The Geography of Family Planning Quality—Measuring and Accounting for Change

Sasmira Matta, Y. Natalia Alfonso, Suzanne Belle, Shulin Jiang, David Bishai

The purpose of this study is to identify ecological level determinants of the quality of family planning as measured by the Method Information Index (MII) in Ethiopia, Ghana, and Kenya. We computed the MII from household survey data for each round of the Performance, Monitoring, and Accountability (PMA) surveys and aggregated to the enumeration area (EA). Then, we regressed the MII on indicators of SES and the health system of that enumeration area in order to determine what positively or negatively affects the quality of family planning. The results illustrate that previous year's MII is positively correlated with current MII and user fees are negatively correlated. We intend to share the adjusted MII we computed at the EA level with family planning administrators and community leaders so they can detect high priority areas.

Introduction

The purpose of this study is to first measure the quality of family planning (FP) in an area and to identify ecological level determinants of FP quality. The rationale for examining quality as a geographical construct is that public health officials serve districts and other geographic areas. They are responsible for stewardship of the quality of the services in their assigned places. By tracking the quality of services in a given geography, health systems can respond to vulnerable populations and correct failures on a larger scale, as well as at each facility. Our approach is made possible by household survey data on the Method Information Index (MII) in Ethiopia, Ghana, and Kenya. Discerning which factors most greatly affect MII can help managers and policymakers determine the best course of action in improving FP quality. The Method Information Index (MII) measures the extent to which women report being given specific information at the time they initiated their current or most recent contraceptive method. This index is based on three questions: Were you informed about other methods? Were you informed about side effects? Were you told what to do if you experienced side effects? [1]. The Performance, Monitoring, and Accountability 2020 (PMA2020) data are nationally representative samples of households (including women of reproductive age) and service delivery points in multiple countries, with a focus on family planning and contraceptive service provision. Although the quality of family planning services is not the main focus of PMA2020 surveys, the survey does ask the questions that are requisite to computing the MII.

Methods

We accessed the four publicly available PMA2020 rounds for Ethiopia, Ghana, and Kenya spanning the years 2013 through 2016. We used the household and service delivery point datasets to first develop a women level dataset where we linked women to the average characteristics of the SDPs in their EA. Analyses were conducted for the sub-population of women who had been to a healthy facility and discussed family planning with a provider in the last twelve months. We then calculated each individual woman's MII, which is a discrete variable ranging from 0 to 3 points. A woman receives 1 point for each "yes" she answers to an MII question. Next, we aggregated the woman-level MII scores to each EA and round to create an ecological dataset so that each observation in the dataset depicts the average features of a particular EA at a specific time.

The dependent variable was MII. The independent variables were the MII lagged one and two rounds. (Rounds were approximately annual.) The control variables included EA level averages of socioeconomic status (SES), marriage, husband cohabitation, education status, age groups,

urban residence, number of household members, round of data collection, and whether the facilities charge fees. We conducted ordinary least squares regression using Stata software.

Statistical Model

We tested the association of the MII and its lags controlling for different demographic characteristics using multivariable linear regressions models. The estimating equations are as follows:

[1] Including only 1 lag (Autoregressive of Order 1)

$MII_{it}=C+ \beta_1 MII_{it-1} + \beta_3 Z_{it-1} + \beta_4 TimeDummies+\mu_i+ \varepsilon_{it}$

[2] Including 2 lags (Autoregressive of Order 2)

$MII_{it}=C+ \beta_1 MII_{it-1} + \beta_2 MII_{it-2} + \beta_3 Z_{it-1} +\beta_4 TimeDummies+\mu_i+ \varepsilon_{it}$

Where "i" is an index of EA, "t" is time, MII is quality, Z is a vector of ecological factors, μ_i is a place specific error term or fixed effect, and ε_{it} is a random time-varying error term.

Results

Table 1

Change in MII

Variables			Ethiopia	Ghana	Kenya
Increase in MII score for a unit increase in previous years' MII					
MII (Mean at each EA)	Total MII Score-Lagged by one round		0.0640	0.226**	0.193**
			(0.0706)	(0.0895)	(0.0941)
	Total MII Score-Lagged by two round		0.0846	0.190*	0.129*
			(0.0641)	(0.108)	(0.0738)
Percent increase in the MII score by socio-demographic variables					
Control Variables (proportions at EA)	Married		0.295	-0.616**	0.0829
			(0.201)	(0.292)	(0.178)
	Age Category	15_19	-1.172*	-1.012*	-1.679***
			(0.689)	(0.613)	(0.566)
		20_24	-0.160	-0.300	-0.558
			(0.737)	(0.572)	(0.582)
		25_29	-0.328	-0.167	-0.721
			(0.733)	(0.678)	(0.604)
		30_34	-0.437	-0.331	-0.342
			(0.734)	(0.562)	(0.596)
		35_39	-0.425	-0.404	-0.658
			(0.680)	(0.606)	(0.614)
		40_44	0.0136	-0.186	0.718
			(0.773)	(0.712)	(0.809)
		45-59	-	-	-
	Highschool education		0.210	-0.238	0.388*
			(0.224)	(0.309)	(0.198)
	Cohabit with husband		0.316*	0.0747	0.244
			(0.171)	(0.241)	(0.330)
	Live in an urban area		-0.188	0.0202	-0.163
			(0.234)	(0.152)	(0.131)
	Socio-Economic Level	Lowest	-0.331	0.362	-0.454*
			(0.341)	(0.338)	(0.247)
		Lower	0.0546	-0.0159	-0.162
			(0.457)	(0.340)	(0.265)
		Middle	-0.209	0.0186	-0.0874
			(0.337)	(0.367)	(0.360)
		Higher	0.0220	-0.112	-0.223
			(0.261)	(0.279)	(0.250)
		Highest	-	-	-
	Number of Household Members		-0.0964*	-0.0223	0.0224
			(0.0503)	(0.0199)	(0.0388)
	Region		0.0267	-0.00106	0.0265
			(0.0164)	(0.0194)	(0.0183)
	Secular trend (round of data collection)	Later Round	0.0862	-0.142	-0.00480
			(0.0778)	(0.0967)	(0.0871)
		Latest Round	-	-	-
	Fees adjusted to most recent round		-0.000179	-0.00276	2.50e-05
			(0.000138)	(0.00344)	(7.22e-05)
	Number of EA		162	84	113

Standard errors in brackets. *** p<0.01, ** p<0.05, * p<0.1, and standard errors in parantheses

Table 1 shows the regression results for the second order autoregressive model with all of the control variables by country. The results are consistent across Ghana and Kenya. In both of these specifications, we see that for every unit increase of the last round's MII score, the most recent round's score increases by .23 (p<.05) in Ghana and .19 (P<.05) in Kenya. Similarly, every unit increase in MII from two rounds ago, increases the present's rounds MII score by .19 (p<.01) in Ghana and .13 (p<.13) in Kenya. Across the three countries, we see areas with more women in the age group of 15-19 have a statistically significantly lower MII (range: -1.7 (p<.01) in Kenya and -1.0 (p<.1) in Ghana). Aggregate increases in high school education appear to increase MII by .388 (p<.1) in Kenya and cohabitation increases MII by .32 (p<.1) in Ethiopia. Conversely, areas with more women in the lowest stratification of SES have a lower MII by -.45 (p<.10) in Kenya and the incremental increase of household members decreases MII by .1 (p<.10) in Ethiopia.

Figure 1

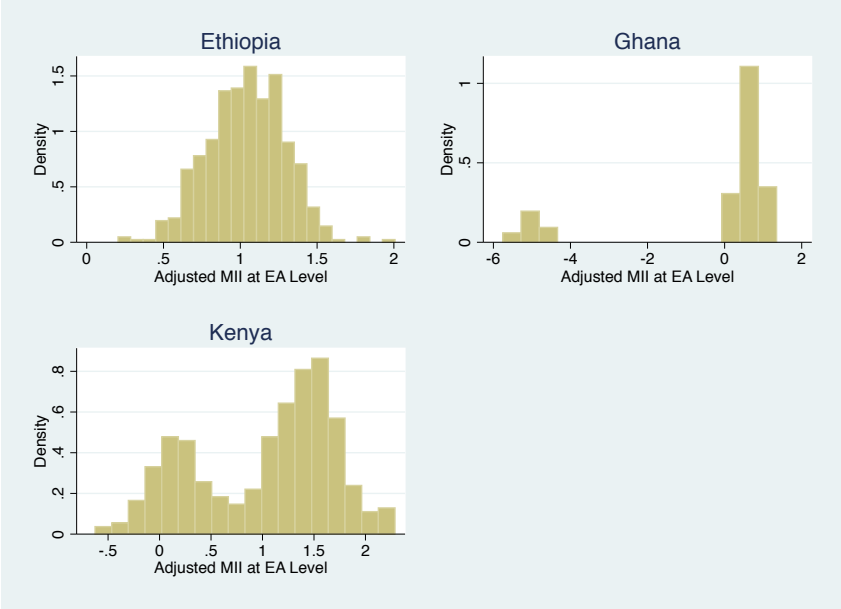

Figure I illustrates the predicted MII values at the spatial level from the statistical model. Ethiopia appears to be normally distributed, whereas Ghana and Kenya appear to have distinct bimodal distributions.

Discussion

These findings demonstrate that a place's historical MII score is a strong predictor for its present-day score. This suggest a process where deficient places will tend to keep getting worse, and higher performing places will keep getting better. This finding emphasizes that health systems need to bring external corrective measures to the areas where family planning quality is below average to correct a propensity to keep drifting to the bottom. The distributions indicate that some EAs have really low MII in comparison to others. In order to secure and ensure that quality family planning services are accessible to all women, identification of influential social determinants of MII has the potential to help stakeholders better allocate resources. While we see that there is some consistency in terms of previous rounds affecting the improvement in the present round, future analysis will include more rounds that span more countries to further explore which ecological factors influence MII.

Equipped with an understanding of which ecological determinants affect MII, managers can quickly identify which EAs are in need of the most resources. This component of the study follows the research agenda set forth by the Bellagio Report whereby experts suggested that researchers focus on ways to communicate indices more easily[2].

References

1. Jain, A.K., *Examining progress and equity in information received by women using a modern method in 25 developing countries*, in *Quality Measurement in Family Planning: Past, Present, Future. Papers from the Bellagio meeting on Family Planning Quality in October 2015.* 2015, Metrics for Management: Oakland, CA.
2. Sprockett, A., K. Longfield, and D. Montagu, *Quality Measurement in Family Planning: Past, Present, Future. Papers from the Bellagio meeting on Family Planning Quality in October 2015.* 2016, Metrics for Management: Oakland, CA.