

# Ethnolinguistic Concordance and the Receipt of Postpartum IUD Counseling Services in Sri Lanka

**CONTEXT:** Ethnic and linguistic concordance are important dimensions of the patient-physician relationship, and are linked to health care disparities. However, evidence on the associations between health behavior and outcomes and patient-provider concordance is limited, especially in low- and middle-income settings.

**METHODS:** To examine how concordance between women and their primary health midwife is associated with women's receipt of postpartum IUD counseling, observational data from a cluster-randomized trial assessing an intervention to increase postpartum IUD counseling were used. Data on 4,497 women who delivered at six hospitals in Sri Lanka between September 2015 and March 2017 were merged with data on 245 primary health midwives, and indicators of linguistic concordance, ethnic concordance and their interaction were generated. Multivariate logistic regression analyses were used to assess the associations between concordance and women's receipt of counseling.

**RESULTS:** Women from non-Sinhalese groups in Sri Lanka face disparities in the receipt of postpartum IUD counseling. Compared with the ethnolinguistic majority (Sinhalese women who speak only Sinhala), non-Sinhalese women have lower odds of having received postpartum IUD counseling, whether they speak both Sinhala and Tamil (odds ratio, 0.6) or only Tamil (0.5). Ethnic discordance—rather than linguistic discordance—is the primary driver of this disparity.

**CONCLUSIONS:** The findings highlight the need for interventions that aim to bridge the sociocultural gaps between providers and patients. Matching women and their providers on ethnolinguistic background may help to reduce disparities in care.

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By Mahesh Karra, Erin Pearson, David Canning, Iqbal Shah, Ranjith de Silva and Arnjali Samarasekera

Mahesh Karra is assistant professor, Frederick S. Pardee School of Global Studies, Boston University, Boston, MA, USA. Erin Pearson is senior researcher, Ipas, Chapel Hill, NC, USA. David Canning is the Richard Saltonstall Professor of Population Sciences, and Iqbal Shah is principal research scientist, both in the Department of Global Health and Population, Harvard T.H. Chan School of Public Health, Boston, MA, USA. Ranjith de Silva is national coordinator, and Arnjali Samarasekera is research associate, both at the Sri Lanka College of Obstetricians and Gynaecologists, Colombo.

Poor communication and a lack of mutual trust have long been cited as key dimensions of a weak patient-physician relationship and, as such, may contribute to the provision of ineffective medical care.<sup>1</sup> In particular, interpersonal barriers that result from linguistic, racial, ethnic or cultural differences between patients and providers may exacerbate the disparities in utilization, care-seeking behavior and health experienced by minority groups relative to the majority.<sup>2–4</sup> Studies have also shown that differential provider treatment toward minorities may explain differences in quality of care and such outcomes as patient satisfaction, adherence to treatment and disease persistence, among others.<sup>5–7</sup>

Ethnolinguistic concordance between patients and their providers has been examined as an important aspect of the patient-physician relationship. Most studies that have assessed the role of ethnolinguistic or cultural (often defined as religious or racial) discordance between patients and providers have emerged from the debate over whether increasing the numbers of minority health professionals would ameliorate health care disparities for minority individuals.<sup>8</sup> Over the last two decades, this debate has been informed by a large body of literature examining the role of minority providers in caring for underserved

minority populations.<sup>9–11</sup> Several studies have found that patients' levels of trust, satisfaction, utilization of services and involvement in decision making about their health are higher when they share the same race, ethnicity or language as their provider.<sup>2,6,12–14</sup> However, other studies have found no associations between health care quality and physician-patient ethnic concordance,<sup>15,16</sup> and the evidence on the benefits of other types of patient-physician concordance, such as gender, is even more mixed.<sup>17,18</sup>

In this study, we examine the relationship between ethnolinguistic concordance and the provision of postpartum contraception counseling services in Sri Lanka. We merge observational data from postpartum women with background data collected on local primary health midwives, who are usually the entry point into antenatal care for pregnant women in remote and rural areas. We then generate indicators of linguistic concordance, ethnic concordance and concordance across both dimensions to assess how concordance is related to women's receipt of postpartum IUD counseling services.

Our study addresses the existing research gaps in two key ways. First, we provide insight into how language and ethnicity are associated with interpersonal care-related outcomes in a low-to-middle-income setting in which

evidence on patient-provider relationships is scarce. Second, we examine how patient-provider relationships across ethnicity and language are both independently and jointly related to differences in the receipt of interpersonal health care, and we are able to disentangle the associations by which both of these sociocultural determinants are correlated with processes of care.

### **Background**

In Sri Lanka, the conflict between its two main ethnic groups—the majority Sinhalese population, which makes up roughly 75% of the country's 21 million people, and the minority Tamil population, which makes up 24%—dates back as far as 150 BC; however, after the nation achieved independence from British rule in 1948, the conflict intensified.<sup>19</sup> Following independence, the Sinhalese disenfranchised Tamil migrant workers from India and made Sinhala the official language. In 1976, a Tamil militant organization known as the Liberation Tigers of Tamil Eelam (LTTE) was formed and began to campaign for an independent Tamil state in northern and eastern Sri Lanka, where the largest proportion of Tamil populations reside.<sup>20</sup> Tensions between the LTTE and the Sinhalese-majority government resulted in a 26-year civil conflict that lasted from 1983 until 2009, when the LTTE was defeated. With an estimated 80,000–100,000 casualties, this conflict is considered to be one of the longest and deadliest civil wars in Asian history.<sup>21</sup>

Since 2009, Sri Lanka has made great economic progress and has transitioned to middle-income status.<sup>22</sup> The country has a highly developed health system, particularly in the areas of family planning, and obstetric and maternal health care. Despite these successes, underlying ethnic tensions remain, and abuses against ethnic Tamil women—including poor treatment during maternity care, and forced contraceptive use and sterilization—continue to be reported.<sup>23,24</sup> Antenatal care is free and comprehensive, and 99% of Sri Lankan women receive antenatal care at least once during pregnancy.<sup>25</sup> However, nationally representative surveys in Sri Lanka, such as the Demographic and Health Survey, do not disaggregate rates of antenatal care and other maternal health indicators by ethnicity,<sup>25</sup> which makes it difficult to identify ethnolinguistic disparities in maternal health at the population level.

Although antenatal counseling may be obtained at field clinics, hospitals and hospital clinics, it is most often provided through home visits by primary health midwives, the “front line” health workers for providing domiciliary maternal and child health and family planning services in Sri Lanka.<sup>26</sup> These midwives are an important part of the primary health care system in the country, especially in rural and remote regions. The government of Sri Lanka has adopted a number of strategies to recruit, train and retain these health professionals to work in difficult settings. Preference is given to recruitment in areas of greater need, and each province has at least one regional recruitment and training center—run by the Family Health

Bureau, in collaboration with the Sri Lanka Family Planning Association—in which candidates are identified and trained in maternal and child health, family planning and midwifery. New primary health midwives must serve for five years after they have been certified, and are expected to be prepared to work anywhere in the province in which they were trained. As an incentive to remain in rural areas and serve vulnerable populations, the Sri Lankan government offers midwives a range of professional development opportunities, as well as allowances and pension schemes.<sup>27</sup>

Within every Ministry of Health catchment area throughout the country (defined areas that coincide with other local government administrative units), primary health midwives are assigned to oversee their own catchment area of 2,000–4,000 people.<sup>26</sup> Through systematic home visits, primary health midwives provide routine care to children and pregnant women, and family planning services—including contraceptive counseling and the distribution of contraceptive pills and condoms—to women and couples. The midwives also facilitate client referrals to local maternal and child health clinics and, as a result, serve as a link between the community and the institutional health system. Low-risk women who begin antenatal counseling at 6–8 weeks are typically visited by their local primary health midwife over the course of their pregnancy, at which time topics related to postpartum health and family planning are routinely discussed.<sup>28</sup>

In recognition of the ethnic and linguistic roots of the conflict between the majority Sinhala-speaking population and the minority Tamil-speaking groups, the government of Sri Lanka conferred national language status to the Sinhala language and the Tamil language, with English as a link language, in the country's constitution in 1987.<sup>29,30</sup> Although this provision allows citizens to interact with institutions in any of the three languages, service providers have become increasingly concerned about their ability to meet public demand across multiple languages, particularly for Tamil-speaking populations. A key reason for this concern is the shortage of qualified and multilingual health personnel in both public and private sectors in Tamil-majority areas. In a study of health services in Sri Lanka's Northern Province, a predominantly Tamil-speaking region, the majority of interviewed providers and inhabitants identified the shortage of multilingual (and specifically Tamil-speaking) health personnel as the most pressing obstacle to improving health outcomes.<sup>31</sup> Moreover, Sinhala-speaking health care providers in the region reported the existence of a linguistic discordance between providers and patients, and mentioned the difficulty of working in Tamil communities due to language barriers.

Family planning counseling materials (e.g., brochures) are typically available and distributed in all three languages. However, even with the availability of these materials, a shortage of multilingual health care providers may act as a barrier to effective counseling and communication

of essential reproductive health information. If there are too few counselors who speak Tamil working in Tamil-majority regions, then Tamil-speaking populations may be less likely than others to receive counseling for family planning. Given the Sri Lankan government's recognition of language as a means for integration and equity across groups, it is important to determine the extent to which matching patients with providers on language alone would be sufficient to close gaps in family planning service provision.

### **Postpartum IUD Provision**

The World Health Organization recommends that a woman wait at least 24 months after a live birth before attempting another pregnancy to reduce the risk of adverse maternal and child health outcomes.<sup>32,33</sup> Some women may be at risk of pregnancy as soon as four weeks after delivery,<sup>34</sup> and the provision of an effective contraceptive—particularly, a long-acting reversible method—immediately postpartum has been shown to reduce the risk of pregnancy following a delivery.<sup>35</sup> The IUD is a long-acting reversible method that can be inserted safely within 48 hours of a delivery and used during breast-feeding.<sup>36</sup> It is also a convenient and cost-effective postpartum option for women who may not be able to attend follow-up visits because of distance, travel costs, time constraints or other barriers to access.

In 2014, the International Federation of Gynaecology and Obstetrics, in collaboration with the Sri Lanka College of Obstetricians and Gynaecologists, launched an initiative to make postpartum contraceptive services a routine part of antenatal counseling and delivery room services in Sri Lanka.<sup>37</sup> A key component of the initiative consisted of training primary health midwives and delivery unit staff at 18 public maternity and teaching hospitals across the country in counseling on and provision of postpartum IUDs. To assess the impact and performance of the initiative, an independent evaluation was undertaken in six of the hospitals by means of a cluster-randomized, stepped-wedge trial.<sup>38</sup> We use baseline data from the postpartum women in that evaluation along with language and ethnicity data collected on local primary health midwives from a sample of Ministry of Health catchment areas to assess whether ethnolinguistic concordance is associated with receipt of postpartum IUD counseling.

## **METHODS**

### **Sample**

Baseline data were collected from 41,772 women who delivered in six rural and periurban district general hospitals in Sri Lanka between September 2015 and March 2017; four of the hospitals are located in Sinhala-majority regions of the country, while the other two are located in Tamil-majority regions. Five data collection officers were assigned to each hospital with the aim to interview all women delivering there during the study period. Consenting women were interviewed in the postnatal

wards of the hospitals before discharge via an electronic survey questionnaire administered by the data collection officers using tablets. The survey asked about social and demographic characteristics, the location and quality of antenatal counseling, and whether the respondent had received postpartum family planning and IUD counseling. At the end of the questionnaire, women were asked to provide information about their place of residence and assigned primary health midwife area, to allow the field team to contact them for follow-up interviews. Approval to conduct the full postpartum IUD study was granted by the Ethics Review Committee at the Faculty of Medicine, University of Colombo, Sri Lanka. Informed consent to participate in the study was obtained; only women who consented (99% of the full sample) were interviewed.

To determine languages the women spoke, field interviewers probed the respondents on those that they could speak at a native or bilingual level. In addition, the field team gathered data on the spoken languages and ethnicities of primary health midwives from Ministry of Health catchment areas surrounding the study hospitals. The team first selected a sample of 13 Ministry of Health catchment areas. They then collected data from primary health midwives who were assigned to 359 primary health midwife catchment area subdivisions within the selected Ministry of Health catchment areas. These data were gathered during orientation sessions and debriefing meetings that the field team held with primary health midwives during the data collection period. When classifying our sample by ethnicity, we assigned women and primary health midwives as Sinhalese or non-Sinhalese, the latter of which includes the Sri Lankan Tamil, Indian Tamil and Sri Lankan Moor ethnic groups. For language, the categories are Sinhala speaker, Tamil speaker or bilingual.

From the original study sample, 7,191 women were successfully matched to 258 primary health midwives from 13 Ministry of Health catchment areas. In a few primary health midwife catchment areas, more than one primary health midwife was assigned. If all of the primary health midwives assigned to that area had the same ethnolinguistic composition (e.g., all were Sinhalese who spoke only Sinhala), then they were collapsed into one primary health midwife observation for the entire primary health midwife area. If all of the primary health midwives assigned to the same primary health midwife catchment area had the same ethnic composition but differing linguistic composition, the observation was recoded to include the most flexible language capacity possible for that area. For example, if an area had a non-Sinhalese primary health midwife who spoke only Sinhala and a non-Sinhalese primary health midwife who spoke only Tamil, then the area would be coded as having a non-Sinhalese primary health midwife who was bilingual. Observations (for both women and primary health midwives) for which there was more than one primary health midwife assigned to the area and for which a clear ethnolinguistic composition could not be ascertained were dropped from the analysis to ensure

clean identification of concordance between midwives and women. After dropping 1,408 observations in which information on language and ethnicity for primary health midwives and women was missing or not clearly coded, 1,241 observations in which women were enrolled prior to the rollout of the intervention (and therefore potentially not exposed to postpartum IUD counseling), and 45 observations from “other” ethnic groups and ethnolinguistic groups with fewer than 10 observations, we were left with an analytic sample of 4,497 women (11% of the original study sample) who were matched to 245 primary health midwives from 13 Ministry of Health catchment areas.

### **Postpartum IUD Counseling**

Our key outcome variable was whether a woman received postpartum IUD counseling prior to being admitted to the hospital for delivery. We chose this outcome because primary health midwives are often a pregnant woman’s first and most frequent point of contact, as well as her entry point into the cascade of care; thus, family planning counseling is a health service that a woman is likely to receive from a primary health midwife before continuing through the health system over the course of her pregnancy.

### **Analysis**

Our first set of analyses focused on ethnicity, and consisted of several specifications that assess how ethnicity and ethnic concordance are related to receipt of postpartum IUD counseling. We began by assessing the association between counseling and women’s ethnicity, measured as a categorical variable (Sinhalese, Sri Lankan Tamil, Indian Tamil or Sri Lankan Moor), with Sinhalese as the reference group. Given that the outcome—receipt of postpartum IUD counseling—is a binary variable, we conducted multivariate logistic regression analyses and included a range of confounding woman-level variables to control for potential bias—specifically, number of live births, ever-use of a family planning method, age, work status and educational attainment. In addition, we included Ministry of Health—area fixed effects to control for any regional heterogeneity, and our standard errors are clustered at the level of the primary health midwife. Next, we examined the relationship between counseling and primary health midwives’ ethnicity; again, we coded ethnicity as a categorical variable (Sinhalese, Sri Lankan Tamil, Indian Tamil or Sri Lankan Moor), with Sinhalese as the reference group. We then examined the relationship between ethnic concordance between women and their primary health midwife through more decomposed interaction analyses, in which we coded women’s ethnicity and midwives’ ethnicity as binary indicators of Sinhalese ethnicity. We compared each woman-midwife ethnicity combination against the reference group, which we define as ethnic Sinhalese women who are matched to ethnic Sinhalese midwives. Through these analyses, we can assess the associations between concordance (and discordance) in ethnicity and outcomes, and determine if those associations vary by ethnic group.

Our second set of analyses focused on language. We began by running a specification to examine the association between counseling and being a Tamil-speaking woman, for which we coded a woman’s spoken language as a binary indicator of whether she speaks Tamil; women who speak only Sinhala served as the reference group, while women who are bilingual were coded as Tamil speakers for this specification. Similarly, we ran a specification to examine the association between counseling and being a Tamil-speaking primary health midwife, and we coded the midwife’s language as a binary indicator of whether she speaks Tamil; midwives who speak only Sinhala served as the reference group, while those who are bilingual were coded as Tamil speakers.

Next, we conducted a more decomposed interactive specification of linguistic concordance by examining the associations between the primary health midwife’s language, the woman’s language and counseling. For this analysis, language was coded to indicate whether a woman or midwife speaks only Sinhala, only Tamil or is bilingual. We coded cases in which a woman reported that she is bilingual and her midwife reported speaking only one of the languages (or vice versa) as a linguistically concordant match. In this specification, women who speak only Sinhala and who were matched to midwives who speak only Sinhala were the reference group.

Our final set of analyses deconstructed the role of ethnolinguistic concordance by identifying each combination of ethnicity and language spoken by women and their primary health midwife. We collapsed our categorical ethnicity and language variables into two ethnicity classifications (Sinhalese and non-Sinhalese) and three language classifications (only Sinhala, only Tamil or bilingual) to give us a total of six ethnolinguistic classifications that could be assigned to each woman and each primary health midwife. As a result, 36 possible ethnolinguistic classifications could be assigned to each woman-midwife matched pair. Several of these combinations did not exist in our sample, while for several others, there were fewer than 10 observations; we dropped these combinations when we constructed our final analytic sample. For this analysis, we designated the ethnolinguistically concordant majority group—Sinhalese women who speak only Sinhala and who are matched to Sinhalese primary health midwives who speak only Sinhala—as the reference group.

## **RESULTS**

### **Descriptive Statistics**

Thirty-five percent of the women reported their primary language is Tamil, 58% reported their primary language is Sinhala, and 7% reported being bilingual (Table 1). With respect to ethnicity, 63% of women reported being Sinhalese, 29% were Tamil (either Sri Lankan Tamil or Indian Tamil) and 8% were Sri Lankan Moor. Compared with the overall Sri Lankan population, a larger proportion of women in our sample are from minority ethnic groups (Sri Lankan Tamil, Indian Tamil and Sri Lankan Moor).<sup>30</sup>



**TABLE 1. Selected characteristics of matched postpartum women and primary health midwives participating in an evaluation of postpartum contraceptive services, Sri Lanka, 2015–2017**

Characteristic	% or mean
<b>WOMEN (N=4,497)</b>	
<b>Language</b>	
Primary language is Tamil	35.1
Primary language is Sinhala	58.1
Bilingual	6.8
<b>Ethnicity</b>	
Sinhalese	63.3
Non-Sinhalese	36.7
Sri Lankan Tamil	16.5
Indian Tamil	12.5
Sri Lankan Moor	7.7
<b>Woman-level covariates</b>	
Mean no. of live births	1.91 (0.9)
Ever used family planning	59.5
Mean age	28.3 (5.4)
Worked in last 12 mos.	5.7
<b>Education</b>	
None	0.9
Some primary	2.3
Primary	1.8
Some secondary	14.2
Secondary	29.3
>secondary	51.6
<b>PRIMARY HEALTH MIDWIVES (N=245)</b>	
<b>Language</b>	
Primary language is Tamil	13.1
Primary language is Sinhala	58.3
Bilingual	28.6
<b>Ethnicity</b>	
Sinhalese	86.9
Non-Sinhalese	13.1
Indian Tamil	11.4
Sri Lankan Moor	1.6

Note: For means, figures in parentheses are standard deviations.

By comparison, 13% of primary health midwives reported their primary language is Tamil, 58% reported their primary language is Sinhala, and 29% reported being bilingual. Eighty-seven percent of midwives reported being Sinhalese, 11% were Indian Tamil, and 2% were Sri Lankan Moor.

For 86% of women, there was concordance between at least one of their spoken languages and at least one of their primary health midwife's spoken languages (Table 2). While every Sinhala-speaking woman was matched to a midwife who spoke Sinhala, only 61% of Tamil-speaking women were matched to a midwife who spoke Tamil (not shown). We found that 71% of women had ethnic concordance with their midwife; however, a further decomposition of this concordance showed that although 98% of Sinhalese women were matched to a Sinhalese midwife, only 25% of non-Sinhalese women were matched to a non-Sinhalese midwife (not shown).

When we used the most flexible definition of ethnolinguistic concordance (which examines the joint association of linguistic concordance and ethnic concordance above), 71% of women matched with their primary health midwife on both ethnicity and language. On the other hand,

**TABLE 2. Percentage distribution of ethnolinguistic concordance between postpartum women and their primary health midwife**

Indicator	% (N=4,497)
<b>LINGUISTIC CONCORDANCE</b>	
<b>Languages match</b> <b>86.1</b>	
Woman speaks Tamil; midwife speaks Tamil	3.2
Woman speaks Sinhala; midwife speaks Sinhala	54.2
Woman is bilingual; midwife speaks Sinhala	4.9
Woman speaks Tamil; midwife is bilingual	11.2
Woman speaks Sinhala; midwife is bilingual	10.8
Woman is bilingual; midwife is bilingual	1.9
<b>Languages do not match</b> <b>13.9</b>	
Woman speaks Tamil; midwife speaks Sinhala	13.9
<b>ETHNIC CONCORDANCE</b>	
<b>Ethnicities match</b> <b>71.4</b>	
Woman is Sinhalese; midwife is Sinhalese	62.0
Woman is non-Sinhalese; midwife is non-Sinhalese	9.4
<b>Ethnicities do not match</b> <b>28.7</b>	
Woman is non-Sinhalese; midwife is Sinhalese	27.4
Woman is Sinhalese; midwife is non-Sinhalese	1.3
<b>ETHNOLINGUISTIC CONCORDANCE</b>	
<b>Ethnicity and language match</b> <b>71.4</b>	
Woman is non-Sinhalese/Tamil speaker; midwife is non-Sinhalese/Tamil speaker	3.2
Woman is non-Sinhalese/Tamil speaker; midwife is non-Sinhalese/bilingual	5.3
Woman is non-Sinhalese/bilingual; midwife is non-Sinhalese/bilingual	0.9
Woman is Sinhalese/Sinhala speaker; midwife is Sinhalese/Sinhala speaker	52.7
Woman is Sinhalese/bilingual; midwife is Sinhalese/Sinhala speaker	0.3
Woman is Sinhalese/Sinhala speaker; midwife is Sinhalese/bilingual	9.1
<b>Ethnicity and language do not match</b> <b>28.7</b>	
Woman is non-Sinhalese/Tamil speaker; midwife is Sinhalese/Sinhala speaker	13.9
Woman is non-Sinhalese/Sinhala speaker; midwife is Sinhalese/Sinhala speaker	1.5
Woman is non-Sinhalese/bilingual; midwife is Sinhalese/Sinhala speaker	4.7
Woman is non-Sinhalese/Tamil speaker; midwife is Sinhalese/bilingual	5.9
Woman is non-Sinhalese/Sinhala speaker; midwife is Sinhalese/bilingual	0.4
Woman is non-Sinhalese/bilingual; midwife is Sinhalese/bilingual	1.0
Woman is Sinhalese/Sinhala speaker; midwife is non-Sinhalese/bilingual	1.3
<b>Ethnic concordance, linguistic concordance</b> <b>71.4</b>	
<b>Ethnic concordance, but no linguistic concordance</b> <b>0.0</b>	
<b>No ethnic concordance, but linguistic concordance</b> <b>14.8</b>	
<b>No ethnic concordance, no linguistic concordance</b> <b>13.8</b>	
Total	100.0

Notes: Percentages may not total 100.0 because of rounding. Some combinations of ethnicity and language by woman and primary health midwife did not contain any observations or contained fewer than 10 observations and were therefore dropped from the table.

14% of women matched with their midwife on neither ethnicity nor language, while 15% of women matched on language but not ethnicity; no woman in our sample matched on ethnicity without also matching on language. When we decomposed the sample on all ethnolinguistic combinations, we found that the largest ethnolinguistic category (53%) consists of Sinhalese women who speak only Sinhala and who were matched to a Sinhalese midwife who speaks only Sinhala.

### Counseling Tabulations and Logistic Regressions

Fifty-five percent of women in the sample reported being counseled on postpartum IUD before hospital admission (not shown). A tabulation of counseling status by women's language shows that 44% of Sinhala-speaking women and 46% of Tamil-speaking women did not receive preadmission counseling. When we ran a tabulation by women's ethnicity, we found that Indian Tamils were the group with the highest proportion of women not counseled

before admission—58%, compared with 44% of Sinhalese women, 42% of Sri Lankan Tamil women and 36% of Sri Lankan Moor women.

In analyses assessing the direct associations between language and women’s receipt of postpartum IUD counseling, women who speak Tamil had lower odds than women who speak Sinhala of having received counseling prior to admission (odds ratio, 0.6; Table 3). In contrast, women who had a Tamil-speaking primary health midwife were no less likely than women who had a Sinhala-speaking midwife to have received counseling. In analyses by ethnicity, women of Sri Lankan Tamil, Indian Tamil and Sri Lankan Moor ethnicities were all less likely than Sinhalese women to have received counseling (0.4–0.7). Similar to our language results, however, women who had a non-Sinhalese midwife were no less likely than women who had a Sinhalese midwife to have received counseling.

We assessed the relationship between women’s language, primary health midwives’ language and counseling using an interaction term approach (Table 4). These results confirmed Tamil-speaking women’s lower odds of having received counseling when matched with a Sinhala-speaking primary health midwife compared with Sinhala-speaking women matched with a Sinhala-speaking midwife (odds ratio, 0.6). We also found that Tamil-speaking women who were matched to a Tamil-speaking midwife had higher odds of having received counseling on postpartum IUD than Sinhala-speaking women matched to a Sinhala-speaking midwife (2.0). In terms of ethnicity, compared with Sinhalese women who were matched with a Sinhalese midwife, non-Sinhalese women matched with a Sinhalese midwife were significantly less likely to have

received postpartum IUD counseling (0.6). In contrast, Sinhalese women matched with a non-Sinhalese midwife were no less likely than those matched with a Sinhalese midwife to have received counseling, while non-Sinhalese women matched with a non-Sinhalese midwife had higher odds of having received counseling than Sinhalese women matched with a Sinhalese midwife (2.0).

These findings were reinforced when we conducted a more complete decomposition analysis of linguistic concordance (Table 5). We found that, compared with women who speak only Sinhalese matched with a midwife who speaks only Sinhalese, women who speak only Tamil were less likely to have received counseling when paired with a midwife who speaks only Sinhala (odds ratio, 0.6); however, we observed that women who speak both Tamil and Sinhala were also less likely to have received counseling when matched with a midwife who speaks only Sinhala (0.7). In contrast, we found that women matched to a midwife who speaks only Tamil or to a bilingual midwife had no lower likelihood of having received counseling. We also observed differential odds of receipt of counseling in cases in which the midwife speaks both Tamil and Sinhala: Compared with Sinhala-speaking women matched with a Sinhalese midwife, women who speak only Tamil who were matched with a bilingual midwife were no less likely to have received counseling, and women who speak Sinhala who were

**TABLE 3. Odds ratios (and 95% confidence intervals) from logistic regression analyses assessing the likelihood that a woman received postpartum IUD counseling, by her and her primary health midwife’s language and ethnicity**

Language/ethnicity	Odds ratio
<b>Woman’s language</b>	
Sinhala (ref)	1.00
Tamil	0.59 (0.48–0.72)**
<b>Primary health midwife’s language</b>	
Sinhala (ref)	1.00
Tamil	1.15 (0.75–1.77)
<b>Woman’s ethnicity</b>	
Sinhalese (ref)	1.00
Sri Lankan Tamil	0.69 (0.53–0.89)**
Indian Tamil	0.37 (0.27–0.50)**
Sri Lankan Moor	0.71 (0.52–0.96)*
<b>Primary health midwife’s ethnicity</b>	
Sinhalese (ref)	1.00
Indian Tamil	0.95 (0.53–1.70)
Sri Lankan Moor	0.86 (0.56–1.34)

\*p<.05. \*\*p<.01. Notes: ref=reference group. Control variables include number of live births, ever-use of a family planning method, age (in five-year age-groups) and educational attainment (no education, primary, secondary, higher). Ministry of Health-fixed effects are included, and standard errors are clustered at the level of the primary health midwife.

**TABLE 4. Odds ratios (and 95% confidence intervals) from logistic regression analyses assessing the likelihood that a woman received postpartum IUD counseling, by linguistic and ethnic concordance between her and her primary health midwife**

Linguistic/ethnic concordance	Odds ratio
<b>LANGUAGE</b>	
<b>Woman</b>	
Speaks Sinhala; midwife speaks Sinhala (ref)	1.00
Speaks Tamil; midwife speaks Sinhala	0.56 (0.45–0.69)**
<b>Primary health midwife</b>	
Speaks Sinhala; woman speaks Sinhala (ref)	1.00
Speaks Tamil; woman speaks Sinhala	0.72 (0.49–1.06)†
<b>Woman x primary health midwife</b>	
Both speak Sinhala (ref)	1.00
Both speak Tamil	1.96 (1.18–3.26)**
<b>ETHNICITY</b>	
<b>Woman</b>	
Sinhalese; midwife is Sinhalese (ref)	1.00
Non-Sinhalese; midwife is Sinhalese	0.56 (0.45–0.71)**
<b>Primary health midwife</b>	
Sinhalese; woman is Sinhalese (ref)	1.00
Non-Sinhalese; woman is Sinhalese	0.72 (0.48–1.06)†
<b>Woman x primary health midwife</b>	
Both are Sinhalese (ref)	1.00
Both are non-Sinhalese	1.95 (1.17–3.25)*

\*p<.05. \*\*p<.01. †p<.10. Notes: ref=reference group. Control variables include number of live births, ever-use of a family planning method, age (in five-year age-groups) and educational attainment (no education, primary, secondary, higher). Ministry of Health-fixed effects are included, and standard errors are clustered at the primary health midwife level.

matched with a bilingual midwife were more likely to have received counseling (1.5).

The findings from Table 4 related to ethnicity are again confirmed by the results presented in Table 5: Non-Sinhalese women matched with a Sinhalese primary health midwife were less likely to have received postpartum IUD counseling than Sinhalese women matched with a Sinhalese midwife (0.6). In contrast, Sinhalese women who were matched with a non-Sinhalese midwife were no less likely to have received counseling.

Table 6 disentangles the joint associations between ethnic and linguistic concordance and women's receipt of counseling through a complete deconstructive analysis across these two dimensions. In this result, the ethnolinguistically concordant majority group is Sinhalese women who speak only Sinhala and who are matched to a Sinhalese primary health midwife who also speaks only Sinhala. Relative to this group, we find that non-Sinhalese women who are matched to a Sinhalese midwife who speaks only Sinhala are less likely to have received postpartum IUD counseling, irrespective of these women's language capacities. More specifically, we found that non-Sinhalese women who speak both Tamil and Sinhala, and non-Sinhalese women who speak only Tamil, have a lower likelihood of having received postpartum IUD counseling relative to the ethnolinguistic majority (odds ratios, 0.6 and 0.5, respectively). This finding suggests that ethnic discordance between women and their primary health midwife is likely to be driving differences in the receipt of counseling, even in cases in which women and their primary health midwife are linguistically concordant.

As part of this same analysis, women matched to a non-Sinhalese primary health midwife had no lower odds (and, in some cases, had marginally higher but nonsignificant odds) of having been counseled on postpartum IUD before admission, irrespective of their ethnic or linguistic background, relative to those matched to a Sinhalese midwife. By the same token, women who are ethnically Sinhalese did not have lower odds of having been counseled on postpartum IUD before admission, regardless of the ethnolinguistic composition of their primary health midwives.

Several robustness checks (e.g., adding women's work status as a covariate, altering the definitions of ethnolinguistic concordance, using alternative measures of language proficiency) and alternative specifications were run to confirm the observed results that we have presented (Appendix Tables 1–3). We also examined the relationship between ethnolinguistic concordance and other outcomes related to family planning service provision, including postpartum family planning counseling more generally and antenatal care (Appendix Table 4). Although we found some variation in the significance of these results, they generally confirm our previous results in that women who belong to ethnolinguistic minority groups (non-Sinhalese and non-Sinhala speaking) and who are matched to an ethnolinguistically discordant primary health midwife tend to have lower odds of having received counseling relative to

**TABLE 5. Odds ratios (and 95% confidence intervals) from logistic regression analyses assessing the likelihood that a woman received postpartum IUD counseling, by linguistic and ethnic concordance between her and her primary health midwife**

Linguistic/ethnic concordance	Odds ratio
<b>Language</b>	
Woman speaks Sinhala; midwife speaks Sinhala (ref)	1.00
Woman speaks Tamil; midwife speaks Tamil	0.91 (0.47–1.75)
Woman speaks Tamil; midwife speaks Sinhala	0.55 (0.41–0.74)**
Woman is bilingual; midwife speaks Sinhala	0.66 (0.48–0.91)*
Woman speaks Tamil; midwife is bilingual	0.75 (0.53–1.10)
Woman speaks Sinhala; midwife is bilingual	1.49 (1.04–2.13)*
Woman is bilingual; midwife is bilingual	0.86 (0.43–1.71)
<b>Ethnicity</b>	
Woman is Sinhalese; midwife is Sinhalese (ref)	1.00
Woman is non-Sinhalese; midwife is Sinhalese	0.56 (0.45–0.71)**
Woman is Sinhalese; midwife is non-Sinhalese	0.72 (0.48–1.06)†
Woman is non-Sinhalese; midwife is non-Sinhalese	0.78 (0.50–1.24)

\*p<.05. \*\*p<.01. †p<.10. Notes: ref=reference group. Control variables include number of live births, ever-use of a family planning method, age (in five-year age-groups) and educational attainment (no education, primary, secondary, higher). Ministry of Health—fixed effects are included, and standard errors are clustered at the primary health midwife level.

**TABLE 6. Odds ratios (and 95% confidence intervals) from logistic regression analyses assessing the likelihood that that a woman received postpartum IUD counseling, by ethnolinguistic concordance between her and her primary health midwife**

Ethnolinguistic concordance	Odds ratio
Woman is Sinhalese/Sinhala speaker; midwife is Sinhalese/Sinhala speaker (ref)	1.00
Woman is non-Sinhalese/Tamil speaker; midwife is non-Sinhalese/Tamil speaker	0.85 (0.43–1.68)
Woman is non-Sinhalese/Tamil speaker; midwife is non-Sinhalese/bilingual	0.78 (0.51–1.20)
Woman is non-Sinhalese/bilingual; midwife is non-Sinhalese/bilingual	1.21 (0.37–3.95)
Woman is non-Sinhalese/Tamil speaker; midwife is Sinhalese/Sinhala speaker	0.54 (0.40–0.73)**
Woman is non-Sinhalese/Sinhala speaker; midwife is Sinhalese/Sinhala speaker	0.76 (0.40–1.43)
Woman is non-Sinhalese/bilingual; midwife is Sinhalese/Sinhala speaker	0.63 (0.45–0.88)**
Woman is non-Sinhalese/Tamil speaker; midwife is Sinhalese/bilingual	0.69 (0.44–1.09)
Woman is non-Sinhalese/Sinhala speaker; midwife is Sinhalese/bilingual	0.93 (0.39–2.23)
Woman is non-Sinhalese/bilingual; midwife is Sinhalese/bilingual	0.58 (0.28–1.24)
Woman is Sinhalese/Sinhala speaker; midwife is non-Sinhalese/bilingual	0.75 (0.51–1.12)
Woman is Sinhalese/bilingual; midwife is Sinhalese/Sinhala speaker	1.09 (0.29–4.09)
Woman is Sinhalese/Sinhala speaker; midwife is Sinhalese/bilingual	1.68 (1.12–2.52)*

\*p<.05. \*\*p<.01. Notes: ref=reference group. Control variables include number of live births, ever-use of a family planning method, age (in five-year age-groups) and educational attainment (no education, primary, secondary, higher). Ministry of Health—fixed effects are included, and standard errors are clustered at the primary health midwife level. Some combinatorial categories did not contain enough observations for the analysis and were therefore dropped.

women who belong to the ethnolinguistic majority group (Sinhalese and Sinhala speaking) and also to women who are ethnolinguistically concordant with their primary health midwife.

## DISCUSSION

There is a large and growing body of literature that emphasizes the impact of cultural proximity and group diversity on social and economic welfare.<sup>39</sup> In the context of transactions (for example, between buyers and sellers, borrowers and lenders etc.), evidence exists to suggest that the level of cultural homophily between transacting parties is likely to affect the outcome of the transaction, both in terms of whether a transaction will take place and in terms of the welfare gains that each party may expect to receive from the transaction. However, the extent to which preferential in-group treatment promotes

efficient outcomes, in which neither transacting party can be made better off without making the other party worse off, is ambiguous. On the one hand, cultural concordance between transacting parties—often captured by ethnicity, race or language proxies—may contribute to favoritism or in-group sorting, which in turn may lead to misallocation of resources and may therefore lower the likelihood of an efficient outcome. On the other hand, cultural proximity may contribute to reductions in the transaction costs or contract enforcement costs between parties, which would improve efficiency.

In the context of public goods and service provision, however, the role of cultural proximity is less clear. Some research has suggested that cultural and ethnic heterogeneity is inversely related to the efficient distribution of services, and usually leads to underprovision and “free riding” from minority groups, wherein such groups may benefit from public goods that are disproportionately (or even exclusively) financed by the majority.<sup>40,41</sup> In contrast, the targeted provision of services by cultural determinants such as ethnicity, geography or language may create more efficient but potentially less equitable outcomes across groups.

We found that women from minority groups, including Tamil-speaking women and women from a non-Sinhalese ethnicity, were less likely to receive postpartum IUD counseling than women from the linguistic (Sinhala-speaking) and ethnic (Sinhalese) majority groups. However, linguistic and ethnic concordance between women and primary health midwives were associated with higher odds of receipt of counseling, regardless of whether the concordance was between minority or majority groups. By decomposing the ethnic and linguistic concordance channels, we found that women who were ethnically discordant with their midwife—specifically, women of a non-Sinhalese minority matched with a midwife of the Sinhalese majority—were less likely to have received counseling even when they were linguistically concordant with their midwife. In contrast, no differential odds were found in the receipt of counseling for women who were ethnically concordant but linguistically discordant with their midwife, nor did we find differential receipt of counseling for ethnic majority women matched to an ethnic minority midwife.

Our findings suggest that the disparity in postpartum IUD counseling for women from minority groups is driven by an ethnic discordance between women and their service providers, rather than by linguistic discordance. There are several possible reasons that could explain why we observe this difference in receipt of care. It is possible that the differential provision of counseling services by Sinhalese providers is being driven by unobservable biases against ethnic minorities; an ethnographic study in Sri Lanka’s tea estates suggested that racism against Tamil patients played a role in their poor treatment and receipt of care.<sup>24</sup> In addition, Sinhalese providers may be more hesitant to offer family planning counseling and services to non-Sinhalese patients, especially for long-acting

methods like the IUD, for fear of reprisal from the non-Sinhalese population. Reluctance by providers to offer services may be the result of ongoing and often polarized coverage around contraception and other sensitive population issues in the Sri Lankan media,<sup>24,42–44</sup> as well as of underlying ethnic tensions that continue to be fueled by reports of contraceptive coercion and the forced sterilization of ethnic minorities in the wake of the Sri Lankan civil war.<sup>40</sup> By the same token, it may also be that non-Sinhalese women are more reluctant to receive services from Sinhalese primary health midwives, which would reflect a mutual sense of mistrust between patients and providers. Regardless of the reasons, our findings imply that this differential gap in service provision cannot be eliminated simply by matching providers and patients on the basis of language alone. Although matching on language is an important start to improving access to care, matching on ethnicity may also be required to further reduce disparities in service provision until such underlying ethnic tensions are addressed.

### **Limitations**

Our study had several limitations. Although we find that ethnic discordance between women and their primary health midwife—particularly when women are ethnic minorities—is correlated with relative differences in women’s receipt of postpartum IUD counseling, our data do not allow us to disentangle the extent to which these differences are being driven by providers, patients or both. Moreover, we do not have detailed background data on primary health midwives (e.g., age, education, family planning preferences or use) that would allow us to investigate possible mechanisms that could explain our findings.

These limitations highlight the need for additional research efforts, particularly those that employ open-ended, qualitative approaches (e.g., in-depth interviews, focus group discussions); findings from such efforts would complement our quantitative inference by allowing us to better identify the key drivers of these disparities. When considering the 41,772 women who were interviewed as part of the postpartum IUD study, we note that the sample is not nationally representative; on average, the women were younger and had more years of schooling than women of reproductive age in Sri Lanka.<sup>25</sup> By the same token, the data on our sample of primary health midwives were drawn from 13 of the same Ministry of Health catchment areas from which our sample of women were drawn, and therefore may also not be representative of the general primary health midwife population in Sri Lanka. Unfortunately, we were unable to collect data on primary health midwives from each of the 305 Ministry of Health catchment areas from which women in the postpartum IUD study originated, and we were therefore left with a much smaller analytic sample of women matched to their respective primary health midwife providers. Although our matched subsample of 7,191 women and our analytic sample of 4,497 women were representative of the original postpartum IUD study sample across a wide range



of characteristics (Appendix Table 5), we may be limited in our capacity to generalize our findings on postpartum IUD counseling to other settings. That said, we can be confident that our inferences on the correlation between ethnolinguistic discordance and health disparities can be generalized to other outcomes (see Appendix Table 4). An additional concern of our study stems from the potential misclassification in the reporting of ethnicity by Tamil women; Indian Tamil women may be likely to report their ethnicity as Sri Lankan Tamil. Because we primarily compared outcomes between Sinhalese women and all other non-Sinhalese women by pooling non-Sinhalese ethnicities into one category, our main findings on the role of ethnic concordance are not affected by this misclassification. To assess the possible impact of bias from misclassification, we ran a robustness check in which we collapsed Sri Lankan Tamil and Indian Tamil ethnicities into one “ethnic Tamil” category (Appendix Table 6). Results from this analysis confirm our previous findings—ethnic Tamil groups, irrespective of their ethnic classification, are less likely than others to have received counseling. Finally, the cross-sectional nature of our data structure for this analysis limits our ability to draw causal inferences to the extent that we cannot rule out possible residual confounding in our estimates even after a wide range of confounding variables were controlled for.

## Conclusions

According to our findings, women from minority, non-Sinhalese groups in Sri Lanka face disparities in the receipt of postpartum IUD counseling, and ethnic discordance—rather than linguistic discordance—between women and their providers appears to be the primary driver of these disparities. Until underlying ethnic tensions are resolved, matching women and primary health midwives on ethnicity is likely to improve postpartum family planning service provision in Sri Lanka.

From a policy perspective, our findings highlight the need for interventions that aim to bridge the sociocultural gaps between providers and patients through, for example, additional primary health midwife training in balanced counseling approaches to family planning, programs that foster community building, and outreach campaigns that prioritize minority groups and vulnerable populations. These efforts would build trust between groups and may overcome key ethnically-driven cultural and linguistic barriers that drive disparities in health care seeking. Regardless of the approach, it is clear that further research is warranted to better understand the deeper underlying reasons for these disparities.

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## RESUMEN

**Contexto:** La concordancia étnica y lingüística son dimensiones importantes de la relación médico-paciente y están vinculadas a las disparidades en los servicios de salud. Sin embargo, la evidencia acerca de las asociaciones entre la conducta y los resultados de salud, así como de la concordancia entre paciente y proveedor de servicios es limitada, especialmente en entornos de bajos y medianos ingresos.

**Métodos:** Para examinar la forma en que la concordancia entre las mujeres y su partera de atención primaria de salud se asocia con la recepción por parte de las mujeres de la consejería posparto sobre el DIU, se utilizaron datos observacionales de un ensayo por conglomerado aleatorio que evaluó una intervención para aumentar la consejería posparto sobre el DIU. Los datos de 4,497 mujeres que dieron a luz en seis hospitales en Sri Lanka entre septiembre de 2015 y marzo de 2017 se combinaron con datos de 245 parteras de salud primaria, y se generaron indicadores de concordancia lingüística, concordancia étnica y su interacción. Se utilizaron análisis de regresión logística multivariada para evaluar las asociaciones entre la concordancia y la recepción de consejería por parte de las mujeres.

**Resultados:** Las mujeres de grupos no cingaleses en Sri Lanka enfrentan disparidades en la recepción de consejería posparto sobre el DIU. En comparación con la mayoría etnolingüística (mujeres cingalesas que solo hablan cingalés), las mujeres no cingalesas tienen menos probabilidades de haber recibido asesoramiento posparto del DIU, tanto si hablan cingalés como tamil (razón de probabilidades, 0.6) o solo Tamil (0.5). La discordancia étnica—más que la discordancia lingüística—es el principal factor impulsor de esta disparidad.

**Conclusiones:** Los hallazgos resaltan la necesidad de intervenciones que tengan como objetivo cerrar las brechas socio-culturales entre proveedores y pacientes. Hacer coincidir a las mujeres y sus proveedores en un entorno etnolingüístico puede ayudar a reducir las disparidades en la atención.

## RÉSUMÉ

**Contexte:** La concordance ethnique et linguistique est une dimension importante de la relation patiente-médecin, liée aux disparités dans les soins de santé. Les associations entre le

comportement et les résultats en matière de santé et la concordance patiente-prestataire ne sont cependant guère documentées, en particulier dans les contextes à revenu faible et intermédiaire.

**Méthodes:** Pour examiner en quoi la concordance entre les femmes et leur sage-femme responsable de leurs soins primaires est associée à l'apport aux femmes d'un conseil post-partum sur le stérilet, les données observationnelles d'un essai randomisé en grappes d'évaluation d'une intervention visant à accroître ce conseil ont été analysées. Les données relatives à 4 497 femmes qui avaient accouché dans six hôpitaux du Sri Lanka entre septembre 2015 et mars 2017 ont été fusionnées avec celles relatives à 245 sages-femmes de soins primaires, et les indicateurs de concordance linguistique, de concordance ethnique et de leur interaction ont été générés. Les associations entre ces concordances et le conseil aux femmes ont été évaluées par analyses de régression logistique multivariées.

**Résultats:** Les femmes des groupes non cinghalais du Sri Lanka sont confrontées à des disparités quant à l'obtention du conseil post-partum sur le stérilet. Par rapport à la majorité

ethnolinguistique (les femmes cinghalaises qui ne parlent que le cinghalais), celles non cinghalaises ont moins de chances d'avoir reçu ce conseil, qu'elles parlent le cinghalais et le tamoul (RC, 0,6) ou seulement le tamoul (0,5). La discordance ethnique – plutôt que linguistique – est le principal facteur de disparité.

**Conclusions:** Les résultats révèlent clairement la nécessité d'interventions qui cherchent à combler les écarts socioculturels entre les prestataires et leurs patientes. Mettre les femmes en rapport avec des prestataires de même origine ethnolinguistique peut aider à réduire les disparités dans les soins.

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**Author contact:** mvkarra@bu.edu

**APPENDIX TABLE 1. Odds ratios (and 95% confidence intervals) from logistic regression analyses assessing the likelihood that that a woman received postpartum IUD counseling, by ethnolinguistic concordance between her and her primary health midwife, controlling for women's work**

Ethnolinguistic concordance	Odds ratio
Woman is Sinhalese/Sinhala speaker; midwife is Sinhalese/Sinhala speaker (ref)	1.00
Woman is non-Sinhalese/Tamil speaker; midwife is non-Sinhalese/Tamil speaker	0.85 (0.43–1.68)
Woman is non-Sinhalese/Tamil speaker; midwife is non-Sinhalese/bilingual	0.78 (0.51–1.20)
Woman is non-Sinhalese/bilingual; midwife is non-Sinhalese/bilingual	1.21 (0.37–3.94)
Woman is non-Sinhalese/Tamil speaker; midwife is Sinhalese/Sinhala speaker	0.54 (0.40–0.73)**
Woman is non-Sinhalese/Sinhala speaker; midwife is Sinhalese/Sinhala speaker	0.76 (0.40–1.44)
Woman is non-Sinhalese/bilingual; midwife is Sinhalese/Sinhala speaker	0.63 (0.45–0.89)**
Woman is non-Sinhalese/Tamil speaker; midwife is Sinhalese/bilingual	0.69 (0.44–1.09)
Woman is non-Sinhalese/Sinhala speaker; midwife is Sinhalese/bilingual	0.93 (0.39–2.25)
Woman is non-Sinhalese/bilingual; midwife is Sinhalese/bilingual	0.58 (0.27–1.24)
Woman is Sinhalese/Sinhala speaker; midwife is non-Sinhalese/bilingual	0.75 (0.51–1.12)
Woman is Sinhalese/bilingual; midwife is Sinhalese/Sinhala speaker	1.09 (0.29–4.10)
Woman is Sinhalese/Sinhala speaker; midwife is Sinhalese/bilingual	1.68 (1.12–2.53)*

\*p<.05. \*\*p<.01. Notes: ref=reference group. Control variables include number of live births, ever-use of a family planning method, age (in five-year age-groups) and educational attainment (no education, primary, secondary, higher). Ministry of Health—fixed effects are included, and standard errors are clustered at the primary health midwife level. Some combinatorial categories did not contain enough observations for the analysis and were therefore dropped.

**APPENDIX TABLE 2. Odds ratios (and 95% confidence intervals) from logistic regression analyses assessing the likelihood that that a woman received postpartum IUD counseling, by ethnolinguistic concordance between her and her primary health midwife, using hospital fixed effects**

Ethnolinguistic concordance	Odds ratio
Woman is Sinhalese/Sinhala speaker; midwife is Sinhalese/Sinhala speaker (ref)	1.00
Woman is non-Sinhalese/Tamil speaker; midwife is non-Sinhalese/Tamil speaker	0.32 (0.24–0.43)**
Woman is non-Sinhalese/Tamil speaker; midwife is non-Sinhalese/bilingual	0.52 (0.32–0.83)**
Woman is non-Sinhalese/bilingual; midwife is non-Sinhalese/bilingual	0.54 (0.23–1.25)
Woman is non-Sinhalese/Tamil speaker; midwife is Sinhalese/Sinhala speaker	0.60 (0.45–0.81)**
Woman is non-Sinhalese/Sinhala speaker; midwife is Sinhalese/Sinhala speaker	0.72 (0.40–1.30)
Woman is non-Sinhalese/bilingual; midwife is Sinhalese/Sinhala speaker	0.62 (0.44–0.87)**
Woman is non-Sinhalese/Tamil speaker; midwife is Sinhalese/bilingual	0.65 (0.40–1.06)
Woman is non-Sinhalese/Sinhala speaker; midwife is Sinhalese/bilingual	0.64 (0.21–1.89)
Woman is non-Sinhalese/bilingual; midwife is Sinhalese/bilingual	0.45 (0.21–0.98)*
Woman is Sinhalese/Sinhala speaker; midwife is non-Sinhalese/bilingual	0.70 (0.42–1.19)
Woman is Sinhalese/bilingual; midwife is Sinhalese/Sinhala speaker	1.11 (0.31–3.95)
Woman is Sinhalese/Sinhala speaker; midwife is Sinhalese/bilingual	1.68 (1.12–2.53)*

\*p<.05. \*\*p<.01. Notes: ref=reference group. Control variables include number of live births, ever-use of a family planning method, age (in five-year age-groups) and educational attainment (no education, primary, secondary, higher). Ministry of Health—fixed effects are included, and standard errors are clustered at the primary health midwife level. Some combinatorial categories did not contain enough observations for the analysis and were therefore dropped.

**APPENDIX TABLE 3. Odds ratios (and 95% confidence intervals) from logistic regression analyses assessing the likelihood that that a woman received postpartum IUD counseling, by ethnolinguistic concordance between her and her primary health midwife, Tamil-majority hospitals only**

Ethnolinguistic concordance	Odds ratio
Woman is Sinhalese/Sinhala speaker; midwife is Sinhalese/Sinhala speaker (ref)	1.00
Woman is non-Sinhalese/Tamil speaker; midwife is non-Sinhalese/Tamil speaker	0.95 (0.47–1.95)
Woman is non-Sinhalese/Tamil speaker; midwife is non-Sinhalese/bilingual	0.87 (0.55–1.38)
Woman is non-Sinhalese/bilingual; midwife is non-Sinhalese/bilingual	3.10 (0.66–14.52)
Woman is non-Sinhalese/Tamil speaker; midwife is Sinhalese/Sinhala speaker	0.56 (0.39–0.79)**
Woman is non-Sinhalese/Sinhala speaker; midwife is Sinhalese/Sinhala speaker	0.71 (0.21–2.41)
Woman is non-Sinhalese/bilingual; midwife is Sinhalese/Sinhala speaker	0.57 (0.35–0.92)*
Woman is non-Sinhalese/Tamil speaker; midwife is Sinhalese/bilingual	0.73 (0.44–1.20)
Woman is non-Sinhalese/Sinhala speaker; midwife is Sinhalese/bilingual	1.70 (0.30–9.74)
Woman is non-Sinhalese/bilingual; midwife is Sinhalese/bilingual	0.48 (0.21–1.12)
Woman is Sinhalese/Sinhala speaker; midwife is non-Sinhalese/bilingual	0.76 (0.40–1.44)
Woman is Sinhalese/bilingual; midwife is Sinhalese/Sinhala speaker	0.16 (0.02–1.24)
Woman is Sinhalese/Sinhala speaker; midwife is Sinhalese/bilingual	1.63 (1.10–2.42)*

\*p<.05. \*\*p<.01. Notes: ref=reference group. Control variables include number of live births, ever-use of a family planning method, age (in five-year age-groups) and educational attainment (no education, primary, secondary, higher). Ministry of Health—fixed effects are included, and standard errors are clustered at the primary health midwife level. Some combinatorial categories did not contain enough observations for the analysis and were therefore dropped.



**APPENDIX TABLE 4. Odds ratios (and 95% confidence intervals) from logistic and ordinary least squares regression analyses assessing women's receipt of other family planning services (postpartum family planning, antenatal care), by ethnolinguistic concordance between her and her primary health midwife**

Ethnolinguistic Concordance	Received postpartum family planning counseling	Received at least 4 ANC visits	OLS: Number of ANC visits received
Woman is Sinhalese/Sinhala speaker; midwife is Sinhalese/Sinhala speaker (ref)	1.00	1.00	0.00
Woman is non-Sinhalese/Tamil speaker; midwife is non-Sinhalese/Tamil speaker	0.87 (0.35–2.16)	0.35 (0.09–1.32)	0.76 (–0.11–1.64)
Woman is non-Sinhalese/Tamil speaker; midwife is non-Sinhalese/bilingual	1.29 (0.54–3.07)	0.29 (0.10–0.80)*	0.091 (–0.41–0.60)
Woman is non-Sinhalese/bilingual; midwife is non-Sinhalese/bilingual	1.48 (0.33–6.64)	3.44 (2.25–5.26)**	0.188 (–0.46–0.83)
Woman is non-Sinhalese/Tamil speaker; midwife is Sinhalese/Sinhala speaker	0.46 (0.31–0.68)**	0.27 (0.13–0.56)**	–0.204 (–0.58–0.17)
Woman is non-Sinhalese/Sinhala speaker; midwife is Sinhalese/Sinhala speaker	2.09 (0.46–9.61)	1.57 (0.50–4.86)	–0.533 (–1.10–0.03)
Woman is non-Sinhalese/bilingual; midwife is Sinhalese/Sinhala speaker	0.63 (0.38–1.05)	1.32 (0.72–2.43)	–0.38 (–1.01–0.25)
Woman is non-Sinhalese/Tamil speaker; midwife is Sinhalese/bilingual	0.48 (0.28–0.82)**	0.17 (0.05–0.50)**	0.091 (–0.54–0.73)
Woman is non-Sinhalese/Sinhala speaker; midwife is Sinhalese/bilingual	-	-	–0.222 (–1.52–1.07)
Woman is non-Sinhalese/bilingual; midwife is Sinhalese/bilingual	0.60 (0.15–2.42)	4.31 (2.32–8.01)**	0.36 (–0.15–0.87)
Woman is Sinhalese/Sinhala speaker; midwife is non-Sinhalese/bilingual	0.66 (0.35–1.25)	0.31 (0.18–0.54)**	–0.217 (–1.35––0.92)
Woman is Sinhalese/bilingual; midwife is Sinhalese/Sinhala speaker	1.02 (0.12–9.02)	-	1.86 (0.51–3.21)**
Woman is Sinhalese/Sinhala speaker; midwife is Sinhalese/bilingual	1.65 (0.86–3.15)	0.69 (0.23–2.10)	0.13 (–0.39–0.64)

\*p<.05. \*\*p<.01. Notes: ref=reference group. Control variables include number of live births, ever-use of a family planning method, age (in five-year age-groups) and educational attainment (no education, primary, secondary, higher). Ministry of Health-fixed effects are included, and standard errors are clustered at the primary health midwife level. Some combinatorial categories did not contain enough observations for the analysis and were therefore dropped.

**APPENDIX TABLE 5. Comparison of selected characteristics of the analytic study sample of postpartum women (N = 4,497) and full FIGO postpartum IUD study sample of postpartum women in Sri Lanka (N = 41,671), 2015–2017**

Characteristic	Study Sample (N=4,497) % or mean	Full PPIUD Sample (N=41,671) % or mean	Difference
<b>Language</b>			
Primary language is Tamil	35.1	29.2	5.9
Primary language is Sinhala	64.9	70.8	–5.9
Bilingual	6.8	3.4	3.4
<b>Ethnicity</b>			
Sinhalese	63.3	69.9	–6.6
Non-Sinhalese	37.7	30.1	7.6
Sri Lankan Tamil	16.5	11.2	5.3
Indian Tamil	12.5	8.9	3.6
Sri Lankan Moor	7.7	9.9	–2.2
<b>Woman-level covariates</b>			
Mean no. of live births	1.91 (0.9)	1.91 (0.9)	0.0
Ever used family planning	59.5	58.4	1.1
Mean age	28.3 (5.4)	28.0 (5.4)	0.3
Worked in last 12 mos.	5.7	4.3	1.4
<b>Education</b>			
None	0.9	0.6	0.3
Some primary	2.3	2.0	0.3
Primary	1.8	1.6	0.2
Some secondary	14.2	13.5	0.7
Secondary	29.3	31.7	–2.4
>secondary	51.6	50.6	1.0

Notes: For means, figures in parentheses are standard deviations.

**APPENDIX TABLE 6. Odds ratios (and 95% confidence intervals) from logistic regression analyses assessing the likelihood that a woman received postpartum IUD counseling by her ethnicity, combining Sri Lankan Tamil and Indian Tamil ethnic groups**

Ethnicity	Odds ratio
<b>Woman's ethnicity</b>	
Sinhalese (ref)	1.00
Tamil (Sri Lankan and Indian)	0.54 (0.42–0.69)**
Sri Lankan Moor	0.71 (0.52–0.96)**

\*p<.05. \*\*p<.01. Notes: ref=reference group. Control variables include number of live births, ever-use of a family planning method, age (in five-year age-groups) and educational attainment (no education, primary, secondary, higher). Ministry of Health-fixed effects are included, and standard errors are clustered at the level of the primary health midwife.