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Antenatal and Delivery Services in Kinshasa, Democratic Republic of Congo: Care-seeking and Experiences Reported by Women in a Household-based Survey

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Abstract

Objectives—Increasing coverage of quality reproductive health services, including prevention of mother-to-child transmission services, requires understanding where and how these services are provided. To inform scale-up, we conducted a population-based survey in Kinshasa, Democratic Republic of Congo.

Methods—Stratified two-stage cluster sampling was used to select women 18 years old who had been pregnant within the prior three years. Participants were interviewed about their reproductive healthcare utilization and impressions of services received.

Results—We interviewed 1221 women, 98% of whom sought antenatal care (ANC). 78% of women began ANC after the first trimester and 22% reported <4 visits. Reasons for choosing an ANC facility included reputation (51%), friendly/accessible staff (39%), availability of comprehensive services (29%), medication access (26%), location (26%), and cost (21%). Most women reported satisfactory treatment by staff, but 47% reported that the ANC provider ignored their complaints, 23% had difficulty understanding responses to their questions, 22% wanted more time with the provider, 21% wanted more privacy, and 12% felt uncomfortable asking questions. Only 56% reported someone talked to them about HIV/AIDS. Strongest predictors of seeking inadequate ANC included low participant and partner education and lack of certain assets. Only 32% of women sought postnatal care. Some results varied by health zone.

Conclusions—Scaling-up interventions to improve reproductive health services should include broad-based health systems strengthening and promote equitable access to quality ANC, delivery, and postnatal services. Personal and structural-level barriers to seeking ANC need to be addressed, with consideration given to local contexts.

Keywords

Antenatal Care; prevention of mother-to-child transmission of HIV; Democratic Republic of Congo; maternal and child health; household survey; implementation research

INTRODUCTION

Improving access to, as well as the utilization and quality of, reproductive health services are key strategies for reaching the 2015 Millennium Development Goal (MDG) to improve

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maternal health (1). Located in a region where the maternal, newborn and child mortality rates are among the highest in the world, the Democratic Republic of the Congo (DRC) is a priority country in which to scale-up key health interventions in order to reach the MDG targets. The 2007 Demographic and Health Survey found that 96% of women in the capital city of Kinshasa received antenatal care and 97% of deliveries were assisted by health professionals (2). However, according to 2012 estimates, the lifetime risk of maternal death in the DRC is 1 in 30, compared to 1 in 3800 in developed countries (1). Thus, low access to quality reproductive health services, including services for prevention of mother-to-child transmission (PMTCT) of HIV, remains an important public health problem.

Despite international support, scale-up of quality reproductive health services in the DRC has been challenging due to decades of civil war, as well as deteriorating socioeconomic conditions and healthcare infrastructures. According to the most recent government estimates available, about 40% of estimated deliveries in Kinshasa were not reported to public health authorities of the 35 health zones throughout the city suggesting that a substantial proportion of reproductive healthcare appears to be provided in clinics that do not report to the Ministry of Health (3).

Fewer than 20% of HIV-infected women in Kinshasa deliver in a PMTCT-implementing clinic (3). While PMTCT services have become more available in Kinshasa in the past few years, unmet needs persist and the availability of reliable indicators of access is limited. Improving the quality of reproductive health services to include services such as PMTCT requires understanding where and how women are currently accessing their care. There is a particular need to understand access among women who seek care at clinics that may not report to public health authorities, as these facilities are often unaccounted for in the scale-up of healthcare services.

In order to inform the expansion of PMTCT, we conducted a population-based household survey to understand where and how women access reproductive healthcare services in Kinshasa. Although scale-up of PMTCT was the primary motivation for this study, the population-based findings have implications for the implementation of reproductive healthcare interventions in general. In this paper, we describe the survey design and present key findings.

METHODS

Study population

The public health system in the DRC is organized into three levels (national, intermediate, and health zone). The health zone level is the operational unit that is responsible for delivering health services to the population and each is supposed to have a reference hospital. The study was conducted in four of the 35 health zones in Kinshasa. The health zones were purposefully selected to include two urban (Binza Météo and Bandalungwa) and two peri-urban (Kisenso and Masina 2) zones with varying coverages of healthcare facilities and PMTCT services, and to exclude zones with police and military areas. Each health zone is further divided into health areas, each of which is supposed to operate a primary healthcare center. There are 11 health areas in Binza Météo (population: 409,961), 7 health areas in Bandalungwa (population: 185,602), 17 health areas in Kisenso (population: 441,637), and 11 health areas in Masina 2 (population: 281,350). Three health areas were randomly selected from each health zone for a total of 12 health areas.

We aimed to recruit at least 1200 recently pregnant women living in a study health area. To determine the proportion of eligible households, trained surveyors completed an abbreviated census in which they randomly selected six streets in each health area. The surveyors

canvassed the 72 selected streets and recorded information on which households had women who had given birth during the prior three years. The results were used to determine the sampling interval k_i for each i health area. The sampling interval k_i was calculated as N_i/n_i, where N_i is the total number of households in the i health area and n is the number of households that we needed to survey to obtain our target of 120 women per i health area [n=120*(1/percent of eligible households in the i health area)]. Between August and October 2009, the interviewers visited every k_i household, a total of 1467 households. Women at least 18 years of age who had been pregnant within the prior three years and who spoke Lingala or French were invited to participate. Two women refused participation, 238 households did not have eligible women, and six women were lost between the enrollment visit and the interview visit. If more than one woman per household was eligible, the woman who had given birth closest to the interview was selected. Up to three attempts were made to interview each woman. Overall, 1221 women were interviewed.

Data collection instrument

Each participant was administered a 90-minute questionnaire consisting of closed-ended questions about their reproductive healthcare utilization, factors determining care-seeking behaviors, their impressions of services received, and their HIV knowledge. Sociodemographic characteristics were also assessed. Prior to beginning the study, the research team field-tested the questionnaire with 12 households in a neighborhood comparable to those selected for the study. The questionnaires were orally administered at participants' homes.

Statistical analysis

Data were entered twice into an electronic database and analysed using SAS 9.3 (SAS Institute, Inc., Cary, North Carolina) survey procedures. All analyses were weighted by the inverse of the probability of participant selection (4,5). In the two-stage cluster sampling design, each health zone was considered in the analysis as a stratum. The probability of selection (P_s) was calculated as the probability of health area selection (P_{PSU} = 3/total number of health areas in the health zone) times the probability of household selection (P_{SSU} = 1/k_i). Descriptive statistics, including unweighted frequencies and weighted percentages, overall and by health zone, were used to summarize survey results. The modified Rao-Scott chi-square test of association was used to evaluate differences in proportions by health zone (6-8). Missing data were handled with a complete case analysis (data were missing for less than 5% of participants unless otherwise noted).

Using logistic regression, we independently assessed the associations between receiving inadequate ANC and participant sociodemographic characteristics, as well as the associations between receiving inadequate ANC and participants' experiences with accessing ANC services. Predictors that were significant at an alpha level of 0.05 were further assessed in a multivariate analysis. Inadequate ANC was defined as starting ANC after the first trimester of pregnancy or having fewer than four ANC visits.

Ethics approval

The study was approved by the University of North Carolina at Chapel Hill Institutional Review Board and the Ethics Committee of the Kinshasa School of Public Health.

RESULTS

Sociodemographic characteristics

We interviewed 1221 women whose median age was 27 years (interquartile range [IQR]: 22-32 years) and who had a median of two children (IQR: 1-4 children). Most participants

(69.1%) had completed at most a primary education and less than 30% were employed, either formally or informally (Table 1).

In total, 1074 women (88.1%) reported having a current partner or husband (Table 1). Partners/husbands were older than the women on average, with a median age of 36 years (IQR: 30-41 years), although age was missing for 18% of partners/husbands. Overall, the proportion of partners/husbands who had completed at least secondary education and the proportion who had some form of employment were more than twice that of women.

The majority of women reported having either their drinking water piped into the yard/plot (40.2%) or using a public stand/pipe (44.5%), and about half of the participants (53.4%) shared their toilet facility with other households (Table 1). Most participants used charcoal (72.5%) as their primary cooking fuel. Overall, 83.4% of women reported having electricity at least part of the day and many owned a radio (64.4%), television (73.9%), or telephone (61.6%). Few participants reported that their families owned a refrigerator (21.4%) or a car/truck (6.5%). Many sociodemographic characteristics varied by health zone.

Uptake of services among women who sought ANC

Overall, 1210 women provided information on ANC-seeking behavior; 1190 (98.0%) reported seeking ANC during their most recent pregnancy. Of the women who sought ANC, less than a quarter (22.4%) reported initiating ANC during the first trimester of pregnancy, although this varied by health zone (range: 16.4-39.1%) (Table 2). Many women (21.7%) had fewer than four ANC visits. Slightly more than half of women (55.4%) did not seek ANC at the facility closest to their home and 19.5% did not return to the ANC facility for delivery. Of the 226 women who did not return to the ANC facility to deliver, most (97.9%) reported delivering at an alternate health care facility as opposed to at home. Seeking ANC at the facility closest to home was not strongly associated with returning to the ANC facility for delivery, with a crude odds ratio (95% confidence interval [CI]) of 1.13 (0.85, 1.50). Overall, only 31.2% of women who sought ANC reported also seeking postnatal care, with differences by health zone (range: 16.9-40.9%) (Table 2).

About half of women reported that they made the decision to seek ANC, with variation by health zone (range: 39.6-54.5%) (Table 2). It was also common for current partners/husbands to have decided that the participants should seek ANC (38.7%), and the majority of women (72.7%) reported that their partner/husband paid for their medical expenses. Overall, only 10.2% of women reported that they paid for their own medical expenses.

The most common reasons for choosing a particular health care facility for ANC were reputation (50.7%), staff friendly/accessible (39.3%), availability of comprehensive services (28.8%), access to medication (26.4%), proximity to home (26.4%), and cost/expense (20.7%) (Table 3). Some reasons were less commonly reported overall, but were prominent in certain health zones, including confidentiality (range: 1.0-33.7%), partner/husband preference (range: 3.2-31.4%), operating hours (range: 4.1-37.7%), and waiting time (range: 5.3-20.1%).

Experiences and satisfaction with ANC services among women who sought ANC

Most women who sought ANC during their most recent pregnancy walked (71.2%) or took a bus (14.4%) or taxi (10.6%) to the ANC facility. Only 6.4% of women reported that it took more than two hours to reach the facility. Once participants arrived at their ANC facility, the majority (87.2%) waited less than two hours to be seen by a provider (Table 4). Most women felt the facility was clean (91.1%) and reported satisfactory treatment by staff not providing care (90.8%). Although most participants (93.0%) felt that their care provider treated them with respect, 47.4% reported that the provider ignored their complaints, 23.0%

had difficulty understanding responses to their questions, 21.9% wanted more time with the provider, 20.8% wanted more privacy, and 11.8% wanted to ask questions but did not ask. Overall, 17.7% of women reported that they were unable to receive medical care at some point during their most recent pregnancy because they could not pay for it. Participants' experiences at their ANC facilities varied by health zone (Table 4).

Knowledge of HIV/AIDS and history of HIV/AIDS services received

Overall, 1200 women agreed to be interviewed about their knowledge of HIV/AIDS and the HIV/AIDS services they had received. Of the 1171 women who had heard of HIV/AIDS, 60.0% had heard of antiretroviral drugs to help people with HIV/AIDS live longer (Table 5). Many women (21.0%) did not know where to get an HIV test, 34.2% did not think it was possible to get a confidential HIV test, and 27.8% of women had never been tested for HIV. In total, 679 women (55.9%) reported that someone had talked to them about HIV/AIDS during ANC.

Predictors of receiving inadequate ANC

In bivariate logistic regression analyses, each five-year increase in participant education was associated with decreased odds of receiving inadequate ANC, and the same association was noted for partner/husband education (Table 6). Other covariates that were predictive of decreased odds of receiving inadequate ANC included the presence of particular household assets, and someone talking to the participant about HIV/AIDS during ANC. Participants who paid for their own health expenses were more likely to seek ANC fewer than four times but not more likely to initiate ANC late.

Overall, women's reports of their experience at their ANC facility (Table 4) were not predictive of receiving inadequate ANC bivariate analyses. However, there were exceptions to this: participants who felt their provider treated them with respect and those who felt the provider showed interest in them were less likely to start ANC after the first trimester of pregnancy (OR [95% CI]: 0.64 [0.43,0.96] and 0.71 [0.52,0.98], respectively). In addition, participants who felt there was enough privacy at the ANC facility were less likely to seek ANC fewer than four times (OR [95% CI]: 0.42 [0.30,0.59]) and less likely to have the combined outcome of starting ANC late and seeking ANC fewer than four times (OR [95% CI]: 0.58 [0.44,0.77]). Participants who felt the provider ignored complaints regarding their health were more likely to have the combined outcome of starting ANC late and seeking ANC fewer than four times (OR [95% CI]: 1.46 [1.06,2.01]).

In the multivariate analysis, each five-year increase in participant education (OR [95% CI]: 0.78 [0.71,0.86]), owning a telephone (OR [95% CI]: 0.81 [0.66,0.98]), and feeling there was enough privacy at the ANC facility (OR [95% CI]: 0.69 [0.53,0.88]) were the strongest predictors of having lower odds of the combined outcome of starting ANC late and seeking ANC fewer than four times.

DISCUSSION

In this large population-based survey of 1221 women in Kinshasa, almost all participants reported receiving ANC and delivering at a medical facility. This is consistent with the 2007 Demographic and Health Survey, which found that 96% of women in Kinshasa received ANC from and 97% of deliveries were assisted by health professionals (2). However, receiving inadequate ANC as defined by international guidelines (9) was common, with almost 80% of women starting ANC after the first trimester of pregnancy and over 20% of women having fewer than four ANC visits. Mortality among women of reproductive age in developing countries is unacceptably high, with about 287,000 maternal deaths occurring

annually worldwide (10). Early initiation of ANC and regular ANC visits are important to ensure that women in need of acute care are identified and linked to appropriate medical interventions, as well as to deliver essential medical interventions for all pregnant women (11).

Essential medical interventions that should be provided during ANC include services for PMTCT. Overall, only about half of women reported that someone talked to them about HIV/AIDS during an ANC visit. Women who started ANC in the first trimester of pregnancy and those who sought ANC at least four times were more likely to have had someone talk to them about HIV/AIDS during an ANC visit. Frequent ANC visits may also facilitate linking HIV-infected women to lifelong HIV care (12).

Although almost all women in our study reported delivering at a healthcare facility, only about 80% returned to their ANC facility to deliver. This is a similar figure to that observed in a large study in Zambia which found that 83% of women returned to their ANC facility for delivery (13). PMTCT programs have also reported high rates of loss to follow-up between pregnancy and delivery specifically among HIV-infected women (14,15). Additional research is needed to understand why some women do not return to their ANC facility to deliver.

The postnatal period is also an important period for delivering routine care services, including support for breastfeeding and infant vaccinations. As PMTCT interventions increasingly become decentralized, the normalization of postnatal care is also crucial for delivering HIV-exposed infant care and antiretroviral therapy for mothers. Only about 30% of the surveyed women reported receiving any postnatal care and the proportion was as low as 17% in one health zone.

A high proportion of women reported that their partners/husbands or another person made the decision for them to seek ANC, and very few women paid fully for or contributed to their healthcare expenses. In predictive analysis, paying for one's own healthcare expenses was associated with seeking ANC fewer than four times. Scaling-up interventions such as PMTCT in reproductive healthcare settings may require identifying effective approaches to increase the participation of partners and other family members and particularly to reduce financial barriers to accessing services. Preliminary analyses suggest that sociodemographic characteristics, and especially socioeconomic characteristics, are strongly predictive of receiving inadequate ANC. These results support the findings from an analysis of the 2007 Demographic and Health Survey, which found that indicators of low socioeconomic status were associated with decreased ANC utilization in the DRC (16). Low education level, both of women and their partners, was also predictive of receiving inadequate ANC in our study. The relationship between low education and inadequate ANC utilization has been documented in other settings as well (17-19). As low education has also been associated with an increased risk of HIV infection (20-22), scale up of PMTCT activities in ANC settings should include specific interventions to improve access to quality ANC for women with less schooling.

Many women reported choosing an ANC facility based on perceived quality of service delivery including friendliness of staff, waiting time, operating hours, access to medications, and expectation of confidentiality. Partner/husband preference and cost were also commonly reported reasons for ANC facility choice. However, there was high variation in responses, suggesting that women who attend all types of facilities, including small and unofficial clinics, need to be accounted for during the scale-up of interventions such as PMTCT programming in reproductive healthcare settings. Many women reported that they chose their ANC facility because it offered comprehensive services. Incorporating interventions

with other common clinical services that may be lacking at some existing ANC facilities could increase the success of the interventions. A high proportion of participants stated they selected their ANC facility due to its proximity to their home; however, seeking ANC at the facility closest to home was not predictive of receiving adequate ANC or returning to the same facility to deliver. This is contradictory to other studies that have found distance to be a barrier to ANC utilization and delivering at a healthcare facility (23-27). More comprehensive analyses might help to understand how factors related to geographic location influence the delivery of PMTCT services as well as ANC and delivery services more generally.

Overall, most women reported being satisfied with the services they received at their ANC facilities. However, experiences reported by women with regards to provider-patient interactions are concerning, with almost half of women reporting that their provider ignored their complaints. Many women also reported that they had difficulty understanding their providers' responses to their questions, that they wanted more time with their provider, that they wanted more privacy, and that they were afraid to ask questions. Quality patient-provider interaction is an important part of quality reproductive healthcare and a recent study found that it may also be important for retaining HIV-infected women in care (28).

This was a large population-based survey that provided information not otherwise obtainable from routine surveillance data. However, there were limitations to this study. In particular, we included women who were pregnant within the three years prior to the interview date, which may have introduced some recall bias. We also did not explore possible differences between women who attended clinics with different management types, such as those affiliated with religious institutions or non-profits. Our assessment of predictors of adequate ANC was limited to the definition as outlined in the WHO guidelines, which defines inadequate ANC as starting ANC after the first trimester of pregnancy or having fewer than four ANC visits (9). Quality ANC involves more than these two criteria. We described other aspects of quality, including women's satisfaction with the services they received and whether services for HIV/AIDS were provided. However, additional analyses that assess predictors of receiving quality ANC defined in other ways may be informative.

The DRC has one of the highest burdens of maternal mortality in the world — the lifetime risk of maternal death in the DRC is 1 in 30, compared to 1 in 3800 in developed countries (1). The maternal mortality ratio is high throughout the Central Africa region (1,29) and improving access to quality reproductive healthcare in the DRC and similar settings should be prioritized. The primary goal of this study was to identify strategies to improve reproductive healthcare by scaling-up PMTCT services in these settings, however our findings have implications for scaling-up interventions in reproductive healthcare settings in general. Strategies should include broad-based health systems strengthening, such as explicit interventions to improve patient-provider interactions. Many of our results differed by health zone, suggesting that interventions may need to be tailored to specific contexts in order to ensure equitable access to quality ANC, delivery, and postnatal services. For example, some health zones may serve a population with lower or no income and interventions implemented in these areas may need to be offered at reduced costs in order to ensure equitable access.

Acknowledgments

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Table 1

Sociodemographic characteristics of 1221 [*] women in Kinshasa, Democratic Republic of Congo

		Health zone				
	Overall [n (%)] [†]	Kisenso [n (%)] [†]	Masina 2 [n (%)] [†]	Binza Météo [n (%)] [†]	Bandalungwa [n (%)] [†]
Participant characteristics						
Age, years [‡]						
18 to <20	89 (7.5)	16 (5.1)	32 (9.8)	20 (6.2)	21 (7.0)
20 to <25	299 (25.2)	80 (25.5)	76 (25.7)	76 (24.9)	67 (21.9)
25 to <30	334 (26.3)	93 (29.4)	73 (23.9)	82 (26.4)	86 (28.4)
30 to <35	261 (22.7)	70 (22.6)	77 (25.9)	55 (18.2)	59 (20.6)
35 to <40	166 (12.8)	30 (9.3)	34 (11.1)	56 (18.7)	46 (15.1)
40+	72 (5.5)	25 (8.1)	10 (3.6)	16 (5.6)	21 (6.9)
Education level						
Did not complete primary school	100 (10.8)	35 (11.7)	32 (11.8)	30 (10.8)	3 (0.7)
Completed primary school	652 (58.3)	215 (68.6)	178 (59.2)	149 (50.8)	110 (37.8)
Completed secondary school or higher	440 (30.9)	63 (19.7)	86 (29.0)	113 (38.4)	178 (61.4)
Employed formally or informally	331 (28.5)	110 (35.6)	81 (27.4)	73 (24.5)	67 (22.8)
Religion [‡]						
Evangelist/Revival/Brahmanist	693 (55.9)	135 (42.5)	186 (62.5)	169 (55.8)	203 (68.1)
Catholic	178 (14.7)	53 (17.3)	43 (14.7)	35 (11.9)	47 (14.6)
Protestant	177 (14.3)	70 (23.1)	29 (8.9)	47 (15.3)	31 (10.2)
Other	169 (15.0)	55 (17.1)	43 (13.8)	52 (17.0)	19 (7.2)
Ethnicity [‡]						
Bakongo	763 (67.2)	238 (75.8)	205 (66.6)	201 (66.4)	119 (40.3)
Baluba	201 (16.2)	19 (6.0)	59 (20.3)	55 (18.5)	68 (21.8)
Bangala	124 (9.0)	18 (5.7)	23 (9.0)	31 (10.0)	52 (18.6)
Baswahili	87 (4.2)	7 (2.1)	10 (3.3)	13 (4.1)	57 (18.4)
Other	38 (3.4)	31 (10.3)	2 (0.8)	3 (0.9)	2 (0.8)
Partner/husband characteristics						
Current partner/husband	1074 (88.1)	283 (90.5)	256 (86.2)	267 (88.0)	268 (89.7)
Education level [‡]						

Health zone

	Overall [n (%)][†]	Kisenso [n (%)][†]	Masina 2 [n (%)][†]	Binza Météo [n (%)][†]	Bandalungwa [n (%)][†]
Did not complete primary school	35 (4.0)	15 (6.1)	7 (3.0)	11 (4.3)	2 (0.6)
Completed primary school	239 (27.2)	102 (40.2)	48 (21.8)	71 (28.0)	18 (7.4)
Completed secondary school or higher	735 (68.9)	139 (53.7)	185 (75.2)	173 (67.7)	238 (92)
Employed formally or informally[‡]	870 (83.9)	214 (81.1)	204 (83.7)	229 (88.3)	223 (86.6)
Household characteristics					
Drinking water source [‡]					
Piped into dwelling	184 (7.6)	4 (1.2)	24 (6.2)	20 (6.6)	136 (43.5)
Piped into yard/plot	512 (40.2)	75 (22.4)	154 (47.3)	140 (44.6)	143 (49.5)
Public tab/Stand pipe	439 (44.5)	168 (53.5)	122 (45.6)	130 (43.6)	19 (6.4)
Other	85 (7.7)	67 (22.9)	2 (0.8)	14 (5.2)	2 (0.5)
Toilet type[‡]					
Flush or pour flush	148 (6.4)	6 (1.9)	8 (2.7)	28 (9.5)	106 (34.3)
Ventilated improved pit latrine	503 (37.2)	80 (24.6)	142 (44.1)	105 (32.6)	176 (60.4)
Pit latrine with slab	118 (10.0)	70 (22.4)	21 (6.1)	15 (5.2)	12 (3.0)
Pit latrine without slab (open pit)	450 (46.4)	156 (51.1)	131 (47.1)	157 (52.7)	6 (2.2)
Toilet shared with other households	672 (53.4)	160 (50.2)	159 (48.9)	203 (64.4)	150 (53.7)
Fuel used for cooking[‡]					
Electric	282 (13.9)	15 (4.8)	29 (7.6)	63 (20.9)	175 (61.3)
Charcoal	761 (72.5)	229 (73.6)	247 (84.6)	196 (63.4)	89 (28.5)
Other	167 (13.6)	66 (21.7)	21 (7.8)	45 (15.7)	35 (10.2)
Household assets					
Electricity	1078 (83.4)	258 (81.1)	248 (78.3)	276 (90.0)	296 (99.0)
Radio	839 (64.4)	192 (61.0)	184 (60.1)	215 (70.2)	248 (823.2)
Television	958 (73.9)	200 (62.9)	229 (73.7)	248 (80.8)	281 (93.3)
Telephone[‡]	855 (61.6)	240 (75.8)	151 (48.2)	184 (60.2)	280 (93.7)
Refrigerator	356 (21.4)	35 (10.8)	66 (19.5)	80 (25.5)	175 (59.0)
Car or truck	108 (6.5)	22 (6.8)	13 (4.5)	20 (6.6)	53 (17.6)

[*] Data were missing for fewer than 5% of participants for all responses except for partner education, which was missing for 6% of participants.

[†] Frequencies are unweighted and percentages are weighted.

‡Modified Rao-Scott chi-square test of association between variable and health zone has p-value <0.05.

Table 2

Utilization of antenatal care and delivery services reported by 1190[*] women who sought antenatal care in Kinshasa, Democratic Republic of Congo

	Health zone					
	Overall [n (%)][†]	Kisenso [n (%)][†]	Masina 2 [n (%)][†]	Binza Météo [n (%)][†]	Bandalungwa [n (%)][†]
Month during pregnancy of first ANC visit[‡]					
1st, 2nd, or 3rd	286 (22.4)	68 (25.4)	57 (21.3)	48 (16.4)	113 (39.1)
4th, 5th, or 6th	717 (68.5)	181 (68.2)	176 (69.9)	205 (70.3)	155 (55.9)
7th or 8th	89 (9.1)	17 (6.4)	20 (8.8)	38 (13.3)	14 (5.0)
Number of ANC visits					
1-3	217 (21.7)	61 (21.8)	59 (21.4)	79 (26.6)	18 (5.7)
>3	948 (78.3)	225 (78.2)	229 (78.6)	220 (73.4)	274 (94.3)
Sought ANC at facility closest to home	589 (44.6)	135 (45.8)	116 (38.9)	147 (47.8)	191 (62.9)
Returned to the ANC facility to deliver	951 (80.5)	232 (78.9)	222 (77.6)	264 (87.3)	233 (79.8)
Sought postnatal care[‡]	395 (31.8)	103 (34.5)	114 (37.5)	49 (16.9)	129 (40.9)
Decided participant should seek ANC[‡]					
Self	564 (47.0)	120 (39.4)	136 (47.4)	166 (54.3)	142 (47.1)
Partner/husband	442 (38.7)	137 (46.0)	112 (38.1)	101 (33.9)	92 (32.7)
Mother or mother-in-law	48 (4.5)	19 (6.8)	13 (4.5)	10 (3.0)	6 (1.4)
Self and husband/partner or other family member	95 (6.3)	15 (5.1)	16 (4.8)	23 (7.8)	41 (14.3)
Other	40 (3.4)	8 (2.7)	16 (5.2)	3 (0.9)	13 (4.5)
Person who pays for participants health expenses					
Self	112 (10.2)	28 (9.6)	33 (11.8)	27 (8.7)	24 (8.8)
Partner/husband	851 (72.7)	210 (70.7)	205 (72.9)	217 (74.1)	219 (73.6)
Other family member	125 (11.2)	36 (12.2)	35 (11.2)	36 (11.7)	18 (5.6)
Self and husband/partner or other family member	45 (3.4)	17 (5.8)	7 (2.0)	9 (2.9)	12 (4.3)
Other	40 (2.5)	5 (1.7)	6 (2.1)	8 (2.6)	21 (7.7)

[*] Data were missing for fewer than 5% of participants for all responses except for the month of first ANC visit, which was missing for 8% of participants.

[†] Frequencies are unweighted and percentages are weighted.

[‡] Modified Rao-Scott chi-square test of association between variable and health zone has p-value <0.05.

Table 3

Commonly reported reasons for choosing a health care facility (HCF) for antenatal care services reported by 1190[*] women who sought antenatal care in Kinshasa, Democratic Republic of Congo

		Health zone				
	Overall [n (%)][†]	Kisenso [n (%)][†]	Masina 2 [n (%)][†]	Binza Météo [n (%)][†]	Bandalungwa [n (%)][†]	
Operating hours[‡]	218 (12.1)	12 (4.1)	21 (6.2)	68 (23.4)	117 (37.7)	
Cost/expense	284 (20.7)	49 (16.4)	59 (18.6)	72 (24.9)	104 (34.0)	
Reputation[‡]	613 (50.7)	113 (38.1)	159 (56.1)	156 (52.2)	185 (60.6)	
Proximity to home	370 (26.4)	62 (21.5)	68 (21.9)	100 (33.1)	140 (47.0)	
Partner/husband prefers HCF	142 (7.2)	9 (3.2)	25 (6.9)	13 (5.0)	95 (31.4)	
Access to medication	332 (26.4)	59 (19.5)	83 (26.7)	91 (31.3)	99 (33.2)	
Clinic maintains confidentiality	128 (4.9)	3 (1.0)	7 (2.2)	15 (5.5)	103 (33.7)	
Short waiting time	143 (8.7)	22 (7.3)	20 (5.3)	34 (12.5)	67 (20.1)	
Staff is friendly/more accessible	502 (39.3)	96 (31.1)	122 (39.7)	123 (42.1)	161 (57.1)	
HCF offered comprehensive services[‡]	362 (28.8)	79 (26.2)	103 (35.5)	44 (15.3)	136 (46.0)	

[*] Data were missing for fewer than 5% of participants for all responses.

[†] Frequencies are unweighted and percentages are weighted.

[‡] Modified Rao-Scott chi-square test of association between variable and health zone has p-value <0.05.

Table 4

Experience seeking antenatal care services reported by 1190[*] women who sought antenatal care in Kinshasa, Democratic Republic of Congo

	Overall [n (%)][†]	Health zone				
		Kisenso [n (%)][†]	Masina 2 [n (%)][†]	Binza Météo [n (%)][†]	Bandalungwa [n (%)][†]	
Waiting time[‡]						
<60 minutes	792 (61.9)	237 (80.5)	140 (45.5)	190 (66.0)	225 (76.3)	
1-2 hours	270 (25.3)	40 (14.2)	79 (29.4)	91 (31.2)	60 (21.5)	
>2 hours	100 (12.8)	16 (5.3)	70 (25.0)	8 (2.7)	6 (2.2)	
Clean facility	1063 (91.1)	274 (92.8)	264 (91.6)	274 (90.4)	251 (84.2)	
Friendly welcome	1167 (98.9)	294 (98.6)	289 (98.9)	299 (99.3)	285 (98.4)	
Satisfactory treatment by staff (not provider)[‡]	1065 (90.8)	263 (88.0)	274 (94.4)	268 (88.4)	260 (88.9)	
Enough privacy[‡]	985 (79.2)	223 (74.2)	212 (73.8)	264 (87.9)	286 (98.7)	
Providers used language participant could understand[‡]	1095 (91.6)	239 (80.2)	271 (93.4)	298 (98.7)	287 (99.0)	
Participant wanted provider to spend more time with her	263 (21.9)	77 (26.7)	70 (23.7)	41 (13.6)	75 (23.2)	
Participant had questions for providers but did not ask them	144 (11.8)	41 (14.4)	30 (10.4)	35 (11.4)	38 (11.6)	
Participant had a hard time understanding answers to her questions	250 (23.0)	51 (17.0)	74 (26.6)	78 (25.5)	47 (15.5)	
Participant felt uncomfortable discussing personal issues with provider	80 (7.1)	27 (8.8)	21 (7.1)	17 (5.9)	15 (4.3)	
Provider ignored complaints regarding participant's health[‡]	473 (47.4)	156 (51.5)	170 (60.6)	86 (29.0)	61 (20.1)	
Providers treated participant with respect	1114 (93.0)	270 (89.5)	278 (94.9)	281 (92.6)	285 (96.6)	
Providers showed interest in participant	1047 (86.1)	248 (82.6)	251 (86.4)	265 (86.9)	283 (95.5)	

[*] Data were missing for fewer than 5% of participants for all responses.

[†] Frequencies are unweighted and percentages are weighted.

[‡] Modified Rao-Scott chi-square test of association between variable and health zone has p-value <0.05.

Table 5

Knowledge of HIV/AIDS and HIV/AIDS services received among 1171 [*] women who had ever heard of HIV/AIDS in Kinshasa, Democratic Republic of Congo

	Overall [n (%)] [†]	Kisenso [n (%)] [†]	Masina 2 [n (%)] [†]	Binza Météo [n (%)] [†]	Bandalungwa [n (%)] [†]
		Health zone			
Possible for healthy person to have HIV	1057 (93.5)	265 (95.4)	255 (92.4)	267 (93.3)	270 (94.4)
HIV can transmit from mother to baby	1003 (88.2)	256 (91.0)	250 (87.9)	249 (86.2)	248 (86.3)
Heard of antiretroviral drugs [‡]	593 (60.0)	106 (45.1)	148 (62.1)	170 (69.8)	169 (65.9)
Knows a place to be tested for HIV [‡]	801 (79.0)	186 (74.9)	179 (74.6)	219 (88.4)	217 (87.8)
Possible to obtain a confidential HIV test [‡]	725 (65.8)	192 (74.2)	115 (49.3)	197 (78.1)	221 (84.7)
Ever had an HIV test [‡]	845 (72.2)	163 (56.9)	206 (70.6)	264 (89.8)	212 (74.7)
Someone talked to participant about HIV/AIDS in ANC	679 (55.9)	142 (51.0)	145 (51.4)	191 (64.4)	201 (70.1)
Discussed how to prevent HIV transmission to baby in ANC	590 (87.1)	128 (88.8)	120 (84.4)	167 (89.1)	175 (88.5)
Discussed how to prevent getting HIV/AIDS in ANC [‡]	646 (93.8)	136 (93.3)	132 (91.6)	183 (96.2)	195 (96.9)
Had an HIV test in ANC [‡]	547 (84.8)	96 (72.6)	109 (83.4)	181 (95.4)	161 (84.6)

[*] Data were missing for fewer than 5% of participants for all responses except for knowledge of antiretroviral drugs, knowledge of a place to be tested for HIV, thought it was possible to obtain a confidential HIV test, and having an HIV test during ANC, which were missing for 18%, 16%, 15%, and 6% of participants, respectively.

[†] Frequencies are unweighted and percentages are weighted.

[‡] Modified Rao-Scott chi-square test of association between variable and health zone has p-value <0.05.

Table 6

Bivariate analysis of predictors of receiving inadequate antenatal care reported among 1214 women in Kinshasa, Democratic Republic of Congo

	Odds ratios (95% confidence intervals)		
	Initiated ANC late	Sought ANC <4 times	Initiated ANC late or sought ANC <4 times
Each 5 year increase in age	1.05 (0.95, 1.17)	1.04 (0.94, 1.14)	1.08 (0.97, 1.19)
Multipara versus primipara	1.54 (1.07, 2.21)	1.20 (0.82, 1.74)	1.47 (0.95, 2.29)
Each 5 year increase in education	0.70 (0.57, 0.85)	0.64 (0.56, 0.73)	0.68 (0.59, 0.78)
Employed versus unemployed	0.99 (0.78, 1.26)	1.05 (0.73, 1.53)	0.97 (0.75, 1.27)
Religion (REF= Evangelist/Revival/Brahmanist)			
Catholic	0.78 (0.54, 1.13)	1.03 (0.60, 1.77)	0.89 (0.64, 1.24)
Protestant	0.90 (0.44, 1.86)	0.66 (0.48, 0.92)	0.87 (0.50, 1.53)
Other	1.08 (0.63, 1.87)	1.20 (0.86, 1.68)	1.03 (0.64, 1.66)
Ethnicity (REF = Bakongo)			
Baluba	0.98 (0.60, 1.60)	0.81 (0.48, 1.37)	0.87 (0.55, 1.36)
Bangala	1.03 (0.49, 2.16)	0.79 (0.29, 2.17)	0.85 (0.38, 1.88)
Baswahili	0.64 (0.32, 1.27)	0.75 (0.40, 1.41)	0.51 (0.23, 1.10)
Other	0.80 (0.45, 1.40)	0.88 (0.58, 1.31)	0.68 (0.38, 1.23)
Current partner versus no current partner	1.03 (0.64, 1.64)	0.64 (0.38, 1.07)	0.76 (0.45, 1.26)
Each 5 year increase in partner age	1.08 (1.00, 1.15)	1.00 (0.93, 1.07)	1.03 (1.00, 1.07)
Each 5 year increase in partner education	0.67 (0.56, 0.81)	0.57 (0.47, 0.67)	0.58 (0.51, 0.67)
Partner employed versus unemployed	0.97 (0.59, 1.60)	0.98 (0.72, 1.33)	0.86 (0.61, 1.19)
Household assets (REF=without asset)			
Electricity	0.58 (0.36, 0.94)	0.33 (0.22, 0.51)	0.56 (0.37, 0.87)
Radio	0.71 (0.54, 0.94)	0.58 (0.45, 0.74)	0.74 (0.54, 0.99)
Television	0.63 (0.52, 0.77)	0.43 (0.32, 0.56)	0.56 (0.46, 0.70)
Telephone	0.59 (0.45, 0.76)	0.45 (0.31, 0.65)	0.61 (0.52, 0.72)
Refrigerator	0.78 (0.53, 1.15)	0.62 (0.38, 1.01)	0.85 (0.62, 1.15)
Car or truck	0.72 (0.43, 1.21)	0.52 (0.19, 1.39)	0.74 (0.40, 1.37)
Sought ANC at closest facility to home versus not	1.14 (0.78, 1.69)	1.03 (0.71, 1.50)	1.26 (0.90, 1.78)
Decided participant should seek ANC (REF=participant)			
Partner/husband	1.04 (0.82, 1.31)	0.94 (0.64, 1.40)	1.00 (0.80, 1.25)
Mother or mother-in-law	0.98 (0.45, 2.12)	1.20 (0.52, 2.74)	0.85 (0.45, 1.60)
Self and husband/partner or other family member	0.71 (0.31, 1.61)	0.89 (0.40, 1.97)	0.79 (0.39, 1.57)
Other	0.72 (0.23, 2.29)	0.50 (0.18, 1.44)	0.56 (0.19, 1.65)
Person who pays for participants health expenses (REF=participant)			
Partner/husband	1.25 (0.66, 2.34)	0.63 (0.49, 0.82)	0.67 (0.48, 0.94)
Other family member	1.38 (0.39, 4.93)	0.77 (0.29, 2.04)	0.76 (0.28, 2.07)
Self and husband/partner or other family member	0.99 (0.36, 2.73)	0.97 (0.39, 2.39)	0.77 (0.30, 1.97)
Other	0.90 (0.45, 1.80)	0.43 (0.16, 1.17)	0.43 (0.23, 0.80)
Someone talked to participant about HIV/AIDS in ANC versus not	0.62 (0.45, 0.85)	0.53 (0.44, 0.65)	0.66 (0.50, 0.87)