Quality of Care in Contraceptive Counselling and Client Outcomes

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Abstract

Whether higher quality of care in contraceptive counselling improves client outcomes is an important question that does not find a clear answer in the extant literature. Using a trial that tested various approaches to increase the uptake of modern contraceptives among the clients of an urban hospital in Cameroon as its background, this study examines the association between a quality of care index for contraceptive counselling and the probability of using a modern method approximately four months later. We find that high quality contraceptive counselling is associated with higher levels of contraceptive use at follow-up and greater client satisfaction. While previous studies have primarily focused on continuation rates among contraceptive users, this study shows that high quality of care can be also instrumental by potentially increasing take-up rates among all clients. The study also shows that a quality of care measure that was validated in rural India can be easily and reliably used to assess process quality in urban Cameroon.

1 Introduction

Recognition of quality of care as an essential component of family planning (FP) services grew rapidly after Bruce (1990) articulated an influential framework, which contributed to a movement in international FP programmes towards placing increased emphasis on improving the quality of services provided as an end in and of itself. It propagated a series of studies developing different tools to measure quality of care and validating them against client outcomes (see, e.g., Costello et al. 2001; RamaRao et al. 2003; Sanogo et al. 2003; Jain et al. 2019). Systematic measurement of quality of care has greatly expanded since these early studies, most notably with the integration of these tools in the Demographic and Health Surveys' Service Provision Assessments and with the growth of the Performance Monitoring for Action surveys (Zimmerman et al. 2017; Choi, Fabic, and Adetunji 2016). Through these efforts, consistent measures for standards of care in family planning services have become available across a wide variety of countries and contexts (see e.g. Tumlinson 2016, for a comprehensive description of methods and best practices).

By and large, most studies in the sizeable literature on the link between quality of care in family planning services and method continuation among adopters are strongly suggestive of a positive association between the two - see e.g., Koenig, Hossain, and Whittaker (1997), Costello et al. (2001), RamaRao et al. (2003), Sanogo et al. (2003), Jain et al. (2012), Dehlendorf et al. (2016), Mallick, Wang, and Temsah (2017), and Jain et al. (2019), except for Barden-O'Fallon et al. (2011). However, as it is difficult to manipulate the quality of care in contraceptive counselling, ascribing a causal interpretation to these findings requires caution. Other studies, recognizing this limitation and using quasi-experimental and/or experimental designs, evaluated interventions designed to improve quality of care - by providing training for providers or decision-support tools for use by providers or the clients themselves - and failed to find evidence of downstream impacts of these interventions on contraception continuation rates at follow-up (Chin-Quee, Janowitz, and Otterness 2007; Jain et al. 2012; Dehlendorf et al. 2019).These studies may cast some doubt on the positive link between quality of care and method continuation. In contrast, evaluating the effects of the introduction of performance-based financing in the Democratic Republic of the Congo, Drouard et al. (2024) find a large positive effect on quality of care, but only a modest increase in the uptake of modern methods.[1] Athey et al. (2023), which provides the background for this study, evaluates the effect of a counselling intervention with the aid of a tablet-based job-support tool in Cameroon and finds large increases in the uptake of long-acting reversible contraceptives. However, these last two randomized controlled trials (RCT) differ in the outcome they evaluate, focusing on the uptake of modern contraceptives among *all clients*, rather than the continuation rate among clients who had initiated the use of a modern method at baseline.

Therefore, whether poor quality of care is a major driver of the low take-up rates of modern contraceptives observed globally - and whether improvements in it can increase client satisfaction and use of highly effective methods - remains an open question. This study provides new evidence on this question: it takes as its starting point the broader quality of care framework described by Jain, Townsend, and RamaRao (2018), then focuses on validating a narrower measure of *process* quality.[2] Hence, the findings of this study speak specifically to the impact of high-quality *contraceptive counselling* on client outcomes.

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1. Due to low baseline rates of contraceptive use, the modest increase in absolute terms is large in percentage terms.

2. Service delivery point readiness, mentioned by Jain, Townsend, and RamaRao (2018) as the other core component of quality of care, was ensured by the underlying experiment in our study (see Section 2.1). The study site is one of the flagship health facilities in Cameroon, where providers had extensive training and experience in contraceptive counselling and administration, and received a "refresher" training before the start of the trial. Materials for infection prevention were always available, and brief stock outs of modern methods (due to COVID-19 related disruptions) were quickly resolved.

We use a process quality of care index developed by Jain et al. (2019) and described in Section 2.4, built by identifying a set of items that prognostic of client outcomes in past validation exercises (Costello et al. 2001; RamaRao et al. 2003; Sanogo et al. 2003), which map four primary *process-quality domains* defined by Jain (2017) and identified by Jain, Townsend, and RamaRao (2018) as essential to high-quality contraceptive counselling. The first domain, *method selection*, involves solicitation of information from the client about her reproductive intentions, family circumstances, previous contraceptive use and preferred method, and provision of information by the provider on various contraceptive methods to meet the clients' needs. The second, *effective use* of a selected method, concerns information given by the provider to the client about how to use the method, the potential side effects, how to manage side effects if they occur, and warning signs of the method (severe adverse effects). The third, *continuity of care*, includes information given to clients about when to return for follow-up, other sources of family planning services, and the possibility of switching to another method if the current one becomes unsuitable. Finally, the *respectful care* domain captures interpersonal relations between the provider and the client and includes treating clients with dignity and respect and ensuring audiovisual privacy and confidentiality.

The data for this study, including quality of care during contraceptive counselling, client satisfaction, contraceptive take-up, and method use at follow-up were collected as part of an RCT evaluating interventions to increase the uptake of modern methods among patients of a Gynaecological, Obstetrics, and Paediatrics hospital in Yaoundé, Cameroon, known as HGOPY for its acronym in French (see Athey et al. 2021 and Athey et al. 2023 for more on the trial and its findings to date).

We find that HGOPY clients who reported receiving above-median quality of care during counselling were 8 to 10 percentage points (18-23%) more likely to report using a modern contraceptive method approximately four months later, compared to those who reported receiving below-median quality of care.[3] This is almost entirely due to the difference in the likelihood of adopting a modern method after counselling, and *not* due to differential continuation rates among adopters - noting that the method continuation rate at HGOPY, above 90% four months after counselling, is substantially higher than those reported in other studies. We also find a strong association between quality of care and satisfaction with the adopted method: receiving above-median quality counselling is associated with a 10-12 percentage point (12-15%) increase in being satisfied or very satisfied with the chosen method. Both findings are strongly driven by the Method Selection, Effective Use, and Continuity of Care domains.

Our study makes three modest contributions to the literature. First, while previous studies have shown that quality of care in contraceptive counselling influences method selection, continued use, satisfaction with method *among adopters*, we find that it can also increase the uptake of modern methods *among all clients* in the first place. Second, our study contributes to validating the specific index developed by Jain et al. (2019), in a starkly different context from the one in their study (clinics in rural India). Practitioners who seek an effective monitoring tool to track process quality can thus consider this index as a viable option. Third, using the latest quasi-experimental estimation techniques and conducting a series of robustness checks that take advantage of the underlying RCT, we attempt to establish a causal relationship between quality of care in contraceptive counselling and contraceptive use at follow-up.

The rest of the paper is organised as follows: Section 2 discusses the setting, data sources, quality of care measurement, the main outcomes, and the estimation strategy. Section 3 presents the findings and Section 4 concludes.

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3. Please see Section 2.5.1 for the list of contraceptives included in our definition of *modern methods*.

2 Methods

2.1 Setting

The data for this study were collected as part of an experiment aiming to increase the uptake of modern contraceptives among women who visited HGOPY. All women aged 15-49, who received contraceptive counselling at the hospital from January 19, 2021 to June 30, 2022 and wished to wait at least 12 months before their next pregnancy were invited to participate in the study. Approximately two thirds of the sample presented at the family planning unit – either seeking to receive information, adopt a new method of contraception, switch to another method, renew their current method, manage the side effects of their current method, or discontinue their current method. The remainder presented at the maternity or gynaecology wards seeking other services and were offered free contraceptive counselling: some had just given birth; some were pregnant and receiving antenatal services; some had returned post-partum for a check-up or for their infants to receive vaccinations; and some presented with a gynaecological problem. Figure 1 presents the study profile: 1,213 eligible individuals were recruited into the study, of whom 1,151 (94.9%) were successfully re-interviewed at follow-up.

One important feature of the setting warrants attention. The underlying experiment made use of a bespoke tablet-based app, which was used by trained service providers for all contraceptive counselling sessions conducted during the study period. The app structures counselling according to established global best-practices and guides the provider through a series of questions and topics to discuss with the patient (see Athey et al. 2023 for details). It serves as a job-support tool for service providers from different departments of HGOPY with different levels of experience in contraceptive counselling, which allows for meaningful variation in quality of care to estimate its association with client outcomes.[4]

2.2 Sample characteristics

Table 1 shows the characteristics of the study sample and those of a representative sample of women from Yaoundé stratum of the Demographic and Health Survey (DHS) of Cameroon in 2018. The women recruited into the study are older, on average, than a random sample of women from Yaoundé, and as such are also more likely to be married, have more children, and want to wait longer before becoming pregnant. Since they were recruited into the study in a hospital specializing in obstetrics and gynaecological care, they are also much more likely to have given birth in the past three months. Women in the study sample also seem to be on average better off, a larger share of whom have at least some tertiary education and/or are salaried employees. However, almost twice as many women in our sample have only primary (or lower secondary) education - likely partly due to the *service social* provided by the hospital for women with lower socioeconomic status - reflecting the diversity of the hospital's clientèle. Despite these differences, the share of women recruited into the study who were using a long-acting (the IUD or implant) or short-acting (pill or injectable) modern contraceptive method at the time of their visit is similar to the prevalence rates in Yaoundé estimated using data from the 2018 DHS.

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4. The app randomly allocates clients to one of two counselling approaches, which differ in terms of how information about contraceptive methods is presented. If clients decide to adopt a modern contraceptive method, the app also randomly assigns discounted prices for Long Acting Reversible Contraceptives. The impacts of these interventions on the uptake of modern contraceptives are reported in Athey et al. (2023). In order to control for their potential confounding effects, we add a full set of treatment indicators to our empirical specifications, which are discussed in more detail in Section 2.5.2.

2.3 Data

There are two data sources for the study. The first consists of data collected by the app during the contraceptive counselling sessions. In addition to serving as a job-support tool for the nurse counsellors, the app also functions as a data collection tool, which records each patient's answers during the consultation and uploads them to a central server managed by the hospital. The app collects basic information for each client, including age, marital status, education, labour force participation, as well as their birth history. Then, as patients are taken through a structured discussion, the app records the clients' fertility plans, needs, and preferences regarding contraceptive methods.[5]

The second source of data consists of two phone surveys. In the first phone survey, conducted with clients who consented to being contacted for follow-up and provided phone numbers (see Figure 1), clients were asked about the quality of (and their satisfaction with) the contraceptive counselling they received at HGOPY. The median time between the counselling session and this first (*baseline*) phone survey was two weeks, with 90% of the surveys taking place within six weeks. It is during this survey that the study participants were asked the questions to construct the quality of care index (see Section 2.4), so the clients successfully interviewed during this round comprise the study sample. In a second phone survey, these clients were asked about contraceptive take-up and continuation since counselling, satisfaction with their chosen method and experience with side effects for those using a method, and their intentions regarding contraceptive use in the near future. The median number of weeks between the counselling session and this second (*follow-up*) phone survey was 19 weeks, and 90% of surveys happened within 25 weeks. It is based upon these data that the outcome measures are constructed - i.e., whether the client was using a modern contraceptive method at follow-up.

2.4 Measuring Quality of Care

Our study uses a measure of process quality, which captures the quality of contraceptive counselling, developed by Jain et al. (2019). Based on earlier studies by Costello et al. (2001), RamaRao et al. (2003), and Sanogo et al. (2003), Jain et al. (2019) define a set of 22 items, which correspond to different elements of high-quality counselling that had been found to positively correlate with client outcomes across a variety of contexts. Each item essentially consists of a Yes/No question asking the respondent to confirm whether the provider explained a specific concept or performed a certain action.

Each item can then be mapped to one of four primary *quality domains*, which were described in Section 1: Method Selection (MS), Effective Use of the preferred method (EU), Continuity of Care (CC), and Respectful Care (RC). Jain et al. (2019) validate their index on a primarily rural sample of women, who had adopted a modern method in Haryana and Odisha in India. They find that having received mid- or high-quality care is associated with a higher likelihood of method continuation relative to low-quality care.[6] These associations were primarily driven by variation in the MS domain, as well as the EU and

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5. This includes, e.g., whether they want to have more children (if so when), whether they are currently using a birth control method (if so their experience with side effects), whether and why they seek to adopt or avoid a specific method, their relevant medical history to check for contraindications, and finally which method - if any - they adopted at the end of the consultation. For each method considered, the app also records the reason why a client did not want to adopt it, and if the client chose a method but did not adopt it immediately, the reasons for this decision.

6. Jain et al. (2019) categorize their indices into low-, mid-, and high-quality, based on cut-off points at the mean ± 0.5 of a standard deviation.

CC domains. Then, using factor analysis, they reduce the 22-item index to a more easily implemented 10-item one, and show that the latter is equally predictive of client outcomes. This 10-item index is the one we construct in this study. We slightly deviate from Jain et al. (2019) and combine the EU and CC domains (into $EU\&CC$), because the 10-item index contains only item under the CC domain.

To construct an aggregate index following the methodology proposed by Jain et al. (2019), we first calculate domain-specific quality indices as simple averages of the items within each domain:

$$Q_d = \frac{1}{N_d} \sum_{i \in I_d} \overline{I}_{d,i} \qquad \text{for } D = \{RC, MS, EU\&CC\} \tag{1}$$

Each domain index Q_d, ranging from 0 to 1, has N_d items in it, each denoted by $\overline{I}_{d,i}$. $\overline{I}_{d,i} = \frac{1}{N_j} \sum_{j \in N_j} I_{d,i,j}$ denotes the average answer to item i in domain d given by respondents $j \in \{1, \ldots, N_j\}$. Note that this definition gives equal weight to each item within a domain.

Figure 2 shows lists each item in the 10-item index, highlighting the domain it belongs, and comparing each score from this study to that reported in Jain et al. (2019). The scores in the MS, EU, and CC domains are high, at 0.92, 0.89, and 0.81, respectively. They are substantially higher than those reported at the rural clinics in Jain et al. (2019), which is not unexpected, given that HGOPY is a high-quality hospital in the capital of Cameroon and that all providers offering contraceptive counselling were (re)trained in counselling prior to the start of the study using the tablet-based app. In contrast, scores in the RC domain, which is concerned with whether the consultation was carried out in a setting with audio or visual privacy, are very low at HGOPY, at 0.11. While attempts were made to improve the counselling environment at the study hospital, in practice many consultations were conducted either in the family planning unit where multiple nurses often worked simultaneously (with clients and other staff members frequently interrupting sessions by coming in and going out), or in the maternity ward with clients resting in shared rooms after delivery - both of which made privacy difficult to achieve.

Then, we calculate the aggregate quality of care index, Q, by averaging over the domain-specific indices with equal weights placed on each domain:

$$Q = \frac{1}{|D|} \sum_{d \in D} Q_d \qquad \text{for } D = \{RC, MS, EU\&CC\} \tag{2}$$

Q also ranges from 0 to 1, with scores increasing in self-reported quality of care. Figure 3 shows the distribution of the index, which shows a large fraction (almost 50%) of counselling sessions with an exact score of 0.75 – largely corresponding to perfect scores for the MS and $EU\&CC$ domains, with a zero score for the RC domain. Given this peculiar distribution of Q, with a mean value of 0.63 but with high variance stemming from a lack of adequate privacy for clients during counselling sessions at HGOPY, we analyse quality of care using a binary indicator, Q^B, which is equal to 1 if the client received high-quality counselling, as defined by having an index score greater than or equal to the median index score.

$$Q^B = \mathbb{1}\left[Q \geq \text{Med}(Q)\right] \tag{3}$$

Defined this way, approximately two thirds of our sample (64.9%) received high-quality counselling, which largely corresponds to answering all items in the MS, EU, and CC domains in the affirmative.

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2.5 Estimating the impact of quality of care

2.5.1 Outcomes

The primary outcome of interest is whether the women in the study sample were using a modern contraceptive method at the time of the follow-up survey - i.e., approximately four to five months after their initial counselling session. In constructing this outcome variable, we consider as modern contraceptives the following four highly effective methods: the copper IUD,[7] the sub-dermal implant, the pill (POP or COC), and the injectable.[8] We then decompose the effect of quality of care during counselling on modern contraceptive use at follow-up into two components: take-up rates of modern contraception after counselling, and continuation rates conditional on take-up.

We also analyse client satisfaction with the adopted method, restricting the sample to all clients who adopted one of the aforementioned modern methods since initial counselling. In the follow-up survey, these women were asked to what degree they were satisfied with this method - regardless of whether they were still using it or not: hence, it is possible for clients to report being satisfied with a method that they have discontinued using, as there can be a number of reasons for discontinuation. We code an indicator for this outcome as being equal to 1 if they reported being satisfied or very satisfied with their adopted method, and 0 otherwise.[9]

2.5.2 Estimation strategy

We estimate the impact of receiving high quality of care by first estimating a simple difference in means between the two groups. Quality of care is denoted by $Q^B \in \{1, 0\}$ and takes a value of 1 for high quality counselling and 0 otherwise. The parameter of interest β - the difference in outcomes between the *high* and *low* quality groups - and its sample counterpart $\hat{\beta}$ are shown below:

$$\beta_{unadj} = \mathbb{E}\left[Y_i \mid Q_i^B = 1\right] - \mathbb{E}\left[Y_i \mid Q_i^B = 0\right]$$

$$\hat{\beta}_{unadj} = \frac{1}{N^1} \sum_{i=1}^{N^1} Y_i - \frac{1}{N^0} \sum_{i=1}^{N^0} Y_i \tag{4}$$

Y_i denotes the outcome variable for individual i, and N^q the sample size of each group. The difference in means estimator recovers the average treatment effect under the assumption that quality of care is independent of potential outcomes, which is potentially violated in our context, since quality of care was not randomly assigned across clients. Section 3.2 discusses the potential for bias in our estimates and reports findings from additional analysis to check the robustness of impact estimates. We note, however, that quality of care is uncorrelated with a large set of individual characteristics, as shown in Table A4.

We may be more willing to accept the assumption of conditional independence - i.e., that Q^B is inde-

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7. The LNG IUD was not available at public hospitals in Cameroon during the study period.

8. Note that this definition of modern methods excludes the lactational amenorrhoea method (or LAM), condoms, and cycle/calendar based methods. This was a deliberate choice: LAM can be highly effective when practised correctly, but it can be used only for a limited time after giving birth (typically less than six months). Condoms and other excluded methods have typical effectiveness rates that are much lower than the included methods.

9. Client satisfaction, with family planning services in general and contraceptive counselling in particular, is very high for the entire study sample at HGOPY (above 95%). Therefore, it is not included as an outcome in our analysis.

pendent of potential outcomes given covariates, and use the following estimator:

$$\beta_{AIPW} = \mathbb{E}\left[Y_i \mid Q_i^B = 1, X_i = x_i\right] - \mathbb{E}\left[Y_i \mid Q_i^B = 0, X_i = x_i\right]$$

To calculate its sample counterpart, we use a doubly-robust augmented inverse propensity weighted (AIPW) estimator (Robins, Rotnitzky, and Zhao 1994; Glynn and Quinn 2010):

$$\hat{\beta}_{AIPW} = N^{-1} \sum_{i=1}^{n} \left(\hat{\mu}_i^1\left(\mathbf{x}_i\right) - \hat{\mu}_i^0\left(\mathbf{x}_i\right) + \frac{Q_i^B}{\hat{e}\left(\mathbf{x}_i\right)} \left(Y_i - \hat{\mu}_i^1\left(\mathbf{x}_i\right)\right) - \frac{\left(1 - Q_i^B\right)}{1 - \hat{e}\left(\mathbf{x}_i\right)} \left(Y_i - \hat{\mu}_i^0\left(\mathbf{x}_i\right)\right) \right) \tag{5}$$

$\hat{\mu}_i^q\left(\mathbf{x}_i\right)$ denotes the predicted outcomes from a linear regression of y_i on pre-treatment covariates $\mathbf{x}_i$ for each group with $q \in Q^B$, while $\hat{e}\left(\mathbf{x}_i\right)$ denotes the estimated propensity score, i.e., the predicted probability of treatment as per a logistic regression of Q_i^B on the same set of controls $\mathbf{x}_i$, estimated on the full sample.The AIPW estimator has the advantage of being doubly-robust, in that it's unbiased as long as at least one of the predicted outcome or the propensity score models is correctly specified, and is more efficient than inverse propensity weighted or regression adjustment estimators (e.g., see Glynn and Quinn 2010; Kennedy 2020).

We select covariates using a double selection procedure as in Belloni, Chernozhukov, and Hansen (2014). We estimate a linear LASSO on the full sample to predict the outcome and the treatment variables and use the union of selected explanatory variables as controls both in the outcome and propensity score models. The controls are selected amongst a large set of standardized client characteristics including age, number of pregnancies, whether they are single, they have tertiary education, have given birth in the last 3 months, and are working (salaried or self-employed); all two-way interactions; and the quadratic terms for the continuous variables.[10] For simplicity and consistency, we run this process once on the main outcome (using a method at follow-up) and then use the same set of lasso-selected controls across all specifications.[11] Finally, we always include the full set of randomized treatment indicators from the underlying experiment as controls - i.e., discounts for LARCs crossed with counselling style.

2.6 Ethical considerations

The study protocols were approved by Cameroon's national ethics committee for human subjects research, the Comite National d'Ethique de la Recherche pour la Sante Humaine (CNERSH) – decision No. 2019/08/1183/CE/CNERSH/SP – and received administrative authorization from the Ministry of Health's (MinSante) Division of Health Operations Research (DROS) – decision No. D30-760/L/MINSANTE/SG/DROS. The protocols were also approved by the implementing hospital's own IRB – decision No. 780/CIERSH/DM/2018. The study protocols, drawn from the documentation submitted for ethics review, are available here. The protocols cover the full set of study procedures and methodology including, but not limited to: data management and information security, enrolment criteria, consent procedures, and treatment of adverse reactions.

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10. All potential control variables are standardized prior to selection by subtracting the mean and dividing by the standard deviation.

11. The selected controls are: a binary indicator of whether the woman was counselled in the Maternity or the Gynaecology department, the same indicator interacted with having delivered less than 3 months ago, the same indicator interacted with wanting to wait between 1 and 3 years before their next pregnancy, and having delivered more than 3 months ago.

3 Findings

3.1 Impact of contraceptive quality of care on method use

Table 2, Panel A presents the main results. The unadjusted estimates suggest that receiving high-quality counselling is associated with a 10.2 percentage points (pp) higher likelihood of using one of the four main modern contraceptive methods at follow-up (p=0.001, 95%CI: [0.042,0.162]). Over a low-quality group mean of 45% this represents a 23% increase. Covariate adjustments increase precision and slightly reduce the magnitude of the estimated difference to 8.2 pp (p=0.003, 95%CI: [0.027,0.137]).

We can decompose the overall impact on contraceptive use into initial take-up and method continuation. Table 2, Panel B shows that method discontinuations were low in our study - less than 10% in both the low- and high-quality of care groups. Thus, the difference in contraceptive use at follow-up mirrors the differences in adoption rates since counselling.

Finally, Panel C in Table 2 shows that while, at 80%, the overall rate of satisfaction with the adopted method is high in the low-quality of care group, the same figure is 10-12 percentage points higher in the high-quality of care group, which represents a 12-15% increase in satisfaction with the chosen method.[12]

The finding that higher quality of care during counselling is associated with higher rates of modern contraceptive use at follow-up is driven by the MS and the $EU\&CC$ domains. Table 3, Panels A and B, show that having a perfect score in these sub-indices is associated with higher method use and satisfaction - with the effect sizes similar in magnitude to the estimates for the overall quality of care index presented in Table 2. As in the case of the main aggregate index, the results are driven by initial adoptions rather than method discontinuations. Finally, we do not find a statistically significant effect of the RC domain on any outcome of interest, although the estimates are imprecise since only approximately 9 percent of individuals counselled reported a full score in this domain. These findings are consistent with Jain et al. (2019), who also find that the differences in method continuation were primarily driven by variation in the MS domain, as well as the EU and CC domains, in rural India.

3.2 Robustness checks

A primary source of concern for this study is that there may be unobserved confounders, which are prognostic of both (self-reported) contraceptive quality of care and contraceptive use at follow-up. While we cannot rule out this possibility because quality of care was not randomly assigned to each client, our results are robust to covariate adjustments - flexibly selected from a large set of baseline characteristics. To address the possible concern that the LASSO covariate selection method may be too conservative, i.e., selects too few variables to include in the model, we re-estimate model 5, simply using *all* the demographic variables collected by the tablet-based app at the start of the counselling session.[13] Appendix Table A2 shows that our findings robust to this adjustment, which is consistent with the finding that quality of care is orthogonal to baseline client characteristics in our setting (Appendix Table A4).

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12. Not shown here, these differences persist if we narrow the definition of method satisfaction to being 'very satisfied' with the adopted method.

13. These include: department, age, children, marital status, education, main activity/employment, desired spacing for next pregnancy, whether they are currently using a LARC or a SARC, and whether they had a method in mind they wanted to adopt at the time of counselling.

Alternatively, the positive association between quality of care during counselling and method use at follow-up could be due to reverse causality, if individuals report higher quality of care precisely because they have adopted a modern contraceptive method. This may occur because some of the items in the quality of care index might be more salient or memorable for clients who adopted a method. Or, clients who adopted a method might be driven by a feeling of reciprocity and overstate the quality of care they received. To address this concern, we can examine the impact of randomly assigned discounts for modern methods on quality of care: as discounts, which are independent of client characteristics and quality of care, are strong predictors of contraceptive take-up (see Athey et al. 2023), they should also be predictive of quality of care in the presence of reverse causality. In Appendix Table A5, we show that offering random discounts for modern methods has no statistically significant effect on self-reported quality of care, measured as either a discrete or a binary index, thus making reverse causality an unlikely interpretation of our findings.[14]

To address the concern that the quality of care index we use is arbitrary and, therefore, the findings might not be robust to its definition, we repeat our analysis using a range of different - discrete and binary - quality of care indices. Results are shown in Table A6, where we compare our main estimates from Table 2 (Panel A) with those using the following indices: (i) the Jain et al. (2019) index, which does not combine the EU and CC domains (Panel B); (ii) an equal weighted index, where each one of the ten items is equally weighted (i.e., a simple average of the ten index items; Panel C); and (iii) an inverse covariance weighted index (ICW), where the weights are proportional to the sums of the rows of the inverted variance-covariance matrix as described in Anderson (2008) (Panel D). As before, we present impact findings for binary indicators of contraceptive quality of care, constructed by dividing the sample into above- and below-median groups. Again, the main findings presented in Panel A are robust to defining the contraceptive quality of care index in different ways.

4 Concluding discussion

In this paper, we contribute to the literature on the relationship between quality of care during contraceptive counselling and subsequent use of modern methods and client satisfaction. We find that having received high-quality contraceptive counselling is associated with a higher likelihood of using a modern contraceptive method 4-6 months later. It is also associated with substantially increased satisfaction with the adopted method. These findings are in line with earlier studies, like Dehlendorf et al. (2016) and Jain et al. (2019), among others.

However, our study also differs from many of the previous studies assessing this link, in that we examine method use not only among those who adopted a modern or highly-effective contraceptive method at baseline, but among *all clients who received contraceptive counselling* at HGOPY - regardless of whether they subsequently adopted a method or not. We find that the strong link between quality of care during counselling and method use at follow-up is largely due to the difference in take-up rates between the low- and high-quality of care groups: when we restrict our sample to those who adopted a method, as many other studies do, we do not find any differences in continuation rates by quality of care. Viewed in this way, our findings point to a broader interpretation than the extant literature: Dehlendorf et al. 2016

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14. We cannot reject the null hypothesis that the coefficient on any discount is equal to zero or the hypothesis that the coefficients on all discount levels are jointly equal to zero.

states that "... the quality of interpersonal care ... influences contraceptive use," but our study points to two distinct channels for such influence: initial uptake of modern methods among all clients who received contraceptive counselling and continued use among those who adopted a method. The potentially causal link between quality of care in contraceptive counselling and increased uptake of highly-effective methods is pertinent to policy, and points to the fact that continued investments to ensure high quality of care may influence client outcomes positively - even in high-quality settings like HGOPY.

We used a contraceptive quality of care index that was validated by Jain et al. (2019) in the states of Haryana and Odisha in India. As validation refers to assessing the predictive validity of a measure for contraceptive continuation among users, our study, strictly speaking, may not be viewed as a validation exercise for the same measure in a different setting. Nonetheless, we consider the findings from HGOPY, a flagship women and children's hospital in urban Cameroon, to be promising. Despite the significant differences between the rural clinics in India and HGOPY in Yaoundé, as well as the respective client populations that they serve, the 10-item index validated by Jain et al. (2019) strongly predicts the use of a highly-effective contraceptive method, as well as satisfaction with the adopted method 4–6 months later. Practitioners who seek an effective monitoring tool to track process quality in other settings can thus consider, with some more confidence, this index as a viable option. For example, this index could serve as a patient exit interview to measure the quality of contraceptive counselling in settings where administrators or policy-makers are interested in monitoring quality at the facility level.

As mentioned earlier, healthcare providers at HGOPY received training in family planning service delivery immediately prior to the study. This included experienced nurse counsellors from the family planning unit, as well as nurses from the maternity and gynaecology wards who had never conducted contraceptive counselling or administration before. The state-of-the-art training, designed by expert health professionals in Cameroon, was conducted using a tablet-based decision support tool (Athey et al. 2023). Quality of care is therefore quite high on average, compared to Jain et al. (2019), as seen in Figure 2. *Method Selection*, *Effective Use*, and *Continuity of Care* domains were all highly predictive of contraceptive use and method satisfaction at follow-up. In particular, *Effective Use* includes the discussion of side effects, which was an emphasis in the design of the tablet-based app used by the nurse counsellors at HGOPY and might have played a part in increasing take-up (and reducing discontinuations) among all study participants. The finding that these three domains, but not *Respectful Care*, drive the findings of predictive validity is also consistent with Jain et al. (2019): while follow-up phone survey data indicate that clients care about audiovisual privacy during contraceptive counselling and complain about the lack thereof at HGOPY, the corresponding scores for this domain are not predictive of the client outcomes we consider - noting that these estimates are less precise than those for the other domains of the quality of care index.

Causal identification of the link between contraceptive quality of care and client outcomes is challenging because it is hard to have randomized interventions that only manipulate the quality of care while leaving every other channel that might influence client outcomes unchanged. The underlying experiment for this study introduced an alternative counselling approach aimed to improve quality of care in contraceptive counselling and administration, but may have also altered client choices through mechanisms other than increased quality of care. Therefore, while we also used quasi-experimental methods to tackle this important question, the robustness of the findings to different assumptions and definitions, presented in Section 3.2, are suggestive of a causal relationship between higher quality of care in contraceptive counselling and improved client outcomes. Future research that can tackle this question with novel experimental designs is likely to be of high value - both academically and in policy circles.

11

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5 Figures

1,914 clients counselled between January 19, 2021 and June 30, 2022

1,503 consented to follow-up interviews by phone
411 refused

1,213 eligible and recruited into the study
231 not reached within 12 weeks of counselling
59 pregnant at counselling and expected delivery date outside the study period

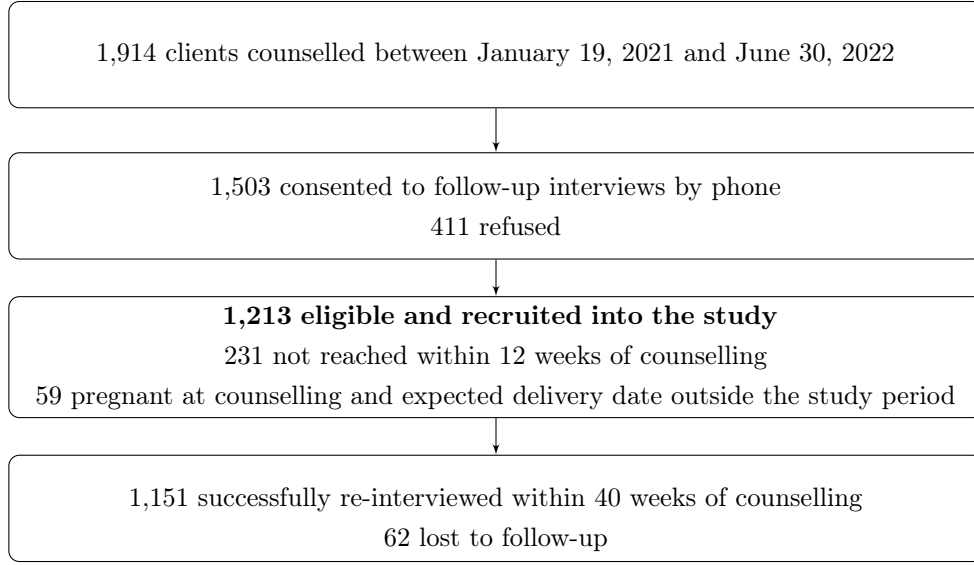| |
|---|
| 1,151 successfully re-interviewed within 40 weeks of counselling |
| 62 lost to follow-up |

Figure 1: Study Profile: target population, recruitment, and loss to follow-up.

The population from which the study participants were recruited consists of 1,914 clients of HGOPY, who received contraceptive counselling between January 19, 2021 and June 30, 2022. Figure 1 shows the sample selection process. 1,503 of these clients consented to participate in follow-up interviews, 1,213 of whom were successfully reached and eligible to participate in the study, for all of whom we have data on their self-reported quality of care and satisfaction with the services they received.[15] Of those recruited for the study, 1,151 (94.9%) were successfully re-interviewed within 40 weeks of initial counselling to collect data on contraceptive continuation and satisfaction with their adopted method. This represents a low attrition rate, of 5.1%, and it is not systematically related to quality of care (the difference between the high- and low-quality groups is of 0.8%, p=.552). We cannot reject the null of a test of joint-orthogonality of the full set of coefficients of attrition regressed on a large set of baseline controls, nor that on the coefficients interacted with the treatment indicator, shown in Table A3. Therefore, we are not concerned with bias in our estimates due to selective attrition. Table A1 shows that sample characteristics after applying the different levels of restrictions are broadly similar.

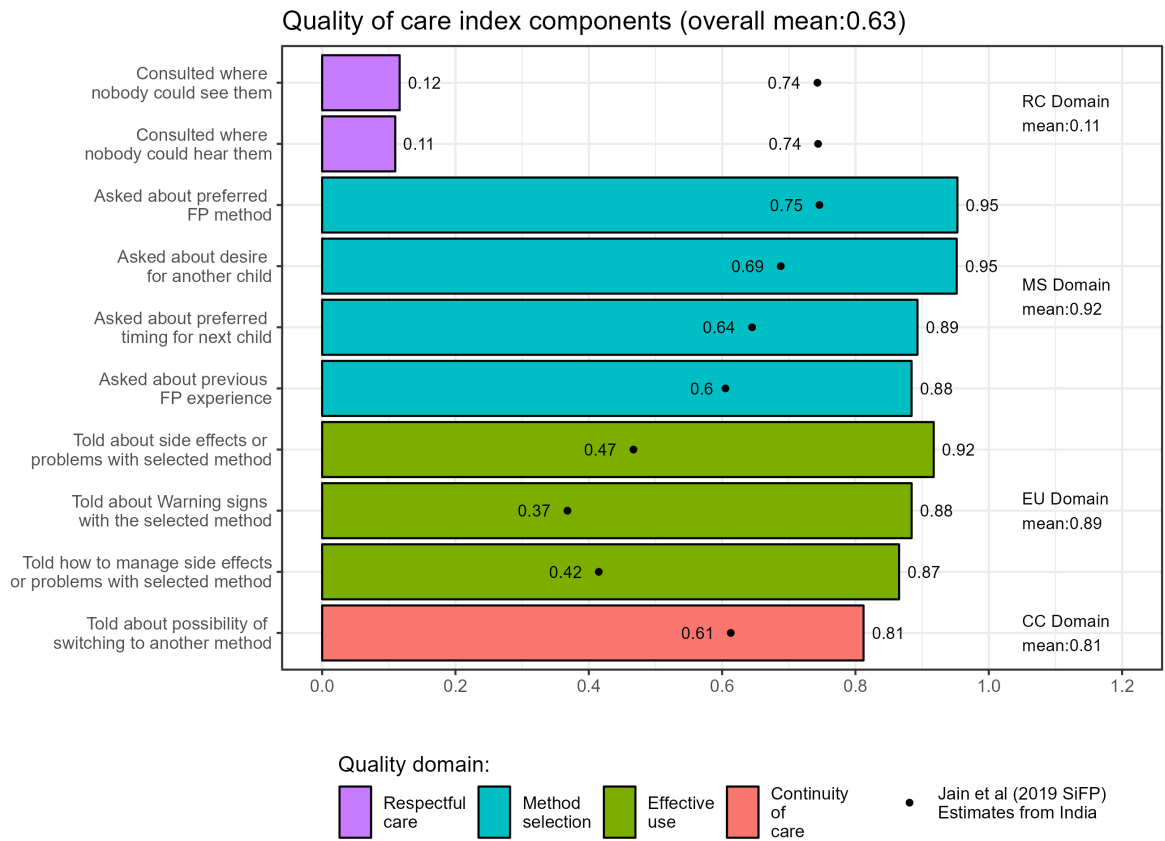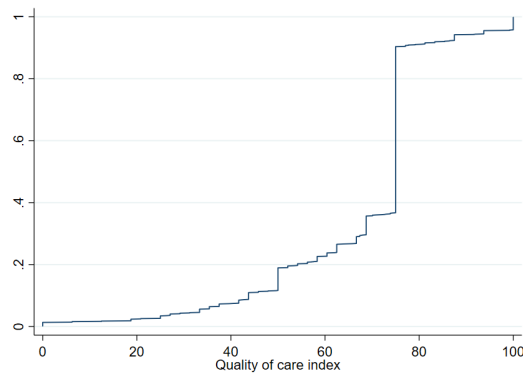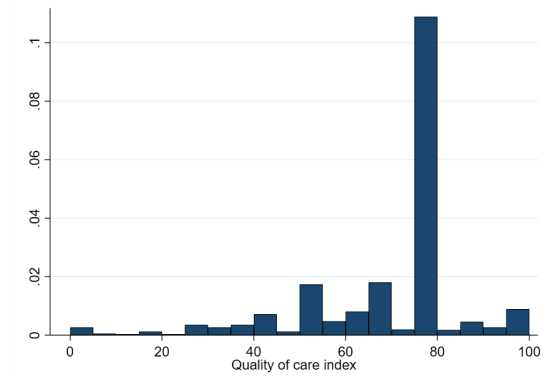15. 59 clients who were pregnant at counselling and were not due to deliver until after the follow-up interview were excluded

Figure 2: Index items

(a) Cumulative density

(b) Histogram

Figure 3: Index distribution

6 Tables

Table 1: Sample characteristics.

	(1) Study sample Mean/(SD)	(2) DHS sample. Mean/(SD)
Age	29.32(0.19)	26.98(9.05)
Adolescent	0.06	0.28
Unmarried couple cohabiting	0.34	0.16
Married	0.35	0.23
Education: Tertiary	0.49	0.21
Education: Secondary	0.24	0.64
Education: Primary/Lower sec.	0.27	0.13
Salaried employee	0.35	0.18
Self-employed	0.12	0.29
Student	0.16	0.31
Pregnancies, total	3.54(0.07)	1.86(2.03)
Children alive today	2.57(0.05)	1.75(1.86)
Ever gave birth (live or still)	0.92	0.63
Gave birth ≤3 months	0.58	0.05
Wants no more children	0.23	0.28
Wait 1 to 3 yrs before next preg.	0.42	0.16
Wait >3 years before next preg.	0.35	0.15
Currently using a LARC	0.04	0.05
Currently using a SARC	0.02	0.06
Currently using other method	0.05	0.24
Number of observations	1213	1,067

Notes: This table shows sample characteristics; column 1 includes the full baseline sample; column 4 contains the same characteristics for the DHS 2018 Yaoundé Stratum. LARC (SARC) refers to Long-Acting (Short-Acting) Reversible Contraception, which, for the purposes of this study, includes the IUD and the implant (the injectable and the pill). See Section 2.5.1 for details on the modern methods considered in this study.

Table 2: Main results.

	(1)	(2) Unadjusted	(3) Adjusted	(4)
	Low Q. mean	$\hat{\beta}$ [95% CI]	$\hat{\beta}$ [95% CI]	N
Panel A: Contraceptive use at follow-up				
Using method at follow up	0.445	0.102 [0.042, 0.162]	0.082 [0.027, 0.137]	1151
Panel B: Decomposing adoptions and continuations				
Adopted since counselling	0.490	0.107 [0.047, 0.167]	0.082 [0.027, 0.138]	1151
Still using method at follow up	0.909	0.009 [-0.039, 0.056]	0.034 [-0.016, 0.085]	644
Panel C: Method satisfaction conditional on adoption				
Satisfied with adopted method	0.801	0.099 [0.036, 0.162]	0.120 [0.054, 0.187]	621

Notes: This table shows the estimated difference in outcomes between the quality of care between groups with low- and high-quality of care, β as described in Section 2.5.2; The outcome variables are: the share using a modern contraceptive method at follow-up (Panel A); the share who adopted a modern contraceptive method between the counselling session and the follow-up survey, and amongst those who adopted a modern method, whether they are still using this method at follow-up (Panel B); then, amongst those who adopted a modern method, whether they were satisfied or very satisfied with this method (Panel C); The differences in sample size across rows are due to missing values (respondents answered "Don't Know"); The selected controls are: a binary indicator of whether the woman was counselled in the Maternity or the Gynaecology department, the same indicator interacted with having delivered less than 3 months ago, the same indicator interacted with wanting to wait between 1 and 3 years before their next pregnancy, and having delivered more than 3 months ago, all centred and standardized.

Table 3: Results by domain indices.

	(1)	(2) Unadjusted	(3) Adjusted	(4)
	Low Q. mean	$\hat{\beta}$ [95% CI]	$\hat{\beta}$ [95% CI]	N
Panel A: Method Selection (full marks)				
Using method at follow up	0.448	0.084 [0.017, 0.152]	0.063 [0.002, 0.125]	1151
Adopted since counselling	0.487	0.095 [0.028, 0.162]	0.074 [0.011, 0.136]	1151
Still using method at follow up	0.919	-0.005 [-0.057, 0.047]	0.009 [-0.049, 0.068]	644
Satisfied with the adopted method	0.797	0.092 [0.019, 0.166]	0.119 [0.038, 0.199]	621
Panel B: Effective Use and Continuity of Care (full marks)				
Using method at follow up	0.431	0.115 [0.052, 0.178]	0.078 [0.020, 0.135]	1151
Adopted since counselling	0.481	0.112 [0.049, 0.175]	0.071 [0.013, 0.128]	1151
Still using method at follow up	0.896	0.025 [-0.027, 0.078]	0.052 [-0.007, 0.111]	644
Satisfied with the adopted method	0.808	0.083 [0.015, 0.151]	0.105 [0.030, 0.181]	621
Panel C: Respectful Care (full marks)				
Using method at follow up	0.520	-0.087 [-0.187, 0.013]	0.018 [-0.073, 0.110]	1151
Adopted since counselling	0.566	-0.076 [-0.177, 0.025]	0.033 [-0.055, 0.121]	1151
Still using method at follow up	0.917	-0.035 [-0.126, 0.056]	-0.028 [-0.119, 0.064]	644
Satisfied with the adopted method	0.872	-0.036 [-0.143, 0.071]	-0.050 [-0.167, 0.067]	621

Notes: This table shows the estimated difference in outcomes between groups where each domain sub-index was equal to 1 or not - i.e. every item within each domain was met or not; The outcome variables are: the share using a modern contraceptive method at follow-up; the share who adopted a modern contraceptive method between the counselling session and the follow-up survey, and amongst those who adopted a modern method, whether they are still using this method at follow-up; then, amongst those who adopted a modern method, whether they were satisfied or very satisfied with this method; Differences in sample size across rows are due to missing values; A more detailed description of the construction of the quality of care is described in section 2.4; The selected controls are: a binary indicator of whether the woman was counselled in the Maternity or the Gynaecology department, the same indicator interacted with having delivered less than 3 months ago, the same indicator interacted with wanting to wait between 1 and 3 years before their next pregnancy, and having delivered more than 3 months ago, all centred and standardized.

A Appendix Tables

Table A1: Sample characteristics, external validity.

	(1)	(2)	(3)	(4)
			Analysis sample	
	Counselled	**Consented**	**Baseline**	**Final**
	Mean/(SD)	Mean/(SD)	Mean/(SD)	Mean/(SD)
Age	29.41(0.16)	29.27(0.17)	29.32(0.19)	29.41(0.19)
Adolescent	0.07	0.07	0.06	0.06
BMI	27.24(0.11)	27.25(0.13)	27.09(0.14)	27.13(0.14)
Unmarried couple cohabiting	0.34	0.34	0.34	0.33
Married	0.34	0.35	0.35	0.36
Education: Tertiary	0.45	0.46	0.49	0.50
Education: Secondary	0.23	0.23	0.24	0.23
Education: Primary/Lower sec.	0.30	0.29	0.27	0.26
Salaried employee	0.34	0.35	0.35	0.35
Self-employed	0.11	0.12	0.12	0.12
Student	0.16	0.16	0.16	0.17
Pregnancies, total	3.51(0.05)	3.54(0.06)	3.54(0.07)	3.52(0.07)
Children alive today	2.51(0.04)	2.53(0.05)	2.57(0.05)	2.56(0.05)
Ever gave birth (live or still)	0.89	0.91	0.92	0.92
Wants no more children	0.23	0.23	0.23	0.23
Wait 1 to 3 yrs before next preg.	0.42	0.42	0.42	0.42
Wait >3 years before next preg.	0.35	0.35	0.35	0.35
Currently using a LARC	0.05	0.04	0.04	0.04
Currently using a SARC	0.02	0.02	0.02	0.02
Currently using other method	0.04	0.05	0.05	0.05
Number of observations	1914	1503	1213	1151

Notes: This table shows sample characteristics across eligiblity criteria; Column 1 shows the full sample of women counselled at the hospital during the study period; Column 2 shows those who consented to participate into the study; Column 3 shows those who met the eligibility criteria, i.e. were: (i) interviewed for the baseline survey within 12 weeks of the counselling session, (ii) were not pregnant at the time of counselling and due beyond the follow-up survey date; and Column 4 shows those who were then successfully re-interviewed at the follow-up survey date (no later than 40 days after the scheduled date of the interview).

Table A2: Robustness to control variables selection.

	(1)	(2) Adjusted	(3)
	Low Q. mean	$\hat{\beta}$ [95% CI]	N
Panel A: Contraceptive use at follow-up			
Using method at follow up	0.445	0.085 [0.030, 0.139]	1151
Panel B: Decomposing adoptions and continuations			
Adopted since counselling	0.490	0.088 [0.033, 0.143]	1151
Still using method at follow up	0.909	0.016 [-0.032, 0.063]	644
Panel C: Method satisfaction conditional on adoption			
Satisfied with adopted method	0.801	0.107 [0.043, 0.171]	621

Notes: This table shows the estimated difference in outcomes between the quality of care between groups with low- and high-quality of care, β as described in Section 2.5.2 using an alternative set of baseline control variables; The outcome variables are: the share using a modern contraceptive method at follow-up (Panel A); the share who adopted a modern contraceptive method between the counselling session and the follow-up survey, and amongst those who adopted a modern method, whether they are still using this method at follow-up (Panel B); then, amongst those who adopted a modern method, whether they were satisfied or very satisfied with this method (Panel C); The control variables include: department, age, children, marital status, education, main activity/employment, desired spacing for next pregnancy, currently using a LARC or a SARC at the time of counselling, and whether they had a method in mind they wanted to adopt at the time of counselling, all centred and standardized.

Table A3: Attrition by treatment and baseline covariates.

	(1)	(2)
	Interviewed at follow-up	
	Unadjusted	Adjusted
Treatment (Above-median quality of care)	0.008	0.008
	(0.014)	(0.014)
Dep.: Maternity or Gynaecology		-0.025
		(0.022)
Age		0.007
		(0.003)
Married		0.035
		(0.021)
Education: Tertiary		0.038
		(0.025)
Salaried employee		-0.018
		(0.027)
Children alive today		-0.013
		(0.007)
Ever gave birth (live or still)		-0.026
		(0.037)
Wants no more children		-0.065
		(0.042)
Wait 1 to 3 yrs before next preg.		-0.019
		(0.024)
Currently using a LARC		-0.052
		(0.069)
Treatment X Dep.: Maternity or Gynaecology		0.033
		(0.028)
Treatment X Age		-0.006
		(0.003)
Treatment X Married		-0.014
		(0.026)
Treatment X Education: Tertiary		-0.009
		(0.029)
Treatment X Salaried employee		0.026
		(0.032)
Treatment X Ever gave birth (live or still)		0.011
		(0.043)
Treatment X Wants no more children		0.079
		(0.048)
Treatment X Wait 1 to 3 yrs before next preg.		0.010
		(0.030)
Treatment X Currently using a LARC		0.097
		(0.070)
Mean in the below-median quality of care group	0.949	0.949
Observations	1213	1213
Covariates	No	Yes
H0: Treatment = 0 (t-test)	0.552	0.544
H0: Controls=0 (F-test)		0.062
H0: Treatment X Controls interactions=0 (F-test)		0.668

Notes: This table shows the impact of treatment on the likelihood of being interviewed at follow-up; t-tests report p-values from the indicated null hypothesis on the treatment coefficients; F-tests report p-values from tests of the joint orthogonality of the full set of indicated coefficients.

Table A4: Sample characteristics over quality of care.

	(1)	(2)	(3)
	Quality of care		
	Low	**High**.	Diff. (1)-(2)
	Mean/(SD)	Mean/(SD)	p-value
Age	29.19(0.32)	29.53(0.24)	0.39
Adolescent	0.06	0.05	0.54
BMI	26.89(0.24)	27.26(0.17)	0.21
Unmarried couple cohabiting	0.33	0.33	0.98
Married	0.37	0.36	0.60
Education: Tertiary	0.51	0.49	0.49
Education: Secondary	0.22	0.24	0.56
Education: Primary/Lower sec.	0.26	0.26	0.84
Salaried employee	0.34	0.35	0.72
Self-employed	0.13	0.12	0.69
Student	0.18	0.15	0.20
Pregnancies, total	3.37(0.11)	3.60(0.08)	0.11
Children alive today	2.49(0.09)	2.59(0.06)	0.32
Ever gave birth (live or still)	0.91	0.93	0.26
Gave birth ≤3 months	0.60	0.57	0.28
Wants no more children	0.22	0.23	0.67
Wait 1 to 3 yrs before next preg.	0.42	0.42	0.97
Wait >3 years before next preg.	0.36	0.35	0.74
Currently using a LARC	0.03	0.05	0.39
Currently using a SARC	0.02	0.02	0.65
Currently using other method	0.05	0.05	0.80
F-test of joint orthogonality			0.931
Number of observations	402	749	1151

Notes: This table shows sample characteristics over the binary quality of care indicator described in Section 2.4; The F-test of joint orthogonality row shows the p-value from an F-test on the full set of individual characteristics in the table regressed on the binary quality of care indicator.

Table A5: Impact of discounts on quality of care.

	(1)	(2)	(3)	(4)
	Discrete index		**Binary index**	
Any discount for LARCs=1	-1.307	-1.473	-0.020	-0.025
	(1.078)	(1.091)	(0.035)	(0.035)
Test: $\beta = 0$ p-value	0.225	0.177	0.567	0.482
Index=0 group mean outcome	64.016	64.016	0.667	0.667
N	1151	1151	1151	1151
Controls	No	Yes	No	Yes

Notes: This table shows the estimated coefficient on a linear regression of randomly assigned LARC price discount indicators on our measures of quality of care; columns 1 and 2 show results from regressing price indicators on the continuous index and columns 3 and 4 on the binary index; The 'Test: $\beta = 0$ p-value' row reports the p-value for a hypothesis test of the coefficient $\beta = 0$; Robust standard error in parentheses; The control variables include: department, age, children, marital status, education, main activity/employment, desired spacing for next pregnancy, currently using a LARC or a SARC at the time of counselling, and whether they had a method in mind they wanted to adopt at the time of counselling, all centred and standardized.

Table A6: Robustness to index definition.

	(1) Unadjusted	(2) Adjusted	(3)
	$\hat{\beta}$ [95% CI]	$\hat{\beta}$ [95% CI]	N
Panel A: Main index			
Using method at follow up	0.102 [0.042, 0.162]	0.082 [0.027, 0.137]	1151
Adopted since counselling	0.107 [0.047, 0.167]	0.082 [0.027, 0.138]	1151
Still using method at follow up	0.009 [-0.039, 0.056]	0.034 [-0.016, 0.085]	644
Satisfied with the adopted method	0.099 [0.036, 0.162]	0.120 [0.054, 0.187]	621
Panel B: Jain et al. (2019) index			
Using method at follow up	0.103 [0.043, 0.162]	0.072 [0.018, 0.127]	1151
Adopted since counselling	0.111 [0.051, 0.170]	0.076 [0.021, 0.131]	1151
Still using method at follow up	0.003 [-0.044, 0.049]	0.023 [-0.026, 0.072]	644
Satisfied with the adopted method	0.089 [0.027, 0.151]	0.105 [0.041, 0.170]	621
Panel C: Equal weights index			
Using method at follow up	0.086 [0.026, 0.145]	0.063 [0.008, 0.117]	1151
Adopted since counselling	0.095 [0.036, 0.154]	0.068 [0.013, 0.122]	1151
Still using method at follow up	-0.003 [-0.048, 0.043]	0.020 [-0.029, 0.069]	644
Satisfied with the adopted method	0.100 [0.039, 0.161]	0.120 [0.056, 0.184]	621
Panel D: Anderson (2008) inverse variance-covariance weighted index			
Using method at follow up	0.082 [0.022, 0.142]	0.065 [0.011, 0.120]	1151
Adopted since counselling	0.090 [0.030, 0.150]	0.068 [0.013, 0.122]	1151
Still using method at follow up	-0.000 [-0.046, 0.046]	0.029 [-0.021, 0.079]	644
Satisfied with the adopted method	0.104 [0.042, 0.165]	0.128 [0.063, 0.193]	621

Notes: This table shows the estimated difference in outcomes between the quality of care between groups with low- and high-quality of care based on different indices of quality of care. Panel A shows results for the main index used throughout the paper, Panel B for the Jain et al. (2019) index with the EU and CC categories separated, Panel C shows results for an index where each one of the 10 items is equally weighted, Panel 4 is calculated by weighting each item using an inverted variance covariance matrix as in Anderson (2008); Binary indices are made by dividing the sample into an below/above median groups; The outcome variables are: the share using a modern contraceptive method at follow-up; the share who adopted a modern contraceptive method between the counselling session and the follow-up survey, and amongst those who adopted a modern method, whether they are still using this method at follow-up; then, amongst those who adopted a modern method, whether they were satisfied or very satisfied with this method.