

Countdown to Millennium Development Goal Five: Maternal Health Seeking Behavior in Ghana

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Abstract

As the international community counts down to the fifth Millennium Development Goal (MDGs) in 2015, sub-Saharan Africa remains the only region of the world with the highest and increasing proportion of global maternal deaths. Skilled attendance at birth has been shown to be effective in reducing maternal mortality. Yet, in Ghana, although 96 percent of pregnant women receive antenatal care, just over half of births are attended to by a skilled health provider. Drawing from frameworks for analyzing the determinants of maternal mortality, this study investigates the effect of frequency and timing of antenatal care visits and quality of care during pregnancy on skilled attendance at delivery while accounting for social and bio-demographic characteristics that impact maternal health. Using binary logistic regression models drawn from the 2007 Ghana Maternal Mortality Study, we find that although the number of antenatal visits, the timing of first visit and the quality of care received during antenatal visits have an independent and significant effect on skilled assistance at delivery, this effect is mediated by household and bio-demographic factors. We situate these findings within the broader context of frameworks for analyzing the determinants of maternal mortality and morbidity in resource constrained settings such as sub-Saharan Africa.

Introduction

As the international community counts down to the fifth United Nations Millennium Development Goal (MDGS) to reduce by three quarters, between 1990 and 2015, the maternal mortality ratio, sub-Saharan Africa (SSA) not only lacks far behind other developing and developed regions of the world in progress to reduce maternal mortality but it's share of global maternal deaths is, in fact, increasing thereby constituting a direct threat to the prospects of achieving the MDG-5 by 2015.

Although estimates of maternal mortality tend to be problematic and uncertain, recent estimates indicate substantial progress in all regions of the world except SSA. For example, the United Nations estimates that the maternal mortality ratio in developing regions dropped by 34% between 1990 and 2008, from 440 maternal deaths per 100,000 live births to 290 maternal deaths. Most of these deaths were concentrated in Sub-Saharan Africa and South Asia, which together accounted for 87% of all maternal deaths. However, whereas, South Asia has made steady progress in reducing its maternal mortality ratio by about 53%, sub-Saharan Africa recorded only 26% reduction in maternal deaths (UNMDG Report 2011). All countries in Sub-Saharan Africa (except Comoros and Cape Verde) had maternal mortality ratios higher than 280 deaths in 2008 (Hogan et al. 2010). In fact, systematic analysis of progress show that the proportion of global maternal deaths in SSA increased from 23% in 1980 to 52% in 2008 (Hogan et al. 2010). As one of the clearest indicators of health disparities between richer and poorer nations, the risk of maternal death in poorest nations is one in six and only one in 30,000 in Northern Europe and other industrialized regions (Ronmans and Graham 2006).

In Ghana, recent estimates put the number of maternal deaths per 100,000 live births somewhere between 214-580 deaths depending on the source of data and technique of estimating maternal mortality (Ghana Maternal Health Survey 2007). One recent analysis of maternal mortality in 181 countries between 1980 and 2008 show a reduction in maternal mortality in Ghana from about 731 to 409 maternal deaths per 100,000, representing a 44% reduction within the period. However, at this ratio, Ghana still lacks far behind model countries such as Bolivia, Egypt and Brazil that have been achieving accelerated progress and are on target to attaining the MDG 5 (Hogan et al. 2010).

Although previous studies have identified several direct and indirect causes of maternal deaths in developing settings, trends in antenatal, delivery and postnatal care have shown that a core strategy of intrapartum care based in health centers can effectively reduce maternal mortality (Chandrasekhar et al. 2011). Yet, in Ghana, although antenatal care is nearly universal (96%), only 55% of births are attended to by a skilled health provider. Given massive scarcity of resources and deprivation in access to care, there is the need to probe and understand the barriers to access to skilled attendants at birth (and immediately after) in order to harness scarce resources expended on antepartum care to effectively reduce maternal mortality.

Thus in this paper, we draw from existing conceptual frameworks to analyze the determinants of maternal mortality by focusing on factors that affect maternal health care seeking behavior in Ghana. Using binary logistic regression, we test the effect of access to health services (antepartum care), the timing of the first visit, frequency and quality of health care while paying attention to social and bio-demographic factors as well as policies and programs launched by the government of Ghana and its international partners to ensure safe motherhood. The paper not only extends existing frameworks for analyzing the determinants of

maternal mortality but explores specific ways of harnessing scarce resources to improve pregnancy and delivery care in the context of achieving the fifth MDG.

Conceptual Framework

Conceptual models that explicate factors that predispose women to greater risk of maternal mortality have largely been drawn from the fertility and child mortality literature (Mosley and Chen 1984). Applied to maternal mortality, these models group the determinants of maternal mortality into distal and proximal factors. Distal factors include women's individual, family and community socioeconomic status. Proximal factors include women's health and reproductive status, access to and use of health services (McCarthy and Maine 1992; Rogo, Oucho and Mwalali 2006). These factors are expected to influence pregnancy, morbidity and mortality by reducing unwanted pregnancies and the likelihood that a pregnant woman will experience a serious complication of pregnancy or childbirth as well as improve outcomes for women who have complications (McCarthy and Maine 1992).

Using this general framework, I test a conceptual model that rests on three key assumptions. First, it is assumed that in resource constrained settings, access to health services such as antenatal care combat maternal mortality and improves the health of women. However, the timing and number of times women access care in pregnancy management is crucial to positive maternal health outcomes. Early timing of antenatal care and at least four antenatal care visits, as recommended by the WHO, will influence maternal health outcomes. Second, it is assumed that basic quality of care is of concern in many health facilities that manage complications during pregnancy, labor, delivery and post-delivery in SSA. Thus poor quality or inadequate services will contribute inversely to maternal health outcomes. Third, because the

availability and quality of health care varies widely between rural and urban areas and in regions with more targeted interventions and policies to ensure safe motherhood, the place of residence and government interventions will impact on maternal health outcomes. In addition to these key assumptions the effect of distal socio-economic characteristics and bio-demographic risk factors that determine maternal health outcomes are tested.

Guided by these conceptual premises, I hypothesize that women whose first antenatal visit occurs in the first trimester will have better odds of a professionally attended delivery (by a doctor and a nurse mid-wife) compared to a home delivery without professional assistance. In the same vein, women who access antenatal services four or more times, will have better odds of being professionally assisted at delivery than those who deliver at home without professional assistance. Lastly, pregnant women who receive basic and required services such as weight and blood pressure monitoring, blood test for illnesses that aggravate pregnancy and health education on the complications of pregnancy and what to do when complications set in will have better odds of delivery by a health professional than a home delivery without professional assistance.

These hypothesized associations are likely to vary between urban and rural areas and within regions with programs geared towards reducing maternal mortality. Thus we expect women in urban areas compared to rural areas and in intervention regions to have better odds of delivery assistance compared to a home delivery without professional assistance. These expected associations will however, diminish after controlling for distal social and bio-demographic and factors that are included in the model, but because of unmeasured but implied socio-economic and community disparities in health, most of the associations will persist after the addition of distal factors.

Methods

The proposed study relies on data collected through the Ghana Maternal Health Survey of 2007, the first nationally representative survey to collect comprehensive data on maternal mortality in Ghana. The data was conducted by the Ghana Statistical Service with technical and financial assistance from the Ghana Health Service, Macro International Inc, the Guttmacher Institute and the Harvard School of Public Health. Data collected is intended to help the government and its consortium of organizations participating in the design of interventions to expand women's access to modern family planning services and comprehensive abortion care, reduce unwanted fertility and severe complications and deaths resulting from unsafe abortion.

The 2007 Ghana Maternal Health Survey was collected in two phases. The sample for Phase I was selected from 1600 nationally representative clusters and in phase II a sub-sample of 400 clusters from phase I were selected. In addition to a verbal autopsy administered to all households with one or more adult female deaths in the previous five years, phase I also featured a women's questionnaire that gathered data on women's health status and their siblings' history of pregnancy-related deaths. This study draws from 10,370 completed interviews from these women aged 15-49.

Since the main objective of this study is to analyze delivery assistance of the last born child, five years preceding the survey in 2007, we estimate a binary logit model with a dichotomous indicator; delivery by a Doctor or Nurse Midwife/Auxiliary Midwife and delivery at home by a Trained/Untrained Traditional Birth Attendant or by Friends and family members/or without assistance. Thus the first category covers skilled attendants at delivery as defined by the WHO and the second category consists of unskilled attendants. The resulting

logistic regression model will be estimated using *proc logistic* in SAS and appropriate goodness-of-fit statistics will be obtained to assess whether or not the estimates in the model fit the data.

The key independent variables are the frequency of antenatal care, timing of the first antenatal visit, and quality of care including basic education on pregnancy complications and what to do when such complications arise. The models will also account for distal household and individual socio-economic and bio-demographic characteristics such as age, marital status, number of living children, ethnicity, religion, mother's education, household wealth index and rural/urban residence as well as residence in any of the three intervention regions.

Results

We start the presentation of results by examining the bivariate findings. Figure 1 shows skilled attendance at delivery by frequency of antenatal care. The figure shows clearly that as the frequency of antenatal visits increases, the proportion of home deliveries decreases. In other words, as the frequency of antenatal care increases, the proportion of skilled attendance at delivery increases as well.

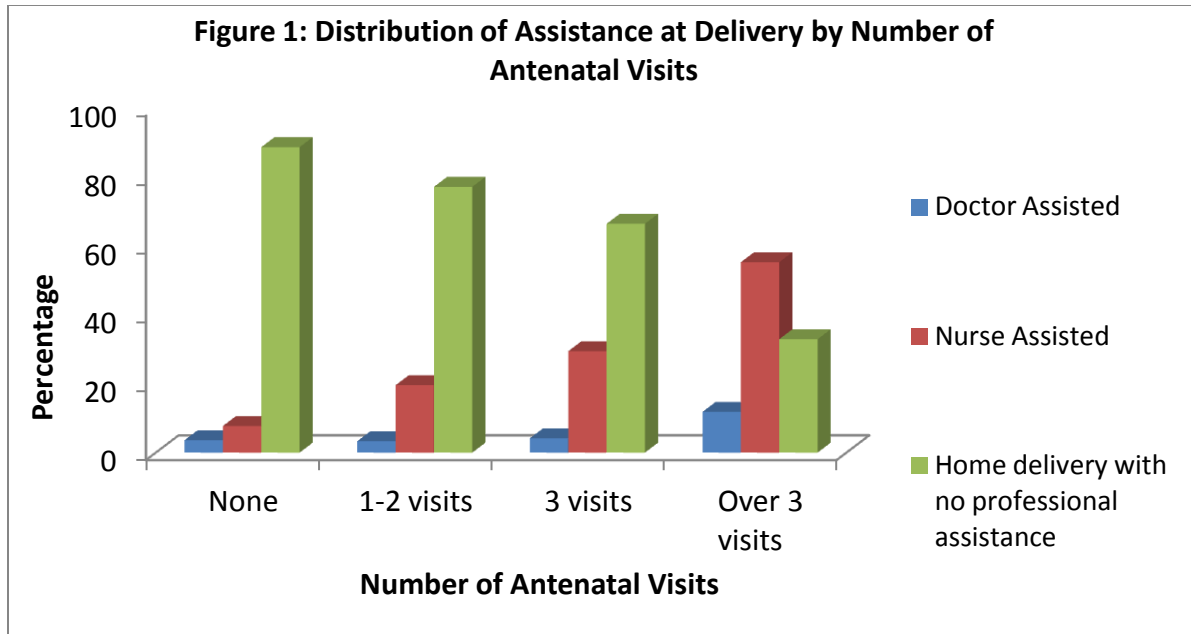


Figure 2 shows a pattern where women who show up for their first antenatal care visit in the third trimester of pregnancy are more likely to deliver at home, whereas those who show up in the first trimester are more likely to especially deliver with a nurse and comparatively with a doctor. This relationship is statistically significant using the chi-square.

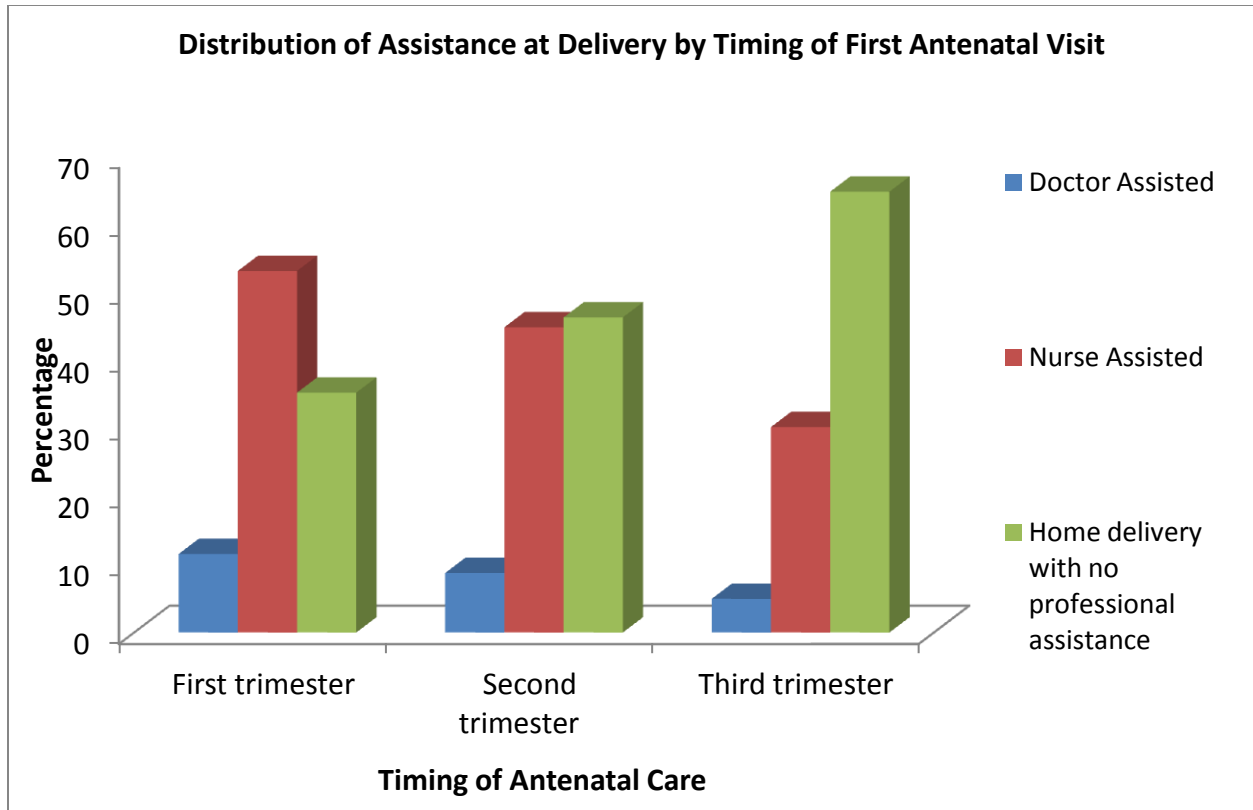
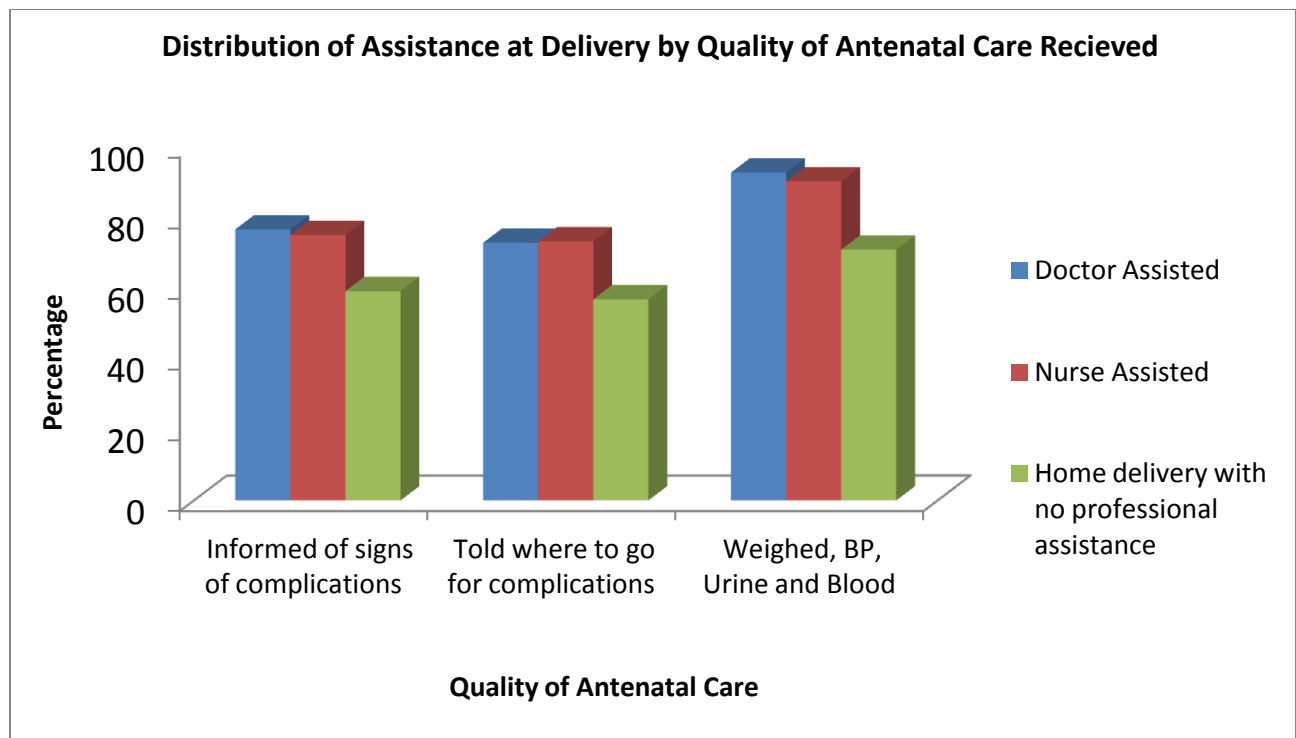


Figure 3 shows those who were told of the signs of complications were more likely to be attended to by skilled health professional. A similar pattern is observed for women who were told where to go when complications arise and for women who received basic quality of antenatal services (i.e their weight and blood pressure was monitored and their urine and blood are tested).



On selected socio-economic and bio-demographic variables, Table 1 (see appendix) shows significant relationships between ethnicity, religion, education and wealth, urban residence and skilled assistance at delivery. These relationships are in the expected directions as indicated by previous research. For instance, Northern Ghana, which is the most deprived area in the country, has the most home deliveries, whereas the Ga-Adangbes of greater Accra, the capital and most urbanized area has the highest proportion of births attended by a physician. Moslems and traditionalists have the most home deliveries whereas the most educated tend to have the most births attended by a doctor and nurse. The least poor using a wealth quintile have the most births attended by a doctor and nurse. Similarly, urban residence compared to rural residence and residence in R3M regions are significant predictors of skilled attendance at delivery. The mean number of children is also a significant predictor of home deliveries; women who have a higher

number of live births are likely to deliver at home. Lastly, respondents who are attended to by a Physician tend to be slightly older 31.2 years compared to 30.1 for nurse and home deliveries but this relationships was not found to be statistically significant using the chi-square.

Multivariate Results

Table 1 presents coefficients from binary logit models. In model 1, the baseline model, we test the key predictors of the study only and in model 2 we adjust for controls. In the baseline model, we see that the effect for women who attended antenatal care on three occasions is positive and significant. The odds of a skilled attendant at delivery are 1.63 times that of women who made 0-2 visits for antenatal services. The coefficient is even stronger for women who made more than four visits. For women who made more than four visits for antenatal care, the odds of a skilled attendant delivery is 5.6 times that of women who made 0-2 visits for antenatal care.

Similarly, we observe that the odds for a skilled attended delivery versus a home delivery for women who went for antenatal care for the first time in second trimester are negative and significant. The odds of a skilled attended delivery for women who went for antenatal care for the first time are 0.86 times that of those who went for antenatal care in their first trimester of pregnancy.

The last two key predictors both measuring the effect of quality of care received during antenatal visits are also positive and highly significant. The odds of a skilled attendant delivery for women who received the basic quality of care during antenatal visits are more than twice that of those who did not receive the same level of care. Similarly, the odds of a skilled attendant at delivery for women who were informed of the complications of pregnancy were 1.36 times that of those who were not.

In model 2, we adjust for control variables which measure basic socio-economic and bio-demographic characteristics of respondents. Although the effects of our key predictors observed in the baseline model are reduced they remain statistically significant. The odds of a skilled attendant delivery for women who make more than three visits for antenatal care are 3.83 times

those who made only 0-2 visits. Again, women who delay access to antenatal care are less likely to be assisted at delivery. On the two indicators of quality, if we adjust for socio-economic and bio-demographic factors, the odds of a skilled attendant at delivery for women who received the basic quality of care are reduced and are no longer significant at $p < 0.05$. However, that of women who were informed of the complications of pregnancy is significant. Lastly, most of the effects of the control variables in model 2 (as shown in the bivariate analysis) are highly significant and in the expected direction.

Table 2: Odds Ratios of Logistic Regression Models of Skilled Assistance During Delivery in Ghana, 2007

	Model 1	Model 2
Health Access and Quality of Care		
# of Antenatal Care Visits (0-2 visits)		
3 visits	1.63**	1.58**
Over 3 visits	5.63***	3.83***
Timing of First Antenatal Visit (1st trimester)		
2 nd trimester	0.86**	0.86**
3 rd trimester	1.39	1.21
Antenatal services received (None/one or more)		
Weighed, BP, urine & blood	2.08***	1.20†
Pregnancy Complications (Not informed)		
Informed of signs of pregnancy complications	1.36***	1.18**
Socio-demographic characteristics		
Age in groups		1.03
Married (not married)		1.13
Number of live births in last five years		0.83**
Ethnicity (Akan)		
Ga/Adangme/Guan		0.762**
Ewe		0.66**
Northern tribes		0.77**
Other		1.11
Religion (Muslim/Other)		
Mainline Christianity		1.40**
Zionist/protestant		1.40**
Education		
Primary		1.33**
Middle/JSS		2.01***
Secondary/Higher		3.32***
Wealth index (Poorest)		
Poorer		1.35**
Poor		1.533**
Less Poor		2.927***
Least Poor		4.098***
Urban (Rural)		3.849***
R3M (Intervention Region) (Non intervention Regions)		1.28**
N=4862		
Reference groups in parentheses		
Level of Significance: †p<0.1; **p<0.05; ***p<0.01		

Discussion and Implications

As reported in many other studies (Chandrasekhar, Gebreselassie and Jayaraman, 2011), there are significant differences by the frequency of antenatal care on skilled attendance at delivery. This study indicates that the timing of first visit antenatal visit and education on pregnancy complication has a significant effect on skilled attendance at delivery controlling for socio-economic and bio-demographic factors. Basic quality of antenatal care was only a marginally significant predictor of skilled attendance.

Given these preliminary results, calls for redirecting resources away from antepartum care (because it overwhelms referral centers and services are inefficient (see Nour 2008) seems misplaced, rather, focus should be on increasing the frequency of attendance at antenatal visits, improving the quality of care and educating women on pregnancy complications.

But this study also shows that although measures associated with antepartum care have a significant effect on skilled attendants at delivery, the fact that these effects seems mediated by socio-economic factors show that a greater impact seems attainable if we focus on distal socio-economic factors such as reducing fertility, providing access to family planning, educating women etc. Also, inequalities in access between rural and urban areas must be addressed if efforts to attain the MDG5 are to be accelerated.

Lastly, operations research linked to program interventions such as the Community Health Services and Planning (CHSP), Reducing Maternal Morbidity and Mortality 3M program and the Ghana Essential Health Intervention (GEHIP) program are needed to help monitor and encourage accelerated progress.

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Appendix: Table 1

Table 1: Sample distribution by type of assistance at delivery and access and utilization factors, GMHS 2007				
Characteristic	All	Assisted by a Doctor	Assisted by a Nurse Midwife/Auxillary Midwife	No Professional Assistance
# of antenatal care visits				
None	3.85	1.4	0.63	8.01
Between 1-2 visits	9.02	2.99	3.71	16.35
3 visits	10.51	4.39	6.51	16.39
Over 3 visits	76.63	91.22	89.15	59.25
Timing of first antenatal visit				
First trimester	55.35	62.9	60.14	47.72
Second trimester	40.93	35.28	37.56	46.37
Third trimester	3.72	1.81	2.3	5.9
Antenatal services received				
Weighed, BP, Urine and Blood	82.19	92.66	90.15	70.87
None/one or more	17.81	7.34	9.85	29.13
Pregnancy complication				
Informed of signs of complications	68.42	76.59	75.03	59.15
Not informed	31.58	23.41	24.97	40.85
Place to go for complications				
Informed of where to go	66.19	72.82	73.2	56.83
Not informed	33.81	27.18	26.8	43.17
Mean number of tetanus injections during pregnancy	2	1.85	1.86	1.8
Total Percent	-	9.93	47.5	42.57
Number of observations	5044	501	2396	2147
All relationships are statistically significant				