Antenatal Care in Cote d'Ivoire: An Empirical Investigation

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Despite building maternity and establishment of a national reproductive program, use of maternal health services by women decreases during the evolution of pregnancy in Cote d'Ivoire. The aim of this study is to investigate the influence of factors which may condition the use of maternal health services by pregnant women in Côte d'Ivoire. Using a sample of 356 women from the Living Standards Measurements Survey of 2008, who declared having used at first prenatal care, we use a multinomial probit model to estimate the coefficients of pregnant woman decision. Our results reveal two types of problems: poverty and education of the young girl. Also, improved access to modern health care may reside in the development of appropriate mechanisms for reducing the economic dependence of women and improving the conditions of schooling in order to provide a better arbitrate in decisions relating to antenatal care (ANC).

JEL Codes: C25, D12, I14 and J13

1. Introduction

Women health during pregnancy and childbirth (maternal health) is major concerns that figure among the Millennium Development Goals (MDGs) because maternal mortality rate remain high in the world. According to WHO (2010) more than 350,000 women, (99% live in developing countries), die each year from complications related to pregnancy or childbirth.

Sub-Saharan Africa is the most affected region in the world, and despite efforts made by the countries, maternal mortality rate decreases very slowly. However decrease of maternal mortality rate is not uniform. It varies from country to country. Thus, in regard of World Bank statistics, certain countries have experienced (over the past twenty years), larger decreases. For instance, in Mozambique, maternal mortality rate fell from 1,000 deaths to 550 (a decrease of 45%). Other countries have made little progress during the same period. In this case, we find countries such as Burkina Faso, (with a drop from 770 to 560 deaths i.e. decrease of 27.27%) and Guinea Bissau, (with a decrease in deaths from 1,200 to 1,000 i.e. a decrease of 16.66%). In revenge, countries such as Gabon have made no progress in reducing maternal mortality. This situation is so worrisome that WHO, UNICEF and UNFPA formed (in 2009) a partnership with African Union's health ministers and organizations (bilateral and nongovernmental) to launch a campaign for accelerating reduction of maternal mortality in Africa.

In Côte d'Ivoire, the situation of pregnant woman is not much better. Maternal health has not improved significantly. As a proof, maternal mortality per 100 000 live births decreased from 690 in 1990 to 597 in 1994 (INS 1994). It was 543 in 2005 (INS 2005) and in 2008 totaled 470. Most cases of these deaths are due to hemorrhage, infections (cancer of uterus), unsafe abortions, dystocia, hypertensive disorders and

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malaria. Hemorrhages explain 50% of deaths of pregnant women and malaria accounts for 36% of causes of hospitalization. Concerning abortions, proportion of girls using it increases with age: this varies from 1% among girls aged 12-14 years, 8% for girls aged 15-19 years to 18% among those aged 20-24. To these causes, it must be added the low level of family planning in the extent that only 13% of married women use a modern method of contraception (INS 2006).

Despite efforts made by the Government of Côte d'Ivoire (building maternity and establishment of a national reproductive health program) in order to reduce morbidity and maternal mortality, supervision of pregnancy and birthing process are low. The use of maternal health services by women decreases during the evolution of pregnancy. Medical assistance at delivery is low (45.4% in 1994, 46.8% in 1998 and 56% in 2005) and level of utilization of antenatal cares (ANC) services has not significantly changed. To this end, the INS (2006) noted that between 1998 and 2005, the first ANC increased from 84% to 85% and the fourth prenatal consultations increased from 35.6% to 45%.

This situation raises many questions embodying the accessibility of ANC services as an important requirement for human development. Unfortunately, while these issues have been recognized recently by many studies (Guliani et al. 2012; Say and Raine, 2007; Barber 2006), specifically, to our knowledge, no attempt has been made to address them in the case of Cote d'Ivoire. Thus this study aims to clarify the problem of under-utilization of ANC services. It will:

- Estimate the impact of socio-demographic characteristics with respect to the decision of the pregnant woman to retain the services of maternal care;
- Estimate the influence of the economic characteristics on the use of health services by pregnant women.

Specifically, we object to answer the following set of questions: how important are household incomes, tariff of consultation and transportation costs to access to health care provider in decision of pregnant women? What are the roles of age, education, marital status, household size and residence in the choice of care provider? In sum we analyze factors likely to condition the use of maternal health services by pregnant women in Cote d'Ivoire.

The article is structured as follows. The section 2 is a summary of literature by highlighting the major conclusions of previous works. Section 3 presents the methodological approach with an emphasis on the data used and the econometric model. In section 4, the estimated results are reported and discussed. Finally, section 5 is reserved for the conclusion and recommendations

2. Literature Review

Problematic of ANC care demand is part of health behavior analysis. This analysis postulates that use of health services is guided by the needs and conditions life of patients (Gertler and Gaag 1990; Gilson 1997; Kermani et al. 2008, etc.). But in addition, use of health service creates externalities that reinforce future use of other services (Hotchkiss et al. 2005). Thus, it's noteworthy that circumstances such as

accidents, pregnancy and infectious diseases significantly determine the decision to seek medical care.

Many works agree on existence of a negative correlation between use of health care services and socio-demographic factors (such as distance to access to health center, absence or poor quality of transport, lack of drugs in health centers, reception, waiting time at the hospital, etc..). But these studies are quite divergent with respect to the influence of economic factors such as pricing users of health services. In this regard, Gilson (1997) conclude that care demand is inelastic to the tariff of consultation and to the income of patient. Therefore, given that there was no significant correlation between tariffs, household income and demand for health services, people are willing to pay for health care regardless price. On contrary, the work of Gertler and Gaag (1990) show that there is a significant correlation between demand and tariff of consultation and that varies with the age of the patient (child or adult) and the household income level. Yates et al. (2006), Kermani et al. (2008) and more recently Tiehi (2012) in their respective works confirm this negative relationship between tariff of consultation and health services utilization. However, despite their differences, these studies agree on the fact that usefulness of introducing or increasing the cost of access to care (especially the price) as a means of mobilizing resources for financing of health system should take into account situation of each country and in particular situation of groups of vulnerable persons.

Particularly (initially fragmented and scarce) studies devoted essentially to the use of maternal health services in developing countries, have gradually developed (De Allegri et al. 2011; Rani et al. 2008; Barber 2006). This interest is certainly due to that beyond their traditional role of detection of risk factors, ANC care help to educate women about the benefits of medically assisted childbirth (Campbell and Graham 2006; Ronsmans et al. 2003). In developing countries (particularly in Africa), this role is not well understood. Women do not have systematically a follow up during pregnancy or an assistance at the time of delivery (Beninguisse et al. 2005).The first ANC visit is late for most cases and adolescents and multiparous women express less need (Pap et al. 2005). Several reasons may explain this situation. For instance, Beninguisse et al. (2005) describe cultural practices (refusing to be examined by a male doctor, avoid attracting the attention of "evil spirits) that restrict access to ANC services during the first months of pregnancy. In other cases, behavior of medical staff and quality of care (Rokers 2009) constitute obstacles to the demand of ANC consultations. Yet as shown by Gabrysh and Campbell (2009), Say and Raine (2007) and De Bernis et al (2003), use of qualified personnel and health services reduce the risk of death for both the mother and the new born.

Among women who pay least one prenatal visit, we can observe a strong wastage between the first and the subsequent visits. It is important to understand the reasons for this situation. This is why our study objective is to analyze the determinants of ANC cares utilization by women in Cote d'Ivoire. Aside from question of measurement, the problem with the previous studies on health care demand is their encompassing nature. Very few studies are interested in the demand for care of vulnerable groups. By choosing to examine the use of prenatal consultation, our study contributes to broaden the reflections on the precarious nature of pregnant women in Africa.

3. The Methodology and Model

3.1 The Data and Variables

Data are from Living Standards Measurement Survey 2008 (LSMS 2008) of National Institute of Statistics (INS) of Côte d'Ivoire. LSMS 2008, like its predecessors in 2002 and 1998, is aimed to understand the living conditions of Ivorian households. This survey covered 16,200 households for a total of 59,700 individuals of all ages living at home. The survey covers a number of socio-demographic information (household composition, education, residence area, income). It also gives a description on population living conditions (home equipment, access to technical infrastructure). The survey takes also into account data on health status and access to health care. From this data pool of the surveyed people, we extracted 356 pregnant women. Thus our final sample included all the women of childbearing age (15-49 years) who declared having used medical care at first ANC consultation.

Medical alternatives are the main options available to the woman who is expecting a child. These medical alternatives represent the dependent variable of the econometric model to be estimated, it comprises three modalities unordered and mutually exclusive which are *traditional care, public care and private care*. The independent variables consist of a set of socio-demographic factors (age, household size, education level, marital status, and religion) and economic factors (household income tariff and transport). These and similar variables have been shown to influence the use of antenatal care in developing countries (Simkhada et al. 2008; Adjiwanou and LeGrand 2013).

3.2 The Sample Characteristics

Table 1: Distribution of households according to medical alternatives

	Observations	Frequency	Percentages
Traditional cares	356	48	13.48%
Public cares	356	220	61.80%
Private cares	356	88	24.72%

From table 1, we note that, pregnant women have used, in majority, public health services (61.80%), followed by private health care institutions (24.72%). The use of traditional treatments as first consultation represents 13.48% of the sample.

Table 2: Average cost of access to health care provider

	Observations	Means	Std-dev	Min	Max
Tariff of consultation					
Traditional cares	356	1556.93	2533.56	50	25000
Public cares	356	2281.36	2396.65	100	17000
Private cares	356	5710.16	3757.26	100	20000
Transport cost					
Traditional cares	356	486.60	811.67	50	5000
Public cares	356	803.16	876.26	50	5000
Private cares	356	1158.94	1394.49	50	7000

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Tariff of access to health care providers are on average 1,557 FCFA (3.05 USD) for traditional care, 2,281 FCFA (4.47 USD) for public care and 5,710 FCFA (11.19 USD) for modern private practitioner. As for transportation costs, access to the traditional caregiver, public doctors or private modern provider, requires respectively an average expenditure of 486 FCFA (0.95 USD), 803 FCFA (1.57 USD) and 1,158 FCFA (2.27 USD). Compared to modern health care, access cost (price of consultation and transportation costs) to traditional care is relatively low. However, this medical alternative attracts only very few women.

Table 3: Socio-demographic and economic characteristic of households

Variables		Observations	Medical alternatives		
			Traditional cares	Publics cares	Private cares
Income		356	83085.71 (51457.95)	106949.9 (81605.09)	315401.8 (275661.1)
Age		356	27.54 (8.62)	25.41 (6.63)	26.30 (6.87)
Household size		356	6 (3.02)	5.83 (4.67)	5.62 (3.71)
Education		356			
	Unschooled	45.22%	24	102	35
	Primary school	14.04%	4	34	12
	Secondary school	15.17%	7	34	13
	High school	20.79%	11	45	18
	University	4.78%	2	5	10
Marital status		356			
	Married	30.90%	20	65	25
	Unmarried	57.58%	23	128	54
	Divorced/widow	11.52%	5	27	9
Residence		356			
	Rural	30.62%	21	69	19
	Urban	69.38%	27	151	69

(*) numbers in brackets are the standard-deviation

Compared to public and private health centers where the average income of households having recourse is respectively 106,949 FCFA (209.70 USD) and 315,401 FCFA (618.43 USD), the average income of users of traditional treatments is 83,085 FCFA (162.91 USD). In addition, although the differences were not significant, we note, nevertheless, that the average age (27.54 years) of pregnant women who have had recourse to traditional care is higher than that of women who used public health services and private health care. Similarly, women from large families use more traditional treatments at first ANC visit.

Another characteristic of this sample is that 45.22% of women are illiterate; 14.04% have primary education, 15.17% have a college level and 20.79% have a level of high school and only a very small proportion (4.78%) has a university education. Finally, we note that a large proportion (69.38%) of women live in urban areas and more than half of those women (57.28%) are single.

3.3 The Model

The study adopts a multinomial probit model. This model is more adapted in cases where alternatives are similar (like choice of a medical alternative). The Independence of Irrelevant Alternatives hypothesis (IIA hypothesis) proves implausible, insofar as absence of an alternative is likely to favor a similar one (Hausman and Wise 1978).

Our process follows an econometrics approach inspired by works of Akin et al. (1993) and Mwabu et al. (2003). On basis of assumption that individual (or decision maker) is rational, it will choose alternative which gives the highest level of utility U_i to him among the set of *p* possible choices. Formally, we note U_{ij} utility of an individual *i* when he receives care of a type of provider *j*. In absence of specific information on each alternative, this utility is defined as follows:

$$U_i = X_i \beta_j + \varepsilon_{ij}$$

(1)

$$1 \le j \le p$$

In this equation X_i is the matrix of specific explanatory variables relative to each individual. Matrix X_i does not vary across alternatives, and it represents observable component of the function of utility. Term ε_{ij} represents the stochastic component which captures the unobserved share of the utility. The matrix form of the equation arises as follows:

$$\begin{bmatrix} U_{i1} \\ U_{i2} \\ ... \\ U_{ip} \end{bmatrix} = \begin{bmatrix} X_i & 0 & ... & 0 \\ 0 & X_i & ... & 0 \\ ... & ... & ... & ... \\ 0 & ... & 0 & X_i \end{bmatrix} \times \begin{bmatrix} \beta_1 \\ \beta_2 \\ ... \\ \beta_p \end{bmatrix} + \begin{bmatrix} \varepsilon_{i1} \\ \varepsilon_{i2} \\ ... \\ \varepsilon_{ip} \end{bmatrix}$$

(2)

Given that utility cannot be observed, one is interested in probability that an alternative *j* is selected compared to other alternatives. An individual chooses alternative *j* if utility he withdraws is higher than that of all other alternatives.

$$y_{ij} = \begin{cases} 1 & if \quad U_{ij} > U_{ik} \; \forall \, k \ne j \\ 0 & if \; no \end{cases}$$

(3)

For an individual *i*, the probability to choose alternative *j* is equal to:

$$P(y_{ij} = 1) = P(U_{ij} > U_{ik}, \forall \, k \ne j)$$

(4)

This probability (equation 4) is conditioned by the nature of the distribution followed by the disturbance ε_{ij}. Assuming that ε_{ij} is normally, identically, and independently distributed ($\varepsilon_{ij} \to \aleph(0,\Omega)$ with Ω a matrix of covariance *p* x *p* without restriction of

independence of disturbance between alternatives), the defined model characterizes multinomial probit model (Hausman and Wise 1978). Under assumptions of normality of error terms and homoscedasticity (Alvarez and Nagler 1995; Rudolph 2003), the model is rewritten in terms of differential of utilities by taking "self-medication" alternative and is referenced as follows:

$$U_i^* = U_{ij} - U_{i1} = X_i(\beta_j - \beta_1) + (\varepsilon_{ij} - \varepsilon_{i1}) = X_i\beta_j^* + \varepsilon_{ij}^* \tag{5}$$

Where $(\varepsilon_2^*, \varepsilon_3^*, \varepsilon_4^*) \to \aleph \left(\begin{bmatrix} 0 \\ 0 \\ 0 \end{bmatrix}, \Omega \right)$ and $\Omega = \begin{bmatrix} 1 & \sigma_{23} & \sigma_{24} \\ \sigma_{23} & 1 & \sigma_{34} \\ \sigma_{24} & \sigma_{34} & 1 \end{bmatrix}$

Coefficients in discrete choices models do not have direct economic interpretation, because of problem of standardization of residual variance. This is why we calculate marginal effects as follows:

$$\rho_j = \frac{\delta P_i}{\delta x_i} = P_j \left[\beta_j - \sum_{k=0}^{j} P_k \beta_k \right] = P_j [\beta_i - \beta] \tag{6}$$

The marginal effects describe sensitivity of probability of event *($y_i = 1$)* compared to variations of the explanatory variables to give a sense to the obtained results.

4. The Findings

Table 4: Coefficients

		Public care		Private care	
		Coefficients	t-std	Coefficients	t-std
Specific variables to medical alternatives					
Tariff of consultation (Log)		0.2791***	2.83	0.2791***	2.83
Tariff of consultation^2 (Log^2)		- 0.0860**	-1.97	- 0.0860**	-1.97
Transport cost (Log)		- 0.7154***	-4.90	- 0.7154***	-4.90
Specific variables to households					
Income (Log)		0.0859	0.73	0.3521***	2.74
Household size		- 0.3272**	-2.25	- 0.3788**	- 2.28
Age					
	36 – 48	ref.	ref.	ref.	ref.
	26 – 35	0.5394	1.17	0.0338	0.07
	20 – 25	0.3833	0.85	- 0.0255	- 0.05
	15 – 19	0.3285	0.65	- 0.3933	- 0.68
Education					
	University	ref.	ref.	ref.	ref.
	High school	1.0580	1.11	- 0.8948	- 0.81
	Secondary school	0.8542	0.85	- 1.0191	- 0.89
	Primary school	1.3413	1.39	- 0.8308	- 0.74
	Unschooled	0.4537	0.49	- 1.0826	- 1.44
Residence					
	Rural	ref.	ref.	ref.	ref.
	Urban	0.6671**	2.18	0.9449***	2.56
Marital status					
	Divorced/Widow	ref.	ref.	ref.	ref.
	Married	- 0.6820	-1 .41	- 0.8008	- 1.44
	Unmarried	0.1093	0.22	- 0.0851	- 0.16

Reference alternative: Traditional care
(***)   Significance at 1%,
(**)   Significance at 5%,
(*)   Significance at 10%.

Considering traditional treatments as the reference alternative medical, we note that monetary costs of accessing (transportation cost and tariff of consultation) to modern providers (public or private) are significant in the decision of pregnant women. These results exhibit a major fact. In contrast to most work on health care demand, concluding to the existence of a negative correlation between tariffs and using of ANC service, our study reveals that demand for ANC care is evolving positively with the increase of tariff of consultations. But this ANC demand up to a threshold beyond which any increase of tariff leads to its decrease. Regarding a household income, it appears important in case of choosing modern private care. Finally, we observe that, compared to rural households, urban household women have a stronger preference for modern healthcare (public and private).

Table 5: Marginal Effects

	Traditional cares Prob.= 0.0833		Public cares Prob.= 0.6850		Private cares Prob.= 0.2316	
	Marginal Effect	t-std	Marginal Effect	t-std	Marginal Effect	t-std
Specific variables to medical alternatives						
Tariff of consultation (Log)						
Traditional care	0.0334**	2.30	- 0.0219***	- 2.65	- 0.0115	- 1.10
Public care	- 0.0219**	- 2.65	0.0774***	3.02	- 0.0554***	- 2.81
Private care	- 0.0115	- 1.10	0.0554***	- 2.81	0.0669***	2.41
Tariff of consultation (Log^2)						
Traditional care	- 0.0103	- 1.57	0.0067**	2.02	0.0035	- 0.89
Public care	0.0067**	2.02	- 0.0238*	- 1.89	0.0171*	1.76
Private care	0.0035	0.89	- 0.0171*	- 1.76	- 0.0206	- 1.56
Transport cost (Log)						
Traditional care	- 0.0857**	- 5.87	0.0562***	3.92	0.0294	1.48
Public care	0.0562**	3.29	- 0.1983***	- 6.48	0.1431***	6.13
Private care	0.0294	1.48	0.1421***	6.13	- 0.1716***	- 6.17
Specific variables to households						
Income (Log)	- 0.0082	- 1.03	- 0.0359**	- 1.99	0.0441***	2.82
Hhsize	0.0023	0.73	0.0058	0.88	- 0.0082	- 1.29
Age						
36 – 48	ref.	ref.	ref.	ref.	ref.	ref.
26 – 35	- 0.0578	-0.86	0.1750**	2.23	- 0.1172*	- 1.71
20 – 25	- 0.0520	- 1.31	0.1537**	1.97	- 0.1017	- 1.53
15 – 19	- 0.0370	- 0.93	0.1920***	2.50	- 0.1549***	- 2.43
Education						
University	ref.	ref.	ref.	ref.	ref.	ref.
High school	- 0.0527	- 1.06	0.3217***	2.94	- 0.2689***	- 3.37
Secondary school	- 0.0378	- 0.55	0.2941***	2.73	- 0.2562***	- 3.74
Primary school	- 0.0614	- 1.20	0.3333***	3.88	- 0.2718***	- 4.66
Unschooled	0.0239	- 0.31	0.3842***	2.47	- 0.4082***	- 3.32
Residence						
Rural	ref.	ref.	ref.	ref.	ref.	ref.
Urban	- 0.1142**	- 2.06	0.0254	0.38	0.0888	1.55
Marital status						
Divorced/Widow	ref.	ref.	ref.	ref.	ref.	ref.
Married	0.0784	1.17	- 0.0589	- 0.62	- 0.0195	- 0.24
Unmarried	- 0.0059	- 0.12	0.0684	0.78	- 0.0594	- 0.77

(***)   Significance at 1%,
(**)   Significance at 5%,
(*)   Significance at 10%.

Table 5 presents the marginal effects of the determinants of women's decisions to use ANC services for the first visit. Estimated probability of the decision of pregnant women to use ANC care is 8.33% for a traditional provider; 68.50% in a public health center and 23.16% in a private care. This result confirms the importance given to modern health care (public or private) compared to traditional cares which are considered by the parturient as high-risk medical care and uncertain results.

The other major findings of this study are related to influence of consultation price, cost of transportation, household income, age, level of education and place of residence of the pregnant woman.

Tariff of consultation: The coefficient is positive and statistically significant for traditional treatments and modern health care. This result contrasts with findings of Getler et al (1990) and more recently reaffirmed by Kermani et al (2008) and Tiehi (2012). Conclusions of these authors establish a negative elasticity between demand and price of care practiced by providers. However, our result partially confirms that of Mariko (2003) who showed that increasing care access tariff does not affect their use if one takes into account severity of the disease, type of care sought, quality and patient vulnerability. Furthermore, our results show that demand for prenatal care is not a strictly increasing function of the tariff. In fact, despite its vulnerability, a pregnant woman is not indifferent to the increase of consultation tariff. Indeed, the square of tariff reveals that there is a threshold beyond which any increase in tariff leads to a significant decline in demand. In many instances, an increase of price of care in modern sector causes a shift in demand towards traditional cares and self-medication.

Transportation costs: Transportation costs have a negative impact on the use of health care regardless of the type. Transportation costs reduce significantly the demand for ANC care. Probability (at 1% threshold) falls to 8.57% for traditional care, to 19.83% for public care and 17.16% for private care. This result indicates the fact that care is difficult to access (Gabrysh and Campbell 2009). So cost of transport (similar to distance to access to caregiver) is an important factor in decision of pregnant women. So much more than tariff of consultation, arbitration of the household in choice of the type of care is primarily conditioned by the cost of travel between place of residence and the health center. This result support previous studies. In sum, when health care services are more accessible, frequency of their use is high. This result corroborates those of previous studies that report similar conclusion. For instance, Musau et al. (2011) showed that in Tanzania, ANC care services are more accessible because 90% of women live less than 5 km from a health center.

Household income: income is positive and statistically significant (0.0441 at 1% threshold) in the decision to use ANC care in private hospitals. In contrast, income effect is negative on the demand of prenatal cares in public health centers (- 0.0359 at 5% threshold). This result shows that women from rich households have a strong preference for private establishments. Thus, household income increases (with a more robust effect) the probability of using private health centers. In other words, increase in household resources is an important determinant in the decision of pregnant women to demand health care offered by modern private providers. This result confirms of the findings of Kermani et al. (2008) and Tiehi (2012). According to these previous works, rich persons are more willing to easily pay for more expensive services because they consider the price to be a good indicator of quality.

Age: Compared to women between 36 and 49 years, the other women in childbearing age have a more pronounced preference for modern public health services. Meanwhile, although, all of them are less likely to use private care services, only younger women (between 15 and 19 years) have a significantly higher probability (- 15.49% at 1% threshold) not to use them. This is an indication of the poverty that characterizes this age bracket. Indeed, in Cote d'Ivoire, adolescents are not economically independent and most of them are under

supervision of their parents. In certain case, teenager girls are forced into a marriage with an older person or often polygamous individual. In these conditions, when they fall pregnant, fearing of complications, they turn away from traditional care (deemed not credible) and private care (too expensive) to move towards the public services. Unfortunately, the demand address to public ANC services by young girls is belated (Pap et al, 2005) and often limited to the first consultation. Generally, in poor household, pregnant women do the first ANC visit in order to have a health record, required for assistance in case of childbirth in modern health center.

Education level: Women education affects the demand for ANC care. This influence is positive in the case of prenatal care in public health centers and negative for the use of private care. Specifically, compared to women with a university education, those of a lower educational attainment have an aversion for private health centers. For example, probability of using a modern private care decreases (-27.18% at 1% threshold) for women with at least one class of primary school while this probability increases (33.33% at 1% threshold) for this category of women in case of ANC visit in public health centre. This result corroborates those Adjiwanou and LeGrand (2013) who find that, compared with less-educated women, well-educated women may have a better recall of the services received, expect and insist on a higher quality of services, and they are more likely to be in a position to pay for good care.

Area of residence: Compared to women in rural areas, those of urban areas have a very strong aversion to traditional providers and probability of their use significantly dropped (-11.42% at 5% threshold). This result corroborates the negative impact of transport costs (and by extension the effect of distance). Indeed, in urban areas, proximity of ANC service makes traditional remedies irrelevant for women. That is not the case in rural areas where the geographical accessibility accentuates financial constraints on the poor rural population. In these conditions, traditional medicine is really the only option that is available to women. Our result is in the same line with Arthur (2012), who explains that expectant mothers in urban areas also tend to use more ANC care compared to their counterparts in the rural areas.

5. Summary and Conclusions

The question of ANC care services use remains a major issue in the definition of health policy in Côte d'Ivoire. Indeed, in this country, monitoring of pregnancies and birthing process is under expectation and use of maternal health services by pregnant women decreases with the evolution of pregnancy. How to explain that, despite efforts to facilitate geographical accessibility to modern health care, rate of ANC consultation remains below expectations of the authorities while traditional practices persist? It is this question (never explored in the case of Cote d'Ivoire), our study wants to answer. For these, its main objective is to capture the influence of factors likely to condition the use of maternal health services in Cote d'Ivoire. To do this, our analysis based on an empirical approach, use a multinomial probit model to estimate the decision of pregnant women in the case of a first prenatal visit.

Four main results emerge from the estimates. First, tariffs of consultation have a positive impact on women's decisions to use a public care or a traditional care. This

result supports partially those of Mariko (2003) and indicates the importance that women of childbearing grant to health care. Indeed, consultation tariff is not a significant limitation in the decision of the women, but it has a threshold beyond which women would turn away from ANC services. In revenge, as found by Arthur (2012), we obtain that transport (an essential component of financial accessibility) limits the decision of the pregnant woman. Also, women from poor households find in traditional care a perfect substitute, when the cost of access to a public health care increases. The second major result is that income elasticity of demand for private care is positive, confirming that women from wealthier households or those whose income increases have a stronger preference for private care. This result corroborates previous studies like those of Kermani et al. (2008) and Tiehi (2012). The third important finding is that, young women (specially the adolescents) have a strong probability not to have recourse to private care when they become pregnant. Finally, in reference to women with higher levels of education, women with lower level of schooling have a higher probability to use modern public health. This finding supports the view of Adjiwanou and LeGrand (2013) who find that, well-educated women are more likely to be in a position to pay for good care offered by private providers.

Our findings raise two key issues which could help to improve ANC services utilization. First, they suggest the importance to reduce women poverty. Indeed women in Africa are very poor and decision to seek ANC care is often linked to that of her husband. Reduce their financial dependence could improve the use of ANC services. Thus, developing of income generating activities for women would be a great way to promote frequentation of maternal health centers. Secondly, the findings point out the problem of young girl education. Likelihood, education increases routine ANC care utilization. Also, well-educated girls are more susceptible to apply a family planning and avoid premature pregnancy. In sum, establishment of appropriate mechanisms for reducing the economic dependence of women and improving schooling conditions in order to provide a better referee in decisions relating to ANC care may boost access to modern health services.

Although it draws pertinent conclusions, this study has some limitations in terms of methodology. Indeed, it does not take into account complexity of obstetrical itinerary, behavior of health workers (reception, corruption...) and technical facilities of the hospital. In addition, the lack of data doesn't allow us to take into account the quality of care. Yet these parameters may be important causes of the decline in the rate of consultation during the evolution of pregnancy.

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