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Correlates of Contraceptive Use and Health Facility Choice among Young Women in Malawi

Jean Digitale,

Population Council, One Dag Hammarskjold Plaza, New York, New York 10017

Stephanie Psaki, Erica Soler-Hampejsek, and Barbara S. Mensch

Abstract

We explore whether differential access to family planning services and the quality of those services explain variability in uptake of contraception among young women in Malawi. We accomplish this by linking the Malawi Schooling and Adolescent Study, a longitudinal survey of young people, with the Malawi Service Provision Assessment collected in 2013–2014. We also identify factors that determine choice of facility among those who use contraception. We find that the presence and characteristics of nearby facilities with contraception available did not appear to affect use. Rather, characteristics such as facility type and whether contraception was provided free of charge determined where women deciding to use contraception obtained their contraception. We argue that in a context where almost all respondents resided within 10 kilometers of a health facility, improving access to and quality of family planning services may not markedly increase contraceptive use among young women without broader shifts in norms regarding childbearing in the early years of marriage.

Keywords

Malawi; contraception; access to family planning; adolescents

Although fertility has declined in sub-Saharan Africa, the region continues to have the highest rates of childbearing and population growth in the world (United Nations Department of Economic and Social Affairs Population Division 2015). Indeed, fertility declines in sub-Saharan Africa appear to be slower than those in Asia and Latin America at comparable stages in their fertility transitions (Bongaarts and Casterline 2012). Additionally, unmet need for contraception, as conventionally measured, is higher in Africa than in other regions; a relatively small percentage of those who report that they do not want to become pregnant are using a contraceptive method (Bongaarts and Casterline 2012; Sedgh and Hussain 2014).

Whether family planning services or investments in other aspects of development, such as women's education, contribute to childbearing declines in high fertility countries is an ongoing and unresolved debate in the demographic literature (Ainsworth, Beegle and Nyamete 1996; Demeny 1992; Jain and Ross 2012; Lutz 2014; Pritchett 1994). Those who

have argued that increased use of contraception results from reduced demand for children advocate investment in economic and social development (Ainsworth, Beegle and Nyamete 1996; Casterline and Sinding 2000; Demeny 1992; Lutz 2014; Pritchett 1994). Pritchett (1994) claims that fertility desires, not contraceptive access, are critical to achieving reductions in fertility. A recent study, controlling for the endogeneity of education, found that with increased schooling, desired fertility fell in Malawi, Uganda, and Ethiopia—evidence that additional years of schooling indeed reduces preferences for a large number of children (Behrman 2015). Those who have focused their research on describing and assessing family planning services assert that improving the accessibility, availability, and quality of these services will increase demand for and use of contraception (Magnani et al. 1999; RamaRao et al. 2003; Ross and Hardee 2013; Ross and Stover 2013; Skiles et al. 2015; Wang et al. 2012; Yao, Murray and Agadjanian 2013) by converting some fraction of those with unmet need into users (Casterline and Sinding 2000). Although inadequate access to services has not been shown to be a primary contributor to unmet need (Bongaarts and Bruce 1995; Casterline and Sinding 2000; Choi, Fabric, and Adetunji 2016; Sedgh and Hussain 2014), research focusing on the service environment has found that better quality of care appears to be associated with greater family planning uptake and continuity of use (Jain 1989; Koenig, Hossain and Whittaker 1997; Mensch, Arends-Kuenning and Jain 1996; RamaRao et al. 2003).

With approximately 60 percent of the population in sub-Saharan Africa under the age of 25, even if the total fertility rate (TFR) decreases substantially in the near future, the region will still be on a trajectory to experience rapid population growth as a result of population momentum (Bongaarts 1994; United Nations Department of Economic and Social Affairs Population Division 2015). However, because differing paces of fertility decline would lead to vast differences in future population size (Casterline 2001), decisions about family planning made by the current cohort of youth will play a key role in determining population size in the future.

In this article, we address gaps in the existing literature on determinants of contraceptive use in sub-Saharan Africa by focusing on the health facility choices of young women. Previous analyses attempting to quantify the effect of availability of family planning services on fertility have typically focused on all reproductive-aged women (Ainsworth, Beegle and Nyamete 1996; Do and Kurimoto 2012; Jain and Ross 2012; Skiles et al. 2015; Yao, Murray and Agadjanian 2013), despite the fact that younger women may have different attitudes toward contraceptive use and different experiences interacting with family planning providers than do older women. Further, little has been written about determinants of health facility choice, and the existing literature is somewhat contradictory. For example, Akin and Rous (1997) found that increased distance and having other services available at a facility were deterrents to choice of that facility in the Philippines, but there was no evidence that other provider characteristics were associated with facility choice. A study in Burkina Faso, Ghana, Malawi, and Uganda found that adolescents had positive views about public clinics, where they perceived confidentiality and accessibility to be high and cost low, and preferred these clinics to private clinics, likely because of cost (Biddlecom et al. 2007). In contrast, in an analysis comparing public and private health facilities in Tanzania, Kenya, and Ghana, client satisfaction was higher at private facilities than at public facilities, likely due to

“factors such as shorter waiting times and fewer stockouts of methods and supplies” (Hutchinson, Do, and Agha 2011). Understanding the determinants of health facility choice is important because these factors—distance, availability of contraceptive methods, cost, and so on—may influence whether young women initiate and continue use of contraception throughout their reproductive lives.

To address this, we link data from the Malawi Schooling and Adolescent Study—a longitudinal survey of young people first interviewed in 2007 when they were between 14 and 17 years old and last interviewed in 2013—with data from the Malawi Service Provision Assessment (Ministry of Health [Malawi] and ICF International 2014) collected in 2013–2014. We explore whether differential access to family-planning services explains variability in uptake of contraception among young women, and identify the factors that determine choice of facility among those who use contraception.

Background

Family planning needs of young women

More than three-quarters of females in Eastern and Southern Africa are estimated to have had at least one sexual experience by the age of 20 (Lloyd 2005). Levels of—typically defined as non-use of contraception among those who do not want to become pregnant—are reported to be very high (40 percent or more) among sexually active, unmarried young women in more than half the countries in the region. Levels of both contraceptive use and unmet need are higher among sexually active, unmarried young women than among currently married young women in most of the region (Khan and Mishra 2008), likely due to pressure to conceive shortly after marriage (Hindin and Fatusi 2009). Motherhood is a fundamental element of married women’s identity and enhances social status (Cooper et al. 2007) in sub-Saharan Africa; being childless is generally regarded as undesirable (Dyer 2007).

Family planning programs in sub-Saharan Africa have been criticized for primarily targeting those who are married or who have been pregnant at least once, ignoring the needs of unmarried sexually active youth (Prata, Weidert, and Sreenivas 2013). The timing of contraceptive use relative to first birth and marriage is an important consideration in determining which women family the planning programs are reaching (Defo 2011; Garenne, Tollman and Kahn 2000; Prata, Weidert and Sreenivas 2013). Reasons cited for unmarried adolescents not seeking family planning services include embarrassment or fear, cost, and lack of knowledge about where to obtain contraception (Biddlecom et al. 2007). Although practitioners have sought to develop “youth-friendly” services to address these barriers, based on current levels of contraceptive use among unmarried young women who report being sexually active, this approach has shown limited success thus far (Prata, Weidert and Sreenivas 2013).

Fertility in Malawi

Malawi’s demographic profile is fairly typical of sub-Saharan Africa, with 45 percent of the population under the age of 15 (Population Reference Bureau 2014). The TFR in Malawi

fell from 6.7 births per woman in 1992 (National Statistical Office and Macro International Inc. 1994), to 6.3 in 2000 (National Statistical Office [Malawi] and ORC Macro 2001), 6.0 in 2004 (National Statistical Office [Malawi] and ORC Macro 2005), 5.7 in 2010 (National Statistical Office and ICF Macro 2011), and 4.4 as of 2016 (National Statistical Office and ICF International 2016). Among countries in sub-Saharan Africa, Malawi has made considerable progress in increasing uptake of modern contraceptives among those who desire to limit births (Sharan et al. 2011; USAID/Africa Bureau et al. 2012). In Eastern Africa, the contraceptive prevalence rate (CPR), including modern and traditional methods, among women aged 15–49 years old who were married or in a union was 12 percent in 1990 and increased to 33 percent by 2010. CPR in Malawi among married women was at approximately the same 12 percent regional average in 1990, but increased to 45 percent by 2010 (Alkema et al. 2013). As of 2016, use of modern contraception among currently married women in Malawi has reached 58 percent (and among sexually active unmarried women it is now 43 percent) (National Statistical Office and ICF International 2016). The large increase observed in contraceptive prevalence between 2004 and 2010 did not lead to a commensurate reduction in the TFR (Jain et al. 2014), although TFR has decreased further as of 2016. While unmet need among women in Malawi aged 15–49 years old who were married or in a union decreased from 36 percent in 1992 (National Statistical Office and Macro International Inc. 1994) to 19 percent in 2016, among sexually active unmarried women unmet need remains high (40 percent) (National Statistical Office and ICF International 2016). A consequence of this consistently high level of unmet need is that close to half of pregnancies in Malawi are considered mistimed or unwanted (National Statistical Office and ICF Macro 2011); this is among the highest levels in sub-Saharan Africa (Johnson, Abderrahim and Rutstein 2011). Additionally, although the proportion of adolescents aged 15–19 who have begun childbearing decreased from 2004 (34 percent) to 2010 (26 percent), it then increased again to 29 percent in 2016 (National Statistical Office and ICF International 2016).

There are considerable regional differences within Malawi. Young women in the southern region, where the MSAS sample resided at baseline, tend to have poorer sexual and reproductive health outcomes than those in the rest of the country. They have a lower median age at first birth (18.5 among 20–24 year olds) than those in the northern and central regions (19.1 and 19.2, respectively). HIV prevalence among women age 15–49 is highest in the southern region (18 percent) (compared to 8 percent in the northern region and 9 percent in the central region) (National Statistical Office and ICF Macro 2011).¹ Sociocultural and religious differences exist between regions as well, which likely influence fertility. Ethnic groups in the North are patrilineal, whereas the Yao tribe and others in the South are matrilineal. Eighty-three percent of Malawians are Christian (Malawi National Statistical Office 2008); however, three-quarters of the Yao tribe are Muslim and maintain Yao traditions along with Islamic ones (Chimbiri 2006).

¹At the time this article was written, the DHS had released the 2015–16 Key Indicators Report cited here, but not the complete 2015–16 Malawi Demographic and Health Survey Data and Results.

Family planning policies and programs in Malawi

The rapid expansion of contraceptive use in Malawi reflects, in part, the apparent commitment on the part of the government to reduce fertility through expansion of the national family planning program (Respond Project 2012). Both the Maputo Plan of Action in 2006 and a policy analysis by the Malawi Ministry of Development Planning and Cooperation in 2010 recognized that rapid population growth might outpace economic growth and the government's ability to provide social services (African Union Commission 2006; Ministry of Development Planning and Cooperation 2010). In 2009, Malawi's government "domesticated" the Maputo Plan of Action via the development of the Sexual and Reproductive Health and Rights Policy, intended to guide program managers of government health departments; nongovernmental, community, and faith-based organizations; and the private sector to effectively develop sexual and reproductive health services responsive to the needs of the Malawian people (Kureya and Kureya, n.d.). Malawi's reproductive health program is embedded in the Joint Programme of Work for a Health Sector-Wide Approach (SWAp) (2004–2010), implemented by the government with the assistance of development partners (Respond Project 2012). SWAp's objective was to 1) "establish and deliver an essential health package (including family planning), to be provided free of charge to all Malawians" and 2) "address the severe shortages of workers in the health sector by improving the retention, training, and deployment of health care staff" (Respond Project 2012, 3).

The individual effects of various policies and programs are difficult to quantify, but between 2004—when efforts to increase access to family planning began—and 2016—the year of the most recent DHS with publicly available data—the percentage of currently married women using a modern method of contraception more than doubled from 28 percent (National Statistical Office [Malawi] and ORC Macro 2005) to 58 percent (National Statistical Office and ICF International 2016). Additionally, during the same period there was a significant expansion from 6 percent to 24 percent in the use of long-acting and permanent methods among currently married women (National Statistical Office and ICF International 2016). Almost three-quarters of modern contraceptive users obtain it at public sector facilities where services are free. Among injectable users (the most popular method in Malawi), 84 percent go to public sector facilities and another 9 percent go to Christian Health Association of Malawi (CHAM) facilities (Skiles et al. 2015) (the government contracts with some CHAM facilities to provide the free essential health package in rural areas [SHOPS Project 2012]). Despite progress in expanding access to contraception, however, shortages of both short- and long-term methods remain a problem (Ministry of Health [Malawi] and ICF International 2014), which is likely to affect continuity of use (Respond Project 2012; USAID/Africa Bureau et al. 2012).

Data, Analyses, and Methods

Data

The Malawi Schooling and Adolescent Study (MSAS) is a longitudinal survey that followed 2,649 adolescents (1,337 females) aged 14–17 when first interviewed in 2007. At baseline the sample comprised 1,764 students (875 females) randomly selected from enrollment

rosters in randomly selected primary schools in Balaka and Machinga, two rural districts in southern Malawi. The sample also included 885 adolescents (462 females) not enrolled in school, who resided in those schools' catchment villages. Out-of-school adolescents were identified through key informants located at the school or in the randomly selected school catchment villages. Six rounds of data collection were completed, with the last round collected between August 2013 and October 2013. Follow-up rates for the females were: 91 percent in 2008 (round 2), 91 percent in 2009 (round 3), 89 percent in 2010 (round 4), 90 percent in 2011 (round 5), and 89 percent in 2013 (round 6).

The survey collected data on schooling, marital and birth histories, and contraceptive use, among other topics. Audio computer-assisted self-interviews (ACASI) were conducted for sensitive topics, including sexual behavior. In rounds 1–5 of data collection, adolescents were asked about injectable, pill, and condom use, the most commonly used methods of contraception among young women in Malawi reported in the DHS that preceded MSAS in 2004 (National Statistical Office and ICF Macro 2011). In round 6, the MSAS survey section on contraception was greatly expanded. Respondents were asked about ever and current use of modern methods (injectable, implant, pill, IUD, male condom, female condom, sterilization) and the facility from which current methods were obtained. Those who had previously given birth, were not currently pregnant, and were not currently using contraception were asked reasons for their nonuse.²

The Malawi Service Provision Assessment (SPA) was designed to be a census of all formal health care facilities in the country. It was implemented by the Ministry of Health (MoH) with technical assistance from the Demographic and Health Surveys (DHS) program funded by the United States Agency for International Development. The Central Monitoring and Evaluation Division of the Malawi MoH compiled a master list of all formal-sector health facilities in Malawi (n=1,060) and data were successfully collected on 92 percent of these facilities (n=977). Facilities were of varying types (e.g., hospital, health center, and clinic) and under various managing authorities (e.g., government, Christian Health Association of Malawi, and the private sector). The SPA included a facility inventory, health provider interview, observation, and patient exit interviews. Data collection took place during June–August 2013 and November 2013–February 2014.

These analyses utilize all rounds of MSAS data and also link round 6 of MSAS data, collected from females in 2013 when respondents were aged 20–23, with SPA data from 2013–2014 to assess the service environment at the time that MSAS respondents reported contraceptive use.

Timing of first use of contraception

We begin with an exploration of the timing of initiation of contraceptive use among the MSAS female sample in relation to first birth and first marriage. This provides useful contextual information for discussion of the way in which facility access and quality may

²In rounds 1–4, female respondents were not asked directly if they were currently pregnant. In round 5, female respondents were asked if they were currently pregnant, but were not excluded from questions on current use of contraception if they were. In round 6, female respondents were asked if they were currently pregnant, and those responding “yes” were excluded from questions about current contraceptive use.

affect the demand for services. Because respondents were not asked the date of first use of contraception we use the round of data collection (1–6) in which each event was first reported. All rounds of data collection were approximately one year apart (except for a two-year gap between rounds 5 and 6). Ever use of a modern contraceptive method was defined as use of pill or injectable. As condoms may be obtained from sources other than health facilities, condom use was excluded from these analyses (Wang et al. 2012). First birth was considered to have preceded first use of contraception if it was reported in a round prior to or the same round as first report of contraceptive use. Given that injectables are the most common method used in this population (National Statistical Office and ICF Macro 2011), it is less likely that someone first used injectables (rendering her unable to conceive for three months), conceived, and gave birth in the year between two interviews than that she gave birth and then began using contraception, perhaps upon recommendation of a health care provider, sometime in the months after delivery. First marriage was considered to have preceded contraception only if it was reported in a round prior to first report of contraceptive use. We also describe current use of contraception (pill or injectable) within each round, stratified by whether a respondent had ever given birth and her current marital status.

Sociodemographic correlates of contraceptive use

Next, we describe our sample and its contraceptive use at round 6 in 2013 and examine associations between key demographic and socioeconomic characteristics of young women in the MSAS sample (i.e. marital status, parity, and education) and current contraceptive use at round 6 using simple descriptive statistics, bivariate logistic regressions, and a multivariable logistic regression model. Examining the influence of these individual-level characteristics on contraceptive use for a sample of young women sheds light on the development versus service provision debate (for example, by examining the effects of education) in this population. We restrict the sample to the 994 MSAS females interviewed at that round who had ever had sex and were not currently pregnant. Current use of modern contraception was defined as use of injectable, implant, pill, IUD, or sterilization.

Construction of facility-level measures

Facility-level characteristics collected for the SPA included facility type, managing authority, urban versus rural location, existence of user fees for contraception, and facility readiness indicators. Indicators of facility readiness were constructed based on an analysis that used data from SPA surveys conducted in Tanzania, Kenya, and Ghana (Hutchinson, Do, and Agha 2011). Seventeen measures were created in four domains (termed “structural attributes of quality” by Hutchinson et al.): infrastructure and equipment, management, availability of services, and counseling (see appendix). These measures were identical to Hutchinson, Do, and Agha’s except where precluded by data limitations and lack of variability among Malawian facilities.³

³Hutchinson and colleagues (2011) also created quality indicators in two domains (termed “process attributes of quality”), interpersonal and technical, that we were unable to generate because client observation and exit data, from which these indicators could be constructed, were available for only 47% of facilities (n=380) that provided family planning services (n=810). We therefore constructed only readiness indicators.

Linking family-planning facilities to MSAS respondents and assessing the impact of services

We linked MSAS respondents to facilities in two ways: 1) based on geographic proximity; and 2) based on respondent reports of where they obtained contraception, among those using contraception. First, MSAS respondents were linked to nearby facilities in the SPA using GPS coordinates collected at the time of the interview. The MSAS coordinates were documented at the location of the interview (94 percent of interviews were conducted at the respondent's home). In the case of respondents for whom coordinates were missing, round 5 coordinates were used if the respondents had not reported moving between the two rounds. For the remaining forty-seven women for whom GPS data were missing, we imputed coordinates based on all location data we had for the respondent (e.g., village, traditional authority, maps, and nearby landmarks). All analyses involving linkages using GPS data were also run without these forty-seven cases to check for robustness of results. The SPA dataset included the GPS coordinates of each facility. To explore how the service environment might influence current use of contraception, we identified up to ten facilities within ten kilometers of the respondent (Burgert and Prosnitz 2014). These facilities were identified using the STATA package *geonear*, which computes geodetic distances, and facility characteristics were merged into a joint dataset with MSAS data.

We examined whether both the quantity and quality of facilities within the ten kilometer radius of respondents were associated with contraceptive use. To assess the impact of service environment quality, we averaged each facility readiness indicator for all such facilities (Stephenson, Beke and Tshibangu 2008; Wang et al. 2012), creating for each respondent a mean score for each continuous variable or a proportion of facilities with an attribute for each binary variable. If a respondent did not live within ten kilometers of any facility, we assigned the characteristics of the nearest facility. We then averaged these pooled indicators to report the difference between users and nonusers and assessed the associations between the service environment and current use of contraception using logistic regression. As a robustness check, for each indicator we also assigned the highest score among those facilities to each respondent and repeated the analysis. In addition, we estimated a variance-components model to assess whether characteristics of the nearest facility were associated with contraceptive use within our sample (Rabe-Hesketh and Skrondal 2008). We then assessed whether characteristics of the nearest facility were associated with the probability of contraceptive use with bivariate random effects logistic regression models.

Second, we explored factors affecting facility choice among contraceptive users, who reported the facility where they obtained their current method. We received a de-identified list of facilities from the SPA team and matched MSAS responses to SPA facility codes to merge the datasets and acquire the characteristics of facilities that respondents visited for family planning. Thus, we were able to identify the characteristics of facilities where young women in our sample obtained contraception and assess the individual- and facility-level factors that influenced which facilities they visited. Distance from the respondent to the facility at which she obtained contraception was computed using the STATA package *geodist*. Given the focus on increasing accessibility of family planning in low prevalence

settings, respondents were categorized according to whether they obtained services at the nearest facility providing family planning.

Among respondents who were currently using contraception, we estimated a variance-components model to evaluate the extent to which facility-level factors explained whether the respondent obtained services at the nearest facility (Rabe-Hesketh and Skrondal 2008), in order to shed light on why some users chose to travel longer distances to obtain contraception. We then assessed the relative contribution of facility- and individual-level characteristics to the probability of going to the nearest facility with bivariate and multivariable multilevel random effects logistic regression models. All analyses were done in Stata 13 (StataCorp 2013).

Results

Timing of first use of contraception

More than half (58 percent) of the female MSAS sample ($n=1,337$) reported ever using contraception (pill and injectable) by the last round of data collection in 2013. Approximately one-third (34 percent) reported never using contraception by 2013; another 8 percent were not observed in 2013 and had never reported use of contraception prior. The remaining few ($n=3$) were missing data on contraceptive use at all rounds. For a small group of respondents (approximately 5 percent), the timing of first use of contraception in relation to first birth and first marriage could not be determined either due to reporting contraceptive use and birth and/or marriage at baseline or to missing data.

Among those who reported first use of contraception by 2013 for whom timing in relation to first birth could be ascertained ($n=683$), the vast majority (87 percent) of young women first used contraception sometime after first birth. Of those who gave birth by the last round in which we observed them ($n=1018$), 9 percent used contraception prior to first birth, 58 percent used after first birth, and an additional 33 percent never used and, thus, if they do use contraception, will initiate use after first birth.⁴ Similarly, among those who reported first use of contraception by 2013 for whom timing in relation to first marriage could be ascertained ($n=697$), almost three-quarters (74 percent) first used contraception after marriage, and another 12 percent reported first using contraception in the same round at which they reported first being married. Of those who first married by the last round in which we observed them ($n=1065$), 9 percent used contraception prior to first marriage, 49 percent used after, 8 percent used in the same round, and an additional 35 percent never used and, thus, if they do use contraception, will initiate use after marrying.⁵ Approximately three-quarters of respondents (73 percent) reported first use of contraception after both birth and marriage, and an additional 10 percent reported first use after birth in the same round as marriage.

Note that, in contrast to pill and injectable use, which the majority of users initiated after first giving birth (87 percent), the majority of condom users ($n=735$) reported use before (58

⁴An additional 227 women in the sample had not given birth and not initiated use and thus are censored on both variables.

⁵An additional 194 women in the sample had not married and not initiated use and thus are censored on both variables.

percent) or during the same round (13 percent) as their first birth. Similarly, among those who reported using a condom by 2013 (n=765), more than half (52 percent) used a condom before first marriage, and an additional 14 percent used a condom the same round at which they reported first being married.

Figure 1 displays current use of pill and injectable in each year of data collection, by current marital status and whether a respondent had ever given birth.⁶ Those who had ever given birth were more likely to use contraception than those who had not at all rounds of data collection. The largest number of respondents to use contraception were those who were married and had ever given birth.

Sociodemographic correlates of contraceptive use

Of the 1,186 female MSAS respondents interviewed in round 6, 10 percent were pregnant (n=120) and 6 percent had never had sex (n=71). These cases were excluded from all analyses of round 6 data.⁷ Additionally, one respondent lived in Mozambique and was therefore excluded. The remaining sample included 994 respondents. More than half of this sample (54 percent) reported current use of modern contraception (injectable, implant, pill, IUD, or sterilization). The vast majority of MSAS respondents using modern contraception were using injectables (80 percent, n=422), followed by implants (17 percent, n=89). Few respondents were currently using pills (3 percent, n=14) or IUDs (2 percent, n=9), and only one reported being sterilized.⁸ Among those who were currently using pills or injectables and for whom we knew their contraceptive status in prior rounds (n=413), this was the first reported use for almost half (46 percent). Among those who were not currently using a modern method (n=449), almost two-thirds (65 percent) reported that they had never used modern contraception.

Table 1 shows current use of modern contraception by sample characteristics. Those who were never married (8 percent) or were separated, divorced, or widowed (38 percent) were less likely to use contraception than those who were currently married (62 percent). This effect remained after adjusting for the other covariates listed in the table (AOR, not currently married: 0.36, p<0.001). As expected, higher parity was positively associated with higher contraceptive use. Belonging to the Yao tribe was associated with being less likely to use contraception in the multivariable model, while belonging to the highest wealth tertile was associated with being more likely to use contraception compared to the lowest tertile.

⁶The sample includes those who were pregnant because respondents were not asked directly at all rounds whether they were pregnant. Also, this sample does not exclude those who reported never having had sex due to high levels of inconsistency in reporting about sexual behavior among adolescents in sub-Saharan Africa (Beguy et al. 2009; Mensch et al. 2014; Palen et al. 2008; Soler-Hampejsek et al. 2013). One analysis found that 55.1 percent of females in this sample reported sex inconsistently at baseline (Soler-Hampejsek et al. 2013). In addition, some respondents who report never having sex report contraceptive use. For example, in round 3, 9.5 percent of those who state they had never had sex report ever using pill or injectable and 3.6 percent were currently using pill or injectable. (Reports of condom use and sex are even more inconsistent than pill and injectable use and sex: 15 percent of those who report they never had sex in round 3 report ever using a condom.)

⁷In contrast to the earlier analysis, here we exclude those who did not have sex; even though a small number of those who had never had sex reported ever using a modern method (injectable, implant, pill, IUD, or sterilization) (5.7 percent, n=4), none of them reported current use at the time of round 6.

⁸An additional thirty-five respondents reported using condoms (and were not using any of the modern methods described here).

Access and quality of family-planning services and current contraceptive use

Almost all respondents (90 percent) lived in rural areas (as opposed to urban areas or in a boma (district headquarters)). For only a minority (16 percent), the nearest facility offering family planning services was located within one kilometer. However, for nearly two-thirds (66 percent) of respondents, the nearest facility was within five kilometers. Another 31 percent lived between 5–10 kilometers from the nearest facility, with the remaining few (3 percent) residing 10 km or more (see Figure 2). The median number of facilities (up to ten) providing family planning within a five-kilometer radius of each respondent was only one; the median number of facilities (up to ten) within a ten-kilometer radius was three. There was no significant difference in the mean number of facilities within ten kilometers between users (3.5) and nonusers (3.6).

Descriptive statistics of characteristics of facilities included in the analysis (within ten kilometers of at least one MSAS respondent or the nearest facility to at least one respondent who did not live within ten kilometers of any facility) are listed in the appendix. Descriptive statistics of facility characteristics and their bivariate associations with current contraceptive use are provided in Table 2. The service environment around each respondent is represented two ways for every indicator: the mean value and the maximum value among up to ten facilities within ten kilometers. These indicators were then averaged for users and nonusers to compare the service environments between the two groups. Only one indicator—number of visual aids for demonstrating use of family planning methods at facility—was significantly associated with current use of contraception ($p < 0.05$). However, this association was negative and the difference between users and nonusers was small.⁹ Multivariable models including the mean values and the maximum value of facility characteristics shown in Table 2 were not jointly significant (models not shown: likelihood ratio chi square (18) = 22.03, $p = 0.23$; likelihood ratio chi square (19) = 15.60, $p = 0.68$, respectively.)¹⁰ Additionally, a variance-components model indicated that only 2 percent of the variation in current use of modern contraception among MSAS respondents was attributable to the characteristics of the nearest facility providing family-planning services ($\rho = 0.022$; $p < 0.05$). Bivariate multilevel logistic regression models of the characteristics of the nearest facility (type, managing authority, urban versus rural location, existence of user fees for contraception, and seventeen readiness indicators) did not show any significant association with current contraceptive use (results not shown). We did not estimate multivariable models because none of these models was significant, and because of the small value of ρ in the variance components model.

⁹We did not include a measure of provision of youth-friendly services in our results because the SPA measures are based on self-reports from staff and, thus, are not objective indicators of the degree to which a family planning provider is welcoming to young women, particularly those who are not married or of low parity. Moreover, upon our examination of what is included in the SPA (the proportion of staff at a facility who report providing “youth-friendly or adolescent-friendly” services), we found no evidence that the existence of youth-friendly services had an effect on contraceptive use (when constructed in the same manner as the variables in Table 2, using the mean and maximum value within ten kilometers).

¹⁰“Government facility” was excluded from both models as government facilities were virtually all free and other managing authorities (namely, private and NGO) were unlikely to have hospitals or health centers (see appendix). “Number family planning methods offered” was excluded as it was represented by “number family planning methods available.” Next, as some of the remaining variables were correlated, we checked the variance inflation factors to test for multicollinearity. This led to the exclusion of the “other reproductive health services available” in the mean values model above, as the variance inflation factor was greater than ten.

Where users obtained their contraceptives

We explored where respondents currently using modern contraception obtained their method of contraception. Of those respondents for whom we had data on where contraception was obtained (n=512), most went to a health center (64 percent), followed by a hospital (19 percent), and clinic or other health facility (10 percent). A small proportion (5 percent) acquired contraception from mobile or outreach services or a health surveillance assistant; for the remaining few (2 percent), we could not identify the facility type.¹¹ Among respondents who went to facilities listed in the SPA (86 percent, n=441), only 15 percent went to a facility that charged fees for contraception. Interestingly, 15 percent (n=64) of MSAS respondents who visited facilities identified in the SPA reported obtaining contraception at facilities that, according to the SPA, did not provide family-planning services; this type of facility represented 10 percent of the facilities in the SPA to which respondents reported going (n=82 facilities). One facility was a government hospital (one respondent visited); the remaining seven were CHAM health centers (sixty-three respondents visited). We relied on the respondent report that these facilities did indeed provide family planning because multiple respondents reported getting contraception from each CHAM facility; in particular, three or more respondents (range: 3–22) stated that they obtained contraception at each of the seven CHAM facilities. Family-planning readiness indicators could not be calculated for these facilities as the data necessary were not collected by the SPA.

Less than half (45 percent, n=232) of respondents obtained contraception at the facility providing family-planning services closest to the place at which they were interviewed in round 6.^{12, 13} Table 3 displays the characteristics of facilities where respondents got contraception by whether the respondent went to the nearest facility providing family-planning services (among those who went to a facility listed in the SPA). The majority of respondents in both groups went to health centers, although more respondents who did not go to the nearest facility went to hospitals than those who went to the nearest facility (36 percent versus 8 percent). Both groups were equally likely to obtain services from a government facility, but those who did not go to the nearest facility were more likely to pay for contraception. (Additional analyses not shown here demonstrated that those who did not go to the nearest facility lived in areas where a higher proportion of facilities within ten kilometers charged for family planning). Those who did not go to the nearest facility were far more likely to go to urban facilities. Although those who went to the nearest facility most likely traveled shorter distances than those who did not (depending on the density of facilities near them),¹⁴ it is interesting to note the large percentage of respondents (30

¹¹Of condom users in our sample not using any other method of contraception who reported where they obtained condoms (n=34) in round 6, almost three-quarters (70.6 percent) report they procured them at a health facility (with the largest group of those going to a health center). The remainder got it at either a shop or youth center. However, the vast majority of this sample was currently married (73.5 percent) and had ever given birth (79.4 percent). Thus, this may not reflect where unmarried, nulliparous youth obtain condoms.

¹²The sixty-four respondents who reported obtaining contraception at facilities that did not provide family planning according to the SPA were categorized as going to the nearest facility if the facility that they reported visiting was closer to them than the nearest facility providing family planning according to the SPA. They were categorized as not going to the nearest facility if the facility that they visited was farther away than the nearest facility providing family planning according to the SPA.

¹³A slightly smaller percentage (26.5 percent) of condom users (n=34) reported getting condoms at the nearest facility providing family planning.

¹⁴For example, a respondent in an urban area might travel one kilometer to the second-nearest facility to her, but a respondent in a rural area might travel five kilometers to the nearest facility to her.

percent) who did not go to the nearest facility and appear to have traveled fifteen kilometers or more to obtain contraception.

Determinants of facility choice

Further exploration demonstrated that migration was a key determinant of whether a respondent went to the nearest facility. Almost half of the round 6 sample (45 percent, $n=445$) reported having moved (on a visit, temporary, or indefinite basis) at least once since being interviewed at round 5 approximately two years earlier. Of those who moved at least once and were currently using contraception, only 33 percent went to the facility nearest to where they were interviewed in round 6, as compared to 54 percent of those who had never moved since round 5 ($p<0.001$). Of those respondents who moved at least once since round 5, 21 percent reported getting contraception at a facility fifteen kilometers or more away (15–445km) versus 9 percent of those who had never moved since round 5 (15–74km). Thus, it appeared that some respondents reported obtaining contraception at a facility in a region from which they had since moved by the time of the round 6 interview. We did not ask when they visited the facility. Still, almost half of the respondents who had not moved did not go to the nearest facility and some traveled great distances to obtain contraception.

We also explored other individual- and facility-level correlates of visiting the nearest facility to obtain contraception. A variance-components model indicated that more than half (56 percent) of the variation in visiting the nearest facility among MSAS respondents was attributable to characteristics of the nearest facility ($\rho=0.563$; $p<0.001$). The results were essentially the same (52 percent, $\rho=0.516$, $p<0.001$) among those who had never moved since round 5.

Bivariate multilevel logistic regression models were estimated with each of the seventeen facility readiness indicators to determine if they were associated with whether a respondent obtained contraception at the nearest facility.¹⁵ Only four were significant: number of days per week that family-planning services were provided, availability of provider 24 hours a day, supervisory visit within the last six months, and number of other reproductive health services offered (results not shown).¹⁶ After these variables were added to a model with other facility characteristics (facility type, fee, and urban/rural location), only the “number of other reproductive health services offered” remained significant (results not shown). Further analysis revealed that these four characteristics were strongly associated with facility type and fee (among the facilities nearest to this sample of respondents, results not shown). Facilities that charged fees had family-planning services available more days per week than those that did not charge a fee. Health centers and hospitals almost universally had a provider available 24 hours a day, and all health centers had a supervisory visit within the last six months. Free facilities were more likely to offer a greater number of other reproductive health services than facilities that charged fees. All hospitals and health centers offered two to three other reproductive health services (with approximately 80 percent

¹⁵The sixty-four respondents who obtained contraception at a facility that did not provide family planning according to the SPA were excluded from these multilevel models (including Table 4) because quality indicators on the nearest facility were missing for respondents who obtained contraception at facilities nearer to them than the “nearest” facility according to the SPA.

¹⁶The existence of youth-friendly services (the proportion of staff at a facility who report providing “youth-friendly or adolescent-friendly” services) had no effect on whether a respondent went to the nearest facility.

offering three other services). In contrast, 84 percent of clinics offered either no other service or just one. Due to the strong association between other services and facility type, “other services” was excluded from the final model. Managing authority was not included in the model with fees as there was little variation within categories. Among facilities nearest to respondents, virtually 100 percent of government facilities were free, whereas nearly all private and NGO facilities charged fees for contraception. Half of CHAM facilities were free and the other half charged for contraception.

In a multivariable multilevel logistic regression model estimating only the associations between individual-level characteristics and facility choice (with women nested within facilities), only three variables were significantly predictive of not going to the nearest facility for contraception: ever having moved since round 5, distance of five kilometers or more to nearest health facility, and being in the middle or highest wealth tertile as compared to the poorest (results not shown). The final multivariable multilevel logistic regression model (Table 4) included individual-level characteristics and facility characteristics with no readiness indicators. The individual-level characteristics significant in the model described above (with no facility-level characteristics) remained significantly associated with going to the nearest facility for contraception (with the exception of being in the highest wealth tertile). Those who moved since round 5 were less likely to go to the nearest facility (AOR: 0.37, $p<0.001$). Those who lived five kilometers or farther from the nearest health facility were less likely to go to it than those who lived fewer than five kilometers away (AOR: 0.19, $p<0.001$). In other words, if a woman did not live within five kilometers of a facility then she was less inclined to go to the closest facility. Respondents in the middle wealth tertile were less likely to go to the nearest facility than the poorest tertile (AOR: 0.47, $p<0.05$). Respondents who lived nearest to facilities that provided free contraception were more likely to go to those facilities (AOR: 8.98, $p<0.001$). We tested a model including an interaction term for distance and cost; the interaction was not significant and therefore was not included in the final model. Those who lived near clinics or other facility types were less likely to go to them than those who lived near health centers (AOR: 0.23, $p<0.001$).

Reasons why those who had previously used contraception were not currently using it

Finally, we explored reasons for nonuse among those who had used contraception (injectable, implant, pill, IUD, or sterilization) in the past, were not currently using, and yet reported wanting to space or limit births ($n=98$)¹⁷; the largest proportion indicated they were not having sex (35 percent). The next most common reasons cited for nonuse were breastfeeding (27 percent), not being married (18 percent), not having menstruated since last birth (13 percent), side effects/health concerns (12 percent), and opposition to contraceptive use (8 percent). No respondent stated that she was unaware of a place to obtain contraception or that access, distance, cost, not being able to get her preferred method, or stockout was a problem.

¹⁷Nine respondents who had never given birth were excluded from these data because they were not asked about their spacing/limiting preferences or reasons for nonuse given inclusion criteria for this question.

Robustness considerations

To investigate robustness of results that describe the relationship between access and current contraceptive use, we estimated the models using alternative measures of facilities and distances.

- A categorical number of facilities (rather than continuous) in ten kilometer radius was not significantly associated with current contraceptive use.
- Bivariate associations between current contraceptive use and characteristics of facilities within a five kilometer radius were not meaningfully different from those within a ten kilometer radius (as shown in Table 2); no bivariate associations between current contraceptive use and characteristics of facilities within a ten kilometer radius were significant in an analysis limited to rural respondents.
- Distance to the nearest health facility offering family-planning services was not significantly associated with current use of contraception.

We also assessed the robustness of our results that describe whether respondents went to the nearest facility (Table 4). These did not meaningfully change when we restricted the sample to respondents who had not migrated since round 5, nor did they change when we restricted the analysis to respondents living in rural areas.

Finally, all analyses involving data linked by GPS coordinates were repeated without the cases for which coordinate data were imputed. There were no meaningful differences in the results.

Discussion

In a setting where family-planning programs have expanded such that there appears to be little variability in access, at least as we are able to measure it, demographic characteristics appear to be the primary factor affecting contraceptive use among young women. Both the longitudinal and the round 6 data from MSAS show that current users of contraception were much more likely than nonusers to be married and to have given birth. Very few young women began to use contraception prior to first birth and first marriage. This echoes findings from the recent DHS that most women in Malawi begin using contraception after their first birth (National Statistical Office and ICF Macro 2011). Lack of use may be due to stigma surrounding contraceptive use among unmarried women for whom use is a tacit acknowledgement of being sexually active (Williamson et al. 2009; Wood and Jewkes 2006). In addition, those who wish to use contraception but have not had children may be discouraged from using or even denied it (Prata, Weidert, and Sreenivas 2013). Such provider “bias” might partially be addressed by sensitizing and expanding programs; however, altering the service environment may have little effect in the absence of wider normative change. Moreover, whether unmarried or married, adolescents and young women may not want to delay or prevent their first birth due to pressure to demonstrate their fecundity (Hindin and Fatusi 2009; Preston-Whyte et al. 1990; Williamson et al. 2009; Wood and Jewkes 2006). Jewkes et al. (2001) suggest that although the majority of adolescent pregnancies are unplanned, they are not necessarily unwanted. It follows that

expanding access to family-planning services, high quality or otherwise, may not translate into substantially lower fertility in these populations.

The presence and characteristics of nearby facilities with contraception available did not appear to affect use among young women in our sample. Approximately 2 percent of the variation in current use of modern contraception among MSAS respondents was attributable to the facility-level characteristics of the nearest facility providing family-planning services. Although this variance components model only accounted for the nearest facility, this finding was consistent with our null findings for the effect of the broader service environment on use of contraception. In contrast, Skiles et al. (2015) found that distance to injectable services sites based on kernel density mapping affected injectable use among rural Malawian women aged 15–49. Those in the two highest quintiles of access were more likely to use contraception than those who lived in the lowest quintile of access. Our results may differ because we focus on use among those at the beginning of their reproductive years, for whom we are predicting first or early use of contraception. This population might have different needs and expectations and face different constraints than those who are older. As a higher percentage of our sample resided in rural areas than in the nation as a whole, we may not have been able to capture the variation in access that exists throughout the country. Still, our results are consistent with other research indicating that geographic access is not a primary barrier to use or cause of unmet need (Bongaarts and Bruce 1995; Choi, Fabic, and Adetunji 2016). In light of the debate on what factors contribute to declines in TFR in high-fertility countries, our results suggest that, whereas access to sites offering contraception is a prerequisite for use by young women, it is by no means sufficient, especially if access exceeds a threshold that most young women do not consider to be problematic. Of note in our sample, among prior users who were not currently using contraception, but wanted to space or limit births, no one stated she was unaware of a facility from which to obtain contraception or that access, distance, cost, not being able to get her preferred method, or stockout was the reason that she was not currently using contraception. Additionally, at least among this age-restricted, rural sample, education does not explain variation in current use; rather, marital status and parity are the critical factors that appear to affect demand. Our findings add nuance to the debate by suggesting that the relative importance of family planning services vs. development may depend on the motivation for using contraception and the level of access already present. Given the expansion of services in Malawi, and the fact that young women primarily aim to space births, rather than delay a first birth or limit childbearing, the debate regarding the relative contributions of expanding access versus development may have less salience.

In contrast to the models estimating the likelihood of contraceptive use, facility-level characteristics were key determinants of where those who decided to use contraception obtained it. Although facility-level characteristics of the nearest service site explained only a small percentage of the variation in contraceptive use, they accounted for more than half of the variation in visiting the nearest facility among MSAS respondents. The only individual-level characteristics associated with going to the nearest facility were: migration, distance to facility, and being in the middle wealth tertile. Young women were more likely to go to facilities that provided free contraception, were health centers as compared to clinics, and were within five kilometers of where they lived. One explanation for our finding that a

respondent was less likely to go to the nearest facility if it was not within five kilometers is that she went to the facility that was more convenient in terms of transport even if it was farther away. It is of note that if a respondent did not prefer to go to the nearest facility, but was motivated to use contraception, she sometimes traveled great distances to do so. This fact highlights that, in our sample of young women, proximate geographic access may be less important than other factors in influencing usage.

This study has some important limitations. First, MSAS data were not designed for the purposes to which we have put them. The focus of MSAS was on education, transitions to adulthood, and sexually transmitted diseases. Thus, minimal data on contraception were collected prior to round 6, and we did not ask whether respondents used implants in rounds 1–5, which we found in round 6 to be the second most common method in our sample. Additionally, as our measure of contraception in analyses using all rounds of data included only pill and injectable (excluding condom use), we are providing a somewhat distorted picture of the timing of contraceptive initiation relative to marriage and first birth. Second, gaps remain in data collected at round 6, in particular, an absence of questions on exact timing of first contraceptive use as well as continuity of use. In addition, we did not collect qualitative data, which would have enabled us to investigate decision making around contraceptive use. Also, the SPA's lack of client observation and interview data for all facilities prevented creation of more comprehensive quality of care measures. Finally, it is somewhat concerning that 10 percent ($n=8$) of the facilities identified in the SPA where respondents reported getting contraception did not provide family-planning services according to the SPA. Although some of these facilities may have stopped providing contraception between the last time a respondent obtained contraception and the time of the SPA interview, it is improbable that this is the case for all of them. Thus, there is likely some misclassification in the SPA regarding which facilities provided family-planning services due to reporting errors by facility staff, data entry error, or deliberate misreporting to enable skipping large sections of the questionnaire (akin to the age-heaping seen in the DHS to limit eligibility for certain questions [Borkotoky and Unisa 2014; Pullum 2006]).

This analysis underscores the problems that arise from matching datasets based on GPS coordinates, even when the datasets are collected contemporaneously. Some respondents had clearly moved since the time they had last obtained contraception. This resulted in misclassification when determining whether they went to the nearest facility to obtain contraception: where they obtained contraception may have been the nearest facility to them at their previous location, but now did not appear to be the nearest facility because they had moved. The amount of misclassification is difficult to quantify given the highly mobile sample. Additionally, shorter distance as the crow flies does not equate to ease of access for a respondent; this may explain, in part, why a minority of respondents went to the facility nearest them.

The expansion of facilities providing family planning has led to relatively high prevalence of modern contraceptive use, but fertility is not as low as expected given this prevalence. Many of the young women in our sample may use contraception sporadically (Furnas, forthcoming). Indeed, Furnas (forthcoming) found that many young people's contraceptive behavior in Malawi apparently changes in response to transitions between one partner and

another, and changes in preferences within relationships, so that unmet need for contraception may be more dynamic than previously assumed. Previous research has also found that some women purposely delay obtaining their next injectable due to the desire to menstruate (Jewkes et al. 2001; Wood and Jewkes 2006). Furthermore, even though respondents do not cite access as problematic, for the vast majority of users who rely on injectables, having to return to a health facility every few months may be a deterrent to consistent use, particularly in poor rural areas where many women travel long distances to obtain contraception. In other words, our findings are not inconsistent with the results of Skiles et al. (2015) discussed above; access may matter less in our sample, both because we are more likely to be modeling initiation of use rather than continuity of use, and because uninterrupted usage may be a more pressing need for those who are older and more likely to be limiting, rather than spacing, births. The high levels of migration in this population may interrupt usage if young women who have temporarily moved prefer to obtain contraception at a facility that they have visited before or if they delay seeking care at a new facility after a permanent move. In addition, views about the desirability of lower fertility or longer birth intervals may not be that deeply held in the face of the exigencies of daily life. Additional research is warranted on the continuity of use among adolescents and young women in settings such as Malawi.

The contraceptive choices of young women in Malawi and sub-Saharan Africa will be instrumental in defining future population growth. Although many studies have examined the influence of facility access and quality on contraceptive use among all women of reproductive age, the factors influencing use among young women, who face pressures to conceive, likely differ. There has been progress in expanding access to family planning in Malawi such that almost all respondents in our mostly rural sample live within ten kilometers of a health facility. Our findings indicate that whereas improving access and quality of family-planning services undoubtedly matters for older women, at least in the short term, this may not markedly increase use of contraception among young women without broader shifts in cultural norms regarding childbearing in the early years of marriage.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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Biographies

Jean Digitale is a data analyst/research coordinator at the Population Council. She has contributed to cleaning and analysis of data from several studies, including the longitudinal Malawi Schooling and Adolescent Study, which draws on in-depth data from more than 2,500 adolescents to elucidate relationships among young people's schooling experiences, learning, and health outcomes.

Stephanie Psaki is an associate in the Poverty, Gender and Youth Program at the Population Council. She conducts research on girls' education, sexual and reproductive health, and violence. Psaki also serves as the editor of *Studies in Family Planning*, a scholarly journal published by the Council.

Erica Soler-Hampejsek is an associate at the Population Council. She uses various statistical methods to study the influence of schooling on the timing of sexual initiation, marriage, and childbearing. She has collected and analyzed longitudinal data in Guatemala, Malawi, and Zambia, and directed five rounds of data collection for the Malawi Schooling and Adolescent Survey.

Barbara Mensch is a senior associate at the Population Council. She has conducted research on the quality of family planning services in developing countries and its effect on contraceptive use, transitions to adulthood in Africa, reliability of self-reports relating to sexual behavior in demographic surveys, and the behavior and characteristics of HIV prevention trial participants.

Figure 1.

Current use of contraception (pill and injectable) among MSAS females aged 14–17 in 2007 according to whether they had ever given birth and current marital status

Figure 2.

Location of female MSAS respondents and health facilities that offered family planning services, 2013

Note: The map focuses on Balaka and Machinga, the districts from which our respondents were originally sampled, and where 87% of them still lived in 2013. (The remainder not shown here were scattered around the country).

Table 1
Current use of modern contraception^a by sample characteristics among MSAS respondents age 20–23 in 2013^b

	N=994		N=881 ^c		
	%	N	Unadjusted OR	95% CI	Adjusted OR 95% CI
Current age					
20–21	51.6	572	Ref		Ref
22–23	56.4	422	1.11	0.85,1.45	0.98 0.73,1.32
Marital status					
Currently married	62.0	771	Ref		Ref
Never married ^d	7.9	101			
Sep. Div, Wid ^d	38.0	121	0.28	0.20, 0.41 ***	0.36 0.24, 0.52 ***
Parity					
0	3.2	94	-----		-----
1	43.5	285	Ref		Ref
2	65.5	444	2.41	1.77,3.27 ***	2.16 1.51,3.09 ***
3+	67.3	171	2.66	1.79,3.97 ***	2.55 1.57,4.14 ***
Education					
< Primary	59.7	636	Ref		Ref
Completed primary	54.5	66	0.91	0.53,1.55	0.89 0.50,1.59
Secondary: Partial or completed ^e	39.1	281	0.67	0.49,0.92 *	0.82 0.55,1.22
Chichewa reading comprehension^f					
Below the sample mean	55.8	344	Ref		Ref
Above the sample mean	52.2	647	1.03	0.78,1.36	1.10 0.80,1.52
Age at school leaving					
Less than	18	58.8	507	Ref	Ref
18 and older ^g	53.0	432			
Currently attending school ^g	10.9	55	0.84	0.64,1.10	1.13 0.81,1.59
Tribe					
Other	56.0	570	Ref		Ref

		N=994				N=881 ^c			
		%	N	Unadjusted OR	95% CI	Adjusted OR	95% CI		
Yao		50.5	424	0.71	0.54,0.93 *	0.70	0.52,0.93 *		
Household wealth tertile^h									
Low		51.6	374	Ref		Ref			
Medium		57.7	312	1.31	0.96,1.81 [†]	1.21	0.86,1.70		
High		51.9	308	1.43	1.03,2.00 *	1.58	1.09,2.28 *		
Ever moved since Round 5 (2011)									
No		57.4	544	Ref		Ref			
Yes		49.2	445	0.83	0.63,1.09	0.87	0.65,1.17		
Urban/Bomaⁱ									
Rural		53.6	893	Ref		Ref			
Urban/Boma		53.5	101	1.05	0.67,1.64	1.01	0.62,1.64		
LR chi ² (13)						87.7	***		

p<.001;

**
p<.01;

*
p<.05;

[†]
p<.10

^a Defined as use of injectable, implant, pill, IUD, or, sterilization

^b Among Round 6 females excluding 120 pregnant respondents, 71 respondents who report never having sex, and 1 respondent who does not live in Malawi.

^c Those with no children were excluded from regressions as there were only 3 contraceptive users with no children.

^d The never-married and separated, divorced, widowed categories were collapsed in regressions as there were only 8 never-married contraceptive users.

^e Only 20 respondents completed secondary.

^f Scored out of 6 (0 if could not read). Sample mean = 3.84.

^g The 18 and older and currently attending school categories were collapsed in regressions as there were only 6 contraceptive users currently attending school (and as the sample is now was aged 20–23 in 2013, all those currently attending school at Round 6 will therefore leave school after age 18).

^h Household wealth tertiles were estimated from principal component analysis of possession of 14 household items.

A boma is a district's headquarters.

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Table 2Characteristics of nearest facilities (within 10 kilometers)^a to users and non-users of contraception^b

	Mean value among 10 nearest facilities within 10 km		Maximum value among 10 nearest facilities within 10 km	
	Users ^c	Non-users ^c	Users ^d	Non-users ^d
	N=533	N=461	N=533	N=461
Facility characteristics				
Free family planning provided	66.8%	66.9%	96.4%	95.4%
Urban location	13.2%	11.8%	24.0%	24.1%
Hospital or health center	63.2%	63.2%	93.8%	93.9%
Government facility	60.5%	59.0%	95.3%	94.1%
Infrastructure & equipment				
Physical infrastructure scale (0–5)	3.5	3.6	4.1	4.2
Equipment in family planning (FP) service area scale (0–7)	4.2	4.3	5.2	5.4 [†]
Management				
Routine facility management meetings	61.2%	62.0%	92.9%	93.5%
System to collect client opinion	45.9%	46.2%	80.7%	83.7%
Quality assurance program	52.3%	54.3%	83.1%	85.2%
Supervisory visit in last 6 months	88.7%	88.8%	99.8%	99.8%
Stock inventory, organization, and quality scale (0–5)	4.3	4.4	4.8	4.8
Availability of services				
# days FP services provided (0–7)	3.8	3.9	5.1	5.3
# FP methods offered (0–13)	6.7	6.7	6.7	6.7
# FP methods available (0–10)	4.8	4.7	6.5	6.6
Provider available 24 hrs	79.0%	81.1%	98.1%	98.3%
# other reproductive health services (0–3)	2.2	2.2	2.8	2.8
Counseling				
FP guidelines	46.1%	47.2%	79.5%	82.6%
# visual aids (0–5)	1.9	2.0 [*]	2.7	2.8 [*]
Has private room	75.7%	75.5%	91.6%	92.0%
Individual client card	39.6%	43.6% [†]	70.4%	75.1% [†]
Proportion providers trained in FP	0.3	0.3	0.6	0.6

p<.001;**
p<.01;*
p <.05;†
p<.10^a If the respondent did not live within 10 kilometers of any facility, the characteristics of the nearest facility were assigned^b Defined as use of injectable, implant, pill, IUD, or sterilization^c Continuous variables: mean of the respondents' means; binary variables: mean of percent of facilities that met criteria for each respondent

^dContinuous variables: mean of the respondents' maximum values; binary variables: percent of respondents that live near at least 1 facility that met criteria

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Table 3

Characteristics of facilities where respondents obtained contraception^a, by whether respondent went to the nearest facility providing family planning services^b

Facility characteristic	Did not get at nearest facility n = 209	Got at nearest facility n = 232
Type		***
Hospital	35.9	7.8
Health Center	50.7	81.5
Clinic/Other	13.4	10.8
Managing authority and fee^c		***
Government/Public: Free	67.9	65.9
CHAM: Free	13.9	25.4
CHAM: Not free	7.2	7.3
Private: Not free	3.3	0.9
NGO: Not free	7.7	0.4
Urban	44.5	7.3 ***
Distance from respondent to facility (km)		***
0–4	32.1	78.0
5–9	30.1	21.1
10–14	7.7	0.9
15 or more ^d	30.1	0

p<.001;

**
p<.01;

*
p <.05;

†
p<.10

^a Defined as use of injectable, implant, pill, IUD, or, sterilization

^b Sample includes only current users of contraception who obtained contraception at a facility listed in the SPA, as we do not know facility characteristics for those who did not go to a facility listed in the SPA. Facility characteristics are reported per respondent (more than one respondent may report going to a facility and the sample size is the number of respondents).

^c Tested using 2-sided Fisher's exact test due to expected frequency < 5 in at least one of the cells. Among respondents who went to government facilities, 2% went to facilities that reported charging fees for contraception in the SPA. The SPA reports whether a fee is charged for contraception at all facilities, regardless of whether it reports family planning services are available there.

^d Maximum distance is 445 km between facility where respondent reported obtaining contraception and GPS coordinates recorded at interview.

Table 4

Multivariable multilevel logistic regression model of whether or not current users of contraception^a went to the nearest facility to obtain it

n=435 ^b	AOR	95% CI
Current age		
20–21	Ref	
22–23	1.18	0.70,1.98
Marital status		
Currently married	Ref	
Not currently married	0.83	0.35,1.96
Parity		
1	Ref	
2	1.35	0.70,2.63
3+	1.35	0.58,3.13
Education		
< Primary	Ref	
Completed primary or greater	1.31	0.68,2.50
Chichewa reading comprehension^c		
Below the sample mean	Ref	
Above the sample mean	1.44	0.82,2.51
Tribe		
Other	Ref	
Yao	1.47	0.85,2.53
Household wealth tertile^d		
Low	Ref	
Medium	0.47	0.25,0.86 [*]
High	0.55	0.29,1.04 [†]
Ever moved since Round 5 (2011)		
No	Ref	
Yes	0.37	0.22,0.64 ^{***}
Distance to nearest health facility offering family planning services (km)		
<5	Ref	
5+	0.19	0.10,0.36 ^{***}
Nearest facility type		
Health Center	Ref	
Hospital	2.74	0.73,10.28
Clinic/Other	0.23	0.10,0.56 ^{***}
Cost of family planning at nearest facility		
Not free	Ref	
Free	8.98	3.55,22.71 ^{***}

n=435 ^b	AOR	95% CI
Nearest facility location		
Rural	Ref	
Urban	0.33	0.10, 1.15 [†]
Wald Chi ² (15)	74.36	***
Rho	0.13	**

p<.001;

**
p<.01;

*
p <.05;

[†]
p<.10

^a Defined as use of injectable, implant, pill, IUD, or, sterilization

^b 3 respondents with no children were excluded from this model. The 64 respondents who obtained contraception at a facility that did not provide family planning according to the SPA were excluded because quality indicators on the nearest facility were missing for respondents who obtained contraception at facilities nearer to them than the “nearest” facility according to the SPA.

^c Scored out of 6 (0 if could not read). Sample mean = 3.84.

^d Household wealth tertiles were estimated from principal component analysis of possession of 14 household items.