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Trends and Determinants of Maternal Health Indicators in Menya Governorate, Egypt

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Introduction

Over the past two decades, Egypt has made major strides in improving maternal health care. Data from the Egypt Demographic Health Surveys indicate that the percentage of births whose mothers received antenatal care increased from 39% in 1995 to 53% in 2000, and to 70% in 2005. These surveys further show that the percentage of deliveries that were assisted by a medical provider increased steadily from 35% in 1988 to 46% in 1995, and to 72% in 2005 [El-Zanaty, Hussein, Shawky, Way, and Kishor, 1996][El-Zanaty and Way, 2001][El-Zanaty and Way, 2006][Sayed, Osman, El-Zanaty, and Way, 1989]. Despite this incredible success story, progress has been uneven. Most notably, maternal health care for women living in rural Upper Egypt remains far below the national average [USAID Cairo, 1995] [El-Zanaty and Way, 2006]. For example, in 2005 only 55% of births to women in rural upper Egypt were medically assisted, compared to the national average of 72%. Similarly, antenatal care was provided for only 51% of births, compared to 68% nationally. Because of this, several programs have been aiming to improve maternal health care in rural Upper Egypt [Communication Initiative, 2005][John Snow International, 2004][Labbok et al. 2000]. Those programs include, among others, the Healthy Mother Healthy Child Project, and the Communication for Healthy Living Project.

Although there is evidence that maternal health care in rural Upper Egypt has improved, it has done so at a much slower pace than elsewhere in the country. It is therefore important to obtain detailed information about trends in maternal health care in this region, to assess if the ongoing health programs are helping to reduce the gap with other regions. Moreover, it is important to identify the factors that may facilitate or impede further improvements. This study uses panel survey data to examine trends in maternal health care, and the determinants of maternal health care, in Menya governorate in rural Upper Egypt.

Data and Methods

This paper uses data from two waves of a longitudinal survey conducted in Menya governorate, Egypt. The "Menya Village Health Survey (MVHS)" was conducted in seven villages of El-Menya governorate. It was implemented by El-Zanaty and Associates, under the auspices of the Ministry of Health and Population (MOHP), with funding from the United States Agency for International Development. The surveys contain data on a randomly selected panel sample of ever-married women living in seven villages in El-Menya. The villages were purposively selected to include five villages where targeted by the Communication for Healthy Living project (Koloba, Monshaat El Maghalka, Nazlet Hussein Ali, Saft Al Khamar, Zohra) and two comparable villages where the project was not operating (Toukh El Khail and Ebshedaat). Within the selected villages, the sample of panel respondents was selected using a multi-stage stratified sampling procedure [El-Zanaty, Meekers, Armanious, El-Ghazaly, 2004][El-Zanaty, El-Ghazaly, El-Said Mahmoud, and Meekers, 2005]. The first survey wave was conducted in 2004; the second in 2005.

The survey questionnaires asked women to report detailed information about antenatal care, delivery assistance, and postnatal care. In the 2004 MVHS, this information was collected for all births during the five years preceding the survey. In the

2005 survey wave, identical information was collected for any births that occurred since the 2004 survey. Data from both survey waves were merged to create a child file containing information on all births that occurred to the panel study participants between 1999 and 2005. During this time period, the ever-married women interviewed in the two MVHS surveys had a total of 2,347 births.

Table 1 shows the characteristics of the sample. Overall, 60% of the 2,347 births in the sample were born to uneducated women, 10% to women with primary education only, and 31% to mothers with secondary or higher education. Comparison by year of birth shows that the percentage of births born to uneducated women has steadily decreased from 66% in 1999 to 47% in 2005. To measure household socioeconomic status, we use a cumulative scale of household possessions (electricity, piped water in the residence, motorcycle, car/van/truck, refrigerator), as reported at the time of the survey. Respondents were then classified as low, medium, or high socioeconomic status based on the number of possessions or amenities (0-1 amenities/possessions=low; 2=medium, 3-5=high). Using this definition, 24% of births are classified as from a low SES family, 36% from a medium SES family, and 40% from a high SES family. These percentages vary little by year of birth. Overall, 27% of births are first-born children, 21% are second-order births, and 53% are third or higher-order births. Breakdown by year of birth shows that the percentage of third and higher-order births has declined steadily from 61% in 1999 to 49% in 2005. This pattern is consistent with the decline in fertility that has been observed in rural Upper Egypt [El-Zanaty and Way, 2006][Robinson and El-Zanaty, 2006]. Nevertheless, the percentage of births born to mothers aged 25 and older has stayed nearly constant at roughly 50% between 1999 and 2005. Just over half of the births in our weighed sample (54%) lived in villages where the Communication for Health Living is implementing community-based maternal and child health activities.

The analysis undertaken in this paper examines trends in key indicators of antenatal care, delivery assistance, and postnatal care for the mother. The second part of

the paper uses logistic regression analyses to identify the determinants of antenatal care, delivery assistance, and postnatal care.

Antenatal care is measured using six dichotomous variables: 1) whether ANC was provided by the public or private sector; 2) whether ANC was provided by a doctor; 3) whether the mother had four or more antenatal care visits prior to this birth; 4) whether the first antenatal checkup occurred within the first 6 months of pregnancy; 5) whether the last antenatal care checkup for this birth occurred at the 8 month of pregnancy or later, and 6) whether both antenatal care and tetanus toxoid (TT) were provided during the pregnancy.

The quality of delivery assistance is measured using dichotomous variables indicating whether the birth 1) took place at a public or private health facility, and 2) was medically assisted by a doctor, trained nurse, or midwife.

Three dichotomous variables are used to measure postnatal care for the mother. The first indicator measures whether the mother received postnatal care within two days of the delivery, and the second indicates whether the mother had postnatal care from a doctor, trained nurse or midwife. The third indicator measures whether the mother received the first postnatal checkup for the delivery at a medical facility (yes vs. no or no postnatal care).

Results

Trends in Maternal Health Care

The first panel in Table 2 shows trends in our indicators of antenatal care. All indicators show substantial improvements between 1999 and 2005, although these improvements did not occur gradually. For example, the data show that the percentage of birth for which antenatal care was provided by either the public or private sector increased steadily from 38% in 1999 to 42% in 2001. However, by 2002 the percentage increased to 57%, and stayed roughly at that level through 2004. In 2005, the percentage who received antenatal

care from the public or private sector once again increased substantially, reaching an all-time high of 69%. All other ANC indicators show a similar pattern, with the most substantial improvements being recorded in 2002 and 2005.

Data on indicators of delivery assistance show that the percentage of births that were delivered at public or private health facilities increased from 17% in 1999 to 48% in 2005. However, once again these improvements did not occur gradually. The percentage of births delivered at public or private health facilities increased from 17% to 24% between 1999 and 2000, and then stayed roughly constant through 2002. The percentage increased dramatically from 26% to 36% between 2002 and 2003 and from 34% to 48% between 2004 and 2005. The percentage of births that were medically assisted shows a nearly identical pattern, albeit at a higher level, with noticeable increases in 2000, 2003, and 2005.

The indicators on postnatal care checkups reveal that the percentage of births for which the mother had a postnatal checkup within two days after the delivery increased steadily from 16% in 1999 to 29% in 2003. However, from 2003 onward the percentage decreased gradually to 21% in 2005. The percentage who had postnatal care from a doctor, trained nurse, or midwife, and the percentage who had their first postnatal checkup at a medical facility (as opposed to elsewhere or no checkup) show nearly identical patterns with the percentages increased steadily until 2003, but declining afterward.

Determinants of Maternal Health Care

Because these observed trends may be the result of changes in socio-economic status, mother's age at birth and other factors, we conduct logistic regression analyses to assess the net trends in maternal health care. We also identify other factors that influence antenatal care, delivery assistance, and postnatal care.

Table 3 shows the relative odds that the child's mother had antenatal care from a public or private health provider. The first model shows the effect of year of birth. The findings confirm that births in 2002-2004 are 1.99 times more likely than those in 1999-2001 to have been born to mothers who had antenatal care; those born in 2005 are 3.25 times more likely than those born in 1999-2001 to have been born to a mother who had antenatal care. The second model adds controls for mother's level of education and household socioeconomic status. While both of the variables are associated with significantly higher odds of antenatal care, they do not explain the observed trends. The third model in Table 3 shows that first-order births are three times more likely than third- and higher-order births to have been born to a mother who had antenatal care (OR=2.98). To a lesser extent, this is also the case for second-order births (OR=1.62). The mother's age at the time of the birth of the child is not associated with antenatal care. The trends in antenatal care remain significant after adding controls for these two variables. The fourth model assesses if the odds of prenatal care are different for children born to women who live in the CHL intervention villages relative to those who live elsewhere. The results confirm that births to women in the intervention sites are 2.38 more likely than those in the control sites to have mothers who had antenatal care.

Finally, model 5 shows the results of the full model that includes all variables. The results show that the odds of antenatal care are significantly higher if the child's mother has primary or secondary education, if the child is born into a household with a medium or high socioeconomic status, if the child is a first or second birth, or is from a household in one of the CHL intervention villages. However, after controlling for all these factors, there is still evidence of a significant net increase in antenatal care in 2002-2004, and particularly in 2005.

The relative odds that a child's delivery took place in a public or private health facility are shown in Table 4. Based on our observations from the descriptive analyses, we recoded year of birth into four time periods that appear to have distinct levels of

delivery care: 1999, 2000-02, 2003-04, and 2005. Model 1 confirms that deliveries during the period 2000-2002 are 1.62 times more likely than those from 1999 to have taken place in a health facility. The relative odds that a child's delivery took place in a health facility further increases for births that took place in 2003-2004 (OR=2.60) or 2005 (OR=4.46). Adding controls for mother's education and household socioeconomic status shows that children born to women with secondary education are more likely than uneducated women to have been delivered at a public or private health facility (OR=1.87, see Model 2). However, neither primary education nor socioeconomic status has an effect on the odds that a child was delivered at a health facility. Controlling for education and SES does not affect the trends in facility-based deliveries. Model 3 includes controls for the child's birth order and the age of the mother at the time of the delivery. First-order and second-order births are significantly more likely than higher-order births to have been delivered at a health facility (OR=4.33 and 1.74, respectively). However, children born to mothers aged 25-34 are significantly less likely than those born to younger mothers to have been delivered at a health facility (OR=.44). Model 4 further indicates that children born to mothers living in the CHL intervention villages are more likely than those living elsewhere to have delivered in a health facility (OR=1.75). However, controlling for the site has no influence on the effect of year of birth.

The net effect of each of these predictor variables, after controlling for other factors, is shown in Model 5. The results confirm that children born to a mother with secondary education have higher odds of been delivered in a health facility. After controls, being born to a mother aged 25-34 or 35 and older are both associated with lower odds of being born in a health facility. First-order and second-order births are both significantly more likely than higher-order births to have been delivered in a public or private facility. Children born to mothers in the CHL intervention villages are also more likely than those elsewhere to have been delivered in a health facility. Adding all these controls slightly reduces the positive effect of being born in 2005 on being delivered in a

health facility. Nevertheless, after controls, children born in 2005 are nearly four times more likely than those born in 1999 to have been delivered in a health facility.

Table 5 shows the relative odds that a child's mother had a postnatal checkup at a medical facility after the delivery. The descriptive analyses had suggested that levels of postnatal care increased gradually until about 2003, and declined afterwards. To enable us to test if this apparent trends is significant, we re-classified year of birth into four groups: 1999-2001, 2002, 2003, and 2004-05. The results presented in Model 1 confirm that levels of postnatal care increased until 2003. That is, the mothers of those children born in 1999-2001 and 2002 have significantly lower odds than mothers of children born in 2003 to have had postnatal care at a medical facility. However, Model 1 also suggests that the apparent decline in postnatal care after 2003 is not statistically significant.

As before, Models 2 through 4 show the effect of mother's education, household socioeconomic status, birth order, mother's age at birth, and site of residence. Because the likelihood of postnatal care is likely to be higher if the delivery took place in a health facility, or was medically assisted, the effect of those variables is shown in Model 5. The results confirm that the mothers of children born in a medical facility are nearly 15 times more likely than those who delivered at home to have had a postnatal checkup. However, the fact that a delivery was medically assisted does not affect the likelihood that the child's mother had a postnatal checkup. It is noteworthy that after controlling for these two variables, the mothers of those children born in 2004-05 are 38% less likely than the mothers of those children born in 2003 to have had postnatal care (OR=0.62). In other words, had it not been for the fact that the percentage of deliveries in health facilities increased in 2004-05 (see Tables 2 and 4), we would have seen a substantial decline in levels of postnatal care.

The final model confirms that there was a net increase in the level of antenatal care from 1999 through 2001, and a decline from 2003 onward. However, this latter decline was largely compensated for by increases in the percentage of deliveries in health

facilities and, to a lesser extent, by the increase in first- and second-order births that resulted from the decreasing fertility levels. Model 5 also shows that the effect of mother's secondary education on postnatal care disappears after controlling for other factors. This suggests that women with secondary education are more likely to seek postnatal care, not because they are better educated per se, but rather because they are more likely to deliver in a health facility. Model 5 similarly shows that the effects of women's age at birth and of second-order births become non-significant after controls. The effect of first-order births on postnatal checkup remains significant after controls, but the odds ratio reduces from 3.30 to 1.69. This finding indicates that the increased likelihood of postnatal checkups for mothers of parity one is partially – but not completely - explained by the fact that such women are more likely than other women to deliver in a health facility. Finally, after controls the positive effect of residence in the CHL intervention communities on postnatal care become negative. Thus, in absence of the increase in deliveries in health facilities, levels of postnatal care would have been lower in the CHL intervention villages than in the other villages.

Conclusion

Much of Egypt has experienced very substantial improvements maternal health care of the past two decades. Unfortunately, the progress has not been even across the country, and women in rural Upper Egypt have fallen far behind in terms of maternal health care. Recognizing these differentials, the Ministry of Health and foreign donors such as the United States Agency for International Development have sponsored several programs that aim to address the health needs of women in rural Upper Egypt.

We use data on 2,347 births that occurred to women in the Menya Village Health Survey panel study between 1999 and 2005 to assess trends in antenatal care, delivery care, and postnatal care for mothers. The results show that there has been major progress in all indicators during this time period, although these improvements have not been

gradual. It is noteworthy that postnatal checkup for mothers appear to have increased until about 2003, but stabilized or decreased afterward. Our analyses of the determinants of maternal health care show that factors such as mother's education, household socioeconomic status and the child's birth order can have a major impact. However, the results also indicate that these factors are not responsible for the observed improvements in maternal health care. The analyses further show that a tendency toward declining levels of postnatal care has been counteracted predominantly by increases in the percentage of births that are delivered in health facilities.

References

Table 1: Births born during the six-year period before the survey

Percent distribution of births born during the six-year period before the survey, by mother's background characteristics and child's year of birth, MVHS 2004 – 2005

	Year of birth							
Background characteristics	1999	2000	2001	2002	2003	2004	2005	Total
Mother's Education (2004-05)[1]								
No education	66.0	62.1	64.0	56.7	60.1	56.1	47.0	59.4
Primary	12.2	11.3	11.0	9.4	10.1	5.9	9.6	9.9
Secondary/higher	21.8	26.6	25.0	33.9	29.8	38.0	43.4	30.7
Household socioeconomic status (2004-05)								
Low	27.4	21.8	23.7	24.3	22.5	25.1	22.4	24.0
Medium	36.3	35.8	36.7	31.5	39.8	35.6	37.3	36.1
High	36.3	42.3	39.6	44.1	37.7	39.3	40.4	39.9
Birth Order								
Firth birth	21.7	28.8	21.7	26.8	31.6	29.7	24.6	26.5
Second birth	17.3	16.3	24.6	22.1	19.1	21.7	26.8	20.9
Third or higher	61.0	54.9	53.8	51.1	49.3	48.7	48.7	52.5
Mother's Age at Birth[2]								
<25	50.0	49.3	52.0	50.7	49.9	47.5	51.6	50.0
25-34	38.4	39.9	36.7	41.1	41.4	41.5	38.5	39.7
35+	11.6	10.8	11.3	8.2	8.8	11.0	9.9	10.2
Site								
Control villages	48.3	43.0	49.7	39.7	47.2	47.3	44.3	45.8
CHL Intervention villages	51.7	57.0	50.3	60.3	52.8	52.7	55.7	54.2
Weighted Number of births	346.0	307.0	346.0	365.0	377.0	374.0	228.0	2,343.0
Unweighted Number of births	337.0	311.0	340.0	377.0	375.0	374.0	233.0	2,347.0

[1] 25 missing cases[CHECK this]
[2] 24 missing cases [CHECK this]

Table 2: Trends in Key Maternal Health Indicators

Percentage of births that benefited from antenatal care, quality delivery assistance, and for whom the mother received postnatal care, by child's year of birth, MVHS 2004-2005

	Year of birth							
Maternal Health Indicators	1999	2000	2001	2002	2003	2004	2005	Total
ANC								
% ANC provided by public or private sector	38.3	40.5	42.3	56.5	57.1	58.5	68.7	51.2
% ANC provided by doctor	38.3	40.5	42.3	56.5	56.7	57.9	68.7	51.1
% with 4+ antenatal care visits	22.9	27.3	28.8	38.3	40.9	43.0	53.1	35.8
% with first anatenatal care check up within first 6 months	36.3	39.5	41.0	55.4	53.9	57.9	65.6	49.5
% with last antenatal care checkup at 8 months or later	28.5	32.3	31.9	46.7	45.2	47.4	55.7	40.7
% had ANC and TT during pregnancy	33.1	36.8	36.9	52.3	52.3	54.1	62.6	46.4
DELIVERY								
%delivered at public or private health facility	17.2	24.0	25.9	25.5	36.1	34.0	48.1	29.4
% with medically assisted deliveries (doctor/trained nurse/midwife)	40.4	44.5	45.1	47.5	55.3	58.7	70.2	50.9
POSTNATAL CARE FORE MOTHERS								
% with postnatal care within 2 days	16.1	16.1	19.6	22.9	28.9	22.6	20.5	21.2
% who had postnatal care from doctors or trained nurse/mid wife	22.6	23.2	27.1	34.9	40.1	34.6	32.4	30.9
% who had first postnatal checkup at medical facility)	17.5	19.1	20.5	26.8	33.4	27.8	29.9	25.0
Weighted Number of births	346.0	307.0	346.0	365.0	377.0	374.0	228.0	2,343.0
Unweighted Number of births	337.0	311.0	340.0	377.0	375.0	374.0	233.0	2,347.0

Table 3: Relative odds of having had antenatal care from a public or private health facility

	(1)	(2)	(3)	(4)	(5)
Year of Birth					
1999-2001 (reference)	--	--	--	--	--
2002-2004	1.99***	1.94***	1.90***	2.01***	1.92***
2005	3.25***	2.87***	3.07***	3.34***	2.77***
Mother's Education					
None (reference)		--			--
Primary		1.27			1.33**
Secondary or higher		2.80***			2.28***
Socioeconomic Status					
Low (reference)		--			--
Medium		1.27**			1.28**
High		1.87***			1.87***
Birth Order					
First birth			2.98***		2.68***
Second birth			1.62***		1.38**
Third or higher (reference)			--		--
Mother's Age at Birth					
<25 (reference)			--		--
25-34			0.84		0.87
35+			0.98		0.88
Site					
Control (reference)				--	--
Intervention				2.38***	2.03***
N of Cases	2,347	2,324	2,324	2,347	2,301

Table 4: Relative odds of having had delivery care from a public or private health facility

	(1)	(2)	(3)	(4)	(5)
Year of Birth					
1999 (reference)	--	--	--	--	--
2000-2002	1.62**	1.55**	1.54**	1.59***	1.50**
2003-2004	2.60***	2.42***	2.33***	2.62***	2.26---
2005	4.46***	3.99***	4.18***	4.47***	3.85***
Mother's Education					
None (reference)		--			--
Primary		1.18			1.19
Secondary or higher		1.87***			1.49**
Socioeconomic Status					
Low (reference)		--			--
Medium		1.11			1.10
High		1.19			1.60
Birth Order					
First birth			4.33***		3.89***
Second birth			1.74***		1.56**
Third or higher (reference)			--		--
Mother's Age at Birth					
<25 (reference)			--		--
25-34			.44***		.46***
35+			.68		.64**
Site					
Control (reference)				--	--
Intervention				1.75**	1.59***
N of Cases	2,347	3,324	3,324	2,347	2,301

Table 5: Relative odds of having had postnatal checkup at a health facility

	(1)	(2)	(3)	(4)	(5)	(6)
Year of Birth						
1999-2001	.47***	.49***	.50***	.47***	.59**	.62**
2002	.73*	.73*	.76	.72**	.98	1.01
2003 (reference)	--	--	--	--	--	--
2004-2005	.80	.77*	.78**	.80	.62**	.61**
Mother's Education						
None (reference)		--				--
Primary		1.14				1.02
Secondary or higher		1.56***				1.02
Socioeconomic Status						
Low (reference)		--				--
Medium		.99				.99
High		1.06				1.06
Birth Order						
First birth			3.30***			1.69**
Second birth			1.43**			1.10
Third or higher (reference)			--			--
Mother's Age at Birth						
<25 (reference)			--			--
25-34			.53**			.78
35+			.72*			.85
Site						
Control (reference)				--		--
Intervention				1.19*		.80*
Place Delivery						
Home (reference)					--	--
Medical facility					14.88***	15.52***
Assistance at delivery						
Non-medical assistance(reference)					--	--
Medical assistance					1.32	1.96
N of Cases	2,347	2,324	2,324	2,347	2,347	2,301