

# Social and Economic Consequences of the Cost of Obstetric and Neonatal Care in Lubumbashi, in the Democratic Republic of Congo: Mixed Study

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## Research article

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# Abstract

**Background:** The aim of this study was to explore and measure the social and economic consequences of the cost of obstetric and neonatal care in Lubumbashi, the Democratic Republic of Congo.

**Methods:** We conducted a mixed qualitative and quantitative study in the maternity departments of health facilities in Lubumbashi. The qualitative results were based on a case study conducted in 2018 that included 14 respondents (8 parturients, 2 accompanying family members and 4 health care providers). A quantitative cross-sectional analytical study was carried out in 2019 with 411 women who gave birth at 10 referral hospitals. Data were collected for one month at each hospital, and selected parturients were included in the study only if they paid out-of-pocket and at the point of care for costs related to obstetric and neonatal care.

**Results:** Costs for obstetric and neonatal care averaged US \$77, US \$207 and US \$338 for simple, complicated vaginal and cesarean deliveries, respectively. These health expenditures were greater than or equal to 40% of the ability to pay for 58.4% of households. At the time of delivery, 14.1% of women in childbirth did not have enough money to pay for care. Of those who did, 76.5% spent their savings. When households did not pay for care, mothers and their babies were held for a long time at the place of care. This resulted in prolonged absence of the mother from the household, reduced household income, family conflicts, and the abandonment of the home by the spouse. At the health facility level, the length of stay increased without generating any additional financial benefits. Disrespectful care and the deterioration of the relationships between caregivers and parturients were also recorded.

**Conclusion:** To reduce the social and economic consequences of care, the government of the DRC should implement a mechanism for subsidizing care and should associate it with a cost-sharing system. This would result in achieving universal health coverage and improving the physical, mental and social health of mothers, their babies and their households.

## Background

All people and communities must have the health services they need without facing financial hardship. This is achieved through universal health coverage, one of the global objectives for sustainable development by 2030, which guarantees access to quality health services for all and protects against the financial consequences of direct payment for care [1]. In the Democratic Republic of Congo (DRC), direct payment for care by the users themselves is the main mode of financing the health system: More than 93% of households must pay directly out-of-pocket to gain access to health care [2]. The cost of this care is high in relation to the income of the population, and health services are therefore often beyond the reach of the poorest people [3,4]. In fact, in the DRC, there is no financial protection mechanism for the poorest individuals, and the few health insurance plans that exist are available only to certain public or private professional companies: Prepaid systems through voluntary health insurance plans cover only a tiny fraction of the population, i.e., 7% [5]. This constitutes a major challenge for the health system in general. In terms of obstetric and neonatal care in particular, several studies across the country have found that the cost of providing this care is expensive for households at the time of delivery and results in catastrophic costs [6–10]. Nevertheless, 81.5% of women give birth in a hospital environment in the presence of qualified personnel, with a high fertility index, at the rate of 6.6 children per woman [11,12]. Households using this care through direct payment are likely to face significant social and economic consequences in the short and long term. In a context of the DRC, where the price of care constitutes a barrier for 35% of individuals [13] and the maternal mortality ratio is still among the highest in the world [12,14], the need for a financial protection mechanism for households is indisputable: It would reduce financial barriers to the accessibility and use of health services and would protect individuals from social and economic consequences. However, it must necessarily be based on clear quantitative and qualitative scientific data, and such data are still insufficient [2,15–17]. Therefore, the objective of this study was to explore and measure the social and economic consequences of the cost of obstetric and neonatal care in Lubumbashi, DRC.

## Methods

### Context

This study was carried out in Lubumbashi, the second largest city in the DRC in terms of density and socioeconomic development. This city is the capital of the province of Haut-Katanga and includes seven administrative communes, eleven health zones covering nine geographic zones and two special zones belonging to the military and the police. Each health zone has several first-line structures (for primary care), intermediate structures and hospitals. These health facilities belong to a large and diverse group of institutional providers (the state, religious denominations, local NGOs, and independent parastatal and private companies); however, the state sector remains the majority provider in the supply of hospital care through its general reference hospitals [18,19].

## Study design

We conducted a mixed qualitative and quantitative study (QUAL-QUAN). The study design was exploratory-sequential; the first study was qualitative and aimed to explore the consequences of the high cost of obstetric and neonatal care that are experienced daily by the women who have recently given birth. The second study was quantitative and initiated after the analysis of the qualitative data, and it aimed to measure the burden or the consequences of the charges imposed on households. *Qualitative aspect* The qualitative study was carried out between May and November 2018 with 14 respondents, including 8 parturients, 2 accompanying family members and 4 health professionals providing maternity services to three health facilities, including a first-line structure and two referral hospitals. This survey was a case study carried out using semi structured and iterative individual interviews that were conducted by the same researcher (the principal investigator of the study) following a tested interview guide that was developed in French and translated into the local language (Swahili). These interviews were transcribed by computer and recorded on a Dictaphone only with the consent of the respondents. All respondents were selected in a reasoned and progressive manner depending on whether they agreed to participate in the study and whether they could provide relevant information. During the interviews, the developed themes allowed the participants to express themselves freely and without constraint. They were contacted until the data were saturated with the content of the interviews. All of the selected women had experienced complications at the time of delivery and had to pay directly at the point of care. Those who were selected at the level of the reference hospitals were detained there for nonpayment of these costs. From the parturients, we gathered information concerning difficulties with paying for care, strategies for the recovery of funds, changes in lifestyle within the household, relationships within the couple and the family, relationships between caregivers and the parturients and representations of childbirth. These data were completed and triangulated with information provided by accompanying family members and health care providers. The analysis of all the interviews was carried out by content and then transversally to highlight the convergences and divergences of the data. The analysis was carried out independently by two researchers based on the interview guide. The amounts of expenditure reported (expected or paid) by women were expressed in American dollars (US \$) at the average exchange rate of 1,600 Congolese francs (Fc) for 1 US dollar (US \$) [*exchange rate observed at time of investigation*]. *Quantitative aspect* After analyzing the qualitative data, we conducted an analytical quantitative cross-sectional study in the maternity departments of 10 health facilities (reference hospitals). Data were collected in 2019, and each hospital was surveyed for a period of one month. At each health facility, the survey was exhaustive with all women who gave birth during the study period (one month) and who paid directly out-of-pocket and at the place of care for the costs of obstetric and neonatal care. These criteria allowed us to constitute a sample of 411 parturients in total. Based on interviews structured by a pretested questionnaire and a documentary review of maternity cards and records, we examined the sociodemographic characteristics of the women, the type of childbirth, the complications that arose, the profile of newborns, spending on household consumption and health expenditures. These health expenditures were related to the financial cost borne by women and their households for obtaining obstetric and neonatal care. These costs were calculated as the sum of direct payments related to childbirth (medical consultation and maternity card, act of childbirth, surgical intervention, operating kit and dressing of operating wounds in cases of cesarean section, treatment of complications, maternity stay, purchase of prescription drugs or not) and newborn care. Transportation used for the round trip to maternity and other paid costs (tips) were excluded from the health expenditure analysis. Based on the declarations of parturient women, we recorded and calculated the total household expenditures that corresponded to the monthly average of the following consumption expenditures: food, clothing, schooling for children, housing, transport, visits, parties and entertainment, water, electricity, mobile phone units and other unexpected expenses. All amounts spent were expressed in US dollars (US \$) at the average exchange rate of 1600 Congolese francs (Fc) for 1 US dollar (US \$) [*average exchange rate observed in 2019*]. Quantitative data were managed and analyzed with SPSS Statistics version 21.0, Epi Info Version 7 and Excel 2013 software. We used the World Health Organization (WHO) methodology described by Ke Xu to measure the burden or consequences of direct health payments [20]. Thus, for each household, this burden was calculated as the percentage of direct care payments over the household's ability to pay. This ability to pay was

equal to total expenses minus substitution expenses when these were less than or equal to food expenses. In cases where substitution expenses were greater than food expenses, the ability to pay was equal to total expenses minus food expenses. The calculation of the burden of direct health payments enabled us, using the same methodology described by Ke Xu [20], to measure the rate of financial catastrophe (catastrophic expenditure) at the thresholds of 5%, 10%, 20% and 40% of the ability to pay of households, as well as the impoverishment of households induced by the costs of obstetric and neonatal care. A household was considered poor (living below the poverty line) when its total expenditure was lower than its subsistence expenditure, and a non-poor household was impoverished when it fell below the poverty line after paying for care.

### **Ethical considerations**

Data were collected anonymously. To ensure anonymity, all identities of the respondents were coded. We obtained their voluntary participation on the basis of free and informed consent. The collected and analyzed data was kept confidential. The research team obtained authorizations from health authorities and health professionals who provided agreement in writing. But free and informed consent to participate in the study was obtained verbally from mothers and their accompanying family members. The study obtained the approval of the Medical Ethics Committee of the University of Lubumbashi (CEM-UNILU: UNILU/CEM/132/2019).

## **Results**

*Qualitative aspect* The results of the first table show the characteristics of the parturients and their newborns and the characteristics of care based on qualitative research. We noticed that the average length of stay was approximately 3 weeks and that the average cost of care was US \$ 21.8 at the front line and US \$ 243.1 at the hospital. Analysis of the qualitative data revealed to us in the first figure that when the cost of care is too high for households, it becomes unaffordable for them. Two conditions arise: if the household is solvent, it can either spend all its savings, borrow funds, sell items, reduce the consumption of essential goods (food, clothing, housing, schooling for children, etc.) or obtain assistance from relatives. This household will be impoverished, but it will pay for care. Otherwise, if the household is insolvent and cannot obtain enough money to pay the costs, mothers and newborns are detained for a long time at the place of care. This leads to a prolonged absence of the mother at the household level, a reduction in household income, family conflicts, and the abandonment of the home by the spouse. This further impoverishes the household, and at the level of the health facility, the length of stay is sometimes increased without treatment and without the health facility recording any additional financial benefits. Patient escapes are being recorded, and the relationship between caregivers and parturients is degraded, as healthcare providers now provide disrespectful care to patients.

### **Payment difficulties and detention at the place of care**

In their interviews, the health care providers and parturients said that the latter did not expect the complications they experienced during childbirth or what it would cost them. They were all hoping for a normal birth. Some women did not consult healthcare providers during pregnancy, and for others, the complication was not diagnosed during prenatal follow-up. *"I didn't know it was a cesarean, I didn't even know how much I had to pay; I was referred urgently from a health center... My husband earns around 10,000 Fc (6.25 US \$) per day, and we are asked to pay 350,000 Fc (219 \$) for the intervention, apart from the costs relating to medication and the stay ... I only gave them 35,000 Fc (\$ 22) that I had prepared for a normal delivery ..."* [Parturient NIK]. *"It is in the case of obstetric complications that the cost increases... If someone has no money available, we hold it because if we release it, there will be no hope of recovering this money..."* [Health care providers DEPS].

### **Fund recovery strategies**

The respondents mentioned that they are part of poor or deprived households whose heads are unemployed, work in the informal sector (without fixed income), or practice a survival trade. No one wants to lend them money because of their insolvency. *"I sold salt, soap and tomatoes, I earned almost 7,000 Fc to 10,000 Fc per day (\$ 4.30 to \$ 6.30) for children's food. What my husband earns helps with their education, transportation and other needs. But since I have been here, I can no longer sell, everything is ruined ... What my husband earns cannot keep the children alive at home and me too in the hospital ..."* [Parturient NIK]. *"There are families who obviously have the will to pay for care and to leave the hospital, but by observing them, we notice that they have nothing ... It was the mom who sold tomatoes, vegetables or embers that end up in the hospital ... The husband is a contractor, his salary is insignificant ... If he is not taken for a daily job, he is at home and he has nothing ..."* [Health care provider CEPK].

## Changing lifestyle within the household

The parturients testified that their detention at the place of care resulted in not only separation of the couple but also prolonged maternal absence felt at the family level. This created problems of education, nutrition, schooling, and safety of other children as well as reduced family income since the mother could no longer carry out her usual business activities. *"I had to stop my small business, stay in the hospital until we pay all the bills... But as long as I'm in the hospital, I can't sell and I can't help my husband: everything is fucked up ... He alone has to pay for everything: food, schooling, transportation, clothes, etc. Under these conditions, there will be no money to pay for care ... I do not know what to do for the other children, I have seven, and they stay alone at home since their dad is a motorcyclist and he stays a long time in town to find the necessities... Only two of them go to school, my oldest daughter even got pregnant..." [Parturient MAK].*

## Relationships within the couple and the family

According to the declarations of the parturients and accompanying family members, relations within the couple and the family were strained. Without knowing how long the mother would be gone, the spouse left the family home in search of money. Family members no longer had the means to bring food, water or soap to the hospital every day. Out of shame, embarrassment or simply out of weariness, they stopped inquiring about the state of health of their sister, daughter, mother, wife, and their son (daughter) or grandson (daughter). *"It is my aunt/my little sister who brings me food, soap or water from time to time, and most often, I share those of my room neighbors ... Even my mother comes here very rarely..." [Parturient VAS]. "Since the birth, my husband left the house on the pretext that he went to get the money ... I think that sometimes he intends to return, but he cannot; he is afraid that he will be face claims to money he doesn't have ..." [Parturient CAS]. "... We didn't argue ... But he doesn't come to see me at the hospital. Besides, no member of his family comes to see me; they don't even think that I should eat too..." [Parturient BEK].*

## Relationships between caregivers and parturients

In terms of health facilities, we observed that the established rates canceled the expected benefit since the clients could no longer pay for their care. The healthcare professionals stated that beds were occupied free of charge, the drugs used were not reimbursed, the care offered was not valued, and the women who gave birth escaped. This situation led to drug stock-outs, demotivation of staff, lack of confidence in the caregiver-caregiver relationship, exclusion from certain care and disrespectful care. Nevertheless, the health professionals declared that they maintained the quality of care for parturients to the limits of their means. *"Women frequently escape without paying, especially if it is a case of stillbirth... To escape, they put their babies in a bucket or even in a bag and they run away... They simply manage with the sentries – who are not paid well either – and they go out easily ... The length of stay can go up to two or three months ... Sometimes, the director of the hospital authorizes discharges even in the event of partial payment of invoices... If the woman and her baby remain in the hospital beyond the planned stay, the amount of the first invoice will not change..." [Health care provider DOPK]. "My husband gave the pastor medical prescriptions, and he agreed to buy the medicines for us, but when we brought them to the hospital, the nurses told us that these were not the products there. I had to buy... I don't know what to do; I wait without treatment until my husband, who has gone in search of a better work contract, finds the money for other drugs and returns to pay..." [Parturient VAS]. "... They separated me from my baby and only call me to breastfeed her ... I beg, I ask them to trust me, I cannot run away, I will stay in the hospital since the removal of the son's suture is incomplete... When the child is in neonatology without treatment, we have to pay for the bed, and the cost of care increases. I can't escape, I just want to get my child back ..." [Parturient CAS]. "The woman who came to give birth with a husband, she became pregnant intentionally, and she should therefore be able to pay for her care ... We do not accept paupers at maternity ... If necessary, the government should subsidize..." [Health care provider CEPK].*

Quantitative aspect In the second table, the quantitative data show that the average age of the parturients recruited was  $30 \pm 6$  years; 2 in 10 women had a primary education, and 88.8% were married. Almost half of them (46.0%) and nearly half of their spouses (45.8%) were in liberal professions. Each household had an average of  $3 \pm 2$  living children. The third table shows that 4 in 10 women experienced complications during childbirth and that 3 in 10 women gave birth via cesarean section. Prolonged labor and obstructed labor were the most commonly treated complications (57.9%). The mean length of stay was higher in the case of obstetric and/or neonatal complications (up to  $16 \pm 23$  days). One-quarter of newborns experienced complications at birth (25.5%), and 94.4% remained alive until discharge from maternity.

## Health payments and monthly household expenses

In the second graph, we see that the cost of care for newborns averaged US \$28 per household. On the other hand, the cost of obstetric care for a simple vaginal birth was 2.7 times less than that of a complicated vaginal birth (US \$74 vs. US \$ 197). The care provided during this latter type of delivery cost almost 2 times less than that obtained in the case of a cesarean section (US \$ 179 vs US \$ 329). The third graph shows that monthly expenditures on food represented 35% of total household expenditures, or \$ 218 on average per household.

### **Availability of funds and adaptation strategies**

At the time of delivery, 14% of women did not have enough money available to pay for care. For this reason, 9 women (2.2%) were detained at the point of care. In contrast, households that could afford care had to spend their savings in 76.5% of cases, and 17.3% of women reported decreasing consumption of essential goods; these were food requirements in 66.2% of the cases (Table 4).

### **Impact of health expenditures related to obstetric and newborn care on households**

It was clear that almost all of the households surveyed were already poor (9 out of 10 households). Health expenditures related to obstetric and neonatal care represented 20.8%, 79.6% and 121.6% of households' ability to pay, during simple deliveries, complicated vaginal deliveries and cesarean sections, respectively. However, compared to total expenditures, health expenditures represented 12.3%, 43.2% and 68.2% for simple deliveries, complicated vaginal deliveries and cesarean sections, respectively (Table 5). We found that the more complications that occurred at the time of delivery, the more households suffered financial disaster. Thus, 93.3%, 75% and 37.2% of households that underwent cesarean section, complicated vaginal deliveries and normal deliveries, respectively, incurred catastrophic expenses greater than or equal to 40% of their ability to pay (Table 6).

## **Discussion**

Direct payment for care by users compensates for shortfalls in state funding since the supply of health care generally involves financial costs to be recovered [9,21–27]. In the absence of a financial protection system, these costs become high relative to household income, reducing households' access to care [9,21–23,25–30] and/or becoming catastrophic or impoverishing expenses [20,31–33]. Several surveys around the world have shown that this method of payment constitutes a barrier to access to quality health care [19,34–39] and leads to a lack of equity and universal health coverage [2,6,10,14,19–22]. The same is true for interventions that reduce the case fatality rate among women with obstetric complications, which in this case cause high, unaffordable, catastrophic and impoverishing costs for households in resource-poor countries. The literature shows that households that do not have enough money to pay for care must make a choice between becoming poorer by supporting these expenses and the consequences linked to debt repayment, stress and social tensions, or give up seeking treatment and endure persistent health problems that in turn reduce the ability to work and nonetheless lead to impoverishment [22,25,40,41]. In Mali, between 20.7% and 53.5% of households have incurred catastrophic expenses greater than 15% and 5% of their annual income, respectively. Several marriages have dissolved due to the pressure of impoverishment and debt. Even cases of maternal death resulted in catastrophic expenses, and the households of escapees struggled to obtain enough food; one or more family members had to leave to look for a new job to be able to repay debts or feed their families [41]. In Burkina Faso, households were no longer able to continue their productive activities because their capital was depleted. The women blamed themselves for having aggravated preexisting financial difficulties that had engendered domestic rivalries and social tensions [3]. In Bangladesh, the wealthiest households financed care through income and savings, while the poorest households resorted to borrowing from high-interest local lenders, thereby becoming vulnerable to financial difficulties [42]. In India, the median cost of care ranged from US \$11.15 for normal delivery to US \$ 15.90 for complicated cases [43]. Almost 15% of households spent more than 40% of their monthly income. Up to approximately one year after giving birth, women with serious maternal complications had not only significant financial repercussions but also a higher risk of mental depression and more difficulty performing daily household tasks [44]. The present study in the DRC shows that obstetric and neonatal care is expensive. These generate catastrophic spending for already poor households. This financial catastrophe is not without social and economic consequences because those who can pay spend their savings or reduce their basic needs. However, for households that cannot pay, the mothers and babies are held at the point of care, sometimes without treatment, since they cannot afford care. This study aligns with several other studies within the DRC [6,8,9] and elsewhere [32,45–47] revealing that even the lowest healthcare costs are out of reach for many people. As a result,

several social and economic consequences arise at the household level: exclusion from health care, indebtedness and high use of the informal sector [15,39,48]. It is true that the presence of qualified personnel during all deliveries is considered to be one of the most important interventions for safer births because it reduces maternal deaths and increases successful delivery of infants [41,49–51]. On the other hand, as this study and several other studies have demonstrated, in poor countries, women and families who must pay out-of-pocket for the costs of care suffer in terms of their physical, mental and social states, and these distressing repercussions are linked to the unaffordable cost of the care they receive. This issue also raises questions regarding staff motivation, patient-centered care, the renewal of equipment, the supply of drugs to maintain quality, the availability of care and the improvement of conditions in the health infrastructure [52–54]. These issues are all the more serious because they occur at the level of state structures that normally should be supported by the government but are not sufficiently supported because of the slow disbursement of budgetary allocations, which already do not meet the requirements of the Abuja Agreements [17,55,56]. All in all, in an environment where seven out of ten households are poor, we believe that the Congolese State should, failing to introduce free healthcare, follow the example of several other countries [15,30,40,57,58]: create an effective and sustainable healthcare subsidy policy; favor and promote the establishment of cost-sharing and/or financial risk systems that focus on the poorest households; and improve the quality of care and ensure that care management is based on community participation, especially that of male sexual partners, who are equally involved in conception [36,38,59]. When the cost of obstetric and newborn care becomes unaffordable for households, it is no longer possible to achieve universal health coverage.

## Conclusion

While providing adequate obstetric care to all women with high-risk pregnancies or complications is one of the pillars of safe motherhood, the cost of this care is unaffordable and results in catastrophic financial outcomes that have economic consequences and social impacts on already poor households. Thus, support strategies for sharing costs and/or financial risks, providing financial protection for households and improving the quality of relationships between caregivers and patients are required.

## Abbreviations

DRC: Democratic Republic of Congo; Fc: Congolese Francs; NGOs: Non-governmental organizations; QUAL-QUAN: qualitative and quantitative study; SD: Standard deviation; US\$: US Dollar; WHO: World Health Organization

## Declarations

### Ethics approval and consent to participate

The research team obtained authorizations from health authorities. Health professionals provided agreement in writing, but free and informed consent to participate in the study was obtained verbally from mothers and their accompanying family members. The study obtained the approval of the Medical Ethics Committee of the University of Lubumbashi (CEM-UNILU: UNILU/CEM/132/2019).

### Consent for publication

Participants gave consent for direct quotes from the interviews to be used in this manuscript.

In this study, the authors did not obtain the participants' consent for the original and/or analyzed data to be publicly available.

### Availability of data and materials

All the data generated or analyzed during the quantitative research are included in this published article and its additional information files. Most of the data used and/or analyzed during the qualitative survey are available from the corresponding author upon reasonable request. Data will be restricted when judged by the principal investigators that privacy could be compromised.

### Competing interests

The authors declare that they have no competing interests

## Funding

Not applicable

## Authors' contributions

MNA, NMA, OMJ, MTH and MKF participated in the research protocol design, contributed to the interpretation of the results and provided critical comments on the study and the document. MNA conducted all individual interviews and transcribed the data. MNA and NMA read the transcripts and analyzed and interpreted the data. MNA wrote the manuscript, OMJ translated it, and all authors have read and approved the final content critically.

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## Tables

**Table I. Characteristics of parturients, newborns and care (qualitative survey)**

Characteristics	Frequency (n=8)	Mean
Average age of mothers (in years)	8	23.6
Average age of newborns (in weeks)	8	7
Average length of stay (in weeks)	8	3.1
Profession of newborns		
Any	3	
Informal sector	4	
Formal sector	1	
Average monthly income per woman (US \$)	8	58.6
Type of birth		
complicated vaginal delivery	4	
Cesarean section	4	
Average financial cost of childbirth by health facility (US \$)		
Health center (first line)	2	21.8
General referral hospital	6	243.1

**Table II. Profile of parturients (quantitative survey)**

<b>Profile</b>	<b>Frequency (n=411) n (%)</b>	<b>Mean ± SD</b>
Age (in years)		30 ± 6
< 20	12 (2.9)	
20 – 35	306 (74.5)	
> 35 – 46	93 (22.6)	
Marital status		
In couple	365 (88.8)	
Single	46 (11.2)	
Level of study		
Primary	85 (20.7)	
Secondary	253 (61.6)	
University	73 (17.8)	
Profession		
Private enterprise	32 (7.8)	
Public company	27 (6.6)	
Liberal profession	189 (46.0)	
Unemployed	163 (39.6)	
Profession of spouses		
Private enterprise	78 (21.4)	
Public company	95 (26.0)	
Liberal profession	167 (45.8)	
Unemployed	25 (6.8)	
Place of investigation		
Kamalondo Hospital	26 (6.3)	
Kampemba Hospital	55 (13.4)	
Katuba Hospital	50 (12.2)	
Kenya Hospital	56 (13.6)	
Kisanga Hospital	32 (7.8)	
University clinics	87 (21.2)	
J Sendwe Hospital	31 (7.5)	
Mumbunda Hospital	36 (8.8)	
Ruashi Hospital	18 (4.4)	
HMR Hospital	20 (4.9)	
Number of living children		3 ± 2
Any	7 (1.7)	

1 to 4	292 (71.0)
4 to 8	104 (25.3)
More than 8	8 (1.9)

*SD = Standard deviation*

**Table III. Delivery, complications, newborn profile and length of stay**

<b>Characteristics</b>	<b>Frequency (n =411) n (%)</b>	<b>Stay in days mean ± SD</b>
<b>Type of birth</b>		
Cesarean section	120 (29.2)	5 ± 24
Complicated vaginal delivery	52 (12.7)	16 ± 51
Normal delivery	239 (58.2)	14 ± 39
<b>Complications of childbirth</b>		
No	240 (58.4)	5 ± 24
Yes	172 (41.8)	15 ± 43
<b>Types of obstetric complications</b>		
Eclampsia and pre-eclampsia	21 (12.3)	8 ± 5
Hemorrhages	49 (28.7)	15 ± 53
Dystocia (extended work)	99 (57.9)	16 ± 43
Uterine ruptures	3 (1.7)	16 ± 23
<b>Newborns (n= 416)</b>		
<b>Sex</b>		
Female	177 (42.5)	
Male	239 (57.5)	
<b>State at birth</b>		
Living	388 (94.4)	
Stillborn	24 (5.8)	
Death after birth	4 (0.9)	
<b>Birth complications</b>		
No	314 (75.5)	6 ± 17
Yes	102 (25.5)	19 ± 60

*SD = Standard deviation*

**Table IV. Availability of funds and household adjustment mechanisms**

<b>Characteristics</b>	<b>Frequency = 411 n (%)</b>
Money available at the time of delivery	
No	58 (14.1)
Yes	353 (85.9)
Source of income if money available (n=353)	
Help from friends and relatives	16 (4.5)
Money transferred from outside by relatives	7 (1.9)
Loan	19 (5.4)
Saving	270 (76.5)
Sale of assets	41 (11.6)
Reason for lack of funds if money not available (n=58)	
Spouse on a trip	4 (6.9)
Unemployed wife or spouse	8 (13.8)
Insufficient financial income	43 (74.1)
Type of care not planned	3 (5.2)
Detention of woman for lack of money	
Yes	9 (2.2)
No	402 (97.8)
Reduction of basic needs to pay for care	
No	340 (82.7)
Yes	71 (17.3)
Types of reduced needs (if yes)	
Children's education	13 (18.3)
Rent	7 (9.9)
Food	47 (66.2)
Other requirements	4 (5.6)

**Table V. Average cost (CM) of obstetric and newborn care, ability to pay and household impoverishment (in US \$ per woman)**

Characteristics		Cost of care per woman in US \$	Total household expenditure in US \$	Ability to pay per household in US \$	% of average cost / Total expenditure	% of Average Cost / Ability to Pay	Proportion of poor households **	Proportion of non-poor and impoverished households
	Frequency	<i>mean ± SD</i>		<i>mean ± SD</i>	%	%	<i>n (%)</i>	<i>n (%)</i>
<b>Type of birth</b>								
Normal delivery *	239	77 ± 70	626 ± 625	371 ± 392	12.3	20.8	226 (94.6)	0 (0)
Complicated vaginal delivery *	52	207 ± 128	479 ± 444	260 ± 256	43.2	79.6	49 (94.2)	0 (0)
Cesarean section *	120	338 ± 160	495 ± 354	278 ± 249	68.2	121.6	116 (96.7)	2 (50)

\*\* Poverty line = substitution expenses \* Obstetric and neonatal care

Table VI. Incidence of catastrophic expenses by type of birth (as a % of households' ability to pay)

All the women (N)	Expenses ≥ 5%			Expenses ≥ 10%			Expenses ≥ 20%			Expenses ≥ 40%			
	<i>n</i>	% ☒	<i>Mean ± SD (US\$)</i>	<i>n</i>	%☒	<i>Mean ± SD (US\$)</i>	<i>n</i>	% ☒	<i>Mean ± SD (US\$)</i>	<i>n</i>	% ☒	<i>Mean ± SD (US\$)</i>	
<b>All treatments</b>	<b>411</b>	<b>386</b>	<b>93.9</b>	<b>351</b>	<b>85.4</b>	<b>303</b>	<b>73.7</b>	<b>240</b>	<b>58.4</b>				
<b>By type of birth</b>													
Normal delivery	239	214	<b>89.5</b>	83 ± 72	186	<b>77.8</b>	89 ± 74	143	<b>59.8</b>	101 ± 79	89	<b>37.2</b>	118 ± 83
Complicated vaginal delivery	52	52	<b>100</b>	207 ± 128	48	<b>92.3</b>	220 ± 125	45	<b>86.5</b>	232 ± 119	39	<b>75.0</b>	247 ± 116
Cesarean section	120	120	<b>100</b>	337 ± 160	117	<b>97.5</b>	345 ± 156	115	<b>95.8</b>	350 ± 152	112	<b>93.3</b>	354 ± 148

☒: % calculated by dividing *n* (number of women with percentage greater than or equal to the threshold) compared to *N* (number of women included in the study)

## Figures

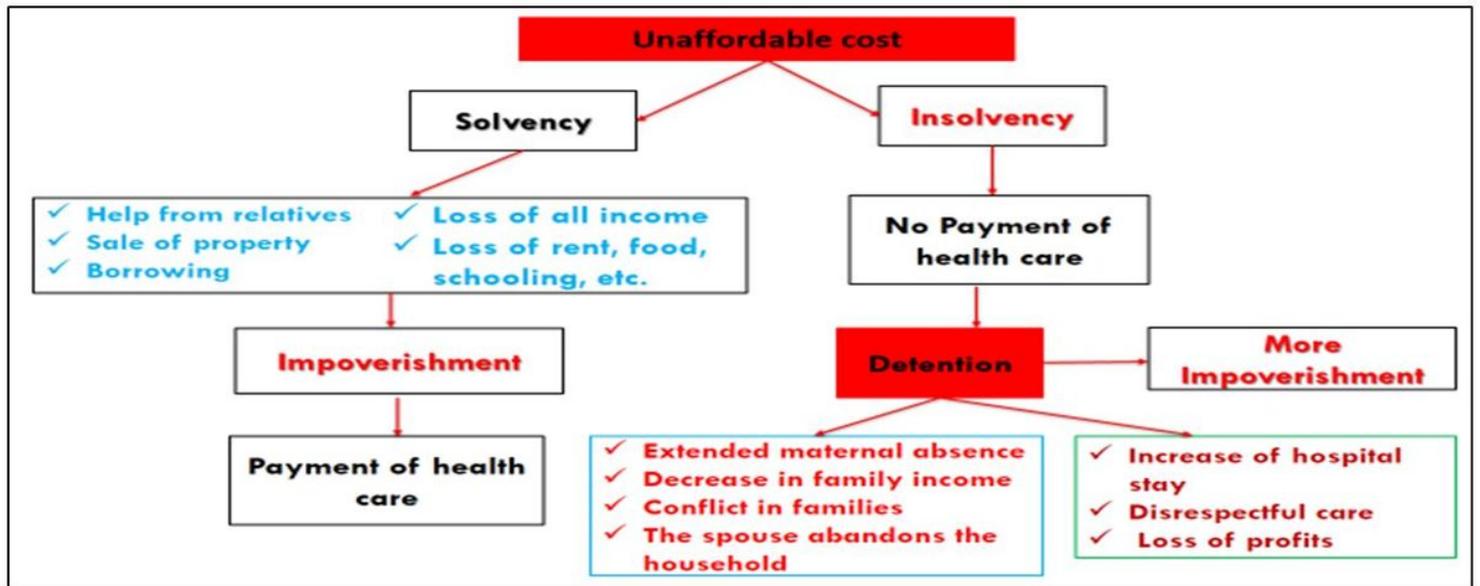


Figure 1

Consequences of the cost of obstetric and newborn care on households.

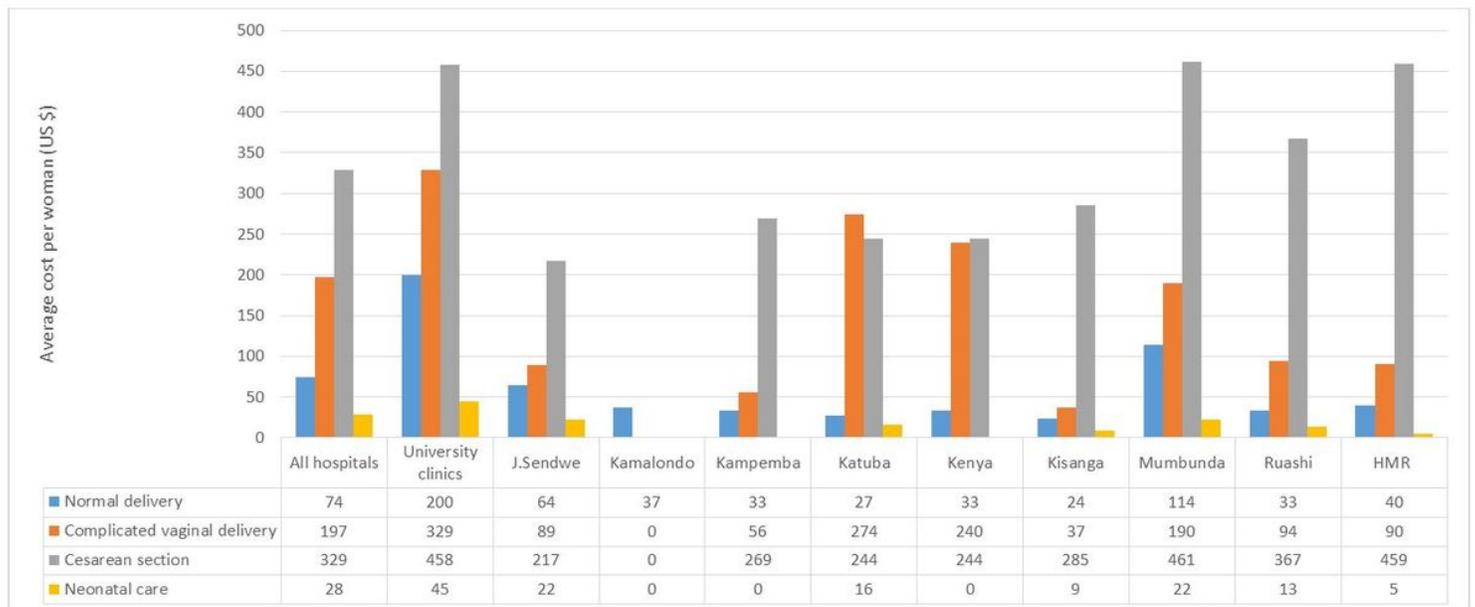
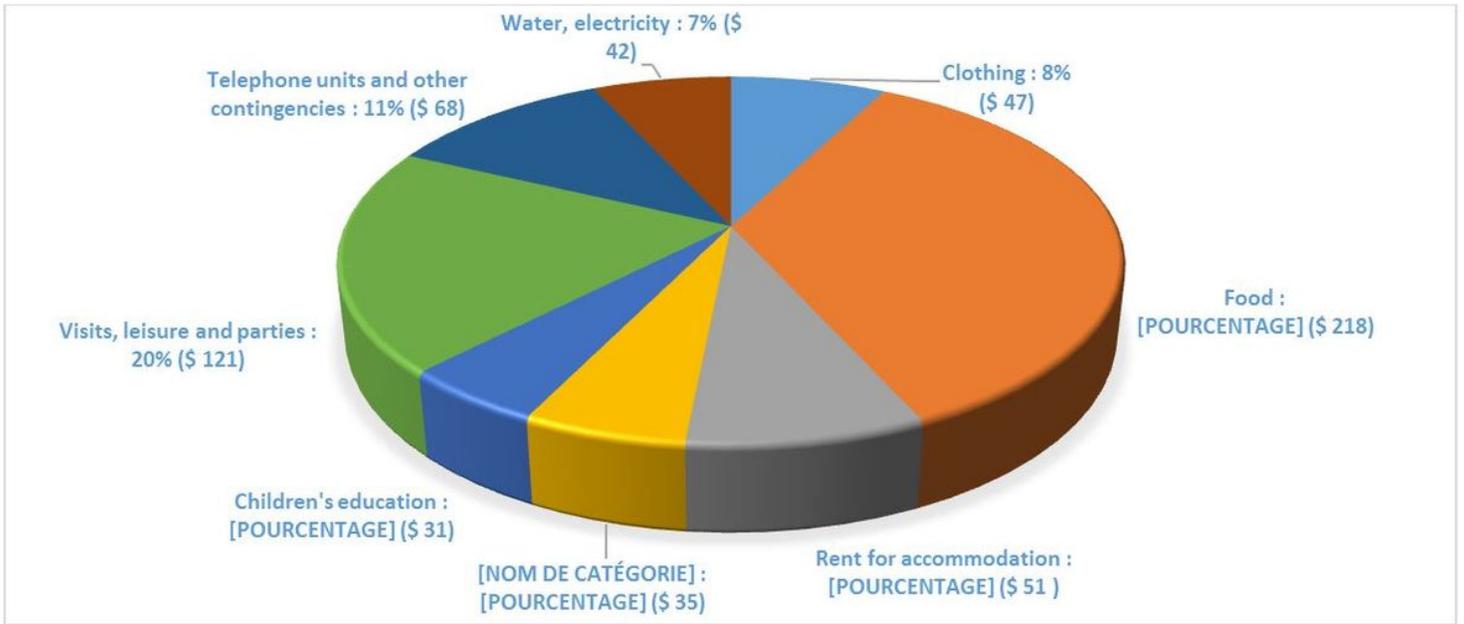


Figure 2

Average cost of obstetric and neonatal care per woman and per health facility.



**Figure 3**

Proportion of monthly household spending (average in USD \$).