

# Correlates of Rapid Repeat Pregnancy Among Adolescents and Young Women in Uganda

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**CONTEXT:** Short pregnancy intervals can contribute to maternal and child morbidity and mortality. No previous research has explored factors associated with short pregnancy intervals among young women in Uganda, where adolescent pregnancy and short birth intervals are common.

**METHODS:** Data on 626 married or cohabiting women aged 15–22 with one or two previous pregnancies were drawn from the 2011 Uganda Demographic and Health Survey. Bivariate and multivariable logistic regression analyses were used to examine characteristics associated with rapid repeat pregnancy, defined in two ways: a pregnancy occurring within 24 months or 12 months of a prior pregnancy outcome.

**RESULTS:** Among women, 74% and 37% had experienced a rapid repeat pregnancy within 24 months and 12 months, respectively. Rural women were more likely than urban women to have had a rapid repeat pregnancy within 24 months (odds ratio, 2.4). Women aged 15–17 and those 18 or older at first union were more likely than women younger than 15 to have had a rapid repeat pregnancy within 24 months (3.8 and 3.4); those whose partner had at least a secondary education had lower odds than others of the outcome (0.6). The odds of rapid repeat pregnancy increased with the number of months between marriage and first birth (1.05). Variables associated with rapid repeat pregnancy within 12 months included urban-rural residence, region, age at first union and marriage-to-birth interval.

**CONCLUSIONS:** Efforts to reduce rapid repeat pregnancy among young women in Uganda should focus on rural areas. Strategies to reach women during antenatal care and the postpartum period after their first birth should be prioritized. *International Perspectives on Sexual and Reproductive Health*, 2018, 44(1):11–18, <https://doi.org/10.1363/44e5518>

With one of the highest total fertility rates in Eastern Africa (6.2 births per woman in 2011), Uganda's growing youth bulge reflects the country's low contraceptive prevalence rate and young age at first marriage, as well as its cultural preference for large families.<sup>1</sup> These fertility indicators are even more pronounced in the Northern region of the country, where decades of conflict have impeded development efforts. The median ages of marriage and first birth for women in the Northern region are the lowest in the country—16.9 and 17.9 years, respectively, compared with national rates of 18.1 and 18.9 years. Furthermore, the uptake of modern contraceptive methods in the region has lagged: The contraceptive prevalence rate in Northern Uganda is 23%, compared with 30% nationally. Also noteworthy with respect to fertility trends is the Eastern region, which has the country's highest total fertility rate (7.5).

As in other low- and middle-income countries, adolescent pregnancy is common: One-quarter of all pregnancies in Uganda are among adolescents.<sup>1</sup> Pregnant women younger than 20 are at increased risk of postpartum hemorrhage, obstetric fistula, anemia, malnutrition and maternal mortality.<sup>2</sup> Moreover, the socioeconomic impact of adolescent childbearing can be

devastating: Pregnant teenagers are frequently stigmatized by their communities and deprived of educational opportunities.<sup>3</sup>

Adolescents who are subject to multiple pregnancies within the space of only a few years are especially vulnerable to adverse reproductive health outcomes.<sup>3</sup> Short birth-to-pregnancy intervals have been shown to contribute to both mother and child morbidity and mortality. Among Ugandan women aged 15–19 who have had at least two births, nearly 40% report having a child within 24 months of the preceding one. And according to an analysis of Demographic and Health Survey (DHS) data collected between 2013 and 2016 from 22 U.S. Agency for International Development (USAID) priority countries, Uganda had the greatest increase in the proportion of 15–19-year-olds who had experienced a birth interval of less than 24 months.<sup>4</sup>

Despite findings suggesting that the prevalence of rapid repeat pregnancy—defined here as a pregnancy occurring within 24 months of the preceding pregnancy outcome—is high among adolescents in Uganda,<sup>1</sup> little is known about the factors associated with the phenomenon there. Indeed, we conducted a review of published research literature and could not find a study that specifically addressed rapid repeat pregnancy among

adolescents in Uganda.\* Although studies specifically examining interbirth intervals (i.e., the interval between two live births) among women of reproductive age have been conducted in Sub-Saharan Africa, few examined factors associated with interpregnancy intervals that account for both nonlive and live pregnancy outcomes.<sup>5-7</sup>

Research to date in Sub-Saharan Africa has mostly focused on the factors associated with the ability of young women—regardless of parity—to prevent pregnancies. Two factors often cited are inequitable gender norms and young women's low autonomy with respect to decisions about fertility and contraceptive use.<sup>8-10</sup> Findings from qualitative studies among war-affected young women in Uganda underscore how dire poverty and the lack of educational opportunities may force women into early marriage and subsequent early childbearing.<sup>11,12</sup> Once married, women are less likely to be able to advocate for contraceptive use.<sup>13,14</sup> Moreover, data suggest that war-torn populations in Uganda often face great pressure to reproduce to replace children lost in the conflict.<sup>15</sup>

Other studies have shown adolescents' misconceptions about contraception reduce their use; such misconceptions range from the belief that birth control pills destroy the fallopian tubes to the notion that condoms might become lodged in the reproductive tract, resulting in death.<sup>8,9,15-17</sup> In addition, women living in current or former conflict zones—such as Northern Uganda—face even greater obstacles to meeting their fertility preferences, including lack of supplies, limited trained staff and destroyed or nonexistent health infrastructure.<sup>15,18,19</sup>

One notable theme from the Uganda-specific literature is the phenomenon of young women engaging in transactional sex with older male partners in exchange for school fees, pocket money and basic necessities.<sup>20,21</sup> Studies have shown that such women are less likely to practice safe sex, and are more likely to engage in sexual activity with multiple partners and to report high rates of unintended pregnancy and induced abortions.<sup>22,23</sup> Although these studies do not provide prevalence data on pregnancy outcomes among this population, they underscore how socioeconomic vulnerability is associated with poor adolescent reproductive health outcomes in Uganda, as well as in other countries in the region.

Although studies to date have helped to contextualize the social and cultural environment adolescents must navigate to meet their fertility preferences, they have not specifically addressed the factors associated with rapid repeat pregnancy among this population in Uganda. In an effort to fill this gap, we explored how social, demographic and fertility-related variables are associated with rapid repeat pregnancy among young women in Uganda.

\*A review of the research literature was conducted in May 2016. We searched PubMed, Embase, POPLINE and USAID Development Experience Clearinghouse databases using keywords relevant to proximate determinants of rapid repeat pregnancy among Ugandan adolescents or adults: postpartum contraceptive use, resumption of sexual intercourse in the postpartum period, and fertility preferences of the mother or partner. Only articles published between January 1, 2000 and May 7, 2016 were selected for inclusion. Because of the paucity of articles identified in the literature review, we expanded the search to include all women of reproductive age in Sub-Saharan Africa.

## METHODS

Data were drawn from the 2011 Uganda DHS, a nationally representative survey that aims to capture the country's maternal and child health profile, as well as other information related to fertility and family planning. A total of 9,247 women of reproductive age (15–49 years) were eligible for the DHS women's questionnaire; of those, 8,674 consented to participate, for a response rate of 94%.<sup>1</sup> We analyzed data from women aged 15–22 who were married or cohabiting at the time of interview and who reported at least two pregnancies. To include all eligible women at risk of having a rapid repeat pregnancy, we also included eligible women who had had only one pregnancy if at least 24 months had passed between the pregnancy outcome and the date of interview. Only married and cohabiting women were included because our literature review highlighted several marriage-related variables (e.g., partner influence on fertility preferences and contraceptive use) that are associated with rapid repeat pregnancy, and because sample size limitations precluded separate analyses for married and unmarried respondents. We included young women up to age 22 to look at reproductive health outcomes that occurred 24 months prior to the date of the interview, when the oldest respondents would have been 19 years old.

After our inclusion criteria were applied, a final analytic sample of 626 women aged 16–22 remained; no 15-year-olds were included in the sample.

## Variables

Our outcome of interest was rapid repeat pregnancy. This has sometimes been defined as a pregnancy occurring within 24 months after a live birth; however, because that does not account for all pregnancy outcomes and a significant number of pregnancies in Uganda do not result in a live birth,<sup>24</sup> we used a broader definition in the literature,<sup>25-28</sup> which includes all reported pregnancy outcomes (i.e., live births, miscarriages, stillbirths and induced or spontaneous abortions). To capture a woman's current and past fertility, the DHS asks respondents to report a month-by-month history of contraceptive use, births and pregnancies for the six-year period preceding the date of survey. Using calendar data on the months in which a woman reported being pregnant or experiencing a miscarriage, stillbirth, abortion or birth, we classified women as having experienced a rapid repeat pregnancy if the interval between any recorded live birth and the onset of the following pregnancy was less than 24 months or the interval between a reported nonlive pregnancy outcome and the onset of the subsequent pregnancy was less than 24 months.

We included 17 explanatory variables on the basis of themes identified in our literature review. Standard social and demographic variables included respondent's age, education, wealth quintile and region of residence, and whether she lived in an urban or rural area. We preserved the DHS categories for our descriptive tables, but collapsed them for some variables (education, wealth quintile and region) for cross-tabulations and regression analyses to avoid sparse data issues.

We also included the following sexual activity and fertility variables: age at first sex, age at first union, marriage-to-birth interval, age at first birth, parity, husband's number of other wives and respondent's rank among wives. Marriage-to-birth interval was measured as the number of months between the date of a respondent's first union and the date of her first live birth; women whose first birth occurred before their first marriage had a marriage-to-birth interval of 0.

In addition, given the role of interpersonal relationships and gender norms in fertility outcomes,<sup>8-10,13,14</sup> we included measures of the age difference between the respondent and her partner (less than 10 years or at least 10 years), partner's level of education, respondent's attitude toward gender-based violence and respondent's household decision-making power. Attitude toward gender-based violence was assessed by five yes or no questions asking whether a man is justified in beating his wife if she goes out without telling him, neglects the children, argues with him, refuses to have sex with him or burns the food; we dichotomized women by whether they believed that wife-beating is justified in at least one of the five situations. We assessed household decision-making power by whether women reported being involved in household decisions about their earnings, health care, large household purchases, visits to family or relatives and their partner's earnings. For each domain, women who reported having sole or joint decision-making power were coded as 1 and those who reported no decision-making power as 0; we summed all domains to create an index ranging from 0 to 5.

### Analysis

We conducted quantitative data analyses using Stata version 13.1. The analyses used sampling weights provided with the DHS data and accounted for the complex sampling design, including cluster and stratification information. Given that we were interested in only a subset of the sampled DHS population, we performed subpopulation analyses as appropriate.† Descriptive statistics—including weighted percentage distributions, weighted means and frequency distributions—were computed for the subpopulation in the DHS data set that met the study's inclusion criteria.

All explanatory variables that were not missing for more than 15% of the eligible respondents were included in the bivariate analyses. Response options for several variables (age, education, region and parity) were collapsed to reduce the number of categories for the bivariate and regression analyses. Variables that pertained to only a subset of our sample were not included in the regression models. Women with missing responses or who answered "do not know" to items were dropped from the regression

analyses that included those items. We performed chi-squared tests adjusted for the complex sampling to explore bivariate associations between the explanatory variables and the outcome. Significance was assessed at  $p < .05$  on the basis of two-sided comparisons.

Exploratory variables found to be marginally significant ( $p < .10$ ) in bivariate analyses were tested in multivariable logistic regression models. Regardless of significance in bivariate analyses, we included respondent's age and did not include constructs that were considered to be closely or partly measured within the definition of our outcome (i.e., parity and history of a miscarriage, stillbirth or abortion) in the regression model. Collinearity was evaluated among the explanatory variables to be included in the regression model by inspecting the correlation matrix and assessing estimation problems of the model parameters. Only the most salient of each set of highly collinear variables was tested in the model. We followed backward variable selection procedures, whereby we manually removed the least significant variable in each round until only significant covariates ( $p < .05$ ) remained in the final model. We report adjusted odds ratios, 95% confidence intervals and  $p$  values.

Given that multiple definitions of rapid repeat pregnancy exist in the literature, we also evaluated pregnancies occurring within 12 months of a prior pregnancy outcome. The modeling procedures described above were repeated using the definition based on the shorter time frame.

### RESULTS

The mean age of women in our sample was 20.4 years (Table 1). Twenty-one percent had at least a secondary education, and 79% had a primary education or less. The largest proportion of women (23%) lived in the Eastern region, and most (84%) lived in a rural area. Seventy-three percent of women were younger than 18 at first marriage or cohabitation; 16% reported being in a polygynous relationship. Most respondents (78%) did not report having a partner who is at least 10 years older; 37% of partners had at least a secondary education, and 63% had a primary education or less. In addition, 65% of women considered wife-beating to be justified in at least one of the five scenarios, and women's average household decision-making power was low (mean score, 2.1).

On average, women were 15.4 years old at first sex (Table 2). Twenty-seven percent had had one child, and 71% had had two or more; only 3% had never given birth. Twenty-two percent of women reported having had a miscarriage, stillbirth or abortion. Among women who had had a child, the mean age at first birth was 17 and the mean marriage-to-birth interval was 12.4 months. Three-quarters (74%) of women had experienced a rapid repeat pregnancy according to our primary definition (i.e., pregnancy onset within 24 months of a prior pregnancy outcome), and 37% had had one according to the definition using the shorter time frame (i.e., pregnancy onset within 12 months of a prior pregnancy outcome).

†When complex sampling designs are used, treating the subset as if it were the full sample will yield incorrect standard errors; proper subpopulation analysis will account for all sampling units selected into the original sample regardless of whether members of the subpopulation were selected in all of these units (source: Graubard BI and Korn EL, Survey inference for subpopulations, *American Journal of Epidemiology*, 1996, 144(1):102-106, <http://dx.doi.org/10.1093/oxfordjournals.aje.a008847>).

**TABLE 1. Selected characteristics of young Ugandan women, Demographic and Health Survey, 2011**

Characteristic	N	% or mean
<b>All</b>	626	100.0
<b>Mean age</b>	626	20.4 (20.3–20.5)
<b>Education</b>		
None	65	6.2 (4.2–9.0)
Primary	427	73.2 (68.8–77.2)
Secondary	123	19.2 (15.9–23.0)
>secondary	11	1.4 (0.6–3.1)
<b>Wealth quintile</b>		
Poorest	154	22.7 (18.7–27.2)
Poorer	133	23.2 (19.4–27.4)
Middle	123	21.9 (18.1–26.1)
Richer	85	13.8 (10.9–17.3)
Richest	131	18.5 (14.2–23.8)
<b>Residence</b>		
Urban	146	16.5 (12.5–21.3)
Rural	480	83.5 (78.7–87.5)
<b>Region</b>		
Kampala	44	6.3 (3.8–10.1)
Central 1	56	9.5 (6.8–13.2)
Central 2	62	10.6 (8.0–14.0)
East central	84	12.7 (9.6–16.5)
Eastern	102	22.5 (18.5–27.1)
North	61	8.3 (6.2–11.0)
Karamoja	54	3.7 (2.2–6.3)
West-Nile	58	4.6 (3.4–6.2)
Western	61	13.5 (10.1–17.8)
Southwest	44	8.3 (6.4–10.6)
<b>Mean age at first union</b>	626	16.3 (16.1–16.4)
<b>Age at first union</b>		
<15	116	17.9 (14.9–21.3)
15–17	339	55.3 (50.8–59.7)
≥18	171	26.8 (23.3–30.7)
<b>No. of husband's other wives</b>		
0	485	77.9 (73.9–81.5)
≥1	113	16.4 (13.4–19.9)
Don't know	28	5.7 (3.6–8.8)
<b>Respondent's rank among wives†</b>		
First	36	26.0 (18.3–35.5)
≥second	77	48.3 (38.3–58.5)
Don't know	28	25.7 (17.1–36.7)
<b>Age gap with partner (in yrs.)</b>		
<10	487	78.2 (74.5–81.5)
≥10	137	21.8 (18.5–25.5)
<b>Partner's education</b>		
None	59	5.9 (4.1–8.5)
Primary	324	57.4 (52.0–62.6)
Secondary	198	32.3 (27.3–37.8)
>secondary	30	4.4 (2.8–6.8)
<b>Wife-beating is justified</b>	399	64.7 (59.9–69.3)
<b>Mean household decision-making power (range, 0–5)</b>	618	2.1 (2.0–2.3)

†Among those who reported that their husband has other wives. Notes: The sample includes women aged 15–22 who were married or cohabiting at the time of interview and who reported at least two pregnancies; eligible women who had had only one pregnancy were also included if at least 24 months had passed between the pregnancy outcome and the date of interview. Sample sizes are unweighted; percentages and means are weighted. Figures in parentheses are 95% confidence intervals.

**TABLE 2. Sexual activity and fertility characteristics of young Ugandan women**

Characteristic	N	% or mean
<b>Mean age at first sex</b>	582	15.4 (15.3–15.6)
<b>Age at first sex</b>		
<15	169	30.1 (25.7–34.8)
15–17	335	58.2 (53.4–62.9)
≥18	78	11.7 (9.2–14.8)
<b>Mean age at first birth</b>	609	16.9 (16.7–17.1)
<b>Total no. of children ever born</b>		
0	17	2.8 (1.6–4.7)
1	177	26.9 (23.2–31.1)
2–3	402	65.5 (61.1–69.6)
≥4	30	4.8 (3.2–7.1)
<b>History of miscarriage/abortion/stillbirth</b>		
No	491	78.0 (73.9–81.6)
Yes	135	22.0 (18.4–26.1)
<b>Mean marriage-to-birth interval (in mos.)</b>	609	12.4 (11.3–13.4)
<b>Rapid repeat pregnancy within 24 mos.</b>		
0	183	26.3 (22.4–30.5)
≥1	443	73.7 (69.5–77.6)
<b>Rapid repeat pregnancy within 12 mos.</b>		
0	418	63.5 (59.3–67.6)
≥1	208	36.5 (32.4–40.7)

Notes: The sample includes women aged 15–22 who were married or cohabiting at the time of interview and who reported at least two pregnancies; eligible women who had had only one pregnancy were also included if at least 24 months had passed between the pregnancy outcome and the date of interview. Sample sizes are unweighted; percentages and means are weighted. Figures in parentheses are 95% confidence intervals.

All exploratory variables were evaluated in bivariate analyses, except “respondent's rank among wives,” which was relevant only to women in polygamous marriages, of whom 26% responded “don't know” (see Table 1). In bivariate analyses examining associations between variables and rapid repeat pregnancy within 24 months, greater proportions of women who reported experiencing the outcome than of those who did not had a primary education or lower (82% vs. 73%; Table 3) and had a partner with a primary education or lower (67% vs. 52%). Experience of a rapid repeat pregnancy within 24 months was also associated with lower levels of wealth, rural residence, older ages at first sex and at first birth, and a longer marriage-to-birth interval. In addition, greater proportions of women who had had a rapid repeat pregnancy within 24 months than of those who did not entered into their first union between the ages of 15 and 17 (60% vs. 42%) and had a history of a nonlive pregnancy outcome (28% vs. 6%). Finally, the mean household decision-making power of women who had had a rapid repeat pregnancy within 24 months was lower than that of women who had not experienced the outcome (2.1 vs. 2.4). In bivariate analyses examining the relationship between variables and rapid repeat

pregnancy within 12 months, experience of the outcome was associated with living in a rural area, living in the Eastern or Western region, having been 15 or older at first union, older ages at first sex and at first birth, having borne no more than one child, having a history of a nonlive pregnancy outcome and having a longer mean marriage-to-birth interval.

In our regression model examining rapid repeat pregnancy within 24 months, women living in a rural area had more than twice the odds of those living in an urban area of having experienced the outcome (odds ratio, 2.4; Table 4). In addition, women who at first union were aged 15–17 and those who were 18 or older were more likely than those younger than 15 at first union to have experienced a rapid repeat pregnancy within 24 months (3.8 and 3.4, respectively). Also, the odds of rapid repeat pregnancy increased 5% with each one-month increase in marriage-to-birth interval (1.05). Finally, women whose partner had a secondary or higher level of education were less likely than those whose partner had a primary or lower education to have had a rapid repeat pregnancy within 24 months (0.6).

The results from our regression model using the 12-month definition of rapid repeat pregnancy also show that living in a rural area, older age at first union and having a longer marriage-to-birth interval were significantly associated with the outcome. In addition, young women in the Central, Eastern and Western regions of Uganda had approximately twice the odds of those in the Northern region of having experienced a rapid repeat pregnancy within 12 months (odds ratios, 2.0–2.5).

## DISCUSSION

To our knowledge, this is the first study of rapid repeat pregnancy among adolescents and young women in Uganda. Our results highlight the high prevalence of the outcome among young Ugandan women: Nearly three-quarters of women in our sample had experienced a pregnancy within 24 months of a previous birth outcome, and more than one-third had had one within 12 months. A significant explanatory variable in the final regression models was living in a rural area, which suggests that future efforts to reduce rapid repeat pregnancy should focus on adolescents and young women living in rural Uganda.

National and international efforts to delay marriage among young women in Uganda have surged in the last several years, most notably culminating with the Uganda 2015 National Strategy to End Child Marriage and Teenage Pregnancy.<sup>29</sup> The results from our analysis, however, suggest that women who wait longer to get married or to have children following marriage may have an increased risk of rapid repeat pregnancy within both the 24- and 12-month time frames. According to a study on birthspacing practices among adult married women in Uganda and Zimbabwe, the older the woman's age at marriage, the shorter the birth interval.<sup>30</sup> This phenomenon may be explained at least partly by the desire for large families in Uganda (the mean wanted fertility rate in 2011 was

**TABLE 3. Social and demographic characteristics of young Ugandan women, by experience of rapid repeat pregnancy within 24 months and 12 months**

Characteristic	24 months		12 months	
	None	≥1	None	≥1
<b>Mean age</b>	20.4 (0.14)	20.4 (0.07)	20.4 (0.08)	20.5 (0.11)
<b>Education</b>				
None/primary	73.3	81.6*	78.2	81.5
≥secondary	26.7	18.4*	21.8	18.5
<b>Wealth quintile</b>				
Poorest	18.0	24.3***	23.5	21.2
Poorer	19.9	24.4***	23.9	21.9
Middle	20.8	22.2***	19.4	26.1
Richer	9.5	15.3***	12.2	16.5
Richest	31.8	13.8***	21.0	14.3
<b>Residence</b>				
Urban	30.1	11.6***	19.0	12.0*
Rural	69.9	88.4***	81.0	88.0*
<b>Region</b>				
Central	31.8	24.5	27.9	23.8*
Eastern	27.4	37.9	33.1	38.8*
Northern	19.7	15.5	19.9	11.0*
Western	21.1	22.0	19.2	26.4*
<b>Age at first union</b>				
<15	28.5	14.1***	22.4	9.9**
15–17	42.2	60.0***	52.5	60.2**
≥18	29.3	25.9***	25.1	29.8**
<b>No. of husband's other wives</b>				
0	84.4	82.0	81.8	84.0
≥1	15.6	18.0	18.2	16.0
<b>Age gap with partner</b>				
<10	75.1	78.2	77.3	79.8
≥10	24.9	21.8	22.7	20.2
<b>Partner's education</b>				
None/primary	51.8	67.3**	61.1	67.2
≥secondary	48.2	32.7**	38.9	32.8
<b>Wife-beating is justified</b>				
No	37.8	34.4	35.7	34.5
Yes	62.2	65.6	64.3	65.5
<b>Mean household decision-making power</b>	2.4 (0.16)	2.1 (0.08)†	2.1 (0.12)	2.1 (0.08)
<b>Mean age at first sex</b>	14.8 (0.17)	15.6 (0.10)***	15.2 (0.10)	15.8 (0.16)**
<b>Mean age at first birth</b>	16.0 (0.16)	17.2 (0.11)***	16.5 (0.11)	17.6 (0.16)***
<b>Total no. of children ever born</b>				
0–1	31.9	28.9	25.9	36.3*
≥2	68.1	71.1	74.1	63.7*
<b>History of miscarriage/abortion/stillbirth</b>				
No	94.0	72.3***	90.7	55.8***
Yes	6.0	27.7***	9.3	44.2***
<b>Mean marriage-to-birth interval (in mos.)</b>	9.6 (0.88)	13.4 (0.64)***	11.4 (0.66)	14.2 (0.87)*

\*p<.05. \*\*p<.01. \*\*\*p<.001. †p<.10. Notes: The sample includes women aged 15–22 who were married or cohabiting at the time of interview and who reported at least two pregnancies; eligible women who had had only one pregnancy were also included if at least 24 months had passed between the pregnancy outcome and the date of interview. Figures in parentheses are standard errors.

4.5 children<sup>1</sup>), whereby a woman who waits longer than her peers to marry or to conceive following marriage may face pressure (internal, external or both) to reach her desired family size within a shorter time frame. The role

**TABLE 4. Odds ratios (and 95% confidence intervals) from multivariable logistic regression models examining young Ugandan women's likelihood of experiencing a rapid repeat pregnancy within 24 and 12 months**

Characteristic	24 months (N=594)	12 months (N=609)
<b>Residence</b>		
Urban	1.00	1.00
Rural	2.36 (1.39–4.01)**	1.61 (1.01–2.58)*
<b>Region</b>		
Northern	na	1.00
Central	na	1.95 (1.00–3.79)*
Eastern	na	2.31 (1.27–4.20)**
Western	na	2.46 (1.33–4.54)**
<b>Age at first union</b>		
<15	1.00	1.00
15–17	3.84 (2.14–6.87)***	3.14 (1.59–6.21)**
≥18	3.42 (1.69–6.92)***	3.97 (1.85–8.51)***
<b>Partner's education</b>		
None/primary	1.00	na
≥secondary	0.58 (0.37–0.90)*	na
<b>Mean marriage-to-birth interval</b>	1.05 (1.02–1.07)***	1.04 (1.02–1.06)***
<i>Overall F-test model of fit</i>	<i>Prob&gt;F&lt;0.001</i> <i>F(5,381)</i>	<i>Prob&gt;F=0.002</i> <i>F(7,379)</i>

\*p<.05. \*\*p<.01. \*\*\*p<.001. Notes: na=not applicable, because variable was not significant in bivariate analyses. The sample includes women aged 15–22 who were married or cohabiting at the time of interview and who reported at least two pregnancies; eligible women who had had only one pregnancy were also included if at least 24 months had passed between the pregnancy outcome and the date of interview.

of fertility preferences in birthspacing practices has been documented elsewhere in Sub-Saharan Africa: Studies in Tanzania and Zimbabwe have found that the likelihood of repeat pregnancy increased with parity.<sup>6,31</sup> Future research should employ qualitative methods to better understand how cultural norms for desired family size influence birthspacing practices.

The regional differences we found in the model using the 12-month definition of rapid repeat pregnancy are noteworthy given the decades-long conflict in Northern Uganda and deserve further inquiry. Despite the heightened vulnerabilities due to the conflict, evidence suggests that adolescents and young women in the Northern region desire fewer children than women in other regions.<sup>11,16,32</sup> In qualitative studies by Adams and Chi, for example, participants in Northern Uganda describe how limited resources (e.g., lack of fertile land) in postconflict areas have changed cultural expectations toward large families.<sup>11,16</sup> In Adam's study, adolescents cited the need for birthspacing in light of these postconflict realities.<sup>16</sup> The regions explored in the models are vast and comprise smaller geographic areas with different family planning contexts. Thus, the regional differences we observed may be masking disparities within the regions. Unfortunately, it was not possible to run the models with smaller geographic areas because of limited sample sizes. Moreover, the generalizability of this study's regional findings should not be overstated given the small regional sample sizes.

Several other limitations of the present study are worth noting. We acknowledge that there are several definitions

of rapid repeat pregnancy in the literature and that choosing a different definition could affect the findings. However, the plurality of peer-reviewed articles in our literature review defined rapid repeat pregnancy as we defined it in this study. In addition, the definition we used included all reported pregnancy outcomes, not just live births, and we evaluated how our findings changed using another definition based on a shorter time frame.

Also, only women who were married or cohabiting were included in the analyses, because sample size limitations did not allow for separate analyses for respondents who were married and cohabiting and those who were unmarried and not cohabiting; we opted to restrict the analysis to married or cohabiting women because several of the most salient explanatory factors identified in the literature were related to marriage. In addition, we acknowledge that our outcome of interest is influenced by the accumulation of age and sexual experience. We attempted to account for this limitation by controlling for respondent's age at the time of the interview, age at first union and age at first birth in the regression models. Nevertheless, a more robust approach—had the sample size been adequate—would have been to include only women of the same age in the analysis. Furthermore, this study does not account for errors in data collection and recall bias. And given the use of secondary data in our study, we were limited by the data available to us, which limited our ability to explore covariates of rapid repeat pregnancy that were not included in the DHS data set. However, the DHS data are nationally representative, which allowed us to evaluate differences in the outcomes in both urban and rural contexts, as well as across regions. Also, our robust subpopulation sample size (more than 600 respondents) allowed us to study rapid repeat pregnancy by maternal age and other previously unexplored socioeconomic characteristics.

## Conclusions

The majority of adolescents and young women in our sample reported experiencing a repeat pregnancy within a time frame that does not meet World Health Organization standards for healthy birthspacing.<sup>3</sup> Strategies to reach young women during antenatal care and after their first birth should be prioritized. Findings from our analysis also suggest that future efforts to reduce rapid repeat pregnancy should target adolescents and young women in rural areas.

Future research should focus on understanding the specific reasons for short birthspacing practices and contraceptive nonuse in the postpartum period, including among adolescents and young women who seek postabortion care. Research efforts would benefit from using qualitative methodologies to understand how young women's and men's fertility preferences at the onset of marriage contribute to rapid repeat pregnancy. Studies should also include adolescent mothers (primi- or multiparous adolescents), as findings could help tailor interventions to meet the sexual and reproductive health needs of this population.

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## RESUMEN

**Contexto:** Los intervalos cortos entre embarazos pueden contribuir a la morbilidad y mortalidad materna e infantil. Ninguna investigación previa ha explorado los factores asociados con los intervalos cortos entre embarazos en mujeres jóvenes en Uganda, donde el embarazo adolescente y los intervalos cortos entre embarazos son comunes.

**Métodos:** Se obtuvieron datos de 626 mujeres casadas o en unión consensual, en edades de 15 a 22 años, con uno o dos embarazos previos a partir de la Encuesta Demográfica y de

Salud de Uganda de 2011. Se usaron análisis de regresión logística bivariada y multivariada para examinar las características asociadas con la repetición rápida de embarazos, misma que se definió de dos formas: un embarazo ocurrido dentro de los 24 o de los 12 meses del resultado de un embarazo previo.

**Resultados:** 74% y 37% de las mujeres había experimentado una repetición rápida de embarazo dentro de los 24 y 12 meses, respectivamente. Las mujeres del medio rural tuvieron mayor probabilidad que las del medio urbano de haber tenido una repetición rápida de embarazo dentro de los 24 meses (razón de probabilidades, 2.4). Las mujeres en edades de 15 a 17 años o de 18 o mayores en su primera unión, tuvieron mayor probabilidad que las menores de 15 años de haber tenido una repetición rápida de embarazo en los siguientes 24 meses (3.8 y 3.4); las mujeres cuyas parejas habían tenido al menos educación secundaria tuvieron menores probabilidades que otras del resultado (0.6). Las probabilidades de una repetición rápida de embarazo aumentaron con el número de meses entre el matrimonio y el nacimiento del primer hijo (1.05). Las variables asociadas con la repetición rápida de embarazo en los siguientes 12 meses incluyeron la residencia urbana-rural, región, edad en la primera unión y el intervalo entre el matrimonio y el nacimiento.

**Conclusiones:** Los esfuerzos para reducir la repetición rápida de embarazo en mujeres jóvenes en Uganda deberían concentrarse en las áreas rurales. Debería asignarse prioridad a las estrategias para abordar a las mujeres durante la atención prenatal y el período posparto, después del nacimiento de su primer hijo.

## RÉSUMÉ

**Contexte:** Les brefs intervalles entre les grossesses peuvent contribuer à la morbidité et à la mortalité maternelles et infantiles. Aucune recherche n'a encore exploré les facteurs associés aux brefs intervalles entre les grossesses des jeunes femmes de l'Ouganda, où la grossesse à l'adolescence et les brefs intervalles entre les accouchements sont fréquents.

**Méthodes:** Les données relatives à 626 femmes âgées de 15 à 22 ans, mariées ou vivant en union et ayant déjà eu une ou

deux grossesses ont été extraites de l'Enquête démographique et de santé 2011 de l'Ouganda. Des analyses de régression logistique bi- et multivariées ont permis d'examiner les caractéristiques associées à la grossesse à répétition rapide, telle que définie de deux manières: une grossesse survenant dans les 24 ou les 12 mois suivant le résultat d'une grossesse antérieure.

**Résultats:** Parmi les femmes à l'étude, 74% et 37% avaient eu une grossesse à répétition rapide dans les 24 ou 12 mois, respectivement. Les femmes des milieux ruraux étaient plus susceptibles que leurs homologues urbaines d'avoir eu une telle grossesse en l'espace de 24 mois (RC, 2,4). Les femmes âgées de 15 à 17 ans ou de 18 ans et plus au moment de leur première union étaient plus susceptibles que leurs cadettes de moins de 15 ans d'avoir eu une grossesse à répétition rapide en l'espace de 24 mois (3,8 et 3,4); la probabilité était moindre pour celles dont le partenaire avait, au minimum, une éducation secondaire (0,6). La probabilité d'une grossesse à répétition rapide augmente avec le nombre de mois écoulés entre le mariage et la première naissance (1,05). Les variables associées à une grossesse à répétition rapide en l'espace de 12 mois sont la résidence urbaine-rurale, la région, l'âge au moment de la première union et l'intervalle entre le mariage et l'accouchement.

**Conclusions:** Les efforts de réduction de la grossesse à répétition rapide parmi les jeunes femmes en Ouganda doivent se concentrer sur les régions rurales. Les stratégies d'accès aux femmes lors des soins prénatals et durant la période post-partum après leur premier accouchement doivent être privilégiées.

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