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ORIGINAL PAPER

The impact of user fee removal policies on household out-of-pocket spending: evidence against the inverse equity hypothesis from a population based study in Burkina Faso

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Abstract
Background User fee removal policies have been extensively evaluated in relation to their impact on access to care, but rarely, and mostly poorly, in relation to their impact on household out-of-pocket (OOP) spending. This paucity of evidence is surprising given that reduction in household economic burden is an explicit aim for such policies. Our study assessed the equity impact on household OOP spending for facility-based delivery of the user fee reduction policy implemented in Burkina Faso since 2007 (i.e. subsidised price set at 900 Communauté Financière Africaine francs (CFA) for all, but free for the poorest). Taking into account the challengeslinked to implementing exemption policies, we aimed to test the hypothesis that the user fee reductionpolicy had favoured the least poor more than the poor.

Methods We used data from six consecutive rounds (2006–2011) of a household survey conducted in the Nouna Health District. Primary outcomes are the proportion of households being fully exempted (the poorest 20 % according to the policy) and the actual level of household OOP spending on facility-based delivery. The estimation of the effects relied on a Heckman selection model. This allowed us to estimate changes in OOP spending across socio-economic strata given changes in service utilisation produced by the policy.
Findings A total of 2,316 women reported a delivery between 2006 and 2011. Average household OOP spending decreased from 3,827 CFA in 2006 to 1,523 in 2011, without significant differences across socio-economic strata, neither in terms of households being fully exempted from payment nor in terms of the amount paid. Payment remained regressive and substantially higher than the stipulated 900 CFA.
Conclusions The Burkinabè policy led to a significant and sustained reduction in household OOP health spending across all socio-economic groups, but failed to properly target the poorest by ensuring a progressive payment system.

Keywords User fees · Abolition · Maternal health · Policy · Out-of-pocket spending · Burkina Faso

JEL Classification C01 · I14 · I18 · I38 · Z18

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Introduction

The recent years have been characterized by the implementation of user fee removal/reduction policies across an increasing number of sub-Saharan African countries [1]. In line with Millennium Development Goals 4 and 5 (MDG 4 and MDG 5), user fee removal/reduction has frequently

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targeted maternal care services with the explicit dual objective of increasing access to facility-based delivery, thus contributing to reduce maternal and neonatal mortality, and of decreasing the economic burden imposed on households by the high medical cost of obstetric care [2–4]. Concerns have been raised about the ability of user fee removal/reduction policies to actually benefit all socio-economic groups and not only the least poor [5], as was observed in earlier community financing policies implemented in the 1990s [6].

Impact evaluations of user fee removal/reduction policies targeting maternal care have focused almost exclusively on the assessment of the impact in relation to access to care, repeatedly showing that removal/reduction produces significant increases in service utilisation [1, 7, 8]. On the contrary, there is still an extreme paucity of evidence on the impact of user fee abolition on the economic burden faced by households, especially poor households, in spite of the fact that this has also been recognized as an explicit policy aim. Only three studies have attempted to estimate the impact of user fee removal/reduction on household out-of-pocket (OOP) spending for facility-based delivery. One study in Ghana used descriptive analytical techniques to compare OOP spending on delivery and the incidence of catastrophic payments before and after the removal of the relevant fees. The study relied only on two time measurements, one before and one after user fee removal, and on an analytical model that did not take into account the underlying changes in utilisation patterns produced by the policy [9]. One study by the authors described time trends in OOP spending on delivery in Burkina Faso, as the by-product of an analysis centred on assessing the impact of a user fee reduction policy on utilisation of obstetric services [10]. One additional study, also in Burkina Faso, developed a complex analytical model to estimate the equity impact of the policy on excessive spending for delivery, but did so using only two time measurements and deriving both of them from facility-based samples [11]. By failing to include the non-users in the analytical model, this approach could only produce limited evidence on the equity impact of user fee removal/reduction on household spending. The literature assessing the impact of user fee removal/reduction on OOP spending beyond maternal care services is similarly scant and suffers from exactly the same methodological limitations [8, 12–14].

This study attempted to fill this important gap in knowledge by using 6 years of population-based data and developing an analytical model that assessed the equity impact of user fee removal/reduction on household OOP spending for facility-based delivery while taking into explicit account the underlying changes in utilisation patterns produced by the policy. Assessing the equity impact of user fee removal/reduction on household OOP spending on delivery is essential to value such policies comprehensively, taking into account different dimensions of the effects produced [7].

Methods

Study setting

The study took place in the Nouna Health District (NHD), rural Burkina Faso. The district has a population of approximately 311,000 distributed in 300 villages. At the time of the study, the district comprised 25 first-line facilities, Centres de Santé et de Promotion Sociale (CSPS)—24 located in rural areas and one in Nouna town—and one district hospital located in Nouna town. The District does not include any additional private or charity health care facility. Throughout the time of the study, the 25 CSPS in the NHD were equipped and staffed as Basic Emergency Obstetric Care facilities capable of managing uncomplicated deliveries, while only the district hospital was equipped and staffed as a Comprehensive Emergency Obstetric Care facility capable of managing complicated deliveries, including C-sections. A sub-portion of the NHD has been part of a Health and Demographic Surveillance System (HDSS) for over 15 years [15].

Following national directives, the NHD introduced an 80 % subsidy for facility-based delivery in January 2007 [16]. The Burkinabè policy, which is one of user fee reduction rather than complete removal, has been described in detail elsewhere [17]. In brief, the policy entails that women are required to pay 20 % of the estimated total cost of delivery, i.e. 900 CFA (Communauté Financière Africaine franc) for an uncomplicated delivery, 1,800 CFA for a complicated delivery and 11,000 CFA for a C-section (US$1 is equivalent to approximately 535 CFA). The poorest women, i.e. those identified as indigents by social services staff, are supposed to be exempted from any payment. Before 2007, no formal fee exemption scheme was in place at the CSPS level. In the NHD, the policy was implemented at once across all facilities starting on 1 January 2007.

A priori, one would define the user fee reduction policy as an equitable one, given that it entails an explicit provision to exempt the very poor from payment, while asking those who are expected to be able to contribute still to pay a minimum fee. This represents a clear departure from the pre-policy period, which was characterized by full payment of maternal care services across all income groups (no exemption policy in place). Prior research, however, indicated that the exemption policy has not been effectively implemented, because of a lack of information among health care providers and the absence of proper targeting programs, the result being that all women are charged the same amount [17, 18]. Therefore, we postulated that the inverse equity hypothesis [19] could apply in this context, given that the least poor are normally better informed of policy development and have better means to overcome geographical barriers to access. In the light of these

contextual elements, we tested the hypothesis that the user fee reduction policy produced greater benefits among the least poor compared to the poorest.

Data

We used data from six consecutive rounds (2006–2011) of a repeated cross-sectional household survey which was established in the NHD in 2006 with the primary objective of monitoring utilisation and costs of health care services across a range of conditions (malaria, HIV, maternal care, diarrhoea and respiratory-tract infections). Data from previous rounds of the survey has already been used to produce a number of evaluations, including two pertaining to the utilisation of maternal care services [20, 21]. The survey sampling procedures have been described in detail elsewhere [22]. In brief, data was collected from a total of 1,050 households, selected using a three-stage cluster sampling procedure. First, clusters were defined according to the catchment area of each CSPS. Second, two villages in each cluster were selected. Third, 20 households were randomly selected in each village, using modified Expanded Program for Immunization (EPI) sampling procedures [23]. To take into account its larger population, 70 households were selected in Nouna town.

The survey entailed the application of four core modules to assess a household socio-demographic and economic profile and of a series of additional modules to monitor health-seeking behaviour in relation to the conditions listed above. Only information from the four core modules and from the module on maternal care was used for this analysis. All women who had completed a pregnancy in the 12 months prior to the survey date were interviewed on utilisation of facility-based delivery and on associated OOP spending. The sample varied between 316 in 2007 and 435 in 2009. Fluctuations in sample size across the years are the natural consequences of small fluctuations in fertility rates in the study region. Since the survey was not developed to target exclusively pregnant women, small fluctuations in sample size across years are inevitable.

Given that information on the utilisation of maternal care services was collected ex post, the survey captured information on 2 years before (2006 and 2007) and 4 years after (2008–2011) the introduction of the user fee reduction policy. It is possible, however, that a few deliveries recorded in the 2007 round of the survey had already benefitted from the policy, because this round took place exactly at the time when the policy was being implemented in the district.

Analytical approach

The assessment of the equity impact of the user fee reduction policy on household OOP spending for facility-based delivery followed a sequential approach.

First, descriptive statistics were used to estimate the proportion of women who over the years had not been charged for a facility-based delivery. Estimates were computed separately for each socio-economic quintile with the aim of verifying whether exemptions had properly targeted the poorest women. One way analysis of variance (ANOVA) was used to test whether the proportion of exempted women varied across quintiles.

Second, data were pooled together across survey years to estimate determinants of household OOP spending for facility-based delivery using a linear regression model. The outcome variable was defined as the actual amount of OOP spending reported by the women (and their households) who delivered at a facility, including women who had been fully exempted from payment. Since the governmental policy targeted exclusively medical costs at point of use and did not include any provision to cover travel costs from home to the CSPS, the expenditure variable included in this study referred exclusively to household OOP spending on direct medical costs at the point of use.

A Heckman estimation model, rather than a standard linear regression, was used to estimate the association between a given set of independent variables and the outcome of interest, i.e. OOP spending for facility-based delivery. Through the application of a two-stage regression, the Heckman model allowed one to compute the estimation while taking into explicit consideration self-selection into the sample, i.e. the fact that expenditure could only be observed for those women who had decided to deliver in a health facility in the first place [24].

OOP spending for facility-based delivery was modelled as

$$\text{Spent}_i = x_i b_i + u_{1i} \text{ (primary equation)}$$

provided that facility-based delivery occurred only if

$$z_i b_z + x_i b_2 + u_{2i} > 0 \text{ (selection equation)}$$

where Spent_i is the OOP spending for women i, x_i are the attributes of woman i, b_1 and b_2 are the coefficients associated with these attributes in the primary and secondary equation, respectively, z_i is the selection instrument (namely the distance to the referral CSPS) and b_z is the coefficient associated with this instrument

and

$$u_1 \sim N(0, \sigma) \text{ and } u_2 \sim N(0, 1) \text{ and } \text{corr}(u_1, u_2) = \rho$$

Had residuals been unrelated ($\rho = 0$), the selection equation and regression equation could have been estimated separately.

To test the hypothesis that the policy had produced a significant reduction in the amount of OOP spending, dummy variables for each survey year were entered into the model. Those reflected the time period prior to the

implementation of the policy (2006 and 2007) and the time period following the implementation of the policy (2008–2011). Time dummy variables were also included in the selection model to account for the fact that utilisation patterns themselves had changed over time as a result of the new policy, implicitly affecting the level of expenditure observed in the primary regression.

To verify whether the policy had produced equitable effects, i.e. reducing OOP spending progressively across socio-economic groups, the model tested whether the policy had affected spending on facility-based delivery differently across women of different socio-economic status. This was achieved by including in the model a series of interaction terms between socio-economic status and each survey year. This approach tested whether time (i.e. survey year) modified the relationship between socio-economic status (wealth) and household OOP spending. Had the policy been successful in producing progressive reductions in OOP spending, the coefficients of the interaction terms should have been increasingly larger (and positive) and statistically significant, indicating that the least poor had come to pay proportionally more than the poorest as a result of user fee reduction and successful indigent targeting.

The specification of a Heckman sample selection model relied on the identification of an adequate instrument supposed to have an effect on the propensity to deliver in a health facility, but no effect on the actual level of expenditure. Distance to the referral CSPS was chosen as such an instrument. From a conceptual point of view, the choice of the instrument was justified by the hypothesis that distance influenced the decision to deliver in a health facility, but not the level of expenditure at the point of use. Previous work in the study region as well as elsewhere in Burkina Faso confirmed the relevance of this theoretical assumption [10]. In addition, to verify the validity of the theoretical assumption, two independent models were run to test the association between distance and both facility-based delivery and OOP spending. The results of the models confirmed the theoretical assumption that distance influenced the choice to deliver in a health facility, but not the related expenditure on medical care (data not shown, but available upon request).

The independence of the equation residuals ($\rho = 0$) was tested using a Wald test. The test confirmed that the correlation coefficient ρ was statistically different from zero, indicating that sample-selection, i.e. that women who delivered in a facility remained different from women who did not deliver in a facility across survey years, was indeed important and ought to be taken into account when estimating the model.

Robust standard errors were estimated to take into account the fact that women were clustered in households, thus violating the independence of observations assumption.

Table 1 Variables and their measurements

Variables	Measurement
Out-of-pocket spending	Continuous variable
Facility-based delivery	0 = Non-facility-based delivery
	1 = Facility-based delivery
Year	5 Dummy variables for year 2007–2011 holding 2006 as the reference
Household wealth	Used as continuous index in regression model
	Categorized into quintiles (1 = poorest; 5 = least poor) for descriptive analysis
Hospital delivery	0 = CSPS delivery
	1 = District hospital delivery
Household size	Number of people living in the household
Parity	Number of pregnancies experienced by the woman
Distance to health facility	Kilometres to the referral CSPS
HDSS	0 = No HDSS village
	1 = HDSS village
Literacy	0 = Illiterate woman (cannot read and write)
	1 = Literate woman (can read and write)
Woman's marital status	0 = Other
	1 = Polygamous marriage

Variables and their measurement

Table 1 lists all the explanatory variables included in the model (except the interaction terms) to control for any available source of confounding. The variables are mostly self-explanatory. In line with prior research by the authors [10, 21], standard procedures applying principal component analysis were used to estimate a household wealth index using a combination of housing infrastructure (i.e. roof material, toilet type, electricity availability, water type and people per room) and durable assets (television, radio, motorbike, bicycle, telephone, cart and plough) [25].

Ethical statement

The study obtained ethical clearance from both the Ethical Commission of the Faculty of Medicine of the University of Heidelberg and the Nouna Ethical Committee, as part of a large collaborative study, SFB 544 project D4, funded by the German Research Society.

Results

Table 2 reports descriptive statistics for the pooled sample of 2,316 women who reported a delivery between 2006 and 2011. Women who delivered in a facility were more likely

Table 2 Descriptive sample statistics for explanatory variables

	Reported deliveries ($N = 2{,}316$)		Non-facility-based deliveries ($N = 677$)		Facility-based deliveries ($N = 1{,}639$)		t test[b]
	Mean	SD	Mean	SD	Mean	SD	
Household wealth	0.220	0.973	−0.055	0.830	0.334	1.004	***
Hospital delivery	NA	NA	NA	NA	0.054	0.227	
Household size	14.642	10.609	14.106	11.357	14.863	10.279	*
Parity[a]	4.038	2.528	4.325	2.606	3.919	2.486	***
Distance to health facility	4.697	5.406	8.747	5.132	3.024	4.566	***
	N	%	*N*	%	*N*	%	
HDSS							
No HDSS village	1,664	71.85	506	74.74	1,158	70.65	**
HDSS village	652	28.15	171	25.26	481	29.35	
Literacy							
Illiterate woman	2,032	87.74	626	92.47	1,406	85.78	***
Literate woman	284	12.26	51	7.53	233	14.22	
Woman's marital status							
Other	1,726	74.53	502	74.15	1,224	74.68	
Polygamous marriage	590	25.47	175	25.85	415	25.32	

* Significant at the 10 % level, ** significant at the 5 % level, *** significant at the 1 % level

[a] $N = 2{,}315$ for reported deliveries, $N = 1{,}638$ for facility-based deliveries

[b] Student t test for mean comparison between non-facility-based deliveries and facility-based deliveries

to be literate, less poor, to have experienced fewer pregnancies and to reside in an HDSS village and at a smaller distance from the referral CSPS. Note that only 5.4 % of all facility-based deliveries were hospital-based, indicating that close to 95 % of all facility-based deliveries occurred in a first-line health centre (CSPS).

As the value of the wealth index is not informative per se, Supplementary Fig. 1 shows its distribution separately for women who delivered in a health facility and women who did not. A higher concentration towards the lower bound among women who did not deliver in a health facility indicates that women who did not deliver in health facility were poorer that the ones who did.

The proportion of women who delivered in a facility increased significantly from 48.9 % in 2006 to 90.3 % in 2011 while the average amount paid decreased significantly from 3,827 CFA in 2006 to 1,523 in 2011 (Table 3).

Nevertheless, the proportion of women fully exempted from payment increased from 3 % before the policy was implemented (2006–2007) to 8.5 % after the policy was implemented (2008–2011), with a peak of 18.4 % in 2009 (Table 3). Table 4 presents full exemption by wealth quintile (data not shown by year given low numbers). No significant differences in the share of fully exempted women across wealth quintiles could be observed either before or after the policy implementation. Still, after user fee removal was introduced, a total of 10 % of all women categorized by our study to belong to the poorest quintile were fully exempted from payment compared to a prior 0 %. Note that since the wealth index calculation was based on the entire sample of 1,050 households included in the survey, wealth quintiles do not contain, and they do not need to contain, 20 % of the sub-sample relevant for this study.

Table 3 Facility-based delivery, exemption, and out-of-pocket spending

	2006	2007	2008	2009	2010	2011
N (overall)	366	316	432	435	385	383
% Facility-based delivery	48.9	57.6	67.8	72.4	84.4	90.3
% Exempted from payment (given facility-based delivery)	3.3	2.7	1.7	18.4	11.7	2.3
Average amount paid for facility-based delivery (in CFA)	3,827	3,329	1,541	1,418	1,297	1,523

Figure 1 describes how all wealth quintiles experienced the same decrease in OOP spending. The F test performed through the ANOVA suggested that OOP spending did not differ significantly across quintiles in any given year (Fig. 1).

Table 4 Share of exempted women (given facility-based delivery) by household wealth quintiles

Household wealth	Pre-intervention share of fully exempted women			Post-intervention share of fully exempted women		
	Mean	SD	*N*	Mean	SD	*N*
1st quintile (poorest)	0	0	39	0.1071	0.3104	140
2nd quintile	0.0370	0.1906	54	0.0455	0.2088	198
3rd quintile	0.0152	0.1231	66	0.0962	0.2955	239
4th quintile	0.0337	0.1815	89	0.0742	0.2625	310
5th quintile (wealthiest)	0.0442	0.2066	113	0.0994	0.2997	392
Total	0.0305	0.1721	361	0.0852	0.2793	1,279
Analysis of variance	SS	*df*	MS	SS	*df*	MS
Between groups	0.0764	4	0.0191	0.5269	4	0.1317
Within groups	10.5884	356	0.0297	99.1838	1,274	0.0778
Total	10.6648	360	0.0296	99.7107	1,278	0.0780

Fisher test (equal means): Prob > $F = 0.6327$; $F = 0.64$, Prob > $F = 0.1494$; $F = 1.69$

Bartlett's test (equal var.): $\chi^2(3) = 19.6047$; Prob > $\chi^2 = 0.000$, $\chi^2(4) = 38.8872$; Prob > $\chi^2 = 0.000$

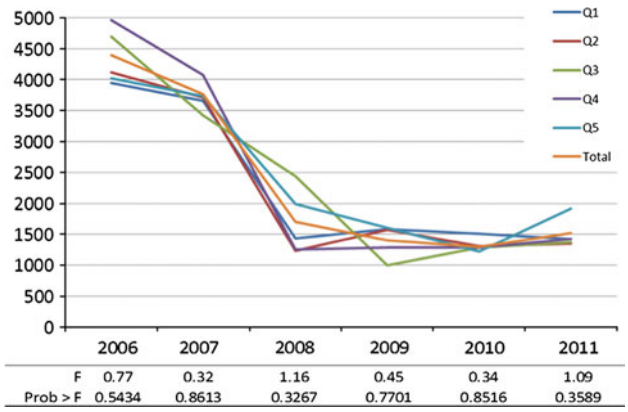

Fig. 1 Average out-of-pocket spending for facility-based delivery by socio-economic quintiles

Table 5 reports the estimated coefficients of both the primary regression equation and the selection equation, confirming the descriptive estimates from Fig. 1. Compared to 2006, all other things being equal, household OOP spending on facility-based delivery significantly decreased by 1,678 CFA in 2008, by 1,662 CFA in 2009, by 1,314 CFA in 2010 and by 948.5 CFA in 2011. No significant differences in OOP spending were identified between 2006 and 2007. The fact that all coefficients for the interaction terms remained insignificant indicates that the user fee reduction policy was neutral with respect to equity, i.e. household OOP spending decreased for all socio-economic strata alike. Likewise, the amount paid did not change in relation to wealth. Having experienced a hospital delivery and residing in an HDSS village both induced significantly higher OOP, while higher parity induced lower OOP spending on facility-based delivery.

The results of the selection equation confirmed the existence of selection bias at the level of the decision to deliver in a health care facility in the first place. Confirming prior work by the authors on a shorter observation period and using a simpler analytical approach [10, 21], the results of the selection equation indicated that over the years the number of women who delivered in a facility increased significantly and was neutral with respect to equity, i.e. the increase was the same across all socio-economic strata. Furthermore, the results of the selection equation indicated that distance continued to act as a deterrent to deliver in a facility, while residing in a HDSS village and being literate favoured it.

Discussion

To our knowledge, this is the first study that assessed the impact and specifically the equity impact of a user fee removal/reduction policy on household OOP spending for facility-based delivery, taking into explicit account the selection bias relevant when modelling expenditure data [26, 27]. Both the econometric theory and its practice postulate that accurate modelling of expenditure data is only possible when selection bias is accounted for, since expenditure data is only observed for those who decide to use health care services in the first place [28]. This postulation rests on the assumption, amply confirmed by the empirical literature [26, 29–31], that important observable and non-observable differences are very likely to exist between those who use and those who do not use services. Failing to include these differences in the model can result in biased coefficient estimation, leading to the formulation of potentially erroneous policy recommendations.

Table 5 Estimated coefficients: Heckman selection model

Variables (reference where needed)	Out-of-pocket spending (primary eqn.)		Facility-based delivery (selection eqn.)	
	Coeff.	SE[a]	Coeff.	SE[a]
Year (2006)				
2007	−434.3	(280.9)	0.210*	(0.113)
2008	−1,678***	(356.1)	0.304***	(0.110)
2009	−1,662***	(309.0)	0.411***	(0.125)
2010	−1,314***	(312.6)	0.717***	(0.164)
2011	−948.5***	(346.5)	0.896***	(0.182)
Household wealth	23.55	(188.4)	0.220**	(0.0954)
Interaction (HH wealth × 2006)				
Household wealth × 2007	314.8	(260.5)	0.0832	(0.122)
Household wealth × 2008	393.2	(248.2)	−0.0424	(0.118)
Household wealth × 2009	94.62	(235.6)	−0.148	(0.118)
Household wealth × 2010	155.0	(212.5)	−0.0426	(0.119)
Household wealth × 2011	309.8	(231.0)	−0.0625	(0.126)
Household size	−6.035	(5.731)	−0.00249	(0.00284)
Hospital delivery	1,383***	(426.4)		
Parity	−67.36**	(27.71)	−0.0195*	(0.0113)
Distance to health facility			−0.0529***	(0.0148)
HDSS village (no HDSS village)				
HDSS village	309.4**	(151.5)	0.164**	(0.0722)
Literacy (illiterate woman)				
Literate woman	192.3	(232.6)	0.216**	(0.104)
Woman's marital status (other)				
Polygamous marriage	−87.42	(117.4)	−0.109*	(0.0621)
Constant	2,287***	(367.9)	0.322***	(0.124)
Observations	1,638		2,315	
Wald	139.5			
p value	0.000			
P	0.952			
Wald test ($\rho = 0$)	45.05			
p value	0.000			

*** Significant at 1 %, ** significant at 5 %, * significant at 10 %

[a] Robust SE adjusted for household clusters

With specific reference to the estimation of the impact of user fee removal on household OOP spending, failing to take into account selection bias, as has been the case in prior studies [9, 11], implicitly entails not taking into account the changes in health service utilisation produced by the policy. User fee removal/reduction has two objectives: on the one hand, to increase access to care; on the other hand, to reduce household OOP spending on relevant health services [32]. Modelling its effects on the second objective without taking into explicit consideration the effects already produced on the first one, represents not only a violation of econometric principles [28], but also appears incoherent with the policy rationale itself [16]. Confirming the existence of important differences between women who delivered in a facility and women who did not (across survey years), the results of this study further legitimated the analytical decisions made a priori by the study team.

The more robust estimation model applied by this study corroborated evidence from prior assessments [9–11] and confirmed that user fee removal was applied effectively to reduce household OOP spending on facility-based delivery. Given that Burkina Faso is one of the poorest countries in the world with an estimated gross domestic product (GDP) based on purchasing power parity (PPP) per capita of US$1,300 (http://databank.worldbank.org), these results are especially noteworthy given that they are the product of an internally driven policy fully funded by the Burkinabè

state and applied nationwide [17]. Previous reports of similar effects were mostly based on the experience of localized non-governmental organisation (NGO)-supported projects [32, 33].

In addition, contrary to fears expressed by some observers [5], this reduction in household OOP spending was not achieved at the expense of the poorest. Household OOP spending was observed to decrease evenly across socio-economic groups, indicating that once the decision to use services was made, the policy offered equal financial protection to all households alike. To some extent, inequalities were reduced as an increasing number of poor women were fully exempted from payment. Although the results of this study indicated that exemption targeting was not as effective as it should have been (no significant differences across wealth quintiles in the share of fully exempted women), comparing the years before to the years after the policy implementation suggested that the increase in the proportion of women fully exempted from payment was most pronounced, although not significant, among the poorest. Still, only 10 % of women identified as poorest by our survey were fully exempted from payment, indicating that the policy clearly fell short of protecting the most vulnerable.

This study also confirmed that average payments at point of use remained substantially higher than the 900 CFA stipulated by national directives [16]. Moreover, not having observed any significant difference in the average amount paid at point of use indicated that payments remained regressive. This result was to be expected given that the policy introduced one single reduced rate for all socio-economic groups without taking into account the household capacity to pay. The fact that across the years, payments did not differ significantly across wealth quintiles may appear surprising and call into question the specification of the index measure. As with all index measures, we cannot exclude that our composite measure of socio-economic status may misclassify some individuals. At the same time, however, having used this same measure in several prior analyses based on the data set (the measure is computed at the household level for all households included in the data set and not for the pregnant women alone [10, 20, 21]) and always having identified an effect of socio-economic status on the outcome of interest (also in the first part model of the analysis presented in this paper), we tend to trust that the observed effect closely represents the reality of OOP payments for delivery in the study area. From a theoretical perspective, one could justify the fact that in all years, OOP payments for delivery did not differ substantially across socio-economic groups in relation to the fact that care available for delivery services in the area is quite standard. Given the rural context and the absence of alternative private obstetric care providers, there was never the option for the least poor to purchase services additional to ones provided as standard care during a delivery. Still, socio-economic status does represent a barrier to access, given that utilisation rates are lowest among the poorest. It is among users of care that the policy produced an egalitarian effect in terms of OOP payments, not on the entire sample of women included in the study.

The policy, however, could have been more equitable if its implementation fidelity had been respected [34], i.e. if full exemptions had properly targeted the poorest 20 %. This implementation gap appears to be a recurrent problem in policies that remove/reduce user fees and was observed in Senegal, Sudan, Niger and Burkina Faso [18, 35–38]. Specific to Burkina Faso, the political mandate to exempt the poorest from the remaining fee (i.e. 900 CFA) was not followed up with specific measures. This experience replicates earlier experiences both from Burkina Faso [39] and from other African settings [40], combining reduced fees with targeted exemptions for the poorest, and suggests that while combining the two may appear conceptually appropriate, the measure is probably too complicated to implement. This may largely explain why other African countries that have embarked on similar policies, following African Union and UN agency recommendations [3, 41], have chosen to remove point-of-service user fees for deliveries for all women alike. A recent multi-country study has shown that the countries that acted most quickly to improve coverage for facility-based deliveries for all were also those that were able to reduce inequalities the most [42], thereby refuting the inverse equity hypothesis [19].

Two important methodological considerations ought to be made in the light of the analysis presented in this manuscript. First, the wealth index, building on a factorial analysis of household asset distribution, is unlikely to perfectly rank households according to their wealth and might have led to misclassification of some women across quintiles. Moreover, since no specific provision was made to assist health providers in the identification of the poorest (and social service staff are not available at CSPS level where 95 % of the delivery are done), it is also likely that external measures such as the asset-based composite used in this study capture dimensions of poverty different from those taken into account by those implementing the program [43]. Still, since the same measure of wealth was applied across the 6 years of analysis (but computed independently for each observation year), the interpretation of the results is based on comparative, rather than absolute, values before and after the intervention was implemented. In addition, it ought to be noted that results are robust to alternative ways of estimating household wealth like monetary measurement corrected by inflation (data not shown, but available upon request). Second, one must

consider that the recall of expenditure figures is likely to have suffered from recall bias. Still, having interviewed women on a yearly basis, we trust to have kept such recall bias to a minimum and, at the very least, consistent across survey rounds.

Beyond its focus on household OOP spending, this study also confirmed (through the selection equation) prior evidence [8, 44, 45] on the impact of user fees removal/reduction on utilisation of formal delivery services which benefit all women and was not captured by the wealthier. Still, in line with prior evidence [8, 44, 45], it also highlighted how households' financial capacity and distance to health care facilities still seriously hindered some women from benefitting from the policy. Similarly, our study indicated that living in an HDSS area represents a clear benefit in terms of health service utilisation. This effect has been documented before in the study area in relation to the utilisation of malaria services [20]. Further qualitative inquiry is needed, however, to understand whether the effect is due to improved service delivery (given that providers are aware of being "observed") or better health awareness among the community, as a positive externality resulting from being included in continuous population and health monitoring.

Finally, the results of our study also confirm the major progress made in Burkina Faso in relation to utilisation of delivery services in comparison to neighbouring countries in West Africa. For instance, in Niger, where women still pay the full cost of deliver, only 18 % of all births take place in a facility [46]. In Ghana, where delivery care has been free at point of use since 2008, nearly 60 % of all women in the poorest quintile continued to deliver at home as of the end of 2009 [47]. In spite of all its imperfections and difficulties, one needs to clearly acknowledge the relative success of the Burkinabè policy aimed at increasing use of facility-based delivery.

Conclusion

Increasing facility-based coverage requires action on at least three fronts: extending coverage to larger populations, reducing OOP health spending and increasing the range of services on offer to respond to population needs [48]. With respect to maternal care, and specifically to delivery care, Burkina Faso has made major investments in the two first areas. Coverage of facility-based deliveries has increased remarkably, contributing to the fight against maternal mortality [4], and OOP has decreased dramatically, increasing household financing protection in the fight against poverty. To move toward universal coverage of deliveries, however, more remains to be done, particularly the complete removal of point-of-service user fees for deliveries to increase coverage further and strive for true equity [44]. At the same time, action is needed in the third area regarding both quality and availability of services, since parallel studies indicate that they are still below the necessary standards of care [49]. Finally, the state must ensure better governance of the policy, both to improve implementation fidelity [36, 50] and especially to ensure that means will be in place to maintain the policy beyond 2015, as its financial sustainability is not yet assured.

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