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Global Journal of Medical, Pharmaceutical, and Biomedical Update

Original Article

Determinants of Utilization and Quality of Antenatal Care Services in Lubumbashi, in the Democratic Republic of the Congo

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Received : 31 December 2021
Accepted : 21 February 2022
Published : 06 April 2022

DOI
10.25259/GJMPBU_26_2021

Quick Response Code:

ABSTRACT

Objectives: Maternal and perinatal mortality is one of the best indicators of a society's health status and development level. In the Democratic Republic of the Congo, antenatal care (ANC) utilization is generally low, and delayed initiation of care is very common. It is in this context that the present study on the utilization and quality of ANC carried out among women in Lubumbashi city aimed to identify determinants of the utilization and quality of ANC services.

Material and Methods: This was a cross-sectional study conducted in Lubumbashi, relating to 1472 women who had given birth during the 12 months preceding the survey, selected by cluster sampling. Logistic regression was used to identify the relative effects of socio-demographic risk factors and all statistical tests were declared significant at a $P < 0.05$.

Results: One tenth (10.5%) of the women in the sample did not attend ANC during their most recent pregnancy and 89.5% had attended ANC at least once. Of the 1318 women with at least one ANC visit, 55.9% had an early initiation of ANC and 53.2% received high quality ANC. Women aged 20–29 years (adjusted odds ratios [aOR] = 2.8 [1.6–5.1]), 30–39 years (aOR = 4.3 [2.1–8.9]) and ≥40 years (aOR = 6.5 [2.6–16.2]), married women (aOR = 1.9 [1.1–3.2]), women with secondary educational level (aOR = 4.9 [3.4–7.2]), and women with higher educational level (aOR = 15.3 [5.3–43.8]) were more likely to have at least one ANC during their pregnancy. Factors contributing to attend four or more ANC visits were secondary educational level (aOR = 1.4 [1.0–2.0]) and higher educational level (aOR = 1.9 [1.2–2.9]), primiparity (aOR = 1.5 [1.1–2.1]), and doing business activities (aOR = 1.4 [1.0–1.8]). Determinant of early initiation ANC was only the higher educational level (aOR = 2.2 [1.4–3.4]). Factors associated with high quality ANC were secondary educational level (aOR = 3.0 [2.1–4.3]) and higher educational level (aOR = 6.2 [3.8–9.9]), and receiving ANCs in a general referral hospital (aOR = 1.5 [1.2–2.0]).

Conclusion: The use and quality of ANC services remain a serious problem in Lubumbashi city. This situation hampers the achievement of maternal and child health goals. Health education can help reduce this in our context.

Keywords: Utilization, Quality, Antenatal care, Maternal health, Health services, Lubumbashi

INTRODUCTION

Pregnancy is a particularly natural and physiological event that does not always occur normally and is responsible for preventable morbidity and mortality.[1] In 2017, the World Health

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Organization estimated that about 295,000 women died worldwide, and every day 810 women died for preventable reasons related to pregnancy and childbirth.[2] The majority of these deaths (94%) occurred in low-resource countries, and most of them could have been avoided. In the same year, sub-Saharan Africa alone accounted for about two-thirds (196,000) of maternal deaths, while South Asia accounted for nearly one-fifth (58,000).[2] In the Democratic Republic of the Congo (DRC), according to 2014 Demographic and Health Survey (2014 DHS-DRC), the maternal mortality ratio was estimated at 846 deaths per 100,000 live births and the neonatal mortality rate was 28‰.[3]

Antenatal care (ANC) coverage is an indicator of access to and use of health-care services during pregnancy. ANC is one of the four pillars of safe motherhood aimed to reduce maternal and perinatal mortality.[4] The antenatal period offers pregnant women opportunities for intervention that may also be necessary for the well-being of their babies.[5,6] the timing of the first ANC visit has the utmost importance to ensure optimal health effects for both women and children.

As the recommended ANC services differ in terms and number of ANC visits and the type and frequency of health service content offered to women during their ANC visits, it is, therefore, difficult to provide a universal definition of pregnancy follow-up, whether adequate or insufficient. The number of ANC visits differs from country to country depending on the national recommendations of each country. For illustration, in developed countries, this number varies from 8 (in Italy) to 11 (in the United States).[7] The previous studies have shown that essential interventions would be provided on four ANC visits at specified intervals, a minimum for healthy women without underlying medical problems.[8,9] These studies prompted the WHO to define the new approach with four ANC visits focused on the objectives of ANC services. The recommended number of ANC visits in resource-limited settings depends not only on effectiveness but also on costs and barriers to accessing ANC services.[8,9] High-quality ANC services can also influence women's behavior to choose skilled health care services at birth.[10,11] Positive experience during pregnancy and childbirth is essential for person-centered care and for the rights of every woman who gives birth, as highlighted in recent recommendations of the WHO.[12-15]

However, it should be noted that there is a significant gap between developed countries (98%) and developing countries (68%) in the ANC coverage. Although this coverage is increasing in many African countries, it alone does not provide sufficient information on the ANC services.[5] In addition, although the coverage of at least one ANC visit is relatively high, many women attending ANC services do not receive all evidence-based components during pregnancy. This gap in quality demonstrates the main missed opportunities in health systems.[5,16]

The role of ANC visits is to ensure that pregnancy is carried out effectively while at the same time ensuring the safety of the mother and her child, in the sense that most of the risk factors related to pregnancy can be detected during it. The DRC's health programs include health education actions to improve mothers' knowledge and attitudes about preventive care.[3] In other words, these information and education activities address the value and need for ANC visits, assisted delivery, postnatal visits, family planning, breastfeeding, nutrition, vaccination, and child growth monitoring. These educational activities are offered to women during any contact with public health facilities (health center, maternity, etc.) during pregnancy, at the time of delivery, and during post-natal visits.

One of the targets of Sustainable Development Goal 3 is to reduce the global maternal mortality rate to below 70 per 100,000 live births and the neonatal mortality rate to no more than 12 per 1000 live births.[17] And improving maternal and child health remains a priority worldwide, particularly in the DRC, where perinatal programs have been implemented to reduce maternal and infant morbidity and mortality. Given that in resource-constrained settings like the DRC, where maternal and perinatal deaths remain among the highest in the world, high-quality care, acting upstream of delivery and postpartum, could help reduce the high death rate.

This concept of utilization and quality of ANC services is always faced with several factors, including the personal characteristics of patients, the availability and accessibility of ANC services, etc. In this regard, the main question that could be asked is: Are pregnant women adequately using ANC services and receiving high-quality ANCs in our settings?

This study aims to determine the utilization and high-quality rates of ANC services and to identify their determinants in Lubumbashi city, in the DRC.

MATERIAL AND METHODS

Study settings

This study was conducted in Lubumbashi city, which is the capital of the Haut-Katanga Province and the second-largest city in the DRC. It is located in the south-eastern part of the DRC at an altitude of 1230 m. Its population was estimated at 2,377,000 inhabitants in 2019 on an area of 747 km^2.

Lubumbashi health district has 610 health facilities (52 hospitals and 558 health centers) in 11 health zones located in seven municipalities in the city. Ten of the 11 health zones include at least one general referral hospital that provides complementary activities. Maternity clinics are available in nearly 2/3 of the frontline facilities, in all intermediate facilities, and all hospitals. In addition, Lubumbashi Health

District has a Provincial General Reference Hospital (Jason Sendwe Hospital) and a University Clinic (University Clinics of Lubumbashi). These two facilities receive patients from the other health facilities in the province and several surrounding localities and currently have a university vocation (teaching, training, and research).

Study design and sample size

This was a cross-sectional study conducted to determine the use and quality of ANC services at a specific time from May 2020 to April 2021 in Lubumbashi city (DRC). Data were collected between May and June 2021 using a questionnaire written in French and Swahili (interpreted according to the respondent's understanding) composed of closed and semi-open questions administered by the study team.

A pre-survey was conducted to test the questionnaire. The study was carried out among women residing only in Lubumbashi city who had given birth in the 12 months before the survey (May 2020 to April 2021). Women who gave birth in Lubumbashi during the same period but did not live there during pregnancy were excluded from our sample. In addition, women who had given birth at home were not included in the study. Women were selected by cluster sampling. The clusters were composed of the different municipalities of the city and these clusters were selected by random sampling.

The following formula was used to calculate the sample size ($n = z^2pq/d^2$), with a 95% confidence interval standard deviation ($z = 1.96$), a prevalence of the ANC services utilization of 78.77% in Lubumbashi city reported by Maleya *et al.*[1] and a 5% accuracy error ($d = 0.05$).

The minimum size of the calculated sample was 257 participants. Given the number of municipalities in Lubumbashi city, this minimum size has been multiplied by 7 due to 257 participants per municipality (cluster). A total of 1799 women were invited to respond to the questionnaire, of which 1472 had agreed to respond and were included in the study; this represents an effective response rate of 81.8%.

The data collection was carried out systematically according to households using inclusion criteria defined until the sample size is reached. Women's data were collected, including socio-demographic variables, number of ANC visits, the timing of first ANC visit, health interventions received during ANC visits, and place of ANC visits.

Definition of study variables

ANC was defined as healthcare linked to pregnancy received by a woman at a health facility before labor. Our first outcome variable is the utilization of ANC services by women during their most recent pregnancy 12 months preceding the survey that resulted in live births. We collected information on the number of ANC visits. We treated the number of ANC visits, and the ANC utilization was defined as attending and accessing ANC in a health facility. In this category, we included all women who had at least one ANC visit during their most recent pregnancy. The second outcome for this study is ANC adequacy. The number of visits was considered adequate if the mother had at least four visits in the pregnancy period; otherwise, inadequate. The third outcome is early initiation of ANC, defined as having the first ANC visit during the first trimester of pregnancy. Timing of visit was considered early if the first visit took place within the first 12 weeks (during the first trimester of pregnancy), and delayed if the first visit took place after the first 12 weeks (during the second or third trimester of pregnancy). Finally, the quality of ANC visits is our fourth outcome variable. The ANC quality was considered good if the mother had eight health service content offered to women during their ANC visits; otherwise, poor. These service components include Counseling for voluntary HIV test, urine sample test, blood sample test, tetanus vaccine, treatment for intestinal parasites, antimalarial treatment, iron supplementation, receiving insecticide-treated mosquito nets, and health education on birth preparedness.

Statistical analysis

First, we calculated descriptive statistics (frequencies or means and standard deviations as appropriate) and their 95% confidence intervals. We then calculated crude odds ratio and adjusted odds ratios (AOR) with their 95% confidence intervals (95% CI) using bivariate and multivariate analyses to examine the association between participant's socio-demographic characteristics and the four outcomes (utilization of ANC services; ANC adequacy; early initiation of ANC; and good quality ANC). Bivariate and multivariable analyses were used to evaluate the differences in the distribution of categorical variables about the study groups. Likewise, all variables in the bivariate analysis were candidates to consider for multivariable analysis, and $P < 0.05$ was considered statistically significant at 95% CI.

Ethical considerations

Informed consent of women was obtained before the start of the interview. This study was authorized by the Medical Ethics Committee of the University of Lubumbashi and the Chief Doctor of the Haut-Katanga Provincial Health Division. For confidentiality reasons, we omitted the names of women during data analysis.

RESULTS

Socio-demographic characteristics of the respondents

There were 1472 women included in the analysis. [Table 1] provides characteristics of the women. The mean age of

Table 1: Socio-demographic characteristics of the respondents.

Variable	Frequency (*n*=1472)	Percentage
Age (years)		
<20	118	8.0
20–29	700	47.6
30–39	483	32.8
≥40	171	11.6
Marital status		
Married	1333	90.6
Single	139	9.4
Occupation		
No occupation	1126	76.5
Business	296	20.1
Civil servants/Students	50	3.4
Parity		
1	266	18.1
2–4	772	52.4
≥5	434	29.5
Educational level		
No education/Primary	256	17.4
Secondary	1014	68.9
Higher/University	202	13.7

women surveyed was 29.5 ± 7.7 years (range: 15 and 49 years); 47.6% of women were between 20 and 29 years; 8% were under 20 years of age, while 11.6% were over 39 years of age. The majority of women (90.6%) were married and only 9.4% were single. About 69% of the respondents had a secondary educational level, while 17.4% had a primary education level and 13.76% of the women had a higher educational level. Overall, 76.49% of women had no occupation, 3.4% worked in the civil service, and 20.1% were doing business. More than half of the women were multiparous (52.5%), 18.1% were primiparous and 29.5% had five or above parity [Table 1].

Utilization and quality of ANC services

Of the 1472 women surveyed, 89.5% (n = 1318) had attended ANC at least once and 154 (10.5%) did not attend ANC during their most recent pregnancy. The majority of women did not use ANCs for reasons primarily related to finances (64.3%) and habit (11.7%). Lack of reason (11.0%), lack of time (3.9%), ignorance (3.9%), neglect (2.6%), and travel (2.6%) were also reasons given for not attending ANCs.

Of all the women who attended ANC services, 100% (n = 1318) recalled the timing of their first ANC visit and the number of visits during their last pregnancy. The mean gestational age at the first ANC visit was 4.1 ± 1.4 months (range: 1 and 9 months); 55.9% had initiated early (during the first trimester) and 44.1% had delayed ANC (after the first trimester). However, almost three-quarters of these women had no specific reason not to attend ANCs early. The absence of pregnancy complications (75.0%) and the lack of financial means (16.7%) were the main reasons given for delayed ANCs.

In terms of the number of ANC visits, 58.1% (766/1318) of the respondents had fewer than four visits and 41.9% (552/1, 318) had at least four or more; the mean number of visits was 3.6 ± 1.5 (range: 1 and 10). Of the 552 women who had at least four or more visits, 36.2% had no specific reason for this, while 46.2% reported that the recommended number was four ANC visits and 17.6% due to discomfort during pregnancy. More than half (50.4%) of the women had attended ANC services in a health center, 26.6% in a general reference hospital, and 23% in a private clinic.

The quality of ANC services was good in 53.2% (701/1, 318) of the respondents. [Table 2] shows that HIV counseling and testing (58.7%), blood sample testing (67.7%), and urine sample testing (64.0%) were the least common of all service components provided during ANC visits; insecticide-treated nets, tetanus vaccination, and intestinal parasite treatment (mebendazole) were offered in 82.5%, 84.8%, and 89.2% of women, respectively. Iron supplementation and antimalarial treatment accounted for 90.8% and 92.4%, respectively.

For those women who successfully received these interventions during ANC visits, the majority obtained them during the 3rd month of their pregnancy [Table 2].

Determinants of ANC utilization

[Table 3] shows relationships between ANC utilization (having at least one ANC visit) and socio-demographic characteristics of the respondents. Women aged 20–29 years (aOR = 2.8 [1.6–5.1]; $P < 0.001$), those aged 30–39 years (aOR = 4.3 [2.1–8.9]; $P < 0.001$) and those aged ≥40 years (aOR = 6.5 [2.6–16.2]; $P < 0.001$) were more likely to attend ANC services than those <20 years of age. Compared to single women, married women used ANC services significantly more (aOR = 1.9 [1.1–3.2]; $P = 0.019$). Women with secondary and higher educational levels were 5 and 15 times more likely to attend ANC than women with no educational/primary level, respectively (aOR = 4.9 [3.4–7.2]; $P < 0.001$, and aOR=15.3 [5.3–43.8]; $P < 0.001$) [Table 3].

Concerning relationships between the adequacy of ANC and socio-demographic characteristics of the respondents, [Table 4] shows that women with secondary educational level (aOR = 1.4 [1.0–2.0]; $P = 0.040$) and those with higher educational level (aOR=1.9 [1.2–2.9]; $P = 0.005$) were significantly more likely to attend four or more ANC visits compared to women with no educational/primary level. We also found that primiparous women were adequately attending ANC services (aOR=1.9 [1.1–3.2]; $P = 0.019$) more than multiparous women.

Table 2: Health service content offered to 1472 women during their antenatal care visits based on timing of first ANC initiated (in months).

	Test for HIV	Urine Sample tested	Blood sample tested	Insecticide treated nets	Tetanus vaccine	Intestinal parasite treatment	Iron supplentation	Antimalarial treatment
Coverage	58.7%	64.0%	67.7%	82.5%	84.8%	89.2%	90.8%	92.4%
95% CI	56.0–61.3%	61.4–66.6%	65.1–70.2%	80.3–84.4%	82.8–86.7%	87.4–90,3%	89.1–92.3%	90.9–93.7%
Timing of first ANC initiated	(*n*=773)	(*n*=844)	(*n*=892)	(*n*=1087)	(*n*=1118)	(*n*=1176)	(*n*=1197)	(*n*=1218)
1st month	1.2%	1.1%	1.0%	0.8%	0.5%	0.8%	0.8%	0.8%
2nd month	5.1%	4.7%	4.7%	4.2%	3.9%	3.8%	4.0%	4.1%
3rd month	38.7%	44.9%	43.8%	40.3%	41.6%	41.8%	40.9%	40.6%
4th month	23.0%	22.3%	22.0%	23.4%	24.0%	23.6%	23.6%	23.7%
5th month or over	32.1%	27.0%	28.5%	31.3%	30.0%	30.0%	30.8%	30.8%

Table 3: Bivariate and multivariate analyzes of factors influencing the use of antenatal care services.

Variable	Total (*n*=1472)	One or more ANC visits (*n*=1318) (%)	No ANC visit (*n*=154) (%)	Crude OR (95% CI)	P-value	Adjusted OR (95% CI)	*P*-value
Age (years)							
<20	118	86 (72.9)	32 (27.1)	1.0		1.0	
20–29	700	633 (90.4)	67 (9.6)	3.5 (2.2–5.7)	<0.001	2.8 (1.6–5.1)	<0.001
30–39	483	441 (91.3)	42 (8.7)	3.9 (2.3–6.5)	<0.001	4.3 (2.1–8.9)	<0.001
≥40	171	158 (92.4)	13 (7.6)	4.5 (2.3–9.1)	<0.001	6.5 (2.6–16.2)	<0.001
Marital status							
Married	1333	1205 (90.4)	128 (9.6)	1.0		1.0	
Single	139	113 (81.3)	26 (18.7)	2.2 (1.4–3.4)	0.001	1.9 (1.1–3.2)	0.019
Educational level							
Illiterate/Primary	256	182 (71.1)	74 (28.9)	1.0		1.0	
Secondary	1014	938 (92.5)	76 (7.5)	5.0 (3.5–7.17)	<0.001	4.9 (3.4–7.2)	<0.001
Higher/University	202	198 (98.0)	4 (2.0)	20.0 (7.3–77.0)	<0.001	15.3 (5.3–43.8)	<0.001
Parity							
1	266	234 (88.0)	32 (12.0)	0.8 (0.5–1.2)	0.229	1.5 (0.8–2.6)	0.175
2–4	772	699 (90.5)	73 (9.5)	1.0		1.0	
≥5	434	385 (88.7)	49 (11.3)	0.8 (0.6–1.2)	0.311	0.7 (0.4–1.2)	0.200
Occupation							
No occupation	1126	1004 (89.2)	122 (10.8)	1.0		1.0	
Business	296	266 (89.9)	30 (10.1)	1.1 (0.7–1.6)	0.729	1.1 (0.7–1.8)	0.626
Civil servants	50	48 (96.0)	2 (4.0)	2.9 (0.8–25.1)	0.157	1.2 (0.3–5.3)	0.797

[Table 5] shows relationships between early initiation of ANC and socio-demographic characteristics of the respondents. We find that proportions of early ANC decrease with increasing age (52.33% for <20 years, 44.87% for 20–29 years, 44.67% for 30–39 years, and 34.81% for ≥40 years) and significantly ($X^2 = 11.9$; $P = 0.007$). Comparison between different age groups shows no statistically significant difference ($P > 0.05$).

Similarly, for parity, proportions of early ANC decreased with increasing parity (49.15% for primiparous, 46.64% for multiparous, and 36.36% for grand multiparous) and significantly ($X^2 = 13.2$; $P < 0.001$). Comparison between different parity groups shows no statistically significant difference ($P > 0.05$). In addition, it appears that women with higher educational levels (aOR=2.2 [1.4–3.4]; $P < 0.001$) were significantly twice as likely to attend ANC services in the first trimester of pregnancy compared to women with no educational/primary level.

Determinants of ANC quality

For relationships between quality of ANC services and socio-demographic characteristics of the respondents, [Table 6] shows that women with secondary educational level (aOR=3.0 [2.1–4.3]; $P < 0.001$) and those with higher educational level (aOR=6.2 [3.8–9.9]; $P < 0.001$) were significantly more likely to have good quality ANC compared to women with no

Table 4: Bivariate and multivariate analyzes of factors influencing the adequacy of antenatal care services.

Variable	Total (*n*=1318)	Number of ANC visits (%)		Crude OR (95% CI)	*P*-value	Adjusted OR (95% CI)	*P*-value
		≥4 ANC (*n*=552)	<4 ANC (*n*=766)				
Age (years)							
<20	86	42 (48.8)	44 (51.2)	1.0		1.0	
20–29	633	253 (40.0)	380 (60.0)	0.7 (0.4–1.1)	0.146	0.8 (0.5–1.3)	0.302
30–39	441	189 (42.9)	252 (57.1)	0.8 (0.5–1.3)	0.366	1.0 (0.6–1.8)	0.931
≥40	158	68 (43.0)	90 (57.0)	0.8 (0.5–1.3)	0.462	1.2 (0.6–2.3)	0.583
Marital status							
Married	1205	506 (42.0)	699 (58.0)	1.0		1.0	
Single	113	46 (40.7)	67 (59.3)	1.1 (0.7–1.6)	0.869	1.2 (0.8–1.9)	0.329
Educational level							
Illiterate/Primary	182	61 (33.5)	121 (66.5)	1.0		1.0	
Secondary	938	392 (41.8)	546 (58.2)	1.4 (1.0–2.0)	0.046	1.4 (1.0–2.0)	0.040
Higher/University	198	99 (50.0)	99 (50.0)	2.0 (1.3–3.0)	0.001	1.9 (1.2–2.9)	0.005
Parity							
1	234	117 (50.0)	117 (50.0)	1.4 (1.1–1.9)	0.021	1.5 (1.1–2.1)	0.015
2–4	699	287 (41.1)	412 (58.9)	1.0		1.0	
≥5	385	148 (38.4)	237 (61.6)	0.9 (0.7–1.2)	0.437	0.8 (0.6–1.1)	0.123
Occupation							
No occupation	1004	406 (40.4)	598 (59.6)	1.0		1.0	
Business	266	123 (46.2)	143 (53.8)	1.3 (0.9–1.7)	0.102	1.4 (1.0–1.8)	0.028
Civil servants	48	23 (47.9)	25 (52.1)	1.4 (0.8–2.4)	0.379	1.1 (0.6–2.1)	0.670

Table 5: Bivariate and multivariate analyzes of factors influencing the early initiation of antenatal care.

Variable	Total (*n*=1318)	Initiation time of first ANC visit (%)		Crude OR (95% CI)	p-value	Adjusted OR (95% CI)	p-value
		First trimester (*n*=581)	2nd and 3rd trimesters (*n*=737)				
Age (years)							
<20	86	45 (52.3)	41 (47.7)	1.0		1.0	
20–29	633	284 (44.9)	349 (55.1)	0.7 (0.5–1.2)	0.235	0.7 (0.4–1.1)	0.124
30–39	441	197 (44.7)	244 (55.3)	0.7 (0.5–1.2)	0.236	0.8 (0.4–1.3)	0.300
≥40	158	55 (34.8)	103 (65.2)	0.5 (0.3–0.8)	0.012	0.6 (0.3–1.2)	0.140
Marital status							
Married	1205	534 (44.3%)	671 (55.7)	1.0		1.0	
Single	113	47 (41.6)	66 (58.4)	1.1 (0.8–1.7)	0.647	1.2 (0.8–1.8)	0.478
Educational level							
Illiterate/Primary	182	67 (36.8)	115 (63.2)	1.0		1.0	
Secondary	938	397 (42.3)	541 (57.7)	1.3 (0.9–1.8)	0.194	1.2 (0.8–1.6)	0.384
Higher/University	198	117 (59.1)	81 (40.9)	2.5 (1.6–3.8)	<0.001	2.2 (1.4–3.4)	<0.001
Parity							
1	234	115 (49.2)	119 (50.8)	1.1 (0.8–1.5)	0.556	1.0 (0.7–1.4)	0.929
2–4	699	326 (46.6)	373 (53.4)	1.0		1.0	
≥5	385	140 (36.4)	245 (63.6)	0.65 (0.5–0.8)	<0.001	0.7 (0.5–1.0)	0.050
Occupation							
No occupation	1004	457 (45.5)	547 (54.5)	1.0		1.0	
Business	266	101 (38.0)	165 (62.0)	0.7 (0.6–0.9)	0.027	0.8 (0.6–1.1)	0.115
Civil servants	48	23 (47.9)	25 (52.1)	1.1 (0.6–2.0)	0.859	0.9 (0.5–1.6)	0.609

educational/primary level. Compared to women who attended ANC services in a health center, women who attended them in a general referral hospital were more likely to have good quality ANC (aOR = 1.5 [1.2–2.0]; P = 0.002). In addition, we find that businesswomen received poor quality ANC than women without occupation (aOR = 0.7 [0.5–0.9]); P = 0.028).

Table 6: Bivariate and multivariate analyzes of factors influencing the quality of antenatal care services.

Variable	Total (*n*=1318)	Quality of ANC services (%)		Crude OR (95% CI)	*P*-value	Adjusted OR (95% CI)	*P*-value
		High Quality (*n*=701)	Low Quality (*n*=617)				
Age							
<20	86	46 (53.5)	40 (46.5)	1.0		1.0	
20–29	633	336 (53.1)	297 (46.9)	1.0 (0.6–1.6)	1.000	1.0 (0.6–1.6)	0.840
30–39	441	250 (56.7)	191 (43.3)	1.1 (0.7–1.8)	0.668	1.3 (0.7–2.2)	0.395
≥40	158	69 (43.7)	89 (56.3)	0.7 (0.4–1.1)	0.182	1.0 (0.5–1.8)	0.867
Marital status							
Married	1205	643 (53.4)	562 (46.6)	1.0		1.0	
Single	113	58 (51.3)	55 (48.7)	1.1 (0.7–1.6)	0.752	1.1 (0.7–1.7)	0.665
Educational level							
Illiterate/Primary	182	48 (26.4)	134 (73.6)	1.0		1.00	
Secondary	938	507 (54.1)	431 (45.9)	3.3 (2.3–4.7)	<0.001	3.0 (2.1–4.3)	<0.001
Higher/University	198	146 (73.7)	52 (26.3)	7.8 (5.0–12.4)	<0.001	6.1 (3.8–9.9)	<0.001
Parity							
1	234	142 (60.7)	92 (39.3)	1.3 (0.9–1.7)	0.134	1.3 (0.9–1.8)	0.144
2–4	699	383 (54.8)	316 (45.2)	1.0		1.0	
≥5	385	176 (45.7)	209 (54.3)	0.7 (0.6–0.9)	0.007	0.8 (0.6–1.1)	0.203
Occupation							
No occupation	1004	547 (54.5)	457 (45.5)	1.0		1.0	
Business	266	118 (44.4)	148 (55.6)	0.7 (0.5–0.9)	0.004	0.7 (0.5–1.0)	0.028
Civil servants	48	36 (75.0)	12 (25.0)	2.5 (1.3–4.9)	0.008	1.7 (0.9–3.5)	0.118
Type of health facility							
Health center	664	322 (48.5)	342 (51.5)	1.0		1.0	
Private clinic	303	164 (54.1)	139 (45.9)	1.3 (0.9–1.7)	0.119	1.1 (0.8–1.4)	0.604
General Referral Hospital	351	215 (61.3)	136 (38.8)	1.7 (1.3–2.2)	<0.001	1.5 (1.2–2.0)	0.002

DISCUSSION

The present study showed that 10.5% of the women surveyed did not attend ANC services; this rate is slightly higher than the 6% recorded nationally in urban areas.[3] The rate of women not attending ANCs varies widely, depending on period, country, or region. A recent study conducted in Lubumbashi (DRC) by Maleya *et al.*[1] reported a rate of 21.23%. Brown *et al.*[18] found a rate of 33% in Kwale (Kenya). El Hamdani *et al.*[19] found 10% of women who did not attend ANC services and pointed out that many women belong to the group of poor and socially disadvantaged women (less educated women and migrant women). These are the most vulnerable women who need ANC the most. This increases the need to seek to better understand barriers that prevent these women from using ANC services and from receiving free healthcare in public health centers. In developing countries, women are often unaware of the health benefits of ANC or do not believe that ANCs are important to them or their babies.[19] To be effective, ANC must start at an early stage of pregnancy and, above all, it must continue with some regularity until delivery. The WHO recommends at least four ANC visits, at regular intervals throughout pregnancy.[14]

One of the main findings of this study is that the delay in initiation of ANC affects more than 44.1% of women. The main reasons for delayed ANC were the absence of pregnancy complications (75.0%) and the lack of financial means (16.7%). This proportion was 57.7% in the Mafuta and Kayembe study.[20] These authors explained that delayed ANC is justified for the majority of respondents by financial difficulties, or by the absence of obstetric complications, although paradoxically, costs associated with ANC are bearable and the prices are cheaper.[20]

Many women link the need for ANC to the occurrence of pregnancy complications. Moreover, they are not sufficiently motivated by the desire to attend ANC, insofar as they do not recognize the need for ANCs and consider them an unnecessary step. It should be noted that the use of ANC services is primarily determined by women's belief that pregnancy monitoring is necessary for the well-being of their fetus. The previous studies reported that this lack of motivation among some women is a barrier to ANC.[19,20]

The proportion of women who initiated the first ANC visit late, reported in this study, is less than 77.8% found in urban areas by 2014 DHS-DRC.[3] This difference could be due to the greater accuracy of the estimate of the 2014 DHS-DRC, linked to the larger sample size, but also the reference period. The proportion reported in the present study better reflects the current state of this phenomenon, as the 2014 DHS-DRC

estimate covered 5 years representing a cumulative annual proportion. In this case, there is not only a significant risk of recall bias for respondents but also the influence of extreme values.[3] This proportion is also greater than 33.4% found by Ewunetie *et al.*,[21] <66.3% reported by Yaya *et al.*[22] in Ethiopia and 57.7% recorded by Kotoh and Boah in northern Ghana.[23] These differences may be due to differences in study location, selection procedures, and methodologies. Some of these authors have studied the phenomenon in health units with a high risk of concentration of cases, unlike the current community survey which is likely to lead to dilution of the phenomenon. Our results reflect a shift towards improving maternal health as a result of the efforts of several global initiatives.

Many studies suggest that the quality of ANCs is more important than the number of ANC visits and the timing of the first ANC.[19] In developing countries, and particularly in the African context, ANC offers the unique opportunity for many women to interact with health services and this opportunity must be used to implement proven-effective actions to reduce maternal morbidity and mortality.[24] In the present survey, we found that more than 80% of women had received tetanus vaccination, intestinal antiparasitic treatment, iron supplementation, and antimalarial treatment. Nearly 60% had been tested for HIV, and over 60% had urine and blood samples tested.

This study found that teenage mothers, single mothers, and mothers with low educational levels (illiterate or primary) were less likely to use ANC services compared to other groups. This finding is also found in African literature.[25-27] Kakudji *et al.*,[28] in a study conducted in Lubumbashi (DRC), found a very highly significant association between adolescence and lack of ANC services utilization. After multivariate analyses, this study shows that mothers educational level had a significant contribution to the utilization and the quality of ANC services. It showed that mothers with no or primary educational level were less likely to utilize and to have good quality ANC services than those with secondary and higher educational levels. This fact clearly shows that mothers with low educational levels (illiterate or primary) were not able to seek ANC services due to a lack of maternal health care knowledge and ignorance. On the other hand, mothers who were educated were able to fully attend ANC services since they had knowledge and practices of better health attainment. They made good use of the services available since they were empowered and therefore were good in decision-making.[29] Educated women are better able to absorb maternal health messages and therefore more likely to attend ANC services during their pregnancy.[30] In addition, illiteracy associated with spouse refusal, risk ignorance, and unwanted pregnancies were additional factors described by Ndiaye *et al.*[25] Four *et al.*[31] added that, in certain specific situations, pregnant women were held at home for household activities. Gandzien *et al.*[27] emphasized that the financial dependence of pregnant women on their spouse or family was considered a major obstacle to attending ANC services during their pregnancies. Finally, other sociocultural aspects identified as factors influencing the use of ANC services are the beliefs that pregnancy is known early by the entourage it may suffer bad spells or fail.[10] Single women have most often concealed their pregnancy from their parents to avoid family conflicts.[27] In developing countries, reasons cited for this apathy toward ANC services among young pregnant single women are lack of family or social support, unpleasant remarks from health workers, and attempts to avoid public scrutiny.[32] A study in Bulawayo showed that fear of HIV testing is a major factor in the lack of follow-up of teenage pregnancy.[33] Unmarried young women often have poor access to reproductive health services, which explains their low use of contraception, including modern methods, and their frequent use of abortion.

Our study found a significant relationship between primiparity and utilization of ANC services. Other studies have found that the rate of ANC utilization decreases as the parity increases significantly.[19,34] Multiparous are convinced that the current pregnancy is progressing well despite the absence of ANCs, because of the better course of previous pregnancies. These women eventually become convinced that ANCs are useless or have less value in encouraging them to limit the use of ANC services.

However, there are limitations in interpreting the results of this study. The first limitation is the cross-sectional nature of the study, which does not allow a dynamic view of the evolution of pregnancy, nor does it establish a causal relationship with the factors identified. However, this study has the merit of being, to the best of our knowledge, one of the first to address questions on the use, adequacy, and quality of ANC services in the community in our settings, and to have identified factors that, taken into account, could influence national guidelines in this area. Second, it is important to keep in mind that the data analyzed include information reported by mothers only during the most recent pregnancies or deliveries. Therefore, concerning the specific service content received by respondents during their last ANC visits, women may not be specifically aware of the laboratory investigations that were performed on them during ANC visits. The study was also limited to Lubumbashi city and the results may not reflect the situation in the rest of the country.

CONCLUSION

The use and quality of ANC services remain a problem in urban areas across our country. This situation hampers the achievement of maternal and child health goals. Identifying key determinants encourages the promotion of targeted

strategies to influence the behaviors and attitudes of the most vulnerable women. To improve the adequacy of ANC services in the study area, policy development, planning, and implementation processes should focus on women with lower educational levels and unmarried women.

Specific efforts on basic ANC are needed to target and raise awareness among women of low socioeconomic status, including those with lower educational levels. Qualitative research is recommended for a thorough understanding of the problem. This study should be replicated in other parts of the country, including rural areas, using indicator combinations to see levels, and trends in the use and quality of ANC services. It could also involve male partners or husbands rather than just women as subjects for further study.

Declaration of patient consent

Patient consent is not required as patients' identity is not disclosed or compromised.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

REFERENCES

1. Maleya A, Kakudji YK, Munan RM, Nsambi JB, Ngwej HI, Mukuku O, *et al*. Issues materno-fœtales des grossesses non suivies à Lubumbashi, République Démocratique du Congo. Pan Afr Med J 2019;33:66.
2. World Health Organization. Trends in Maternal Mortality 2000 to 2017: Estimates by WHO, UNICEF 2019, UNFPA, World Bank Group and the United Nations Population Division. Geneva, Switzerland: World Health Organization; 2019.
3. Ministère du Plan et Suivi de la Mise en oeuvre de la Révolution de la Modernité (MPSMRM), Ministère de la Santé Publique (MSP) et ICF International, 2014. Enquête Démographique et de Santé en République Démocratique du Congo 2013-2014. Rockville, Maryland, USA: MPSMRM, MSP et ICF International; 2014.
4. Bhutta Z, Darmstadt G, Hasan B, Haws R. Community-based interventions for improving perinatal and neonatal health outcomes in developing countries: A review of evidence. Pediatrics 2005;115:519.
5. Tessema ZT, Minyihun A. Utilization and determinants of antenatal care visits in East African countries: A multicountry analysis of demographic and health surveys. Adv Public Health 2021;2021:6623009.
6. Tunçalp Ö, Pena-Rosas JP, Lawrie T, Bucagu M, Oladapo OT, Portela A, *et al*. WHO recommendations on antenatal care for a positive pregnancy experience-going beyond survival. BJOG 2017;124:860-2.
7. Breton B, Peres A, Barranger E. Grossesses non suivies: Historique, issues materno-fœtales et devenir. Gynécol Obstét Fertil 2013;41:173-8.
8. Abalos E, Chamillard M, Diaz V, Tuncalp Ö, Gülmezoglu AM. Antenatal care for healthy pregnant women: A mapping of interventions from existing guidelines to inform the development of new WHO guidance on antenatal care. BJOG 2016;123:519-28.
9. Downe S, Finlayson K, Tunçalp Ö, Gülmezoglu AM. What matters to women: A systematic scoping review to identify the processes and outcomes of antenatal care provision that are important to healthy pregnant women. BJOG 2016;123:529-39.
10. Adjiwanou V, LeGrand T. Does antenatal care matter in the use of skilled birth attendance in rural Africa: A multi-country analysis. Soc Sci Med 2013;86:26-34.
11. Chukwuma A, Wosu AC, Mbachu C, Weze K. Quality of antenatal care predicts retention in skilled birth attendance: A multilevel analysis of 28 African countries. BMC Pregnancy Childbirth 2017;17:152.
12. Tunçalp Ö, Were W, MacLennan C, Oladapo O, Gülmezoglu A, Bahl R, *et al*. Quality of care for pregnant women and newborns the WHO vision. BJOG 2015;122:1045-9.
13. World Health Organization. WHO Recommendations: Intrapartum Care for a Positive Childbirth Experience. Geneva: World Health Organization; 2018. http://www.who.int/reproductivehealth/publications/intrapartum-care-guidelines/en [Last accessed on 2021 May 01].
14. World Health Organization. WHO Recommendations on Antenatal Care for a Positive Pregnancy Experience. Geneva: World Health Organization; 2016. Available from: http://www.who.int/reproductivehealth/publications/maternal_perinatal_health/anc-positive-pregnancy-experience/en [Last accessed on 2021 May 01].
15. World Health Organization. Recommendations on Antenatal Care for a Positive Pregnancy Experience: Summary. Geneva, Switzerland: World Health Organization; 2016. Available from: https://apps.who.int/iris/bitstream/10665/259947/1/WHO-RHR-18.02-eng.pdf?ua=1 [Last accessed on 2021 May 01].
16. Okedo-Alex IN, Akamike IC, Ezeanosike OB, Uneke CJ. Determinants of antenatal care utilisation in sub-Saharan Africa: A systematic review. BMJ Open 2019;9:e031890.
17. Kruk ME, Gage AD, Arsenault C, Jordan K, Leslie HH, Roder-DeWan S, *et al*. High-quality health systems in the sustainable development goals era: Time for a revolution. Lancet Glob Health 2018;6:e1196-252.
18. Brown CA, Sohani SB, Khan K, Lilford R, Mukhwana W. Antenatal care and perinatal outcomes in Kwale district, Kenya. BMC Pregnancy Childbirth 2008;8:2.
19. El Hamdani FZ, Vimard P, Baali A, Zouini M, Cherkaoui M. Soins prénatals dans la ville de Marrakech. Med Sante Trop 2013;23:162-7.
20. Mafuta EM, Kayembe PK. Déterminants de la fréquentation tardive des services de soins prénatals dans les zones de santé de l'Equateur et du Katanga en République Démocratique du Congo. Ann Afr Med 2011;4:845-54.
21. Ewunetie AA, Munea AM, Meselu BT, Simeneh MM, Meteku BT. Delay on first antenatal care visit and its associated

factors among pregnant women in public health facilities of Debre Markos town, North West Ethiopia. BMC Pregnancy Childbirth 2018;18:173.
22. Yaya S, Bishwajit G, Ekholuenetale M, Shah V, Kadio B, Udenigwe O. Timing and adequate attendance of antenatal care visits among women in Ethiopia. PLoS One 2017;12:e0184934.
23. Kotoh AM, Boah M. "No visible signs of pregnancy, no sickness, no antenatal care": Initiation of antenatal care in a rural district in Northern Ghana. BMC Public Health 2019;19:1094.
24. Prural A, De Bernis L, Ould EL, Joud D. Rôle potentiel de la consultation prénatale dans la lutte contre la mortalité maternelle et la mortalité néonatale en Afrique sub-saharienne. J Gynecol Obstet Biol 2002;31:90-9.
25. Ndiaye P, Tal Dia A, Diediou A, Dieye EH, Dione DA. Déterminants socioculturels du retard de la première consultation prénatale dans un district sanitaire au Sénégal. Santé Publique 2005;17:531-8.
26. Abauleth R, Kouakou P, Koffi A, Yesufu A, Effoh D, Boni S, *et al*. Consultation prénatale: Analyse de 332 carnets à la maternité du CHU de Cocody. Med Afr Noire 2007;54:226-30.
27. Gandzien PC. Les grossesses non suivies pronostic obstétrical et néonatal. Méd Afr Noire 2007;54:166-8.
28. Kakudji PL, Mukuku O, Tambwe AM, Kalenga PMK. Etude du pronostic maternel et périnatal au cours de l'accouchement chez l'adolescente à Lubumbashi, République Démocratique du Congo. Pan Afr Med J 2017;26:182.
29. Barasa KS, Wanjoya AK, Waititu AG. Analysis of determinants of antenatal care services utilization in Nairobi county using logistic regression model. Am J Theor Appl Stat 2015;4:322-8.
30. Ha BT, Tac PV, Duc DM, Duong DT, Thi LM. Factors associated with four or more antenatal care services among pregnant women: A cross-sectional survey in eight South Central Coast provinces of Vietnam. Int J Womens Health 2015;7:699-706.
31. Fourn L, Takpara I, Mbainadjiel BS. Visites prénatales et issues défavorables de grossesse dans une maternité urbaine de Cotonou (Bénin). Med Afr Noire 2004;51:381-4.
32. World Health Organization. Adolescent Pregnancy (Issues in Adolescent Health and Development). Geneva: World Health Organization; 2004.
33. Chaibva CN, Ehlers VJ, Roos JH. Midwives' perceptions about adolescents' utilisation of public prenatal services in Bulawayo, Zimbabwe. Midwivery 2010;26:e16-20.
34. Mustafa MH, Mukhtar AM. Factors associated with antenatal and delivery care in Sudan: Analysis of the 2010 Sudan household survey. BMC Health Serv Res 2015;15:452.

How to cite this article: Mpoy CW, Katembo BM, Ndomba MM, Mishika PL, Missumba WK, Mukuku O, *et al*. Determinants of utilization and quality of antenatal care services in Lubumbashi, in the Democratic Republic of the Congo. Glob J Med Pharm Biomed Update 2022;17:2.