0.025)	-0.004 (0.026)	-0.023 (0.026)	-0.039 (0.031)	-0.042 (0.033)	0.079 (0.080)	0.018 (0.018)
Closest facility	0.063*** (0.020)	-0.002 (0.038)	0.006 (0.024)	0.048 (0.031)	0.010 (0.024)	0.042 (0.068)	-0.007 (0.015)
Ever pregnant	0.059*** (0.019)	0.089*** (0.027)	0.021 (0.021)	0.083*** (0.025)	0.038 (0.036)	-0.362 (0.240)	0.014 (0.010)
First visit	0.026 (0.022)	-0.004 (0.033)	0.025 (0.029)	0.021 (0.027)	0.027 (0.037)	0.051 (0.059)	0.001 (0.015)

(continued on next page)

Table A4 (continued)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Examined STI symptoms	Discussed STI risks	Discussed partner status	Discussed condom use as STI prevention	Discussed dual use	Provider talked about condom	Condom provided
Discuss problem with method (or) The name of this variable is positioned on the next page	0.012 (0.055)	-0.060** (0.023)	-0.034* (0.019)	-0.043 (0.052)	-0.042 (0.040)	-0.109 (0.116)	-0.020** (0.009)
Desire to change or discontinue method	-0.017 (0.025)	0.050 (0.055)	0.039 (0.024)	-0.004 (0.037)	0.054 (0.045)	-0.090 (0.096)	0.018 (0.025)
Desire to discontinue - no specific problem	-0.003 (0.037)	0.019 (0.035)	0.030 (0.027)	-0.005 (0.069)	-0.013 (0.048)	0.648*** (0.074)	-0.011 (0.027)
Discuss other physical problem	0.152 (0.152)	-0.154 (0.092)	-0.044 (0.031)	-0.235** (0.099)	-0.207* (0.120)	-0.084 (0.183)	-0.033 (0.046)
Facility-type controls	✓	✓	✓	✓	✓	✓	✓
District fixed effects	✓	✓	✓	✓	✓	✓	✓
Constant	-0.131 (0.100)	-0.108 (0.192)	-0.070 (0.117)	0.187 (0.170)	0.258 (0.175)	0.499 (0.449)	0.117 (0.092)
Observations	850	850	850	850	850	850	848
R-squared	0.120	0.123	0.101	0.164	0.169	0.149	0.113

Notes: This table displays results from Equation (1) using data on family planning visits from the 2013/2014 MSPA. Omitted category for the reason for attending a family planning visit is “resupply/routine follow-up”. Robust standard errors clustered on districts are shown in parentheses. * $p < .10$, ** $p < .05$, *** $p < .01$.

Table A5

Descriptive statistics: Facility inventory module

	Faith-based		Public		Difference	
	Mean	SD	Mean	SD	Difference t-statistics	
Facility diagnoses and treats STIs	0.97	0.17	0.94	0.23	-0.03	(-1.45)
Number of days/month the facility offers STI services	24.67	4.28	22.14	4.60	-2.53***	(-6.23)
National STI guidelines available at facility	0.68	0.47	0.74	0.44	0.06	(1.37)
Prop. of STI health workers/all health workers	0.49	0.30	0.49	0.33	-0.00	(-0.18)
Prop. of trained STI health workers/all health workers	0.05	0.16	0.12	0.23	0.07***	(3.97)
Prop. of supervised STI health workers/all health workers	0.71	0.31	0.71	0.33	0.00	(0.06)
Facility stocks contraceptives	0.55	0.50	0.95	0.21	0.40***	(9.89)
Facility is observed to stock external condoms	0.64	0.48	0.71	0.45	0.08	(-1.4)
Facility is located in rural area	0.88	0.32	0.85	0.35	-0.03	(-0.91)
Facility is connected to the central electricity supply	0.66	0.47	0.54	0.50	-0.12**	(-2.75)
Facility has water piped into facility grounds	0.80	0.40	0.57	0.50	-0.23***	(-5.82)
Distance from facility to any other ownership type	6.30	4.01	10.12	7.64	3.81***	(8.07)
Distance from facility to major road	9.16	11.00	9.33	10.40	0.17	(0.17)
Population density surrounding the facility	2.65	5.09	3.09	11.75	0.45	(0.66)
Observations	160		478		638	

Notes: * $p < .1$, ** $p < .05$, *** $p < .01$. This table shows the difference in facility characteristics, including the preparedness to deliver STI care across faith-based (CHAM) and public providers. Data from the facility inventory module from the 2013–2014 MSPA is used. The unit of observation is facility.

Table A6

Faith-based ownership and facility readiness to provide SRHS

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	National guidelines available	National guidelines available	National guidelines available	Prop. of STI health workers	Prop. of STI health workers	Prop. of STI health workers	Prop. of trained STI health workers	Prop. of trained STI health workers	Prop. of trained STI health workers	Prop. of supervised STI health workers	Prop. of supervised STI health workers	Prop. of supervised STI health workers
Faith-based	-0.080 (0.057)	-0.066 (0.054)	-0.095 (0.058)	-0.005 (0.035)	-0.007 (0.035)	0.004 (0.034)	-0.083*** (0.018)	-0.081*** (0.016)	-0.083*** (0.019)	-0.019 (0.033)	-0.012 (0.031)	0.004 (0.030)
Rural			0.053 (0.062)			-0.014 (0.054)			-0.002 (0.026)			0.000 (0.051)
Central electricity supply			0.072 (0.055)			-0.002 (0.035)			0.012 (0.025)			0.028 (0.025)

(continued on next page)

Table A6 (continued)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	National guidelines available	National guidelines available	National guidelines available	Prop. of STI health workers	Prop. of STI health workers	Prop. of STI health workers	Prop. of trained STI health workers	Prop. of trained STI health workers	Prop. of trained STI health workers	Prop. of supervised STI health workers	Prop. of supervised STI health workers	Prop. of supervised STI health workers
Water piped into facility grounds			0.024 (0.058)			-0.031 (0.029)			0.032 (0.019)			-0.011 (0.021)
Distance to any other ownership			-0.007* (0.004)			0.002 (0.002)			0.001 (0.002)			0.005 (0.003)
Distance to major road			-0.001 (0.003)			-0.002 (0.002)			-0.001 (0.001)			0.000 (0.002)
Population density			-0.003 (0.003)			-0.001 (0.002)			0.000 (0.000)			-0.002** (0.001)
Facility-type controls	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
District fixed effects		✓	✓		✓	✓		✓	✓		✓	✓
Constant	0.500** (0.181)	0.656*** (0.214)	0.804*** (0.289)	0.427*** (0.129)	0.413*** (0.126)	0.398** (0.159)	0.125* (0.071)	-0.100 (0.082)	-0.116 (0.089)	1.010*** (0.018)	0.231*** (0.075)	0.115 (0.108)
Observations	606	606	606	633	633	633	605	605	605	584	584	584
R-squared	0.019	0.070	0.086	0.075	0.254	0.258	0.033	0.162	0.170	0.135	0.241	0.252

Notes: This table shows the regression results from OLS models estimating the impact of faith-based ownership on outcomes related to STI care in the facility-inventory module in the 2013–2014 MSPA. Robust standard errors clustered on districts are shown in parentheses. * $p < .10$, ** $p < .05$, *** $p < .01$.

Table A7
Faith-based ownership and facility readiness to provide SRHS

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Number of days/month offering STI services	Number of days/month offering STI services	Number of days/month offering STI services	Stocks contraceptives	Stocks contraceptives	Stocks contraceptives	Stocks external condoms	Stocks external condoms	Stocks external condoms
Faith-based	2.514*** (0.420)	2.633*** (0.390)	2.455*** (0.384)	-0.384*** (0.062)	-0.378*** (0.061)	-0.362*** (0.062)	-0.098** (0.038)	-0.077** (0.032)	-0.090** (0.037)
Rural			-0.349 (0.614)			-0.007 (0.053)			-0.100 (0.071)
Central electricity supply			-0.418 (0.492)			-0.024 (0.030)			0.050 (0.038)
Water piped into facility grounds			0.765* (0.444)			-0.061*** (0.021)			0.047 (0.055)
Distance to any other			-0.020			0.002			-0.004

(continued on next page)

Table A7 (continued)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Number of days/month offering STI services	Number of days/month offering STI services	Number of days/month offering STI services	Stocks contraceptives	Stocks contraceptives	Stocks contraceptives	Stocks external condoms	Stocks external condoms	Stocks external condoms
ownership type			(0.027)			(0.002)			(0.003)
Distance to major road			0.008 (0.023)			-0.002 (0.002)			0.001 (0.002)
Population density			-0.054*** (0.014)			-0.003*** (0.001)			0.002 (0.002)
Facility-type controls	✓	✓	✓	✓	✓	✓	✓	✓	✓
District fixed effects		✓	✓		✓	✓		✓	✓
Constant	16.750*** (5.713)	14.945** (5.823)	15.219** (6.041)	0.750*** (0.222)	0.809*** (0.130)	0.807*** (0.138)	0.667** (0.279)	0.555*** (0.126)	0.733*** (0.151)
Observations	606	606	606	638	638	638	543	543	543
R-squared	0.068	0.124	0.135	0.295	0.330	0.342	0.028	0.225	0.240

Notes: This table shows the regression results from OLS models estimating the impact of faith-based ownership on outcomes related to STI care in the facility-inventory module in the 2013–2014 MSPA. Robust standard errors clustered on districts are shown in parentheses. * $p < .10$, ** $p < .05$, *** $p < .01$.

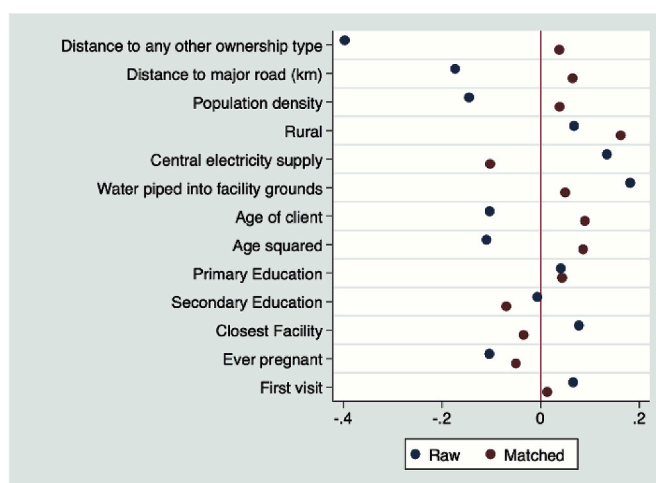


Fig. A1. Difference in means after matching

References

Ahmed, S., Schwarz, M., Flick, R.J., Rees, C.A., Harawa, M., Simon, K., Robison, J.A., Kazembe, P.N., Kim, M.H., 2016. Lost opportunities to identify and treat HIV -positive patients: results from a baseline assessment of provider-initiated HIV testing and counselling (PITC) in Malawi. *Trop. Med. Int. Health* 21, 479–485. <https://doi.org/10.1111/tmi.12671>.

Barbetta, G.P., Turati, G., Zago, A.M., 2007. Behavioral differences between public and private not-for-profit hospitals in the Italian national health service. *Health Econ.* 16, 75–96. <https://doi.org/10.1002/hec.1143>.

Barden-O’Fallon, J., 2017. Availability of family planning services and quality of counseling by faith-based organizations: a three country comparative analysis. *Reprod. Health* 14, 57. <https://doi.org/10.1186/s12978-017-0317-2>.

Basu, S., Andrews, J., Kishore, S., Panjabi, R., Stuckler, D., 2012. Comparative performance of private and public healthcare systems in low- and middle-income countries: a systematic review. *PLoS Med.* 9, 1–14. <https://doi.org/10.1371/journal.pmed.1001244>.

Bjorvatn, K., Svensson, J., 2016. Are not-for-profits different? Theory and evidence on the pricing of health services in Uganda. *Econ. Govern.* 17, 1–10. <https://doi.org/10.1007/s10101-015-0164-y>.

Borghi, J., Munthali, S., Million, L.B., Martinez-Alvarez, M., 2017. Health financing at district level in Malawi: an analysis of the distribution of funds at two points in time. *Health Pol. Plann.* 33, 59–69. <https://doi.org/10.1093/heapol/czx130>.

Cagé, J., Rueda, V., 2019. Sex and the Mission: the Conflicting Effects of Early Christian Investments on the HIV Epidemic in Sub-saharan Africa.

Calvi, R., Mantovanelli, F.G., 2018. Long-term effects of access to health care: medical missions in colonial India. *J. Dev. Econ.* 135, 285–303. <https://doi.org/10.1016/j.jdeveco.2018.07.009>.

Chalkley, M., Sussex, J., 2018. Private Provision of Publicly Funded Health Care: the Economics of Ownership. *Christian Health Association of Malawi, 2016. CHAM 2016 Annual Report.*

Devlin, K., Pandit-Rajani, T., Farnham Egan, K., 2017. Malawi’s Community-Based Health System Model: Structure, Strategies, and Learning.

Digitale, J., Psaki, S., Soler-Hampejsek, E., Mensch, B.S., 2017. Correlates of contraceptive use and health facility choice among young women in Malawi. *Ann. Am. Acad. Polit. Soc. Sci.* 669, 93–124. <https://doi.org/10.1177/0002716216678591>.

Djemai, E., 2018. Roads and the spread of HIV in Africa. *J. Health Econ.* 60, 118–141. <https://doi.org/10.1016/j.jhealeco.2018.05.004>.

Duchoslav, J., Cecchi, F., 2019. Do incentives matter when working for god? The impact of performance-based financing on faith-based healthcare in Uganda. *World Dev.* 113, 309–319. <https://doi.org/10.1016/j.worlddev.2018.09.011>.

- Eggleston, K., Shen, Y.C., Lau, J., Schmid, C.H., Chan, J., 2008. Hospital ownership and quality of care: what explains the different results in the literature? *Health Econ.* <https://doi.org/10.1002/hec.1333>.
- Grépin, K.A., Bharadwaj, P., 2015. Maternal education and child mortality in Zimbabwe. *J. Health Econ.* 44, 97–117. <https://doi.org/10.1016/j.jhealeco.2015.08.003>.
- Hasselbacher, L.A., Hebert, L.E., Liu, Y., Stulberg, D.B., 2020. “My hands are tied”: abortion restrictions and providers’ experiences in religious and nonreligious health care systems. *Perspect. Sex. Reprod. Health* 52, 107–115. <https://doi.org/10.1363/psrh.12148>.
- Hill, E.L., Slusky, D.J.G., Ginther, D.K., 2019. Reproductive health care in Catholic-owned hospitals. *J. Health Econ.* 65, 48–62. <https://doi.org/10.1016/j.jhealeco.2019.02.005>.
- Leonard, K., Masatu, M.C., 2006. Outpatient process quality evaluation and the Hawthorne Effect. *Soc. Sci. Med.* 63, 2330–2340. <https://doi.org/10.1016/j.socscimed.2006.06.003>.
- Liu, Y., Hebert, L.E., Hasselbacher, L.A., Stulberg, D.B., 2019. “Am I going to be in trouble for what I’m doing?”: providing contraceptive care in religious health care systems. *Perspect. Sex. Reprod. Health* 51, 193–199. <https://doi.org/10.1363/psrh.12125>.
- Masdap, 2013. *Roads OpenStreetMap*.
- Ministry of Health, 2012. *National Sexual and Reproductive Health and Rights Strategy 2011–2016*.
- Ministry of Health Malawi and ICF International, 2014. *Malawi Service Provision Assessment (MSPA) 2013–14*. Lilongwe, Malawi, and Rockville, Maryland.
- National Statistical Office (NSO) Malawi, ICF, 2017. *Malawi Demographic and Health Survey 2015–16*. NSO and ICF, Zomba, Malawi, and Rockville, Maryland, USA.
- O’Brien, J., 2017. Can faith and freedom co-exist? When faith-based health providers and women’s needs clash. *Gend. Dev.* 25, 37–51. <https://doi.org/10.1080/13552074.2017.1286808>.
- Olivier, J., 2017. Guest editor conclusion: research agenda-setting for faith and health in development—where to now? *Dev. Pract.* 27, 775–781. <https://doi.org/10.1080/09614524.2017.1332164>.
- Olivier, J., Tsimpo, C., Gemignani, R., Shoyo, M., Coulombe, H., Dimmock, F., Nguyen, M.C., Hines, H., Mills, E.J., Dieleman, J.L., Haakenstad, A., Wodon, Q., 2015. Understanding the roles of faith-based health-care providers in (Africa): review of the evidence with a focus on magnitude, reach, cost, and satisfaction. *Lancet* 386, 1765–1775. [https://doi.org/10.1016/S0140-6736\(15\)60251-3](https://doi.org/10.1016/S0140-6736(15)60251-3).
- Oster, E., 2019. Unobservable selection and coefficient stability: theory and evidence. *J. Bus. Econ. Stat.* 37, 187–204. <https://doi.org/10.1080/07350015.2016.1227711>.
- Oster, E., 2005. Sexually transmitted infections, sexual behavior, and the HIV/AIDS epidemic. *Q. J. Econ.* 120, 467–515. <https://doi.org/10.1093/qje/120.2.467>.
- Reinikka, R., Svensson, J., 2010. Working for God? Evidence from a change in financing of nonprofit health care providers in Uganda. *J. Eur. Econ. Assoc.* 8, 1159–1178.
- Smith, A., Kaybryn, J., 2013. *HIV and Maternal Health: Faith Groups’ Activities, Contributions and Impact*.
- Solo, J., Festin, M., 2019. Provider bias in family planning services: a review of its meaning and manifestations. *Glob. Heal. Sci. Pract.* 7 (3), 371–385. <https://doi.org/10.9745/GHSP-D-19-00130>.
- Thorne, N.B., Soderborg, T.K., Glover, J.J., Hoffecker, L., Guiahi, M., 2019. Reproductive health care in catholic facilities: a scoping review. *Obstet. Gynecol.* 133, 105–115. <https://doi.org/10.1097/AOG.0000000000003029>.
- Tiemann, O., Schreyögg, J., Busse, R., 2012. Hospital Ownership and Efficiency: A Review of Studies with Particular Focus on Germany. *Health Policy, New York*. <https://doi.org/10.1016/j.healthpol.2011.11.010>.
- Tomkins, A., Duff, J., Fitzgibbon, A., Karam, A., Mills, E.J., Munnings, K., Smith, S., Seshadri, R., Steinberg, A., Vitillo, R., Yugi, P., 2015. Series Faith-based health care 2 Controversies in faith and health care. *Lancet* 386, 1776–1785. [https://doi.org/10.1016/S0140-6736\(15\)60252-5](https://doi.org/10.1016/S0140-6736(15)60252-5).
- Tumlinson, K., Speizer, I.S., Curtis, S.L., Pence, B.W., 2014. Accuracy of standard measures of family planning service quality: findings from the simulated client method. *Stud. Fam. Plann.* 45, 443–470. <https://doi.org/10.1111/j.1728-4465.2014.00007.x>.
- UNAIDS, 2020. *UNAIDS AIDSinfo*.
- UNICEF Malawi, 2018. *2019/20 Health Budget Brief. Towards Full Implementation of the Essential Health Package: Achieving SDG 3 in Malawi*.
- Van Biesen, W., Lameire, N., Peeters, P., Vanholder, R., 2007. Belgium’s mixed private/public health care system and its impact on the cost of end-stage renal disease. *Int. J. Health Care Finance Econ.* 7, 133–148. <https://doi.org/10.1007/s10754-007-9013-z>.
- WorldPop, 2017. *Malawi 100m Population Version 2*.