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Unintended pregnancy, induced abortion and abortion care-seeking experiences among adolescents in Kinshasa, Democratic Republic of Congo

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Abstract

Introduction: The Democratic Republic of Congo (DRC), until recently, has a restrictive penal code that forbade abortion under any circumstances and abortion remains largely clandestine to date. To address the evidence gap regarding induced abortion among adolescents in Kinshasa, the capital of DRC, we estimated unintended pregnancy and abortion incidence for adolescents (15-19 years) in 2016 and compared with older women (20-49 years). We also compared the abortion care experiences of adolescents and older women.

Methods: We used the age-specific variant of Abortion Incidence Complications Method to estimate abortion and unintended pregnancy, with data from three primary sources: Health Facility Survey (n=361) provided post-abortion care (PAC) caseloads; Prospective Morbidity Survey (n=1,031) provided the age distribution and characteristics of women presenting for PAC; and, Health Professional Survey (n=115) provided an estimate of the proportion of abortions resulting in facility-based treatment of complications. Bivariate (chi-square, t-test) and multivariable (binary logistic regression, Cox proportional hazard) analyses were used to compare abortion care experiences.

Results: Adolescents had an estimated 27,590 induced abortions, constituting 18.8% of abortions in Kinshasa in 2016. Adolescents had the lowest abortion rate among women less than 35 years (55.2/1,000 women) but recorded the highest rate among ever sexually active women (138.4/1,000) and recently sexually active women (167.2/1,000). Also, adolescents had the highest abortion ratio (82.4/100 live births), proportion of pregnancies unintended (80%), and proportion of unintended pregnancies ending in abortion (49%). Compared to older women, adolescents had higher odds of reporting pregnancy unintendedness (AOR= 1.36, 95% C.I.=1.75-2.24), seeking abortion at later than first trimester (AOR= 1.34, 95% C.I.=1.09-1.63) and from non-medical professionals (AOR= 1.68, 95% C.I.=1.31-2.14), and not using contraceptives before pregnancy (AOR= 2.23, 95% C.I.=2.77-3.43) or post-abortion (AOR= 2.46, 95% C.I.=1.87-3.29).

Conclusions: Interventions are needed to reduce unintended pregnancy among adolescents in Kinshasa and improve their abortion-care experiences.

Keywords: Induced abortion, unintended pregnancy, abortion complications, adolescents

Strengths and limitations of the study

- This study provides the first age-specific estimates of unintended pregnancy and abortion for Kinshasa, DRC.
- The underlying data on the number of PAC patients comes from a census of postabortion care (PAC) providing facilities in Kinshasa, and the weighted age and subgroup distribution of PAC patients is from a representative sample of PAC-providing facilities.
- In the absence of an age-specific multiplier, we uniformly applied a nationally-obtained multiplier from a representative sample of PAC cases to all the age groups to obtain the age-specific induced abortions estimates: this may bias the estimate for specific age groups.

Key questions

What is already known

- Kinshasa has a high level of unmet need for contraception and many women undergo abortions to meet their fertility aspirations but no age-specific data on abortion exists, and adolescent-specific abortion measures, in particular, have never been published.
- While the few studies so far published on post-abortion care in Kinshasa suggests a substantial level of abortion complications, no work has so far been published on the abortion experiences of adolescents and no comparison of adolescents' and older women's experiences have been reported.

What are the new findings?

- We report the first adolescent-specific abortion measures for Kinshasa, DRC, using the age-specific variant of Abortion Incidence Complications Methodology (AICM): with an abortion rate of 138.4/1,000 in 2016, adolescents had the highest abortion rate among sexually active women.
- Adolescents also had the highest abortion rate among recently sexually active women (167.2/1,000), the highest abortion ratio (82.4/100 live births), the highest proportion of pregnancies unintended (80%), and the highest proportion of unintended pregnancies ending in abortion (49%).
- Compared to older women, adolescents also had less desirable abortion care experiences.

What do the new findings imply?

- Effective policies and program are needed to reduce the high rate of unintended pregnancy among adolescents in Kinshasa, including interventions to enable them overcome various barriers to modern contraceptive services.
- Adolescent-responsive health and related social systems are needed to improve the abortion care experiences of adolescents in Kinshasa

INTRODUCTION

Unsafe abortion is a public health challenge that is associated with at least 8% of global maternal deaths.[1] The burden of unsafe abortion is highest in countries with restrictive abortion laws and approximately 97% of unsafe abortions and nearly all abortion-related deaths occur in low- and middle-income countries (LMICs).[2] Africa, which has the highest risk of abortion-related deaths globally,[2] presents striking statistics: most African countries have restrictive laws[3] and induced abortions* occur mostly in a clandestine manner, with the result of over three-quarters (75.6%) of the estimated annual 6.86 million abortions in Africa being unsafe.[2]

Democratic Republic of Congo (DRC), the third most populous country in Africa, previously had a restrictive penal code that forbade abortion under any circumstances but domesticated the African Charter on Human and People's Rights on the Rights of Women (Maputo Protocol) that permits abortion on some health grounds in 2008.[4] However, abortion remains largely clandestine in DRC.[5] With an estimated population of 12 million in 2016, Kinshasa, the capital of DRC, is the second most populous and densest city in sub-Saharan Africa.[6] Kinshasa has a high level of unmet need for contraception[7-9] and many women undergo abortions to meet their fertility aspirations.[5,8,10] Two studies involving different methodological approaches – the Confidante Method[10] and Abortion Incidence Complications Method (AICM)[5] similarly estimated Kinshasa's abortion rate as 55-56 per 1,000 women aged 15-49 for 2015/2016. While some small-scale studies suggest a substantial level of adolescent abortion in Kinshasa,[11-13] adolescent-specific abortion estimates are lacking.

* While we recognize that the term "abortion" technically covers both induced abortion and spontaneous abortion (miscarriages), unless otherwise specified, abortion as used in this paper refers to induced abortion.

Globally, studies on adolescent-specific abortion measures are rare, despite indications that adolescents contribute significantly to the abortion burden and are potentially at greater risks of complications associated with lower rates of healthcare access.[14,15] As a 2019 review to mark the 25th anniversary of the International Conference on Population and Development notes, "Data on the specific levels and trends in abortion measures that are specific to adolescents are scarce, particularly among developing countries."[16] Studies comparing abortion measures for adolescents and older women are also scarce and the findings from the few existing studies vary considerably.[17] In Africa, compared with older women (20-49 years), higher adolescent abortion rates have been reported for Nigeria,[18] but lower rates for Gabon, Ghana, Republic of Congo, and Zimbabwe.[17,18]

Among African countries, recent adolescent-specific abortion estimates are only available for Ethiopia,[19] Uganda,[20] and Zimbabwe.[21] These recent papers, unlike previous works, adjusted for sexual activity and, therefore, provide estimates specifically for sexually active adolescents and older women, which make for a more valid comparison between the age groups. While sexually active adolescents had a higher abortion rate compared to older women in Ethiopia[19] and Uganda,[20] but the reverse was the case in Zimbabwe.[21] The differential findings probably reflect contextual sexual and reproductive health (SRH) dynamics and highlight the need for studies in different geographies. So far, no comparison of abortion incidence for adolescents and older women exist in the literature for Kinshasa, DRC, as age-specific estimates are lacking. Generating age-specific abortion and unintended pregnancy measures is crucial for understanding the burden of unintended pregnancy and abortion among adolescents and for advocating for relevant interventions to improve their health and wellbeing.[9]

Comparing adolescent and non-adolescent abortion-related care experiences, including post-abortion care, is also important as the experiences have significant implications for the health outcomes and well-

being of the women seeking abortions, as well as for health systems treating abortion complications. Some of the existing studies suggest that the quality of care and the experiences of adolescents in the context of abortion may differ significantly from that of older women[19,22] but these findings are by no means universal and vary by geographical and socio-economic contexts. So far, no published studies have compared the abortion care experiences of adolescents and older women in Kinshasa, DRC. Analyzing differences that may exist in the abortion-care experiences of adolescents and older women can generate relevant information for appropriate interventions to address any potential adolescent-specific barriers to relevant care.

This study aims to address the existing evidence gap relating to age-specific analyses of abortion incidence and abortion care experience in Kinshasa, DRC. Our primary objective is to estimate and compare unintended pregnancy and abortion incidence for adolescents and older women in Kinshasa. Secondly, we compare the abortion care experiences of adolescents and older post-abortion care patients.

METHODS

Study Design and Data Sources

We used the age-specific variant of AICM[19,20] to indirectly estimate abortion and unintended pregnancy for adolescents (15-19) and older women (20-49). Developed in the early 1990s, the AICM has been used to estimate abortion incidence for 23 LMICs as of 2017.[23] The age-specific AICM uses three primary data sources: Health Facility Survey (HFS), which provides post-abortion care (PAC) caseloads; Prospective Morbidity Survey (PMS), which provides the age distribution and characteristics of women presenting for PAC and their care-seeking behavior and experience; and, Health Professional Survey (HPS) that provides an estimate of the proportion of abortions that results in facility-based treatment of

abortion complications, the inverse of which serves as the multiplier or adjustment factor in the AICM approach.

The current study is based on data collected in 2016 to estimate abortion incidence for Kinshasa. The HFS was conducted in a representative sample of 361 facilities with the capacity to provide PAC. The PMS was prospectively conducted for 30 days in 223 of the 361 HFS facilities with data from 1,031 PAC patients. The HPS was a purposive sample of 115 health professionals who are knowledgeable about abortion practices in Kinshasa. Details of the study design have previously been published by Chae and colleagues.[5] The Institutional Review Boards of Guttmacher Institute and the University of Kinshasa, School of Public Health approved the study.

Patient and public involvement

We did not directly involve abortion patients in the study planning but the original data collection that provided the foundation for this study sought and received guidance for study planning and results dissemination from a Technical Advisory Committee, which included community representatives and technical experts, and the current study also received similar guidance.

Data Analysis

Abortion measures

Our age-specific estimation of abortion incidence involved three key sequential steps. Firstly, we applied the age distribution of PAC patients from the PMS to the total PAC caseloads reported by Chae et al[5] for women age 15-49 to obtain the PAC caseloads for five-year age groups. Secondly, recognizing that PAC caseloads include both induced and spontaneous abortion (miscarriages), we calculated the number of treated second-trimester miscarriages through a two-step process and subtracted the obtained figure

from the PAC caseloads. The initial step involved estimating second-trimester miscarriages requiring treatment with the assumption that only second trimester miscarriages (13-22 weeks) would result in facility-based care as is the practice in the AICM approach.[23] Clinical data from Harlap and colleagues show that second-trimester miscarriages constitute 2.9% of all known pregnancies and 3.41% of live births;[24] applying the age-specific life tables developed based on that data by Sully et al.,[19] we estimated the number of second-trimester miscarriages for the five-year age groups. Then, in line with previous AICM studies,[23] we estimated the proportion of second-trimester miscarriages that received facility care as equal to the age-specific proportion of facility-based deliveries obtained from the 2013-14 Demographic and Health Survey (DHS) data for Kinshasa.[25] Subtracting the number of treated second-trimester miscarriages from the total age-specific PAC caseloads resulted in the age-specific PAC cases attributable to induced abortion.

Thirdly, we estimated abortions that did not result in facility-based care by using the multiplier, which is the inverse of the proportion of all abortions that result in complications and facility-based care as estimated in the HPS. As age-specific multipliers are not available, we applied the overall multiplier generated by Chae et al[5] uniformly across the age groups to estimate the number of induced abortions for each age group. We then summed the estimates obtained for all age-groups and proportionally adjusted the age-specific estimates to ensure that the sum equaled the figure previously reported by Chae et al[5] for women age 15-49 years.

As standardly defined, we calculated the age-specific abortion incidence rate as the number of abortions per 1,000 women per age group and abortion ratio as the number of abortions per 100 live births for each age-group. To address age-related differential sexual activity we calculated abortion

incidence for women who ever had sex and women with recent sexual activity (defined as sex within 12 months before the survey).[19,20]

Unintended pregnancy

We calculated unintended pregnancy as the sum of three events: (i) induced abortion (explained above), (ii) unintended births, defined as births that were unplanned at the time of conception (either unwanted or mistimed) and obtained from the DHS, and (iii) unintended pregnancies that ended in miscarriage. The number of unintended births was obtained by multiplying the age-specific proportion of unplanned births documented in the DHS report by the number of age-specific births, which was calculated by applying age-specific fertility rates from the 2013–14 DRC DHS[25] to age-specific population estimates of women of reproductive age (15-49 years) in Kinshasa.[26] Based on the work of Leridon and Helner[27] and in line with the AICM approach,[23Error! Bookmark not defined.] unintended pregnancies ending in miscarriage were calculated as the sum of 20% of unplanned live births and 10% of induced abortions. Intended pregnancies were calculated as the sum of planned births (obtained by subtracting unplanned births from the total number of births) and miscarriages from intended pregnancies (estimated as 20% of planned births).[27]

Abortion-related experiences

Using the PMS data of women receiving PAC (following either induced abortions or miscarriages), we compared the background characteristics and experiences of adolescent and older women regarding abortion. Specifically, we compared the socio-demographic and reproductive characteristics for adolescents and older women using chi-square and compared the mean number of days to reach PAC (to assess a possible delay in reaching care) using t-test. We further compared adolescents and older PAC patients using multivariable analyses for nine abortion-related and care experiences: : (i) history of

previous abortion; (ii) contraception at the time of pregnancy; (iii) intendedness of index pregnancy; (iv) gestational age at abortion (first trimester versus later); (v) interference with pregnancy (inducing abortion); (vi) professional status of the abortion service provider (medical professionals versus others); (vii) severity of postabortion complication (none/mild versus moderate/severe); (viii) delay in reaching care (sum of the total number of days taken to decide to seek care and to reach the first health facility); and, (ix) provision of postabortion contraceptives by PAC provider. We controlled for marital status, education, economic level (poor or non-poor status) based on household wealth index, previous pregnancy, and pregnancy intention (except when pregnancy intendedness was the dependent variable) in each multivariable model. We used binary logistic regression for multivariable analyses and obtained the adjusted odds ratio (AOR) and the 95% Confidence Interval (C.I.), except in the case of the number of days taken to reach PAC where we used a Cox proportional hazard model and obtained the hazard ratio (HR), and 95% C.I. Analyses were undertaken using Stata version 16 and SPSS version 24.

RESULTS

Incidence of abortion

An estimated 27,590 induced abortions occurred among adolescents, constituting 18.8% of the 146,713 abortions in Kinshasa in 2016: this proportion is similar to the percentage of women of reproductive age (15-49 years) who are adolescents (19.5%). Adolescents have the lowest abortion rate (55.2 per 1,000 women) among women less than 35 years of age. However, restricting the sample to only sexually active women, the abortion rate shows an inverse relationship with age, and adolescents have the highest rate among all women of reproductive age (Figure 1). The abortion rate is 138.4/1,000 for adolescents who ever had sex and 167.2/1,000 for recently sexually active adolescents. In comparison, for older age groups, the abortion rate ranges from 28.2/1,000 to 92.3/1,000 for those who ever had sex, and from 34.6/1,000 to 117.0/1,000 for recently sexually active women. The abortion ratio also shows an inverse relationship

with age, and adolescents have the highest ratio (82.4 per 100 live births versus 33.1/100 – 56.2/100 live births for older women).

Unintended pregnancy

An estimated 70,733 pregnancies occurred among adolescents – about 12.5% of the 563,064 pregnancies estimated for Kinshasa in 2016. Eighty percent of pregnancies among adolescents are unintended compared to the lower range of 53%-67% for older age groups (Figure 2). The proportion of unintended pregnancies that ended in abortion shows an inverse relationship with age, decreasing progressively from 49% for age 15-19 years to 37% for age ≥35 years. Unlike in older age groups (age 25-49 years), the proportion of unintended pregnancies ending in abortion is higher than those ending in births among adolescents (49% vs 39%) and other young people age 20-24 (46% versus 41%).

Abortion-related experiences

Compared to older women aged 20-49 years, bivariate analysis shows that adolescent PAC clients were significantly less likely to be in union (38% vs 63%, p<0.001) but significantly more likely to come from poor households (48% vs. 39%, p < 0.001) and have post-primary education (19% vs. 10%, p<0.001) (Table 1). Adolescents are less likely to use contraceptives before pregnancy (16% vs. 30%, p<0.001), report their pregnancy as being intended (13% vs 30%, p<0.001), or receive post-abortion contraceptives (9% vs. 17%, p<0.001). However, adolescents were more likely to report the index pregnancy as induced (51% vs 40%, p<0.001) as well as seek abortion at a later gestation age than the first trimester (81% vs 76%, p=0.001) and from non-medical professionals (37% vs 44%, p=0.001). A higher proportion of adolescents compared to older PAC patients also reported experiencing moderate/severe complications (68% vs 61%, p<0.001) or that the index pregnancy resulted from forced sex (9.9% vs 4.9%, p<0.001). Adolescents and older women did not significantly differ in the time taken to reach PAC services (4.0 days vs. 4.4 days, p=0.214)

Multivariable analysis (Figure 3) shows that controlling for the effect of other factors, adolescent PAC patients have significantly higher odds of unintended pregnancy (AOR= 1.36, 95% C.I.=1.75-2.24), not using contraceptives before pregnancy (AOR= 2.23, 95% C.I.=2.77-3.43), but lower odds of history of previous abortion (AOR=0.78; 95% C.I.=0.63-0.96) compared to older PAC patients. Also, adolescent PAC patients have higher odds of seeking abortion at later gestational age (second or third trimester) (AOR= 1.34, 95% C.I.=1.09-1.63) and from non-medical professionals (AOR= 1.68, 95% C.I.=1.31-2.14) and not receiving post-abortion contraceptives (AOR= 2.46, 95% C.I.=1.87-3.29). However, adolescents and older PAC patients did not significantly differ in terms of interfering with the index pregnancy (induced abortion), experiencing post-abortion complications, and the time taken to reach PAC services.

DISCUSSION

This study, to the best of our knowledge, provides the first age-specific estimates of unintended pregnancy and abortion for Kinshasa, DRC. Our results show that adolescents have the lowest abortion rate for women aged less than 35 years. However, when we considered only women who have ever had sex and thereby exposed to the possibility of pregnancy, adolescents have the highest rate of abortion among ever sexually active and recently sexually-active women, similar to the findings in Ethiopia[19] and Uganda[20] but contrary to the findings in Zimbabwe.[21] Compared to their peers in Zimbabwe (15.9/1,000),[21] Uganda (76.1/1,000),[20] and Ethiopia (90.7/1,000),[19] **Error! Bookmark not defined.** the abortion rate is substantially higher for recently sexually active adolescents in Kinshasa (167.2/1,000).

Compared to older women, adolescents have a higher rate of unintended pregnancy in Kinshasa. The proportion of pregnancy that is unintended is also substantially higher for adolescents in Kinshasa (80%) compared to their counterparts in Ethiopia,[19] Uganda,[20] and Zimbabwe[21] where about half of all pregnancies or less are unintended – and likely contributed to the higher adolescent abortion rate in

Kinshasa. Approximately half of the unintended pregnancy among adolescents in Kinshasa ended in abortion compared to less than a fifth of such pregnancies among adolescents in Uganda[20] and Zimbabwe.[21] While the proportion of unintended pregnancies ending in abortion is higher for adolescents compared to older women in Kinshasa, the proportion did not vary systematically by age in Uganda.[20] Unintended pregnancy in Kinshasa, as our findings show, is more likely to result in abortion among adolescents and other young people (age 15-24) than in births unlike the picture in older women. The abortion ratio of 82.4 per 100 live births for adolescents in Kinshasa, which implies that approximately four abortions occur among adolescents for every five births, is substantially higher than the ratio for older women in Kinshasa and more than double the ratio of ≤31.1/100 live births for adolescents in Ethiopia[19] and Zimbabwe.[21]

The higher rate of unintended pregnancy among adolescents in Kinshasa compared to older women may likely be explained by differential contraceptive behavior. As the 2013-14 DRC DHS reports, adolescents have the lowest rate of contraceptive use among women aged less than 45 years.[25] Studies have also shown that adolescents in Kinshasa[28] and DRC as a whole[29] have a higher unmet need for contraceptives. Globally, adolescents have a higher level of unmet need for contraceptives as a result of demand-side barriers (contraceptive-seeking behavior), supply-side barriers (health service factors), and structural and environmental barriers such as unsupportive social norms and policies.[30,31] Specifically for DRC, research findings indicate that existing family planning services have gaps and inadequacies regarding adolescents' needs[32] and that cultural perspectives and social norms against premarital and adolescent sexual engagement are deeply rooted.[33] The strong social stigma associated with pre-marital or out-of-union pregnancy is likely to have also contributed significantly to the high adolescent abortion ratio in Kinshasa. As a qualitative study reported, young people in Kinshasa have concerns that pre-marital pregnancy would

bring dishonor to their families and may, therefore, seek abortion clandestinely in case of unintended pregnancy.[34]

It is important to emphasize that our findings relate to only Kinshasa – the national capital of DRC and a highly urbanized area, and not the entire country. The abortion estimates for DRC as a whole would likely have been much lower as most other parts of the country outside Kinshasa are far less urbanized and abortion rates are generally higher in urban settings.[18] Our focus on Kinshasa alone also likely explains the higher abortion estimates we obtained compared to the figures for adolescents in more nationally-oriented studies in Ethiopia,[19] Uganda,[20] and Zimbabwe.[21]

Regarding abortion-related care experiences, our findings show that adolescent PAC clients less desired abortion care experiences compared to older women in terms of seeking an abortion later than the first trimester and from non-medical professionals, and are less likely to use contraceptives before pregnancy or receive post-abortion contraceptives. Although several authors have reported that adolescents may face more barriers to SRH care[30,31] and receive a lower quality of maternal health services,[35] the findings concerning PAC varied.[20,21] For example, while Riley et al.[21] reported that adolescent PAC patients are 21% more likely to experience a delay in reaching care in Zimbabwe compared to older women, Sully et al.[20] recorded no significant difference between adolescents and older women in this respect in Uganda. The Ugandan study also found no significant difference between adolescents and older women concerning the experience of unintended pregnancy, the gestational age of seeking an abortion, the use of non-medical professionals for abortion services, or in receiving post-abortion contraceptive services.[20]

This study has some limitations. First, in the absence of an age-specific multiplier, we used a uniform multiplier in estimating abortions by age groups: this may bias the estimate for specific age groups.

Secondly, our findings regarding care-seeking experiences may not be generalizable to all abortion experiences as PAC caseload consists of both miscarriages and induced abortion cases, and the care-seeking behaviors may differ for the two groups. Also, women who had abortions but did not experience complications, those who failed to seek facility care for abortion complications or those who died from abortion complications are excluded from the PAC caseloads. Thus, our findings cannot be generalized for induced abortion complications. Thirdly, self-reported information from PAC patients may be liable to social desirability and other forms of response bias.

Our findings imply the need to prioritize adolescent SRH issues in Kinshasa and strengthen policies and programs to enable adolescents to overcome various barriers to accessing modern contraceptives and thereby reduce unintended pregnancy and the associated abortion. Among others, efforts should be directed towards expanding modern family planning services and improving the friendliness and responsiveness of services to adolescents. Evidence-driven behavior change communications are needed to improve adolescent contraceptive-seeking behavior and positively impact SRH-related social norms. Also, there is a need to rigorously implement the domesticated Maputo protocol to improve access to safe abortion as well as abortion-related care experiences and outcomes for adolescents as well as older women. Overall, considerable efforts should be dedicated to strengthening the capacity of health and related social systems to be more adolescent-responsive: meaningful involvement of adolescents and adolescent-serving organizations in relevant policy and program decisions are important in this regard.

Contributors: AOF led the conceptualisation of the research, and TR, PKK, and CM participated in the process. TR and AOF analysed the data. AOF wrote the original draft of the manuscript; TR, PKK, and CM participated in reviewing and editing the draft. PK and CM played leadership roles in the original data collection exercise.

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Table 1. Sociodemographic characteristics of post-abortion care patients, Kinshasa 2016

	Adolescents (15-19) N= 795		Older Women (20-49) N= 4023		All Women (15-49) N= 4990		p-value
	N	%	N	%	N	%	
I. Socio-demographic characteristics							
Socioeconomic status							
Poor	382	48.0	1558	38.7	2026	40.6	<0.001
Nonpoor	413	52.0	2465	61.3	2965	59.4	
Educational level[1]							
No or primary education	149	18.7	430	10.7	650	13.1	<0.001
Post-primary education	646	81.3	3592	89.3	4327	86.9	
Marital status[2]							
In union	292	37.9	2519	62.6	2895	58.3	<0.001
Not in union	479	62.1	1504	37.4	2070	41.7	
II. Reproductive characteristics							
Previous pregnancies							
0	396	49.8	538	13.4	971	19.5	<0.001
≥1	399	50.2	3485	86.6	4019	80.5	
Previous miscarriage[a]							
No	593	74.7	2730	67.9	3453	69.2	<0.001
Yes	202	25.3	1292	32.1	1536	30.8	
Previous abortion[a]							
No	640	80.5	2893	71.9	3653	73.2	<0.001
Yes	155	19.5	1129	28.1	1336	26.8	
Pregnancy intention							
Intended	99	12.5	1204	29.9	1323	26.5	<0.001
Unintended/not sure	695	87.5	2818	70.1	3667	73.5	
Pre-pregnancy contraceptive use							
No	664	83.5	2828	70.3	3627	72.7	<0.001
Yes	131	16.5	1195	29.7	1364	27.3	
Gestational age of index abortion[3]							
First trimester	592	75.7	3156	80.9	3916	80.6	0.001
second or third trimester	190	24.3	746	19.1	941	19.4	
Interfered with pregnancy							
No	393	49.4	2430	60.2	2823	58.4	<0.001
Yes	402	50.6	1605	39.8	2007	41.6	
Source of help in pregnancy interference							
Medical professional	148	36.8	730	45.5	878	43.7	0.002
Non-medical professional	254	63.2	875	54.5	1129	56.3	
Severity of complication							
None/Mild	251	31.5	1574	39.1	1824	39.1	<0.001
Moderate/Severe	544	68.5	2449	60.9	2994	60.9	

Received post-abortion contraceptive							
Yes	72	9.1	665	16.5	752	15.1%	<0.001
No	711	89.5	3344	83.1	4213	84.4%	
Pregnancy resulting from forced sex							
Reported experience	79	9.9	160	4.0	239	4.9%	<0.001
Did not report experience	716	90.1	3875	96.0	4591	95.1%	
III. Time taken to reach health facility							
Mean number of days to reach facility	4.0		4.4		4.2		0.214

[1] 1 missing respondent each from educational level, previous miscarriage, previous abortion and pregnancy intention for older women group

[2] 23 missing respondents from marital variable for adolescents

[3] 13 missing respondents for gestational age at abortion for adolescents and 120 for older women category

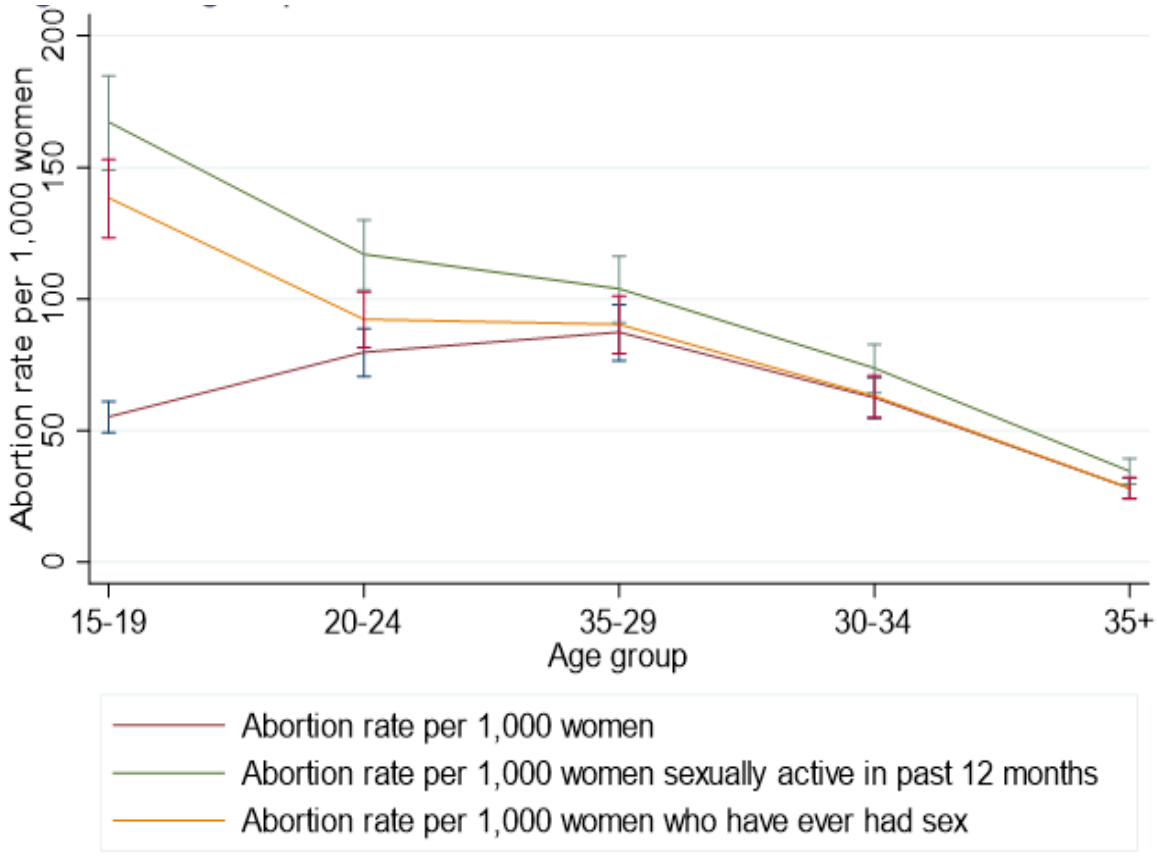

Figure 1: Abortion estimates by age group in Kinshasa, DRC, for all women, ever-sexually active women, and recently sexually active women, 2016

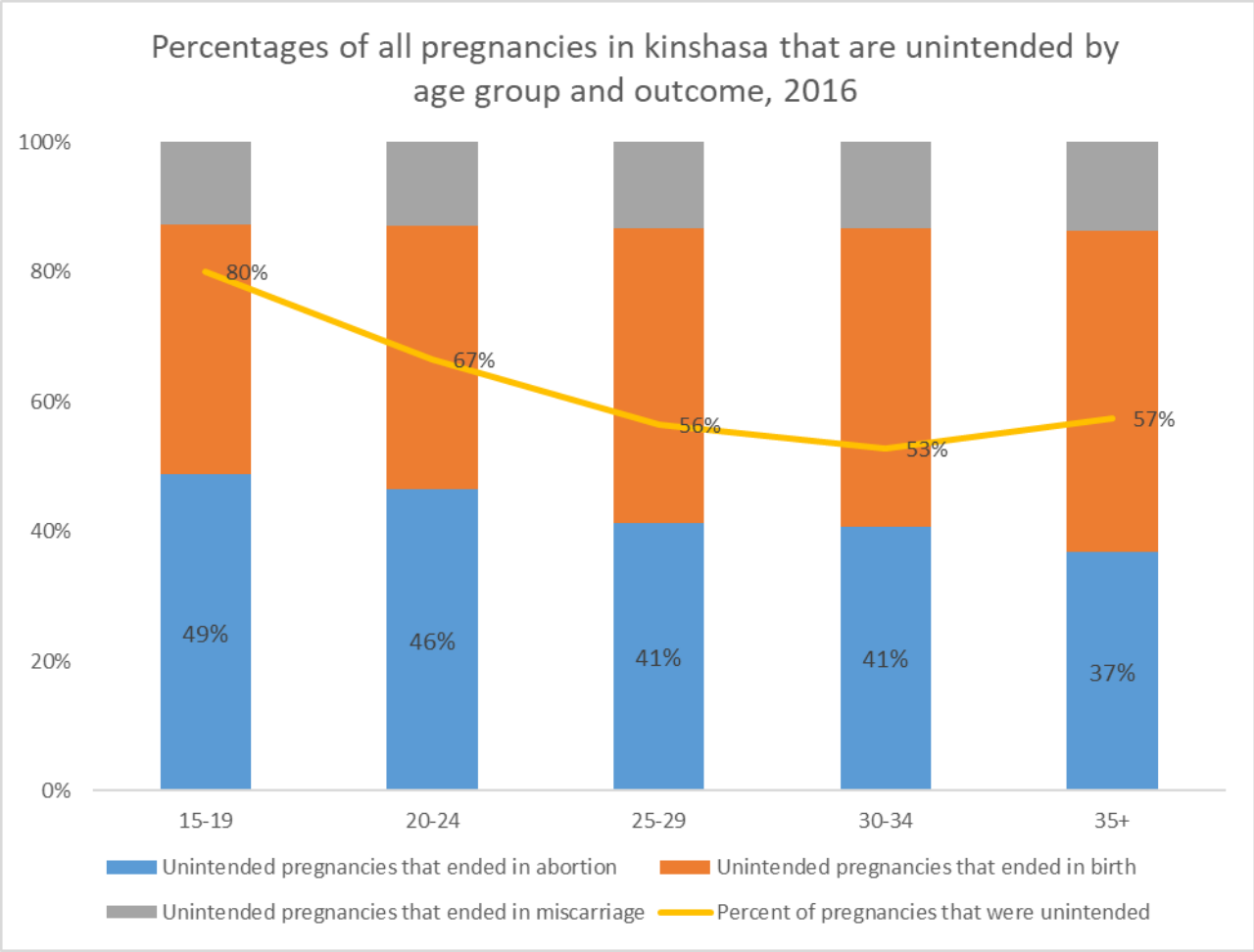

Figure 2: Percentage of all pregnancies in Kinshasa, DRC, that are unintended by age group and outcome, 2016.

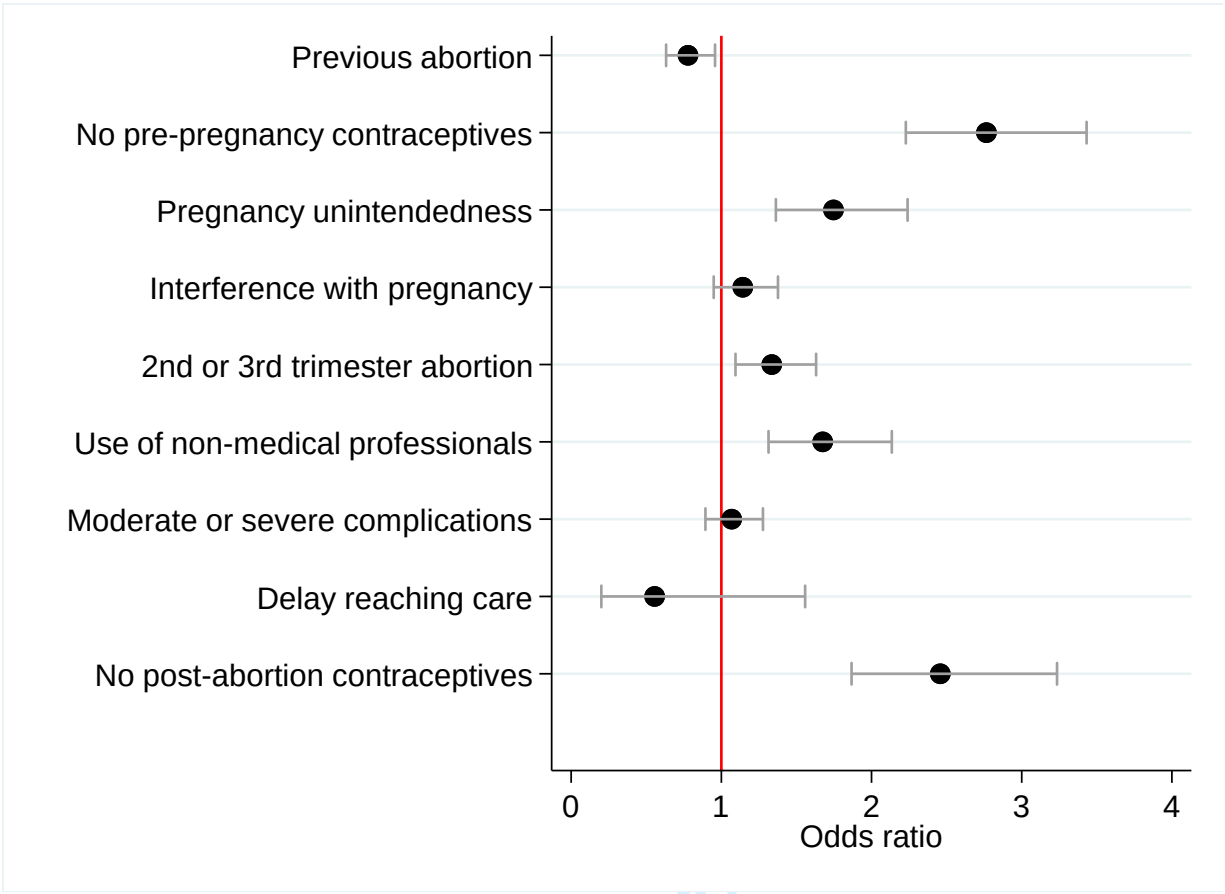

Figure 3: Adjusted odds ratios, hazard ratios and 95% confidence intervals of abortion care experiences among adolescent postabortion care patients as compared to older postabortion care patients in Kinshasa, DRC, 2016.

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Unintended pregnancy, induced abortion and abortion care-seeking experiences among adolescents in Kinshasa, Democratic Republic of Congo: a cross-sectional study

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Abstract

Objectives: To estimate age-specific abortion incidence and unintended pregnancy in Kinshasa, Democratic Republic of Congo (DRC) and compare care-experiences between adolescents (15-19 years) and older women (20-49 years).

Design: We used the age-specific variant of the Abortion Incidence Complications Method to estimate abortion and unintended pregnancy, with data from three primary sources: Health Facility Survey (n=361) provided post-abortion care (PAC) caseloads; Prospective Morbidity Survey (n=1,031) provided the age distribution and characteristics of women presenting for PAC; and, Health Professional Survey (n=115) provided an estimate of the proportion of abortions resulting in facility-based treatment of complications. Bivariate (chi-square, t-test) and multivariable (binary logistic regression, Cox proportional hazard) analyses were used to compare abortion care experiences.

Setting: Health facilities proving PAC in Kinshasa

Participants: Women who presented to PAC facilities with abortion complications and their care providers.

Primary and secondary outcome measures: The primary measures were abortion incidence and proportion of pregnancies unintended. The secondary measures was the odd of reporting specific abortion-care experiences.

Results: Adolescents had an estimated 27,590 induced abortions, constituting 18.8% of abortions in Kinshasa in 2016. Adolescents had the lowest abortion rate among women less than 35 years (55.2/1,000 women) but the highest rate among ever sexually active women (138.4/1,000) and recently sexually active women (167.2/1,000). Also, adolescents had the highest abortion ratio (82.4/100 live births), proportion of pregnancies unintended (80%), and proportion of unintended pregnancies ending in abortion (49%). Compared to older women, adolescents had higher odds of reporting pregnancy unintendedness (AOR= 1.36, 95% C.I.=1.75-2.24), seeking abortion at later than first trimester (AOR= 1.34, 95% C.I.=1.09-1.63) and from non-medical professionals (AOR= 1.68, 95% C.I.=1.31-2.14), and not using contraceptives before pregnancy (AOR= 2.23, 95% C.I.=2.77-3.43) or post-abortion (AOR= 2.46, 95% C.I.=1.87-3.29).

Conclusions: Interventions are needed to reduce unintended pregnancy among adolescents in Kinshasa and improve their abortion-care experiences.

Strengths and limitations of the study

- This study provides the first age-specific estimates of unintended pregnancy and abortion for Kinshasa, DRC.
- The underlying data on the number of PAC patients comes from a census of postabortion care (PAC) providing facilities in Kinshasa, and the weighted age and subgroup distribution of PAC patients is from a representative sample of PAC-providing facilities.
- In the absence of an age-specific multiplier, we uniformly applied a nationally-obtained multiplier from a representative sample of PAC cases to all the age groups to obtain the age-specific induced abortions estimates: this may bias the estimate for specific age groups.

INTRODUCTION

Unsafe abortion is a public health challenge that is associated with at least 8% of global maternal deaths.[1] The burden of unsafe abortion is highest in countries with restrictive abortion laws and approximately 97% of unsafe abortions and nearly all abortion-related deaths occur in low- and middle-income countries (LMICs).[2] Africa, which has the highest risk of abortion-related deaths globally,[2] presents striking statistics: most African countries have restrictive laws[3] and induced abortions* occur mostly in a clandestine manner, with the result of over three-quarters (75.6%) of the estimated annual 6.86 million abortions in Africa being unsafe.[2]

Democratic Republic of Congo (DRC), the third most populous country in Africa, previously had a restrictive penal code that forbade abortion under any circumstances but domesticated the African Charter on Human and People's Rights on the Rights of Women (Maputo Protocol) that permits abortion on some health grounds in 2018.[4] However, abortion remains largely clandestine in DRC.[5] With an estimated population of 12 million in 2016, Kinshasa, the capital of DRC, is the second most populous and densest city in sub-Saharan Africa.[6] Kinshasa has a high level of unmet need for contraception[7-9] and many women undergo abortions to meet their fertility aspirations.[5,8,10] Two studies involving different methodological approaches – the Confidante Method[10] and Abortion Incidence Complications Method (AICM)[5] similarly estimated Kinshasa's abortion rate as 55-56 per 1,000 women aged 15-49 for 2015/2016. While some small-scale studies suggest a substantial level of adolescent abortion in Kinshasa,[11-13] adolescent-specific abortion estimates are lacking.

* While we recognize that the term "abortion" technically covers both induced abortion and spontaneous abortion (miscarriages), unless otherwise specified, abortion as used in this paper refers to induced abortion.

Globally, studies on adolescent-specific abortion measures are rare, despite indications that adolescents contribute significantly to the abortion burden and are potentially at greater risks of complications associated with lower rates of healthcare access.[14,15] As a 2019 review to mark the 25th anniversary of the International Conference on Population and Development notes, "Data on the specific levels and trends in abortion measures that are specific to adolescents are scarce, particularly among developing countries."[16] Studies comparing abortion measures for adolescents and older women are also scarce and the findings from the few existing studies vary considerably.[17] In Africa, compared with older women (20-49 years), higher adolescent abortion rates have been reported for Nigeria,[18] but lower rates for Gabon, Ghana, Republic of Congo, and Zimbabwe.[17,18]

Among African countries, recent adolescent-specific abortion estimates are only available for Ethiopia,[19] Uganda,[20] and Zimbabwe.[21] These recent papers, unlike previous works, adjusted for sexual activity and, therefore, provide estimates specifically for sexually active adolescents and older women, which make for a more valid comparison between the age groups. While sexually active adolescents had a higher abortion rate compared to older women in Ethiopia[19] and Uganda,[20] but the reverse was the case in Zimbabwe.[21] The differential findings probably reflect contextual sexual and reproductive health (SRH) dynamics and highlight the need for studies in different geographies. So far, no comparison of abortion incidence for adolescents and older women exist in the literature for Kinshasa, DRC, as age-specific estimates are lacking. Generating age-specific abortion and unintended pregnancy measures is crucial for understanding the burden of unintended pregnancy and abortion among adolescents and for advocating for relevant interventions to improve their health and wellbeing.[9]

Comparing adolescent and non-adolescent abortion-related care experiences, including post-abortion care, is also important as the experiences have significant implications for the health outcomes and well-

being of the women seeking abortions, as well as for health systems treating abortion complications. Some of the existing studies suggest that the quality of care and the experiences of adolescents in the context of abortion may differ significantly from that of older women[19,22] but these findings are by no means universal and vary by geographical and socio-economic contexts. So far, no published studies have compared the abortion care experiences of adolescents and older women in Kinshasa, DRC. Analyzing differences that may exist in the abortion-care experiences of adolescents and older women can generate relevant information for appropriate interventions to address any potential adolescent-specific barriers to relevant care.

This study aims to address the existing evidence gap relating to age-specific analyses of abortion incidence and abortion care experience in Kinshasa, DRC. Our primary objective is to estimate and compare unintended pregnancy and abortion incidence for adolescents and older women in Kinshasa. Secondly, we compare the abortion care experiences of adolescents and older post-abortion care patients.

METHODS

Study Design and Data Sources

We used the age-specific variant of AICM[19,20] to indirectly estimate abortion and unintended pregnancy for adolescents (15-19) and older women (20-49). Developed in the early 1990s, the AICM has been used to estimate abortion incidence for 23 LMICs as of 2017.[23] The age-specific AICM uses three primary data sources: Health Facility Survey (HFS), which provides post-abortion care (PAC) caseloads; Prospective Morbidity Survey (PMS), which provides the age distribution and characteristics of women presenting for PAC and their care-seeking behavior and experience; and, Health Professional Survey (HPS) that provides an estimate of the proportion of abortions that results in facility-based treatment of

abortion complications, the inverse of which serves as the multiplier or adjustment factor in the AICM approach.

The current study is based on data collected in 2016 to estimate abortion incidence for Kinshasa. The HFS was conducted in a representative sample of 361 facilities with the capacity to provide PAC. The PMS was prospectively conducted for 30 days in 223 of the 361 HFS facilities with data from 1,031 PAC patients. The HPS was a purposive sample of 115 health professionals who are knowledgeable about abortion practices in Kinshasa. Details of the study design have previously been published by Chae and colleagues, including various steps taken to minimize bias in the data collection process.[5] The Institutional Review Boards of Guttmacher Institute and the University of Kinshasa, School of Public Health approved the study.

Patient and public involvement

We did not directly involve abortion patients in the study planning but the original data collection that provided the foundation for this study sought and received guidance for study planning and results dissemination from a Technical Advisory Committee, which included community representatives and technical experts, and the current study also received similar guidance.

Data Analysis

Abortion measures

Our age-specific estimation of abortion incidence involved three key sequential steps. Firstly, we applied the age distribution of PAC patients from the PMS to the total PAC caseloads reported by Chae et al[5] for women age 15-49 to obtain the PAC caseloads for five-year age groups. Secondly, recognizing that PAC caseloads include both induced and spontaneous abortion (miscarriages), we calculated the number of

treated second-trimester miscarriages through a two-step process and subtracted the obtained figure from the PAC caseloads. The initial step involved estimating second-trimester miscarriages requiring treatment with the assumption that only second trimester miscarriages (13-22 weeks) would result in facility-based care as is the practice in the AICM approach.[23] Clinical data from Harlap and colleagues show that second-trimester miscarriages constitute 2.9% of all known pregnancies and 3.41% of live births;[24] applying the age-specific life tables developed based on that data by Sully et al.,[19] we estimated the number of second-trimester miscarriages for the five-year age groups. Then, in line with previous AICM studies,[23] we estimated the proportion of second-trimester miscarriages that received facility care as equal to the age-specific proportion of facility-based deliveries obtained from the 2013-14 Demographic and Health Survey (DHS) data for Kinshasa.[25] Subtracting the number of treated second-trimester miscarriages from the total age-specific PAC caseloads resulted in the age-specific PAC cases attributable to induced abortion.

Thirdly, we estimated abortions that did not result in facility-based care by using the multiplier, which is the inverse of the proportion of all abortions that result in complications and facility-based care as estimated in the HPS. As age-specific multipliers are not available, we applied the overall multiplier generated by Chae et al[5] uniformly across the age groups to estimate the number of induced abortions for each age group. We then summed the estimates obtained for all age-groups and proportionally adjusted the age-specific estimates to ensure that the sum equaled the figure previously reported by Chae et al[5] for women age 15-49 years.

As standardly defined, we calculated the age-specific abortion incidence rate as the number of abortions per 1,000 women per age group and abortion ratio as the number of abortions per 100 live births for each age-group. To address age-related differential sexual activity we calculated abortion

incidence for women who ever had sex and women with recent sexual activity (defined as sex within 12 months before the survey).[19,20]

Unintended pregnancy

We calculated unintended pregnancy as the sum of three events: (i) induced abortion (explained above), (ii) unintended births, defined as births that were unplanned at the time of conception (either unwanted or mistimed) and obtained from the DHS, and (iii) unintended pregnancies that ended in miscarriage. The number of unintended births was obtained by multiplying the age-specific proportion of unplanned births documented in the DHS report by the number of age-specific births, which was calculated by applying age-specific fertility rates from the 2013–14 DRC DHS[25] to age-specific population estimates of women of reproductive age (15-49 years) in Kinshasa.[26] Based on the work of Leridon and Helner[27] and in line with the AICM approach,[23Error! Bookmark not defined.] unintended pregnancies ending in miscarriage were calculated as the sum of 20% of unplanned live births and 10% of induced abortions. Intended pregnancies were calculated as the sum of planned births (obtained by subtracting unplanned births from the total number of births) and miscarriages from intended pregnancies (estimated as 20% of planned births).[27]

Abortion-related experiences

Using the PMS data of women receiving PAC (following either induced abortions or miscarriages), we compared the background characteristics and experiences of adolescent and older women regarding abortion. Specifically, we compared the socio-demographic and reproductive characteristics for adolescents and older women using chi-square and compared the mean number of days to reach PAC (to assess a possible delay in reaching care) using t-test. We further compared adolescents and older PAC patients using multivariable analyses for nine abortion-related and care experiences: : (i) history of

previous abortion; (ii) contraception at the time of pregnancy; (iii) intendedness of index pregnancy; (iv) gestational age at abortion (first trimester versus later); (v) interference with pregnancy (inducing abortion); (vi) professional status of the abortion service provider (medical professionals versus others); (vii) severity of postabortion complication (none/mild versus moderate/severe); (viii) delay in reaching care (sum of the total number of days taken to decide to seek care and to reach the first health facility); and, (ix) provision of postabortion contraceptives by PAC provider. We controlled for marital status, education, economic level (poor or non-poor status) based on household wealth index, previous pregnancy, and pregnancy intention (except when pregnancy intendedness was the dependent variable) in each multivariable model. We used binary logistic regression for multivariable analyses and obtained the adjusted odds ratio (AOR) and the 95% Confidence Interval (C.I.), except in the case of the number of days taken to reach PAC where we used a Cox proportional hazard model and obtained the hazard ratio (HR), and 95% C.I. Analyses were undertaken using Stata version 16 and SPSS version 24.

RESULTS

Incidence of abortion

An estimated 27,590 induced abortions occurred among adolescents, constituting 18.8% of the 146,713 abortions in Kinshasa in 2016: this proportion is similar to the percentage of women of reproductive age (15-49 years) who are adolescents (19.5%). Adolescents have the lowest abortion rate (55.2 per 1,000 women) among women less than 35 years of age. However, restricting the sample to only sexually active women, the abortion rate shows an inverse relationship with age, and adolescents have the highest rate among all women of reproductive age (Figure 1). The abortion rate is 138.4/1,000 for adolescents who ever had sex and 167.2/1,000 for recently sexually active adolescents. In comparison, for older age groups, the abortion rate ranges from 28.2/1,000 to 92.3/1,000 for those who ever had sex, and from 34.6/1,000 to 117.0/1,000 for recently sexually active women. The abortion ratio also shows an inverse relationship

with age, and adolescents have the highest ratio (82.4 per 100 live births versus 33.1/100 – 56.2/100 live births for older women).

Unintended pregnancy

An estimated 70,733 pregnancies occurred among adolescents – about 12.5% of the 563,064 pregnancies estimated for Kinshasa in 2016. Eighty percent of pregnancies among adolescents are unintended compared to the lower range of 53%-67% for older age groups (Figure 2). The proportion of unintended pregnancies that ended in abortion shows an inverse relationship with age, decreasing progressively from 49% for age 15-19 years to 37% for age ≥35 years. Unlike in older age groups (age 25-49 years), the proportion of unintended pregnancies ending in abortion is higher than those ending in births among adolescents (49% vs 39%) and other young people age 20-24 (46% versus 41%).

Abortion-related experiences

Compared to older women aged 20-49 years, bivariate analysis shows that adolescent PAC clients were significantly less likely to be in union (38% vs 63%, p<0.001) but significantly more likely to come from poor households (48% vs. 39%, p < 0.001) and have post-primary education (19% vs. 10%, p<0.001) (Table 1). Adolescents are less likely to use contraceptives before pregnancy (16% vs. 30%, p<0.001), report their pregnancy as being intended (13% vs 30%, p<0.001), or receive post-abortion contraceptives (9% vs. 17%, p<0.001). However, adolescents were more likely to report the index pregnancy as induced (51% vs 40%, p<0.001) as well as seek abortion at a later gestation age than the first trimester (81% vs 76%, p=0.001) and from non-medical professionals (37% vs 44%, p=0.001). A higher proportion of adolescents compared to older PAC patients also reported experiencing moderate/severe complications (68% vs 61%, p<0.001) or that the index pregnancy resulted from forced sex (9.9% vs 4.9%, p<0.001). Adolescents and older women did not significantly differ in the time taken to reach PAC services (4.0 days vs. 4.4 days, p=0.214)

Multivariable analysis (Figure 3) shows that controlling for the effect of other factors, adolescent PAC patients have significantly higher odds of unintended pregnancy (AOR= 1.36, 95% C.I.=1.75-2.24), not using contraceptives before pregnancy (AOR= 2.23, 95% C.I.=2.77-3.43), but lower odds of history of previous abortion (AOR=0.78; 95% C.I.=0.63-0.96) compared to older PAC patients. Also, adolescent PAC patients have higher odds of seeking abortion at later gestational age (second or third trimester) (AOR= 1.34, 95% C.I.=1.09-1.63) and from non-medical professionals (AOR= 1.68, 95% C.I.=1.31-2.14) and not receiving post-abortion contraceptives (AOR= 2.46, 95% C.I.=1.87-3.29). However, adolescents and older PAC patients did not significantly differ in terms of interfering with the index pregnancy (induced abortion), experiencing post-abortion complications, and the time taken to reach PAC services.

DISCUSSION

This study, to the best of our knowledge, provides the first age-specific estimates of unintended pregnancy and abortion for Kinshasa, DRC. Regarding abortion among women aged less than 35 years, adolescents recorded the lowest rate in this study. However, when we considered only women who have ever had sex and thereby exposed to the possibility of pregnancy, adolescents have the highest rate of abortion among ever sexually active and recently sexually-active women, similar to the findings in Ethiopia[19] and Uganda[20] but contrary to the findings in Zimbabwe.[21] Compared to their peers in Zimbabwe (15.9/1,000),[21] Uganda (76.1/1,000),[20] and Ethiopia (90.7/1,000),[19] **Error! Bookmark not defined.** the abortion rate is substantially higher for recently sexually active adolescents in Kinshasa (167.2/1,000).

Compared to older women, adolescents have a higher rate of unintended pregnancy in Kinshasa. The proportion of pregnancy that is unintended is also substantially higher for adolescents in Kinshasa (80%) compared to their counterparts in Ethiopia,[19] Uganda,[20] and Zimbabwe[21] where about half of all pregnancies or less are unintended – and likely contributed to the higher adolescent abortion rate in

Kinshasa. Approximately half of the unintended pregnancy among adolescents in Kinshasa ended in abortion compared to less than a fifth of such pregnancies among adolescents in Uganda[20] and Zimbabwe.[21] While the proportion of unintended pregnancies ending in abortion is higher for adolescents compared to older women in Kinshasa, the proportion did not vary systematically by age in Uganda.[20] Unintended pregnancy in Kinshasa, as our findings show, is more likely to result in abortion among adolescents and other young people (age 15-24) than in births unlike the picture in older women. The abortion ratio of 82.4 per 100 live births for adolescents in Kinshasa, which implies that approximately four abortions occur among adolescents for every five births, is substantially higher than the ratio for older women in Kinshasa and more than double the ratio of ≤31.1/100 live births for adolescents in Ethiopia[19] and Zimbabwe.[21]

The higher rate of unintended pregnancy among adolescents in Kinshasa compared to older women may likely be explained by differential contraceptive behavior. As the 2013-14 DRC DHS reports, adolescents have the lowest rate of contraceptive use among women aged less than 45 years.[25] Studies have also shown that adolescents in DRC[28] and Kinshasa[29] have a higher unmet need for contraceptives. Globally, adolescents have a higher level of unmet need for contraceptives as a result of demand-side barriers (contraceptive-seeking behavior), supply-side barriers (health service factors), and structural and environmental barriers such as unsupportive social norms and policies.[30,31] Specifically for DRC, research findings indicate that existing family planning services have gaps and inadequacies regarding adolescents' needs[32] and that cultural perspectives and social norms against premarital and adolescent sexual engagement are deeply rooted.[33] The strong social stigma associated with pre-marital or out-of-union pregnancy is likely to have also contributed significantly to the high adolescent abortion ratio in Kinshasa. As a qualitative study reported, young people in Kinshasa have concerns that pre-marital pregnancy would

bring dishonor to their families and may, therefore, seek abortion clandestinely in case of unintended pregnancy.[34]

It is important to emphasize that our findings relate to only Kinshasa – the national capital of DRC and a highly urbanized area, and not the entire country. The abortion estimates for DRC as a whole would likely have been much lower as most other parts of the country outside Kinshasa are far less urbanized and abortion rates are generally higher in urban settings.[18] Our focus on Kinshasa alone also likely explains the higher abortion estimates we obtained compared to the figures for adolescents in more nationally-oriented studies in Ethiopia,[19] Uganda,[20] and Zimbabwe.[21]

Regarding abortion-related care experiences, our findings show that adolescent PAC clients have less desired abortion care experiences compared to older women in terms of seeking an abortion later than the first trimester and from non-medical professionals and are less likely to use contraceptives before pregnancy or receive post-abortion contraceptives. Although several authors have reported that adolescents may face more barriers to SRH care[30,31] and receive a lower quality of maternal health services,[35] the findings concerning PAC varied.[20,21] For example, while Riley et al.[21] reported that adolescent PAC patients are 21% more likely to experience a delay in reaching care in Zimbabwe compared to older women, Sully et al.[20] recorded no significant difference between adolescents and older women in this respect in Uganda. The Ugandan study also found no significant difference between adolescents and older women concerning the experience of unintended pregnancy, the gestational age of seeking an abortion, the use of non-medical professionals for abortion services, or in receiving post-abortion contraceptive services.[20]

This study has some limitations. First, in the absence of an age-specific multiplier, we used a uniform multiplier in estimating abortions by age groups: this may bias the estimate for specific age groups as the possibility of the occurrence of a complication and access to treatment may vary by age. Specifically, if the multiplier — "the number of women without complications or with untreated complications for every woman with a treated complication"[19]— is higher for adolescents than for older ages our abortion rate for adolescents would be an underestimate. While no significant difference was recorded in the time taken by adolescents and older women to reach PAC in this study, a higher proportion of adolescents compared to older women experienced moderate/severe complications. Secondly, our findings regarding care-seeking experiences may not be generalizable to all abortion experiences as PAC caseload consists of both miscarriages and induced abortion cases, and the care-seeking behaviors may differ for the two groups. Also, women who had abortions but did not experience complications, those who failed to seek facility care for abortion complications or those who died from abortion complications are excluded from the PAC caseloads. Thus, our findings cannot be generalized for induced abortion complications. Thirdly, self-reported information from PAC patients may be liable to social desirability and other forms of response bias. The findings that adolescents are less likely to report their pregnancy as being intended and more likely to report the index pregnancy as induced may indicate a low level of social desirability bias, if at all.

Our findings imply the need to prioritize adolescent SRH issues in Kinshasa. While Congo DRC has several policies and programs with relevant focus on adolescent SRH issues, including the National Multisectoral Plan on Family Planning (2014 – 2020) and school-based sexuality education program (Family Life Education) program, the country faces formidable challenges in terms of implementation, resulting in sub-optimal effectiveness,[36,37] Thus, the country needs to strengthen the implementation of policies and programs to enable adolescents to overcome various barriers to accessing modern contraceptives and

thereby reduce unintended pregnancy and the associated abortion. Among others, efforts should be directed towards expanding modern family planning services and improving the friendliness and responsiveness of services to adolescents. Evidence-driven behavior change communications are needed to improve adolescent contraceptive-seeking behavior and positively impact SRH-related social norms. Also, there is a need to rigorously implement the domesticated Maputo protocol to improve access to safe abortion as well as abortion-related care experiences and outcomes for adolescents as well as older women. Overall, considerable efforts should be dedicated to strengthening the capacity of health and related social systems to be more adolescent-responsive: meaningful involvement of adolescents and adolescent-serving organizations in relevant policy and program decisions are important in this regard.

Contributors: AOF led the conceptualisation of the research, and TR, PKK, and CM participated in the process. TR and AOF analysed the data. AOF wrote the original draft of the manuscript; TR, PKK, and CM participated in reviewing and editing the draft. PKK and CM played leadership roles in the original data collection exercise.

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Provenance and peer review: Not commissioned; externally peer reviewed.

Data availability statement: Deidentified versions of the raw Health Facility Survey, Prospective Morbidity Survey and, Health Professional Survey Health datasets used by the authors are available from the Guttmacher Institute upon reasonable request to researchers who wish to use the data for scholarly analysis. To discuss obtaining copies of these datasets, please contact popcenter@guttmacher.org with the detailed protocol for your proposed study, and information about the funding and resources you have to carry out the study.

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Figure legends:

Figure 1. Abortion estimates by age group in Kinshasa, DRC, for all women, ever-sexually active women, and recently sexually active women, 2016

Legend: Abortion rate per 1,000 women; Abortion rate per 1,000 women sexually active in past 12 months; Abortion rate per 1,000 women who have ever had sex

Figure 2. Percentage of all pregnancies in Kinshasa, DRC, that are unintended by age group and outcome, 2016

Legend: Unintended pregnancies that ended in abortion; Unintended pregnancies that ended in birth; Unintended pregnancies that ended in miscarriage; Percent of pregnancies that were unintended

Figure 3. Adjusted odds ratios, hazard ratios and 95% confidence intervals of abortion care experiences among adolescent postabortion care patients as compared to older postabortion care patients in Kinshasa, DRC, 2016

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Table 1. Sociodemographic characteristics of post-abortion care patients, Kinshasa 2016

	Adolescents (15-19) N= 795		Older Women (20-49) N= 4023		All Women (15-49) N= 4990		p-value
	N	%	N	%	N	%	
I. Socio-demographic characteristics							
Socioeconomic status							
Poor	382	48.0	1558	38.7	2026	40.6	<0.001
Nonpoor	413	52.0	2465	61.3	2965	59.4	
Educational level[1]							
No or primary education	149	18.7	430	10.7	650	13.1	<0.001
Post-primary education	646	81.3	3592	89.3	4327	86.9	
Marital status[2]							
In union	292	37.9	2519	62.6	2895	58.3	<0.001
Not in union	479	62.1	1504	37.4	2070	41.7	
II. Reproductive characteristics							
Previous pregnancies							
0	396	49.8	538	13.4	971	19.5	<0.001
≥1	399	50.2	3485	86.6	4019	80.5	
Previous miscarriage[a]							
No	593	74.7	2730	67.9	3453	69.2	<0.001
Yes	202	25.3	1292	32.1	1536	30.8	
Previous abortion[a]							
No	640	80.5	2893	71.9	3653	73.2	<0.001
Yes	155	19.5	1129	28.1	1336	26.8	
Pregnancy intention							
Intended	99	12.5	1204	29.9	1323	26.5	<0.001
Unintended/not sure	695	87.5	2818	70.1	3667	73.5	
Pre-pregnancy contraceptive use							
No	664	83.5	2828	70.3	3627	72.7	<0.001
Yes	131	16.5	1195	29.7	1364	27.3	
Gestational age of index abortion[3]							
First trimester	592	75.7	3156	80.9	3916	80.6	0.001
second or third trimester	190	24.3	746	19.1	941	19.4	
Interfered with pregnancy							
No	393	49.4	2430	60.2	2823	58.4	<0.001
Yes	402	50.6	1605	39.8	2007	41.6	
Source of help in pregnancy interference							
Medical professional	148	36.8	730	45.5	878	43.7	0.002
Non-medical professional	254	63.2	875	54.5	1129	56.3	
Severity of complication							
None/Mild	251	31.5	1574	39.1	1824	39.1	<0.001
Moderate/Severe	544	68.5	2449	60.9	2994	60.9	

Received post-abortion contraceptive							
Yes	72	9.1	665	16.5	752	15.1%	<0.001
No	711	89.5	3344	83.1	4213	84.4%	
Pregnancy resulting from forced sex							
Reported experience	79	9.9	160	4.0	239	4.9%	<0.001
Did not report experience	716	90.1	3875	96.0	4591	95.1%	
III. Time taken to reach health facility							
Mean number of days to reach facility	4.0		4.4		4.2		0.214

[1] 1 missing respondent each from educational level, previous miscarriage, previous abortion and pregnancy intention for older women group

[2] 23 missing respondents from marital variable for adolescents

[3] 13 missing respondents for gestational age at abortion for adolescents and 120 for older women category

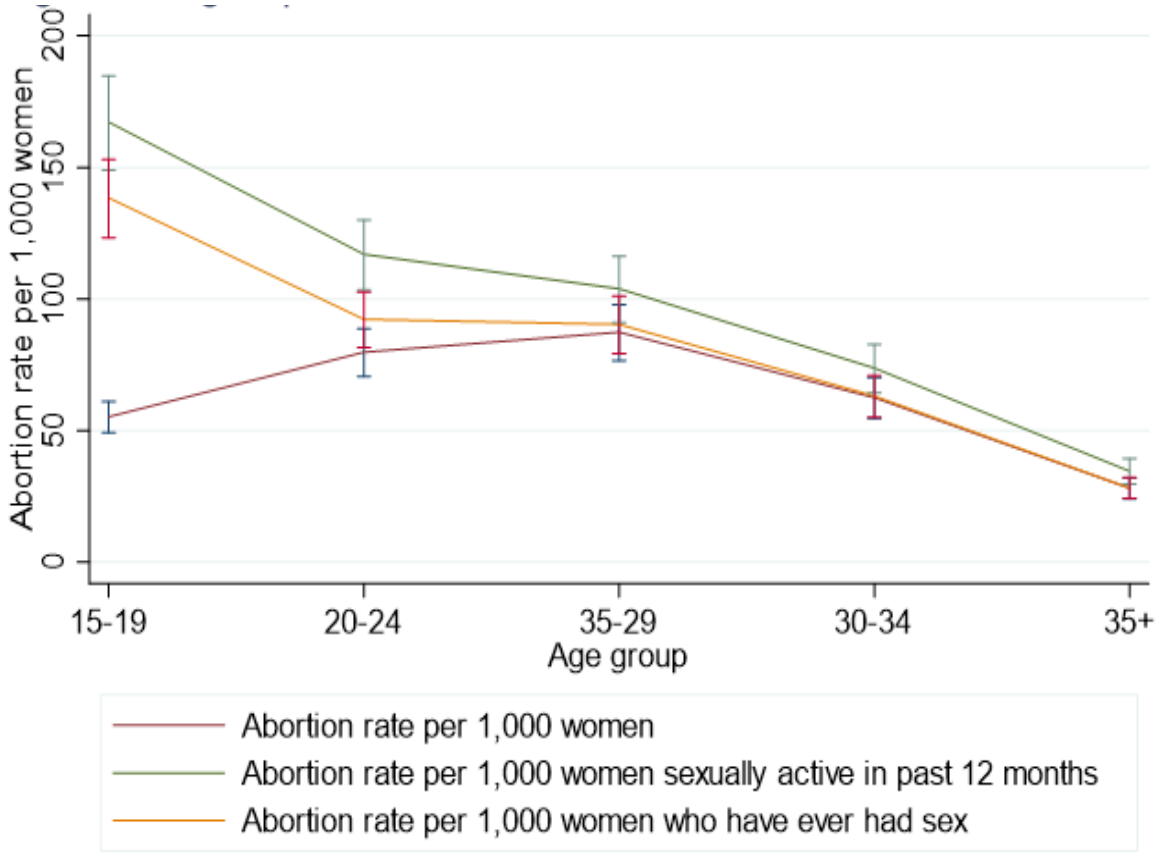

Figure 1: Abortion estimates by age group in Kinshasa, DRC, for all women, ever-sexually active women, and recently sexually active women, 2016

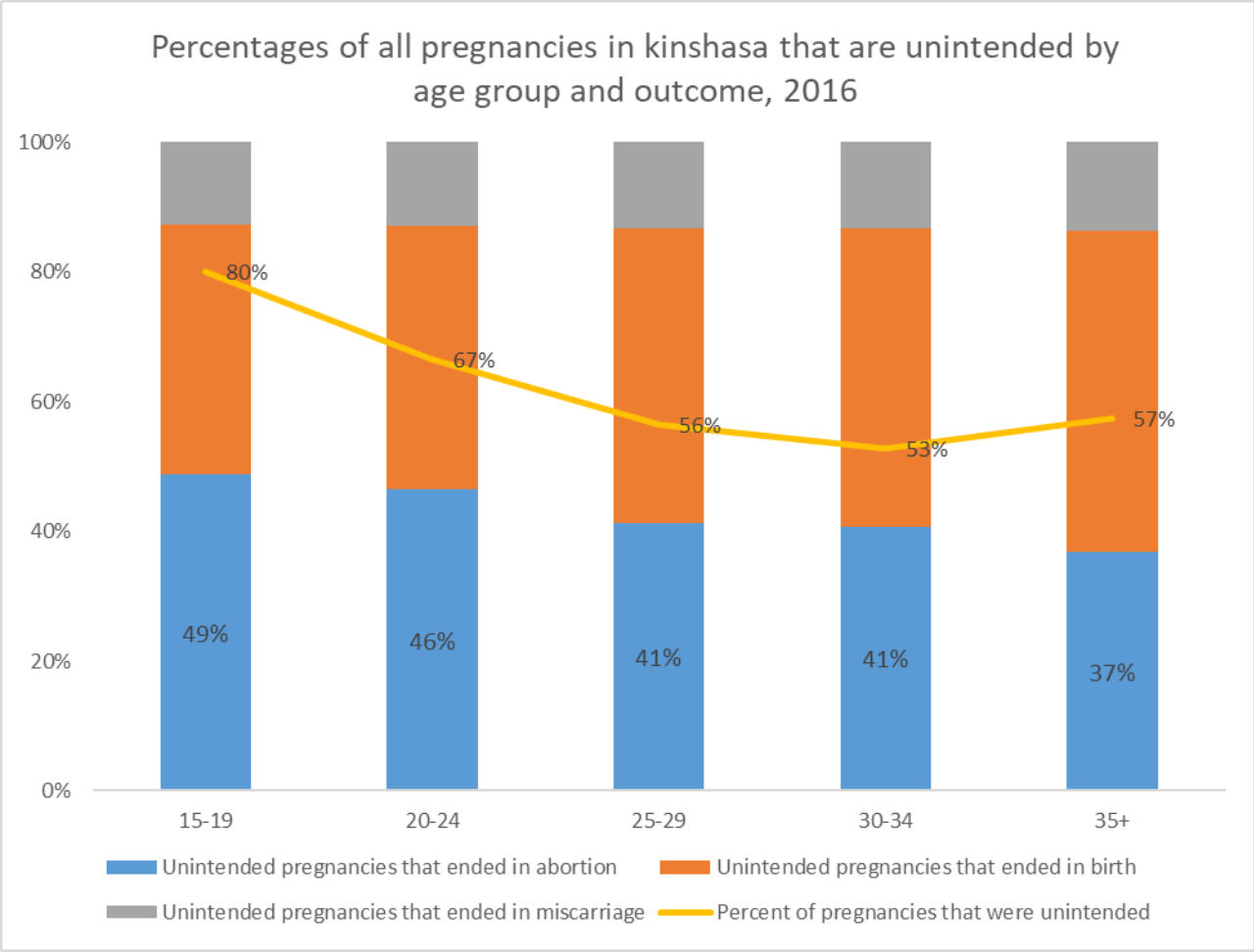

Figure 2: Percentage of all pregnancies in Kinshasa, DRC, that are unintended by age group and outcome, 2016.

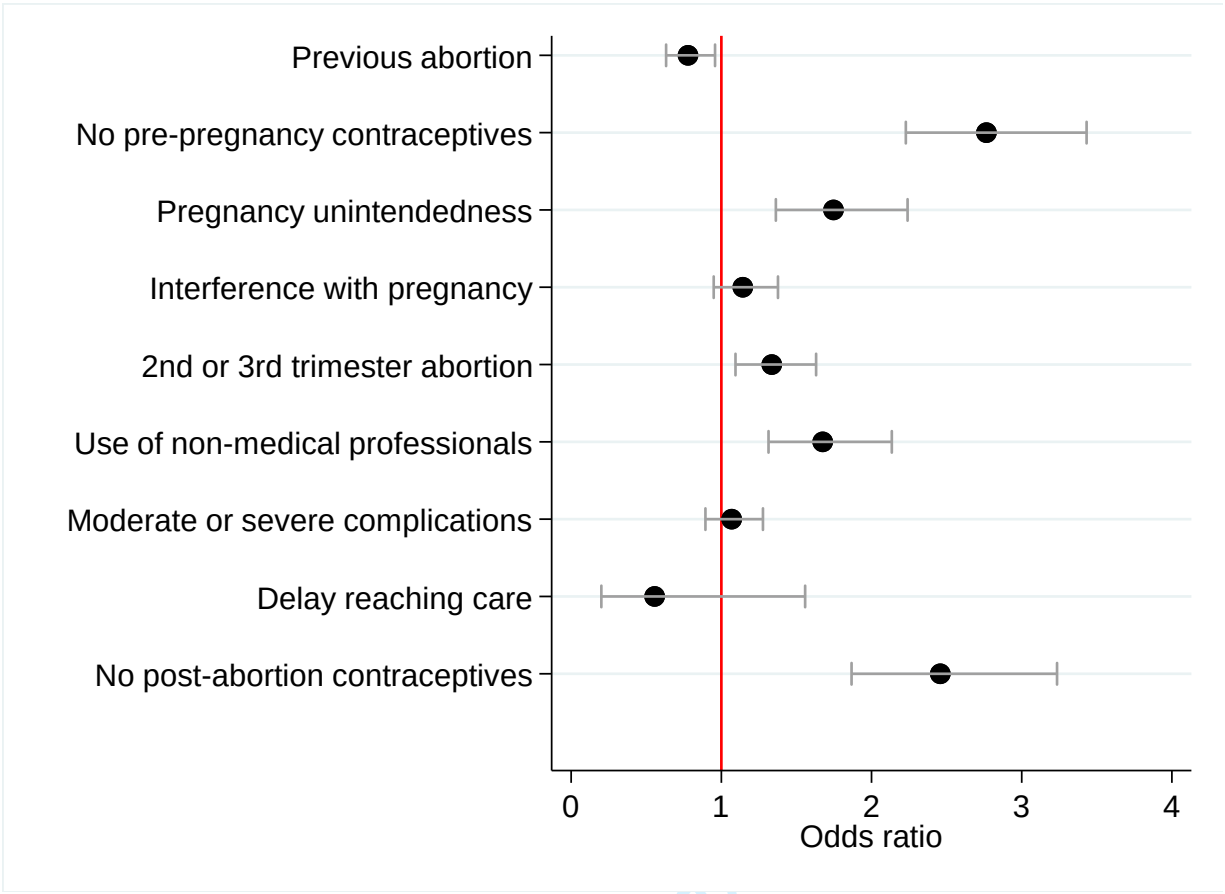

Figure 3: Adjusted odds ratios, hazard ratios and 95% confidence intervals of abortion care experiences among adolescent postabortion care patients as compared to older postabortion care patients in Kinshasa, DRC, 2016.

STROBE Statement—Checklist of items that should be included in reports of ***cross-sectional studies***

	Item No	Page found in the manuscript
Title and abstract	1	1
		2
Introduction		
Background/rationale	2	4-6
Objectives	3	6
Methods		
Study design	4	6-7
Setting	5	6-7
Participants	6	6-7
Variables	7	7-10
Data sources/ measurement	8*	7-10
Bias	9	7
Study size	10	7
Quantitative variables	11	7-10
Statistical methods	12	7-10
Results		
Participants	13*	10
Descriptive data	14*	10
Outcome data	15*	11
Main results	16	10-12
Other analyses	17	
Discussion		
Key results	18	12-14
Limitations	19	15
Interpretation	20	12-14
Generalisability	21	14
Other information		
Funding	22	17

*Give information separately for exposed and unexposed groups.