

**The Effect of Facility Characteristics on
Choice of Family Planning Facility in Rural
Tanzania**

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MEASURE
Evaluation

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I. Introduction

A major goal of most family planning programs in developing countries is to increase quality and access to family planning facilities. While it has long been hypothesized that contraceptive users are responsive to their supply environment, there is scant evidence showing that access and quality factors, have an effect on family planning use (for recent work on the topic see, for example: Bertrand, Hardee, Magnani and Angle 1995; Cochrane and Guilkey 1995; Frankenberg, Sikoki, Suriastini, and Thomas 2001a and 2001b; Koenig, Hossain, and Whittaker 1997; Steele, Curtis and Choe 2000; and Tsui, Ukwuani, Guilkey and Angeles 2001). Much of the work cited above on the role of the family planning supply environment on influencing contraceptive use has focused on access to care. Using distance and proximity as a measure of access to care, several studies have found that access is an important determinant of contraceptive use. Some studies that have tried to examine the role that quality plays on the use of contraceptives have found that quality is important, though it is hard to uncover significant effects for specific quality indicators (see, for example, Mensch, Arends-Kuening and Jain 1996). One study, Mroz, Bollen, Speizer and Mancini (1999), found that a community's subjective measure of quality had a significant impact on contraceptive prevalence in that community and that the size of the impact was larger than the other community measures such as time, distance and accessibility.

In the past, studies that have examined the effect of quality on individual level family planning behavior have often used community level information on family planning service quality. For example, a knowledgeable individual within the community is selected to provide information on the nearest facility or a facility actually

within the community. The facility is surveyed or the knowledgeable individual is asked about the type of services available at the facility. If the unit of analysis is the woman, each woman within the community is then assigned information from this facility.

There are two problems with this type of analysis. The first is that within a community, each woman has no variation in the quality of family planning facility. Since they all are assigned the same facility, the quality attributes of the facility do not vary within a community. The quality variables are in some sense restricted since by construction, they can now only account for differences in behavior across communities (not within). Since the only other factors in the analysis are demand side factors such as education, these variables may be overstated as they are forced to explain the difference in behavior across all individuals. The second problem is that a woman may not attend the facility assigned to her. She may decide to go outside of her community to obtain family planning or to go to another facility which was not surveyed. This will result in measurement error in the quality attributes of the facility that the woman is purported to attend. Mensch et al (1996) in their study of facility quality used a situation analysis to obtain information on all the family planning facilities within 5 kilometers of each community which, in rural areas, is a better approximation to the market for services that the woman faces. They found that better services were associated with greater contraceptive use. Their measure of quality was however an index made up of a number of quality attributes so that the effect of any one factor is obscured. Even though they had information on the market of facilities that a woman could choose to attend, they were not able to make use of this information in their analysis.

Our study represents a departure from the typical question asked in much of the family planning supply literature. Instead of examining the effect of the components of the supply of family planning on contraceptive prevalence or use we ask a more basic question. Among current users of family planning, what quality and access attributes influence a woman's choice of family planning facility? We are able to undertake this analysis because of an unusually rich data set which links rural women in Tanzania with their entire market of family planning facilities surrounding their community.¹ In other words, we have data on all of a woman's options when she is contemplating where to go to receive family planning services. In addition, for 40% of modern contraceptive users in our sample we have information on the actual facility she attended even if it lies outside of the surrounding area. This means that we do not rely on community informants to determine where a woman goes for family planning and we have a more reliable accounting of the attributes of the facility that she attends.

To determine the effect of specific facility attributes on facility choice we use McFadden's conditional logit model. In this model, the effect of choice characteristics are used as determinants of individual facility selection. We use distance as our measure of access, and two quality measures: at least one provider trained since 1992 and the number of modern family planning methods seen in stock. Compared to previous studies we have better data on trained providers and distance is more precisely estimated. The distance variable is based on a Global Positioning System (GPS) reading taken at the facility and measured from the center of the community. Our information on trained providers was based on a survey administered to all family planning providers and

¹ Specifically, the facility survey did a census of all facilities in the enumeration area for the respondents and then two rings of enumeration areas around this target area.

contained very specific questions on the type of training and the year that training was received. This type of study will help policymakers to identify what quality factors attract a woman to a facility and assist them in targeting their population programs to provide better care to women.

The plan of this paper is as follows. In the next section, we describe the data set used and present descriptive statistics. Section III presents the estimation methods and the empirical results. We conclude in section IV.

II. The Data

The data for this analysis is made up of two sources, the 1999 Tanzania Demographic Health Survey (TDHS) and the facility portion of the 1999 Tanzania Reproductive and Child Health (TRCHS) Survey. The TDHS identified 176 census enumeration areas (clusters) and households were selected to be interviewed from each of these clusters. The TRCHS sampled 153 clusters, 150 of which were also sampled by the TDHS.

The facility portion of the 1999 TRCHS contains information on the type of facility, the availability and types of contraceptives, the number of staff, their level of training, and the distance from the facility to the index cluster center.² The sampling plan for the facility portion of the TRCHS is novel because it attempts to capture the market for family planning services for a population. In the past, most DHS style facility surveys which link women to a facility used a sampling strategy which identifies a facility of each type (for example dispensary, health center or hospital) within 30

² For details of the 1999 TRCHS facility survey see “Tanzania Reproductive and Child Health Facility Survey, 1999” MEASURE Evaluation Technical Report Series, No. 7.

kilometers of a community and arbitrarily assigns that facility to the population residing within that community. If there is more than one facility of a particular type within the 30 kilometer radius, only the closest facility is surveyed.

The TRCHS 1999 survey was conducted using a new linked sample survey design developed by the MEASURE Evaluation Project.³ In this new survey design, index clusters (enumeration areas) were first identified from the TDHS. Two concentric rings of clusters were then identified around the index cluster. All the facilities within these two concentric rings around an index cluster were then surveyed. This type of sampling allows us to link women living in the index cluster with their entire health services provision market, provided that the market falls within 2 concentric rings of her cluster center. An additional advantage of this new method is that it is straightforward to calculate sampling weights so that national representative estimates of facility characteristics can be obtained.

Our analysis attempts to capitalize on this new method of data collection. We created a data set that links the women in our sample to all facilities within the 2 concentric rings.

The TDHS contains demographic information such as age and education and other socio-demographic characteristics. In the survey, respondents were also asked the name and type of the last source visited to obtain their current modern contraceptive method. The woman's actual choice of facility is based on the questions "Where did you go to obtain your current method of contraception -- name the source?" Though this question was asked, the response was not keyed into the TDHS dataset. Only the type of

³ See Turner, Angeles, Tsui, Wilkinson, and Magnani, (2000).

facility was recorded. Since the answer to this question was central to our analysis the MEASURE Evaluation Project went back to the survey instrument and had the response to these questions entered into data set. MEASURE staff then undertook the time consuming and difficult task of matching the names of the facilities listed by the women to a facility list and facility ID number. This matching process was less than perfect, as oftentimes the facility names given by the women did not match their official names.

We successfully matched 199 women to a named facility from our facility list. We were then able to match 159 of these women with complete facility data. From the DHS data set we know that 396 women are current using modern methods that they obtained from a health facility (shopkeepers, village health workers, etc. were not included). This means that we only had the name of a facility for 40% of our sample. In order to increase our sample size for those with a missing data on the name of the facility attended, we assigned women the closest facility of the type that they said they attended for their current source of contraception. Unfortunately, this strategy probably causes us to overstate the importance of distance in the multivariate analysis that follows.

Using this strategy, we were able increase our sample size by 147 to a total of 306 women. However, it is clear that the market place for contraceptives is much different in urban as opposed to rural areas. A woman in an urban area has much better access to transportation and her “market” for services may be related to her place of work rather than her place of residence. Therefore, we felt that it was necessary to restrict our sample to rural women for this analysis because we felt that a rural woman’s market for services was more clearly defined and much more likely associated with her place of residence.

With the sample restricted to only rural women, our final sample size is 146 women representing 94 rural clusters.⁴

Table 1 presents the sample means for the variables used in our analysis. The first section of the table describes the mean characteristics of the entire market for family planning services that the woman faces. About 56% were located within 5 kilometers of a cluster center. Only 54% of the dispensaries had at least one trained family planning provider and 78% of the dispensaries had at least one method of family planning seen in stock. It is clear from Table 1 both in terms of trained providers and method availability that the order for facilities going from best to worst is UMATI, hospital, health center, dispensary, and pharmacy.

The second section of the table includes the descriptive characteristics of the women in this sample. The average age of the women in our sample is 29 and they have a limited education of about 5 years. The final section of the table describes the characteristics of the facilities that the women actually used. Health Centers were the most popular with approximately 47% of the women using them for their current source. The majority of these women, approximately 86%, went to health centers located within 5 kilometers of the cluster center.⁵ Approximately 70% of these rural woman went to facilities with at least one family planning provider trained since 1992 and 91% of them went to facilities with at least one method of family planning seen in stock.

⁴ There were 86 rural women that named their facility. 85 of these women attended a facility within 20 kilometers of her house. Only 1 woman went farther than 20 kilometers and that was to attend a hospital.

⁵ Only 7 women with named facilities fell outside of the range.

Table 1. Descriptive Statistics

	Hospital	Health Center	Dispensary	UMATI	Unclassified Type	Pharmacy	Total
Facilities within 0 to 5 KM	0.33	0.68	0.54	0.00	0.88	0.62	0.56
Facilities within 6 to 10 KM	0.09	0.18	0.22	0.50	0.00	0.15	0.17
Facilities within 11 to 20 KM	0.16	0.10	0.19	0.50	0.00	0.14	0.16
Facilities farther than 20 KM	0.42	0.04	0.04	0.00	0.13	0.08	0.11
At least one trained provider	0.93	0.82	0.42	1.00	0.60	0.00	0.43
Sum of FP Methods Seen							
0	0.07	0.14	0.22	0.00	0.70	0.26	0.21
1	0.00	0.00	0.04	0.00	0.00	0.69	0.22
2	0.00	0.00	0.12	0.00	0.10	0.04	0.06
3	0.21	0.40	0.48	0.50	0.20	0.01	0.29
4	0.65	0.45	0.14	0.00	0.00	0.00	0.21
5	0.06	0.00	0.00	0.50	0.00	0.00	0.01
Mean Age	28.00	29.26	29.70	25.75	27.40	30.07	29.44
Mean Years of Education	5.50	4.62	4.94	5.25	6.70	4.86	4.99
Facility Chosen	0.35	0.47	0.35		0.10	0.02	0.26
Facilities within 0 to 5 KM	0.63	0.86	0.86		0.00	1.00	0.83
Facilities within 6 to 10 KM	0.16	0.11	0.14		0.00	0.00	0.13
Facilities within 11 to 20 KM	0.16	0.03	0.00		0.00	0.00	0.03
Facilities farther than 20 KM	0.05	0.00	0.00		1.00	0.00	0.02
At least one trained provider	0.89	0.89	0.58		0.00	0.00	0.70
Sum of FP Methods Seen							
0	0.07	0.06	0.08		0.00	1.00	0.09
1	0.00	0.00	0.08		0.00	0.00	0.04
2	0.00	0.00	0.14		1.00	0.00	0.08
3	0.36	0.53	0.49		0.00	0.00	0.46
4	0.50	0.42	0.22		0.00	0.00	0.32
5	0.07	0.00	0.00		0.00	0.00	0.01

III. Estimation Method and Results

Estimation of the effect of distance and quality on the choice of facility is carried out using a conditional logit model. In this study, each woman is associated with the entire market of facilities that she faces for family planning services. The number of facilities she has in her market will vary according to the cluster that she lives in. Each facility in her market is characterized by a vector of attributes: distance from her cluster center to the facility, having at least one provider with family planning training received

since 1992 and the sum of contraceptive methods seen in stock by the survey staff. The standard conditional logit model can be written as follows:

$$P(Y_i=j) = \frac{e^{X_{ij}\beta}}{\sum_{k=1}^{m_i} e^{X_{ik}\beta}}$$

Where the dependent variable is the probability that woman i will choose facility j ($j=1,2,\dots, m_i$) from the set of m_i facilities in her market. X_{ij} are facility specific characteristics (distance and quality measures for the facility) and β represents the weight that the woman gives to each facility characteristic when she makes her choice. For example, a positive value of β associated with contraceptive availability means that a woman is more likely to choose a facility within her market with contraceptives in stock. We will quantify the size of the effects in simulations presented below.

Note that we have not explicitly included individual characteristics of the woman in the model. This is standard for the base form of the conditional logit model. However, it is easy to introduce individual characteristics in interactive form with the facility characteristics. For example, we may hypothesize that weight given to contraceptive availability may vary with the woman's age or education. We tried such interactions in our empirical analysis but they were not statistically significant and were dropped from the model.

This estimation technique requires that a woman have more than one facility in her market. There were 18 women in our sample that had a choice of only one facility. These women had to be dropped in our analysis leaving a sample of 129 women. This small sample size required us to limit severely the number of quality characteristics that

we included in our model. Thus we include distance measures, a training variable to measure staff quality, and a contraceptive availability measure. These three facility characteristics are universally recognized as potentially important in any study of individual choice of facility for obtaining contraceptives.

Use	Coefficient	T-statistic
At least 1 provider trained since 1992	0.9452	3.19
Facility lies within 0 to 5 KM of cluster center	2.0368	4.92
Facility lies within 6 to 10 KM of cluster center	0.3594	0.65
Facility lies within 11 to 20 KM of cluster center	-1.2454	-1.87
Sum of methods seen in stock	0.3908	3.59

The results of the conditional logit estimations are presented in Table 2. In spite of the small sample size we see that all the quality and distance variables are strongly significant. For example, the effect of having at least one trained provider at a facility has a positive and significant effect on a woman's choice of family planning facility for her current method of contraception. Similarly, the greater the number of family planning methods seen in stock in a facility, the more likely the woman is to go to that facility. As for proximity, the results show that a facility within 5 kilometers of the cluster center is a positive and significant predictor of a woman attending that facility.

Because it is difficult to quantify the size of the impact of the quality characteristics on facility choice, we performed some simple simulations. We use the estimated coefficients in the conditional logit model to predict the probability for each woman of going to a particular facility in her choice set. We call this the status quo

value. We then set a particular quality characteristic or distance variable to one keeping all other variables the same and repeat the exercise of predicting contraceptive type use for each woman. The predicted value is then subtracted from the status quo value and we are able to obtain the change in probability of going to that selected facility that would occur if it was closer or had higher quality.

The simulated effects of all women being treated with a particular program are presented in Table 3. The table shows that distance appears to be one of the most important factors when a woman chooses a particular facility. Simulating a change from the status quo to a particular facility being within 5 KM increases the probability of going to that facility from 0.48 to 0.66. Increasing the number of methods so that at least one method is seen at the facility does not change the probability of using that facility. Furthermore, allowing the facility to have at least one trained provider will increase the probability of using the facility by 5%. This is a small change because 72% of the rural facilities that we choose to vary already had a trained provider.

Allowing a facility to have a least one additional method of family planing in stock does not appear to have much effect on the probability of choosing that facility. Perhaps this is because a very small number of the facilities, 21%, had no methods seen initially.

	None	Full
Family Planning Methods Seen (0 to 1)	0.315	0.358
Family Planning Methods Seen (0 to 3)	0.315	0.457
Trained provider	0.378	0.499
Family Planning Facility within 5KM (none to 6-10 KM)	0.383	0.656
Family Planning Facility within 5KM (none to 11-20 KM)	0.212	0.656

IV. Conclusion

With the 1999 round of surveys in Tanzania, MEASURE DHS and MEASURE Evaluation implemented a new strategy for conducting facility surveys that are linked to population based surveys. The goal of the new survey strategy was to try and capture the market of facilities available to individual respondents so that we could get a better understanding of what factors individuals feel are important when they choose a place to obtain contraceptives. When one thinks about the market available to a potential contraceptive user, it is clear that the definition could be vastly different for urban and rural women. For this reason, our analysis focused on facility choice in rural Tanzania because we felt that the market was more likely to be clearly defined for rural women.

Unfortunately, a consequence of this decision is that we were left with a very small analysis sample. Contraceptive prevalence in rural Tanzania was still quite low in 1999 (see Chen and Guilkey, 2002) and, as a result, we had few users to link to facilities. In spite of this, we find evidence that important quality characteristics of the facilities do seem to have important impacts on the choice of facility. However, because of the limited sample size, one can only classify the results as promising. The next step is to apply the new facility sampling strategy to a higher prevalence country to see how robust the results are to alternative settings with larger numbers of contraceptive users.

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