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Female labour force participation and maternal mortality in Cameroon

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ABSTRACT

The study aimed at analyzing the relationship between female labor force participation and maternal mortality in Cameroon using data from the 2018 Cameroon Demographic and Health Survey. The research employed the Multiple Correspondence Analysis (MCA) to generate an index for maternal mortality. Subsequently, the results were estimated using the Linear Regression with Endogenous Treatment Effects Model (LRETEM) and the ordinary least square. The findings suggested that a woman who engages in the labor market may experience pregnancy-related problems and ultimately pass away. Female labor force involvement was also positively and significantly correlated with maternal mortality. Maternal mortality will rise by 12.9% with every 1% increase in female labor force participation. Maternal mortality was found to be significantly influenced by educational attainment. It was discovered that a rise in education will cause a decrease in maternal mortality in Cameroon, irrespective of educational attainment. Accordingly, the study suggests that evidence-based clinical and programmatic guidelines that support women technically, promote more accessible and efficient treatments, and create suitable guidelines for healthcare professionals can all help lower maternal mortality. Also, governments should equally support healthcare providers to implement policies, through monitoring and mentoring programmes.

Contribution/ Originality: This study contributes to the literature by using multiple dimensions of maternal mortality and employing the robust endogenous treatment effect technique to examine labour for participation on maternal mortality in the case of Cameroon. Consequently, its reliability and novelty cannot be questioned.

1. INTRODUCTION

Globally, women (aged 15 and above) have a labor force participation rate of 49%, while men have a participation rate of 76% (ILO, 2017). Over the last twenty years, there has been a little increase in the percentage of women in the labor force in emerging nations, although there is significant variation between them. The lowest rates of female participation are seen in South Asia, the Middle East, and North Africa. Trend-wise, South Asia fared the worst, with a decreasing proportion of women in the labor force. In contrast, Latin America and the Caribbean had a significant increase in female involvement rates (Klasen, Pieters, Santos, & Manuel, 2018).

In the labor market, women are becoming more bold, and the trend of more women working in developing nations has piqued the curiosity of scholars and the general public (Sunghee, 1991). More and more well-educated women are joining the workforce, working alongside men in similar settings and wielding greater influence inside

the family than in the past. More than half of all people on the planet today are women, and they also put in two thirds of all labor hours, earn one tenth of all money, and own less than one hundred percent of all property worldwide (Che & Sunjo, 2018).

Although women make up slightly more than half of the population of Cameroon, their surprisingly low contribution to economic activity, growth, and well-being has major macroeconomic ramifications (IMF, 2014). For example, in 2010, 87% of women and 67% of men correspondingly worked in susceptible employment, and 58% of women and 49% of men respectively worked in agriculture (World Bank, 2016). Additionally, like most developing nations, Cameroon has a large proportion of its poor and unemployed being female, with the majority of these individuals working in low-wage jobs or in the informal sector. This may be because there are few job opportunities for women due to cultural obstacles, job-related segregation, and low scholastic attainment (Tingum, 2016).

Conversely, maternal mortality serves as a gauge of women's prominence and inequality as well as the state of a nation's health system (Iqbal, Shaheen, & Begum, 2014). Despite a 38% global decrease in the maternal mortality ratio between 2000 and 2017, pregnancy-related avoidable causes such as severe bleeding, infections, delivery problems, and pre-eclampsia claimed the lives of roughly 800 women per day in 2017 (UNICEF, 2019). Pregnancy-related deaths account for 1 in 48 deaths of women in underdeveloped nations, compared to 1 in 1,800 in industrialized nations. Thirty to fifty more women have injuries, infections, or diseases for every woman who passes away. Pregnancy-related problems rank among the top causes of death and disability for women between the ages of 15 and 49 in underdeveloped nation (Iqbal et al., 2014).

Maternal mortality is correlated, either directly or indirectly, with a number of personal and social factors. Pregnancy problems include hemorrhage, eclampsia, sepsis, abortion, and obstructed labour are examples of direct variables (Alvarez, Gil, Hernández, & Gil, 2009). Maternal death can occur indirectly as a result of women's health-seeking behaviors and usage of health services. Maternal mortality is affected by socioeconomic, environmental, and cultural factors (Illah, Mbaruku, Masanja, & Kahn, 2013). The enduring high rates of maternal mortality are remarkable considering that the technology and knowledge required to significantly lower it have been accessible for almost a century, and the costs of intervention are comparatively low (Cutler, Angus, & Adriana, 2006).

Maternal mortality is a significant and ongoing problem that is more unusual in developing nations. Despite the advancements in modern medicine, 529,000 women still die annually from problems during childbirth every minute (UNICEF, 2019). It goes beyond simple concerns about health and availability to medical care. The high rates of maternal death that are found in many nations are also caused by a number of additional factors: Due to poverty, particularly in developing nations, women are less able to make their own decisions regarding their health care, including during pregnancy. This puts them at a disadvantage and increases their chance of dying during pregnancy.

It got more challenging to sustain a family on a single income amidst the dynamic economic conditions prevailing in Cameroon. In order to ensure the welfare of households and reduce poverty, it is likely that other family members, such as the mother, had to enter the labor force in addition to the father, who was considered the "bread winner" in the family (Che & Sunjo, 2018). Due to the growing number of women joining the workforce, they are more likely to work alongside males in the same settings and are now seen as more normal than they were in the past when it comes to holding more authority inside the home (Che & Sunjo, 2018).

Despite many women entering the labour force market and contributing to the income of households which is intended to boast their health quality (maternal health), maternal mortality is still on the rise in developing countries with Cameroon inclusive. This issue remains a major concern not only to the government but the entire economy. Given the significance of ensuring a positive maternal health for long term growth prospects in an ever evolving and interconnected world, the study therefore seeks to analyse the effects of female labour force participation on maternal mortality in Cameroon.The other segments of the study are structured as follows: section two examines pertinent literature, section three details the methodology, section four presents and discusses the findings, and section five offers policy recommendations and a conclusion.

2. LITERATURE REVIEW

The theory of planned behaviour opines that, asking people if they want to behave in a particular way is the best indication of their behavior (Ajzen, 1988). Here, we see that, presuming intention can explain behavior, the intention will not manifest itself in behavior if the behavior is physically impossible to do or if unforeseen obstacles stand in the way. If people have positive attitudes toward specific behaviors, believe that perceived subjective norms (social pressure) are favorable toward those behaviors, and believe they can perform those behaviors correctly, they are more likely to intend to have healthy behaviors in the context of maternal health (using a health facility for childbirth).The shift toward feminism posited as the U hypothesis, which dates back to the 1960s (Sinha, 1967) contends that, in the poorest nations, growth and gender equality in the workforce are mutually exclusive. It demonstrates that the link between female labor force participation and economic development which is determined by GDP per capita is U-shaped. Female labor force participation rates decline when the economy shifts from an agrarian civilization with strong ties between household and market production to an industrial and services-based formal economy. In later stages of development, female economic activity rises once more, propelled by structural change, rising levels of education, and falling fertility.

Different academics have taken different stances on women's participation in the labor force. According to Heckman (1976) a woman chooses whether to be in the employed or jobless population rather than the economically inactive population, which is made up of people who are neither looking for work nor are they currently working. Julius (2011) delineates female labour force participation as the percentage of working-age women who are either employed (including self-employed women) or actively looking for work. Maternal mortality, according to the WHO (2015) is the term used to describe the death of a woman during her pregnancy or within 42 days of the pregnancy's cessation due to any cause connected to or aggravated by the pregnancy or its management, excluding accidental or incidental causes.

Globally, a few experiential field studies on maternal mortality and female labor force participation have been conducted. Using the IV regression technique, Bhalotra, Clarke, Gomes, and Venkataramani (2018) investigated the relationship between maternal mortality and women's political participation and discovered that increasing women's political participation accelerates the drop in maternal mortality. Bhalotra et al. (2018) report that the implementation of women's quotas in parliament resulted in a 9–12% reduction in maternal mortality. Regarding mechanisms, it also led to an 8–11% increase in skilled birth attendance and a 6–11% increase in the utilization of prenatal care. Furthermore, Kamiya (2010) used the System Generalized Method of Moments to estimate the determinants of under-five mortality by analyzing cross-country panel data from 141 developing nations (GMM). The study found evidence of a decrease in the death rate due to increased health spending, GDP (Gross Domestic Product) per capita, and access to improved sanitation; however, the death rate was not significantly impacted by skilled birth attendance, the number of doctors per 1,000 people, or immunization. Bhalotra and Clarke (2013) employed panel data approach and a variety of natural experiments for 108 nations over a 20-year period to investigate the relationship between maternal education and maternal mortality. They looked at three natural experiments that produced logically exogenous increases in education and provided proof that higher levels of maternal education lower the risk of mother death during childbirth.

3. METHODOLOGY

There are three subsections in this section. The study's sample and data collection are examined in the first, the model definition is presented in the second, and the calculation of the maternal mortality index is the subject of the third subsection.

3.1. Data Collection

The National Institute of Statistics (NIS)'s 2018 Demographic Health Survey was utilized for the analyses in this work. The people who lived in Cameroon's 10 regions made up the survey's target population. At the national level, representative clustering survey sampling techniques were employed to gather the sample. Questionnaires and interviews were utilized as data collection tools, and all men and women between the ages of 15 and 49 were eligible for interviews. A total of 14677 respondents provided specific information on maternal mortality, which made up the sample population. Provided information included; sibling's death and pregnancy and this indicator stated whether siblings died while pregnant, died during delivery, died 6 weeks after delivery, died 2 months after delivery and death not related which an index was constructed, female labour force indicators such as; respondent's occupation, usual place of work and respondents currently working. This study adopts a quantitative research design.

3.2. Estimation Technique

The purpose of this study is to examine how maternal mortality in Cameroon is affected by female labor force participation. To attained this, We use the linear regression endogenous treatment effect approach developed by Heckman (1976) and Heckman (1978) to model the relationship between female labor force participation and maternal mortality in Cameroon. Maddala (1983) derived the maximum likelihood and the control-function (CF) estimators of the model to address this effect. Thus, to account for potential endogeneity, heterogeneity of responses of unobservables that are complementing with or substituting for female labour force participation and sample selection.

Maternal mortality is a function of female labour force participation. Maternal mortality is captured as an index which is continuous. The log of it is what will be used in the analysis. The adopted method for estimating the effect of female labour force participation on maternal mortality is the two step, using instrumental variables and the log of maternal mortality. The instruments to be used for this are owns a car, bicycle, motor bikes and access to electricity.

We use the linear regression with endogenous treatment effects model to estimate the effect of a treatment on the desired outcome of interest. This permit the estimation of the average treatment effect (ATE) and the average treatment effect on the treated (ATET or ATT). The linear regression endogenous treatment impact model estimates additional parameters (or coefficients) of a linear regression model enhanced with an endogenous binary-treatment variable in addition to the bearing parameter. When there is no interaction between the treatment indicator variable and any of the independent variables in the outcome model, the ATET (or ATT) predicted by the endogenous treatment effect model (ETEM) is equal to the ATE.

The ETEM is estimated by stating an equation for the endogenous treatment, Z_i (in this case, a model of female labour force participation) followed by specification of an outcome equation, Y_i(in this case maternal mortality).

Given an outcome Yi, which measures maternal mortality, and the endogenous treatment variable, Z_i, which measures female labour force participation, we can specify the endogenous treatment regression model as follows:

$$Y_i = \beta X_i + \delta Z_i + v_i \qquad (1)$$

$Z_i$is a dichotomous variable with a value of 1 for female working, and 0 otherwise.X_i is a vector of outcome covariates.

$$Z_i = w_i\gamma + \mu_i \qquad (2)$$

Where w_i is a vector of endogenous treatment covariates, β and γ are unknown parameters, while $v_i$and μ_i are the error terms.

The covariates X_i and w_i are exogenous because they are unrelated to the error terms.

The empirical model for the outcome equation is specified as follows:

$$MMI_i = \beta_0 + \beta_1 Flfp_i + \beta_2 Tphone_i + \beta_3 Ledu_i + \beta_4 Int_i + \beta_5 hsize_i + \beta_6 Radio_i + \beta_7 Tv_i + \beta_8 Age_i + v_i \qquad (3)$$

Where the variables MMI denotes maternal mortality in index obtain using multiple correspondence analyses, Tphone is owns a telephone, Ledu is level of education, Int is access to internet, hsize is household size,Radio is access to radio, Tv is access to television, Age is age of the female, Flfp is female labour force participation.

The empirical model for the treatment equation is similarly specified as follows:

$$Flfp_i = \gamma_0 + \gamma_1 Bicycle_i + \gamma_2 MotorB_i + \gamma_3 Car_i + \gamma_4 Elect_i + \gamma_5 Tphone_i + \gamma_6 Ledu_i + \gamma_7 Int_i + \gamma_8 hsize_i + \gamma_9 Radio_i + \gamma_{10} Tv_i + \gamma_{11} Age_i + u_i \quad (4)$$

Where Bicycle denotes owning a bicycle, MotorB stand for owning a motor bike, Car denotes owning a car and Elect stands for access to electricity. Equation 4 handles the possible problem of endogeneity of female labour force participation.

3.3. Synthetic Variable Computation for Maternal Mortality

Peculiar to this research, we utilize the multiple correspondent analysis (MCA) to create a maternal mortality index. An extension of correspondence analysis (CA), multiple correspondence analysis (MCA) enables the investigation of the patterns and interactions between many categorical dependent variables. Because of this, it can also be thought of as a generalization of principal component analysis in cases when categorical variables rather than quantitative ones need to be examined.

Researchers from the World Bank have shown since 1998 that this is appropriate for our situation (Filmer & Pritchett, 1998).

A maternal mortality index was constructed using proxies of sibling's death and pregnancy (mm9_01 to mm9_20) with the help of the dimension reduction technique known as the multiple correspondence analysis (MCA). However, among the 20 indicators, only the first 10 had data available, with the rest having all missing values. In this regard, we made use of the 10 indicators and treated them.

The treated data where named from maternal mortality 1 to 10 (mm1 to mm10). Note that that the indicator for siblings' deaths and pregnancies indicates whether a sibling passed away while pregnant, during childbirth, six weeks after the birth, two months after the birth, or in an unrelated manner.

Table 1. Statistics for column categories in standard normalisation.

Dimension	Principal intertia	Percent	Cumulative percent
Dim 1	0.003	34.02	34.02
Dim 2	0.001	9.52	43.53
Dim 3	0.001	8.40	51.93
Dim 4	0.0003	4.21	56.14
Dim 5	0.0002	3.06	59.20
Dim 6	0.0002	2.39	61.58
Dim 7	0.0001	1.44	63.03
Dim 8	0.0001	0.96	63.99
Dim 9	0.0001	0.66	64.65
Dim 10	0.0001	0.58	65.23

As seen from Table 1, the results show that the principal inertias for dimension one is .0026294 with 34.02%, dimension two is .0007355 with 9.52%, dimension three .000646 with 8.40%, dimension four .0003253 with 4.21%, dimension five .0002365 with 3.06%, dimension six .0001844 with 2.39%, dimension seven .0001115 with 1.44%, dimension eight .0000741 with 0.96%, dimension nine .0000511 with 0.66% and dimension ten .0000452 with 0.58%. From the above analysis, it is obvious that the contribution of dimension one is higher than the other dimensions.

4. OUTCOMES AND DISCUSSIONS

Descriptive statistics are offered in this part prior to the discussion and presentation of the inferential analysis.

Table 2. An overview of the variables' descriptive statistics.

Variables	Observations	Mean	Std deviation	Min	Max
Maternal mortality index	14677	0.874	0.051	0	1
FLFP					
No	14677	0.805	0.396	0	1
Yes	14677	0.195	0. 396	0	1
Level of education					
No education	14677	0.579	0.494	0	1
Primary education	14677	0.177	0.381	0	1
Secondary education	14677	0.198	0.398	0	1
Higher education	14677	0.047	0.212	0	1
Age	14677	30.01	11.876	15	64
Milieu					
Rural	14677	0.466	0.499	0	1
Urban	14677	0.534	0.499	0	1
Access to radio					
No	14677	0.598	0.490	0	1
Yes	14677	0.402	0.490	0	1
Access to TV					
No	14677	0.492	0.500	0	1
Yes	14677	0.508	0.500	0	1
Bicycle					
No	14677	0.899	0.301	0	1
Yes	14677	0.101	0.301	0	1
Motorbike					
No	14677	0.761	0.427	0	1
Yes	14677	0.239	0.427	0	1
Car					
No	14677	0.931	0.254	0	1
Yes	14677	0.069	0.254	0	1
Having a phone					
No	14677	0.360	0.480	0	1
Yes	14677	0.640	0.480	0	1
Electricity	14677	0.594	0.491	0	1
Household size	14677	7.539	4.658	1	40
Household size2	14677	78.523	121.139	1	1600

4.1. Weighted Descriptive Statistics

As seen on Table 2, the total number of observations is 14677. The mean coefficient of maternal mortality which is the main dependent variable is 0.8735659 implying that about 87.36% of deaths in mothers are from pregnancy related causes. The variable Female labour force participation predicts that about 19.46% are currently working as opposed to 80.05% who are not working. The results show that 57.8% of the sample population has no educational background, 17.6% have attained primary education, 19.8% have secondary education and just 4.7% have attained higher educational level. A further look at the results revealed that respondent current age had a mean of 30.00818, implying that the average age of the respondents 30years. 46.6% of the sample population resides in the rural areas while 53.4% reside in the urban areas.

Access to radio has a 40.1% and access to television has 50.8% within the sample size. Also having a telephone has a 64% against 35.9% of those who did not own one. Summarily, access to information among the sample population is low. This is because Cameroon is yet to fully access most information and communication tools and properly uses them. Electricity has a mean 0.59405 implying that more than half of the sample population (59.4%) has electricity in their homes. This means that to an extent sophisticated machines can be used to better maternal health due to the availability of electricity to power such machines. Again the household size ranges from 1 to 40 with a mean of 7.838 and when squared, household size ranges from 1 to 1600 with a mean of 78.523.

4.2. Linear Regression (OLS), with Endogenous Treatment (Control Function and Two Step) of Effects of Female Labour Force Participation on Maternal Mortality in Cameroon

The results of the linear regression with endogenous treatment approach and Ordinary Least Square (OLS) methods used to explain the function of maternal mortality are presented in this section. Each of these approaches aims to elucidate whether the engagement of women in the labor force influences maternal mortality.

Table 3. Ordinary least square (OLS) regression, with endogenous treatment (Control function and two step).

Variable	OLS	LRETE (Control function)	LRETE (Two step)
MMI			
Female working (Flfp)	-0.003**	0.015**	0.013**
	(0.001)	(0.006)	(0.006)
Age	-0.0003***	-0.001***	-0.0001***
	(0.00003)	(0.0001)	(0.0001)
Tphone	-0.005***	-0.006***	-0.006***
	(0.001)	(0.001)	(0.001)
Radio	-0.0004	0.001	0.001
	(0.001)	(0.001)	(0.001)
TV	0.001	0.019	0.002
	(0.001)	(0.001)	(0.001)
LEDU			
Primary	-0.004***	-0.0003	-0.001
	(0.001)	(0.002)	(0.002)
Secondary	-0.004***	-0.001	-0.002
	(0.001)	(0.002)	(0.002)
Higher	-0.001	0.003	0.002
	(0.002)	(0.002)	(0.002)
HHsize	-0.0003	0.0003	0.0002
	(0.0003)	(0.0004)	(0.0003)
HHsize2	2.92e-06	-0.00001	-0.0001
	(0.00001)	(0.00001)	(0.00001)
Constant	0.891***	0.885***	0.887***
	(0.002)	(0.003)	(0.003)
Fisher test(p-value)	12.51***	NA	NA
R-squared	0.015	NA	NA
/ Athrho0	NA	-0.293***	NA
		(0.097)	
/ lnsigma0	NA	-3.010***	NA
		(0.032)	
/ Athrho1	NA	-0.151***	NA
		(0.057)	
/ Insigma1	NA	-2.849***	NA
		(0.066)	
rho0	NA	-0.285	NA
		(0.089)	
sigma0	NA	0.049	NA
		(0.002)	
lambda0	NA	-0.014	NA
		(0.005)	
rho1	NA	-0.150	NA
		(0.056)	
sigma1	NA	0.0580	NA
		(0.0004)	
lambda1	NA	-0.009	NA
		(0.003)	
Hazard lambda	NA	NA	-0.009***
			(0.003)
rho	NA	NA	-0.178
sigma	NA	NA	0.051
Observations	14,677	14,677	14,677

Note: Wald test of indep. (rho0 = rho1 = 0) : chi2 (2) = 10.01 prob > chi2 = 0.0067.
Where ***,**,* stand for 1%, 5% and 10% level of significance respectively, standard errors in brackets and NA= Not applicable, LRETE = Linear regression with endogenous treatment effects and OLS = Ordinary least square.

With the main independent variable being female labor force participation and other correlates controlled for, Table 3 shows estimates of maternal mortality under various assumptions. Due to its inability to treat the problem of endogeneity of female labour force participation, OLS estimates can be inconsistent, thereby warranting the

employment of more robust techniques. Furthermore, the wald chi squared test reveal that the instruments used are valid given that the p-value are all less than 0.1 (10%). Form the treatment model outcome presented in Appendix 1, all the instrumental variables (cars, bicycle, motor bikes and access to electricity) are all significant, indicating equally the validity of the instruments. Therefore, the linear regression with endogenous treatment estimates are more appropriate for the analysis since it provides more consistent and efficient estimates and equally account for possible endogeneity. Using the Wald test shown in the footer, we can rule out the null hypothesis that there is no correlation between the outcome errors for the control and treatment groups and the treatment-assignment errors based on the results of the endogenous treatment linear regression. The treatment-assignment error correlation estimate for the control group ($\rho 0$) is negative, indicating that unobservables that tend to occur with unobservables that lower female labor force participation are also associated with observed maternal mortality and because $\rho 1$ is equally negative, similar analysis is deduced for female labour force participation. In the treated group, there is a greater correlation between the unobservables and treatment outcomes, as indicated by the bigger estimate $\rho 1$ compared to the estimate $\rho 0$. There is less variability in the unobservables among the untreated group, as indicated by the control group's outcome error standard-deviation parameter estimate ($\sigma 0$) being slightly lower than the treatment group parameter ($\sigma 1$). The estimated ATE of female labour force participation is positively significant at a 5% level of significance for both the control function and the two step approach. This implies that an increase level of women partaking in working will likely increase maternal mortality. This might be because of stress from work. A woman who works while pregnant can suffer from stress especially when she does not have enough time to rest. This stress affects the pregnancy and leads to complications which may lead to death. This finding is consistent with Goswami (2015) investigation into the effects of occupational stress on bank workers' performance, which used a structured questionnaire to gather information from banks in Rajasthan State's largest cities. The Z-test was used to analyze the hypothesis, and the findings demonstrated that workplace stress negatively impacts employees' mental and psychological well-being by causing them to feel fear, anger, and anxiety. Mohren et al. (2003) and Mikkelsen and Burke (2004) also hold this same view.This, however, conflicts with the findings of Bhalotra et al. (2018) and Osemwengie (2020) who used the IV regression technique to study the relationship between maternal mortality and women's political participation and discovered that increasing women's political participation causes a faster decline in maternal mortality. The control variables such as level of education has a negative effect on maternal mortality implying The likelihood of a woman dying from pregnancy-related reasons decreases with her level of education. This study is in line with that of Bhalotra and Clarke (2016) who conducted a study titled "Maternal Education and Maternal Mortality: Evidence from a Large Panel and Various Natural Experiments" and provided compelling evidence that lowers the risk of maternal death during childbirth correlates with higher levels of education. Moreover, it has been noted that having a phone negatively impacts maternal mortality. This implies that increase access to information and communication technologies reduces the rate of maternal mortality in Cameroon.

5. CONCLUSION

Analyzing the impact of female labor force involvement on maternal mortality in Cameroon was the main goal of this study. Research findings indicate that maternal mortality has received minimal attention while utilizing a multi-dimensional strategy with DHS (Demographic and health survey). Maternal mortality is positively and strongly correlated with female labor force participation, according to the results of the linear regression with endogenous treatment effects. This suggests that a woman who engages in the labor force may experience pregnancy-related problems and ultimately may die. We also noted that the degree of education and information availability of women influences the association between their involvement in the labour market and maternal mortality. Level of education and information accessibility have negative effects on maternal mortality meaning that the more educated and informed a female is, the less likely for maternal mortality to occur. As policy recommendation, maternal mortality can be reduced by providing a stress free working environment for females. This can be done by employers providing

mental health specialist in the work place were these women can go for counselling whenever they are overwhelmed with work and begin to stress out. Maternal mortality can also be reduced by offering evidence-based clinical and programmatic guidelines that advocate for more accessible and cost-effective treatments, provide technical assistance to women, and provide guidelines that are appropriate for healthcare professionals. Governments should also provide healthcare providers with equal support in implementing policies by means of a program of monitoring and mentoring. All these will amount to nothing if the women are not educated to begin to find reasons to go for antenatal care.

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Appendix 1. Treatment model (First stage equation).

FLFP		Control function	Twostep
Bicycle	NA	-0.502***	-0.502***
		(0.056)	(0.056)
Motorbike	NA	-0.433***	-0.433***
		(0.038)	(0.038)
Car	NA	-0.372***	-0.372***
		(0.063)	(0.062)
Electricity	NA	0.141***	0.141***
		(0.039)	(0.039)
Age	NA	0.026***	0.026***
		(0.001)	(0.001)
LEDU			
Primary	NA	-0.679***	-0.679***
		(0.042)	(0.056)
Secondary	NA	-0.576***	-0.576***
		(0.038)	(0.036)
Higher	NA	-0.582***	-0. 583***
		(0.065)	(0.065)
HHsize	NA	-0.106***	-0.106***
		(0.008)	(0.007)
HHsize2	NA	0.003***	0.003***
		(0.0003)	(0.0002)
Tphone	NA	0.319***	0.319***
		(0.033)	(0.032)
Radio	NA	-0.304***	-0.304***
		(0.030)	(0.029)
Tv	NA	-0.088**	-0.088**
		(0.038)	(0.039)
Constant	NA	-0.921***	-0.921***
		(0.057)	(0.056)

Note: Where ***,** stand for 5% and 10% level of significance respectively, standard errors in brackets and NA= Not applicable.