

# Prevalence and Determinants of Fertility Desire Among HIV-positive Women in Rwanda in the Context of Improved Life Expectancy: A Statistical Analysis of Cross-Sectional Data

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## Research

**Keywords:** HIV/AIDS, fertility desire, determinant, logistic regression, odds ratio, Rwanda

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1 **Prevalence and determinants of fertility desire among HIV-positive**  
2 **women in Rwanda in the context of improved life expectancy: a**  
3 **statistical analysis of cross-sectional data**

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12  
13 **Abstract**

14 **Background:** The knowledge of the key determinants of fertility desire among people living  
15 with HIV/AIDS is crucial for the design of efficient maternal and child health care  
16 programs. However, such determinants are not well understood in the context of a successful  
17 scale-up of antiretroviral therapy in Rwanda. The present study aim was to assess fertility  
18 desire among HIV- positive women and its determinants in Rwanda.

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19 **Methods:** Data were extracted from the 2015 Rwanda demographic health survey (RDHS)  
20 for 243 HIV-positive women of reproductive age. Univariate and multivariable based variable  
21 selection as well as multivariable logistic regression analysis were conducted.

22 **Results:** The prevalence of desire to have another child in HIV-positive women was as high  
23 as 40.7%. Multivariable logistic regression analyses showed that the woman's age, number of  
24 her living children, woman's employment status, and having a co-wife are significant  
25 determinants of fertility desire among HIV- positive women in Rwanda. Women younger than  
26 25 years, with no living child, who were unemployed or who had at least a co-wife were  
27 associated with greater odds of desire to have another child in the future than other HIV-  
28 positive women..

29 **Conclusion:** There is a need to devise integrated programs and services that are tailored to  
30 support HIV-positive women in planning their fertility, and controlling HIV transmission to  
31 their prospective children. Efficient policy and fertility interventions among WLHA in  
32 Rwanda should target young women, especially those living with partners and have fewer  
33 children than they prefer.

34 **Keywords:** HIV/AIDS, fertility desire, determinant, logistic regression, odds ratio, Rwanda.

### 35 **Plain English summary**

36 The desire to have more children increased in many countries like Rwanda where we observe  
37 tremendous success in HIV/AIDS treatment. We investigated the factors that influence  
38 fertility desire among women who were living with HIV in the context of Rwanda in 2015.  
39 We found that slightly more than 2 in 5 HIV-infected women still desire to have at least at  
40 least one more child. HIV-positive women younger than 25 years, or without any living child

41 were more likely to desire additional children than any other HIV-positive women. Also,  
42 women who had a co-wife and women who had a paying job were less likely to desire more  
43 children. These findings indicate that there is a need to combine health programs that are  
44 directed to support HIV-positive women to plan their fertility and protect their prospective  
45 children against the mother-to-child transmission of HIV. To maximize outcomes,  
46 interventions programs should focus on HIV-positive women who are younger than 25 years,  
47 living with their partners, and have fewer children than they prefer.

## 48 **Background**

49 Globally, around 38.0 million people were living with HIV at the end of 2019. Among them  
50 around 19.2 million (more than 50%) were women who were at least 15 years old. Majority  
51 of women living with HIV/AIDS (WLHA) (15.9 million) were residing in Sub-Saharan Africa  
52 and were of childbearing age [1]. Despite the risks associated with HIV infection for them [2,  
53 3], many among these women still desire more children [4-6]. Adolescent girls and young  
54 women accounted for 1 in 4 new infections in Sub-Saharan Africa [7] in 2019. Besides, in  
55 eastern and southern Africa three in five new infections occurred among women, and  
56 adolescent girls and young women (aged 15 to 24 years) were 2.5 times more likely than their  
57 male peers to acquire HIV infection [7]. In Rwanda, 3.0% of the population aged 15-49 are  
58 HIV-positive. HIV infection prevalence is higher in women (3.6%) than in men (2.2%).  
59 Among women, HIV prevalence is lowest (0.9%) at age 15-19 and highest (7.8%) at age 40-  
60 44 [8]. In 2019, 99% of pregnant women living with HIV were accessing antiretroviral  
61 medicines [1].

62 Undoubtedly, desire to have more children among people living with HIV/AIDS (PLHA) has  
63 implications for woman's health, delivery of health care services as well as the  
64 implementation of health policy and programs [9]. It increases the demand for maternal and  
65 child health care services including prevention of mother-to-child transmission of HIV.  
66 Studies also reported mental disorders, increased abortion and other health problems related  
67 to pregnancy in HIV-positive women that are potential to induce depression, self-denial and  
68 condemnation [3, 10-12]. Also, HIV-infected pregnant or post-partum women are more likely  
69 to die [2]. Furthermore, HIV/AIDS infection contributes to the decrease of fertility among

70 PLHA by causing abortion and stillbirth or through decreased sexual desire and marital  
71 disruption among other ways [2, 10, 11].

72 Thus, HIV infection causes profound changes in the social life, fertility intention, sexual and  
73 reproductive behaviour of the affected individuals and community [2, 10]. This is partly the  
74 consequence of the economic impact of HIV/AIDS, deterioration of health conditions, and  
75 increased likelihood of deaths that have been attached to being HIV-positive [10, 13, 14].

76 Fortunately, the world has recently witnessed important improvement in life expectancy of  
77 HIV/AIDS affected patients mainly due to early initiation and rapid scale-up of antiretroviral  
78 therapy in several countries [15-17]. Such changes in health outcome are usually accompanied  
79 by changes in many life dimensions including sexual and reproductive behaviours as well as  
80 their determinants [5, 18-20].

81 Several studies have been conducted to understand fertility desire and reproductive health  
82 behaviour of people living with HIV/AIDS. Among potential determinants of fertility  
83 intention or desire there is age [4, 21-23], marital status [5, 22], educational level [5, 24],  
84 household wealth or economic status [4], family size, parity of having alive children [4, 21-  
85 23], partner's fertility desire [23, 25], woman empowerment and gender equity ,  
86 employment status and occupation [26-28]. Further potential factors include contextual  
87 factors such as region and urban residence, religious belief, cultural norms and traditions [4,  
88 25, 29]. Being on antiretroviral therapy led to differing results for fertility desire and  
89 intention in HIV-positive patients [5, 19, 21, 30].

90 The literature shows that the key determinants of fertility desire or intention vary from one  
91 community or country to another. Therefore, overgeneralising the determinants may not  
92 provide adequate information to decision makers and implementers of health programs.

93 In particular, Rwanda is one of the countries where the life expectancy of HIV-positive  
94 patients improved substantially and became comparable to the general population life  
95 expectancy [15]. The improvement suggests changes in fertility desire and intention among  
96 PLHA [5, 18, 19]. In Rwanda, the proportion of women wanting more children has increased  
97 from 44 per cent in 2010 to 49 per cent in 2014-15 [8]. Thus, the assumption of concurrent  
98 changes, and possibly increase, in fertility desire among PLHA in Rwanda, specifically HIV-  
99 positive women deserves testing [19]. There is a need to understand the determinants of  
100 fertility desire among HIV- positive women in Rwanda to inform the planning and provision  
101 of reproductive health services including PMTCT services [31]. The present study aim was  
102 to assess fertility desire among HIV- positive women and its determinants in Rwanda.

## 103 **Methods**

### 104 **Study setting**

105 This study was conducted in Rwanda, a landlocked country of 26,338 square kilometres  
106 located in eastern Africa [8]. According to the most recent Rwanda Population and Housing  
107 Census the Rwanda population was 10,537,222 in 2012 with an annual growth rate of 2.6%,  
108 and a population density of 415 people per square kilometre [32]. The total fertility rate in  
109 women between 15 and 49 years old declined from 6.1 in 2005 and 4.6 in 2010 to 4.2 in 2015  
110 [8]. The national HIV prevalence rate in the population between 15 and 49 years old was  
111 estimated at 3%, being higher in women (3.6%) than in men (2.2%) [8]. The human  
112 development index for Rwanda was as low as 0.536 in 2018 [33]. The country is divided into  
113 four provinces (South, West, East, and North), and City of Kigali. Provinces and City of Kigali  
114 are subdivided into 30 administrative districts. Each district is subdivided into Sectors, Cells  
115 and Villages [34].

116 **Study data and sample**

117 This was a quantitative cross-sectional study based on an analysis of data from the 2015  
118 Rwanda demographic and health survey (RDHS). The latter was conducted by the National  
119 Institute of Statistics of Rwanda (NISR) between November 2014 and April 2015 [8]. It is  
120 the most recent population-based and nationally representative survey in Rwanda that tested  
121 for HIV infection and collected numerous characteristics on individual women and men as  
122 well as their households. Details about the 2015 RDHS methodology are well documented in  
123 the related report [8].

124 To investigate the determinants of fertility desire among HIV-positive women in Rwanda,  
125 each woman's HIV test result and her personal and household's characteristics were matched  
126 based on two data files from the 2015 RDHS, namely the individual women's data (Individual  
127 Recode file) and HIV Test data (AIDS Recode file). Thus, the matched-data were suitable for  
128 the analysis of the determinants of fertility among HIV-positive women in Rwanda. In total,  
129 HIV test was done for 6749 women during the 2015 RDHS. In total, 13497 women were  
130 interviewed and HIV test was done for 6749 women during 2015 RDHS. Among them, 254  
131 women aged 15-49 years were HIV-seropositive. Six HIV-positive women or their partners  
132 were sterilized, 4 were declared infecund and one had missing information on the fertility  
133 desire variable. In sum, 11 HIV-positive women were removed from the analysis. Thus, the  
134 results of the present study are based on data from a sample of 243 HIV-positive women who  
135 had complete data for the analysed variables.

136 **Study variables**

137 *Outcome variable*

138 The outcome variable in this study is the woman's fertility desire to have another child. During  
139 the 2015 RDHS, this variable was measured with six values namely, 'have another',  
140 'undecided', 'no more', 'sterilized' (respondent or partner), 'declared infecund', and 'never had  
141 sex' [8]. The question was asked regardless of whether the woman was pregnant. In this study  
142 the variable was recoded into two levels that indicate whether the woman expressed desire of  
143 'no more' child (coded with 0) or 'have another' child (coded with 1). Except the 'undecided'  
144 persons, individuals with the other values were excluded from the analysis because they  
145 cannot be associated with the choice of fertility desire or intention.

#### 146 *Explanatory variables*

147 Proximate-determinants conceptual frameworks for fertility analysis [35, 36], and other  
148 existing literature [6, 22, 23, 31, 37] guided the selection of potential factors influencing  
149 fertility desire among HIV-positive women. There were different health, social, economic,  
150 demographic, cultural and proximate (behavioural) variables that were collected during the  
151 2015 RDHS. They include woman respondent's age, marital status, the highest level of  
152 education, occupation, employment status, age at first sex, age at first cohabitation, whether  
153 she had a co-wife (polygamy), number of sexual unions, recent sexual activity, number of  
154 living children, the ideal number of children, religion, province of residence, type of place of  
155 residence, partner's desire for children, partner's age, partner's occupation, partner's  
156 educational level, and household's economic status [8].

157 In this study, all categorical variables were dummy-coded, and the first category was the  
158 reference category. Most variable categories were chosen and recoded based on the existing  
159 literature to enable comparisons with other studies [37]. The household's economic status was  
160 derived from the DHS household's wealth index variable which was reported with five

161 quintiles [38]. The ‘poorer’, ‘middle’ and ‘richer’ quintiles were grouped into a ‘medium’  
162 economic status, while the ‘poorest’ and ‘richest’ quintiles were recoded into *low* and *high*  
163 economic statuses respectively [37]. The ‘ideal number of children’ refers to the number of  
164 children to whom a woman would want to give birth in the course of her reproductive life.  
165 The woman’s recent sexual activity was considered for the preceding four weeks [8]. For  
166 current ‘marital status’ variable, categories those women who were ‘married’ or ‘living with  
167 partners’ were grouped into ‘*living with partner*’ category while those ‘widowed’, ‘divorced’,  
168 ‘separated’ or ‘never in union’ (never or no longer in sexual union) were grouped as ‘*not in*  
169 *union*’. For partners’ characteristics, women who were ‘not in union’ formed a separate  
170 category.

### 171 **Statistical analysis**

172 In the present study a series of chi-square tests of independence were used to test the  
173 association of each variable with the woman’s fertility desire. All variables with test p-values  
174 less than 0.05 qualified for the multivariable logistic regression analysis. Data management  
175 were carried out using IBM SPSS Statistics for Windows version 20.0. Data analysis was  
176 carried out using R software version 4.0.2 [39].

177 The outcome variable, woman’s fertility desire, is binary. Thus, a binary logistic regression  
178 model is suitable for the analysis of potential factors’ effects on fertility desire in HIV-positive  
179 women [40]. Specifically, if  $Y_i$  denotes the outcome variable taking on “have another” child,  
180 with an unknown probability  $p_i$  or ‘no more’ child with probability  $1 - p_i$ , and if the set of  
181 covariates  $X$  contains  $k$  factors (including all dummy variables), then the logistic regression  
182 model for a HIV-positive woman  $i$  desirous to have another child is given by equation (1)  
183 [40].

184 
$$\text{logit}(p_i) = \beta_0 + \beta_1 x_{i1} + \Lambda + \beta_k x_{ik} \quad (1)$$

185 The linear predictor,  $\eta_i = \beta_0 + \beta_1 x_{i1} + \Lambda + \beta_k x_{ik}$ , is such that the model parameter vector  
186  $\beta = (\beta_0, \Lambda, \beta_k)'$  of linear fixed-effects is estimated using the study data. For each parameter  
187  $\beta_j, j = 1, \Lambda, k$ , the value  $\exp(\beta_j)$  is the relative adjusted odds ratio (AOR) of desire to have  
188 another child for a woman with attribute  $x_j$  [40]. Interpretation of the present study results  
189 were based on estimated adjusted odds ratios and their corresponding 95% confidence  
190 intervals (CIs). A stepwise variable selection procedure based on Akaike Information  
191 Criterion (AIC) [41] enabled to identify the best model fit given the set of factor that qualified  
192 for multivariable analyses.

## 193 **Results**

### 194 **Univariate analysis**

195 The analytical results indicated that among the 243 HIV-positive women, 99 (40.7%)  
196 expressed a desire to have another child. The results in Table 1 show the frequency distribution  
197 of fertility desire among sampled HIV-positive women according to the selected potential  
198 determinants. Table 1 also shows the results of tests of statistical association between each of  
199 the potential determinants and the woman's fertility desire. Eight factors that qualified for  
200 multivariable analysis (chi-square test p-value less than 0.05) included woman's age, whether  
201 the woman had a co-wife, number of sexual unions, woman's age at first cohabitation, number  
202 of living children, woman's occupation, woman employment status, partners' age.

203 [Insert Table 1]

204 **Multivariable binary logistic regression analysis**

205 All the factors that qualified for multivariable analysis were considered together using a  
 206 multivariable binary logistic regression model. A stepwise variable selection procedure was  
 207 applied in order to identify which factors provide the best fitting model based on Akaike  
 208 Information Criterion (AIC) [41]. The stepwise selection procedure provided a parsimonious  
 209 model with four factors, namely (i) woman’s age, (ii) number of living children, (iii) woman’s  
 210 employment status and (iv) whether the woman had co-wives. Thus, the results of the present  
 211 study are based on a binary logistic regression analysis with the four selected covariates.

212 The analytical results in Table 2 show the adjusted odds ratios (AOR) and corresponding 95%  
 213 confidence intervals (CIs) for the four factors included in the selected model. The p-value for  
 214 Hosmer-Lemeshow goodness-of-fit test was 0.633, confirming that the model was generally  
 215 a good fit at 5% level of significance. Overall percentage of correctly classified cases was  
 216 75.7%, indicating a high prediction power [40]. All the four variables included in the  
 217 multivariable binary logistic regression model turned out to be statistically significant  
 218 determinants of fertility desire among HIV-positive women in Rwanda.

219 **Table 2: Results of logistic regression analysis of the determinants of fertility desire in**  
 220 **HIV-positive women in Rwanda.**

<b>Variables (Reference category)</b>		Adjusted Odds Ratio (AOR)	95% C.I. for AORs	
			Lower	Upper
<b>Woman’s age (15-24years)</b>		1		
	25-34 years	0.511	0.174	1.395
	35-49 years	0.173	0.053	0.528
<b>Woman has a co-wife (No)</b>		1		
	Others	0.438	0.205	0.915
	Never in union	0.917	0.358	2.336
<b>Number of living children (None)</b>		1		
	1-2	0.406	0.103	1.317
	3 or above	0.076	0.017	0.285

<b>Currently employed</b> ( <i>No</i> )	1		
Yes	0.336	0.144	0.757
Constant	24.811	5.791	139.540
Hosmer-Lemeshow goodness-of-fit test p-value	0.633		
Model prediction power (% of correctly classified)	75.7%		
AIC	242.2		

221

222 Specifically, the results indicate that the most influential determinants of fertility desire among  
223 HIV-positive women in Rwanda were woman's age, number of living children, employment  
224 status, and whether the woman had a co-wife. The adjusted odds ratio decreased with increase  
225 in the woman's age. In particular, the adjusted odds ratio of desire to have another child was  
226 0.173 (95% CI: 0.053 - 0.528) for woman's age 35 - 49 years, which indicates that the latter  
227 were associated with more than 82% smaller odds of desire to have another child than those  
228 who were 15-24 years old. Although, women between 25 and 34 years old were associated  
229 with about 49% lesser odds of desire to have another child (AOR=0.511, 95% CI: 0.174-  
230 1.395) than those who were 15-24 years old, this difference in fertility desire was not  
231 statistically significant.

232 Similarly, HIV-positive women who gave birth to 3 or more living children were significantly  
233 associated with 92% lesser odds of desire to have another child (AOR=0.076, 95% CI: 0.017-  
234 0.285) than those HIV-positive women who did not have any living child. There were also  
235 important difference in fertility desire, but not statistically significant, between women with  
236 1-2 living children (AOR=0.406, 95% CI: 0.103-1.317) and those who did not have any living  
237 child.

238 In addition, the adjusted odds ratio was 0.336 (95% CI: 0.144 - 0.757) for employed women,  
239 representing more than 66% lesser odds of desire for more children for HIV-positive women  
240 who were employed compared to those who were not employed. Further, other HIV-positive

241 women were 52% less likely to desire having another child compared to those women who  
242 did not have any co-wife. Women who had never married or never lived in sexual partnerships  
243 (AOR= 0.917, 95% CI: 0.358-2.336) were comparable to married women who did not have  
244 any co-wife.

## 245 **Discussion**

246 This study aimed to assess fertility desire among HIV- positive women and its determinants  
247 in Rwanda, where research-based evidence is still needed to inform the planning of assistance  
248 for women HIV-positive. The present study is based on matched population based-data that  
249 were collected during the most recent RDHS. The latter is the only nationally representative  
250 survey in Rwanda that provides data on HIV tests together with a wide range of  
251 socioeconomic, demographic, environmental, health and behavioural characteristics.

252 The results showed that desire for more children among women living with HIV/AIDS  
253 (WLHA) in Rwanda is relatively (40.7%). Although this is less than the prevalence in the  
254 general women population (49%) [8], it shows that fertility desire in HIV-positive women is  
255 an important component of the national fertility desire among the women population in  
256 Rwanda.

257 Different studies led to mixed results dominated by an increasing desire for children in PLHA.  
258 For example, a study conducted in Rwanda did not find any significant difference in fertility  
259 between HIV-positive and HIV-negative women [42], while, for example, results from studies  
260 conducted in Ethiopia, Kenya and South Africa among PLHA reported prevalence of desire  
261 for more children that was considerably lower (33.4%, 34% and 44% respectively) than in the  
262 general population or HIV-negative counterpart [4, 18]. On the contrary, the prevalence of  
263 desire to have more children among HIV-positive women was as high as 54.6% among HIV-

264 positive women of reproductive age in Addis Ababa, Ethiopia [6]. It was reported to be higher  
265 in HIV-positive men than women [30].

266 We found that the woman's number of living children was a significant determinant of desire  
267 to have more children among WLHA in Rwanda. The negative effect of having one or more  
268 living children on fertility desire and intention has been reported in several studies [4, 22, 23,  
269 30]. In this study, women with no living child were associated with greater odds of desire to  
270 have a child than any other women. Studies show that, in some communities, social pressure  
271 significantly influences a woman's desire to have own child as the only way to experience  
272 motherhood or qualify as a 'woman' [4, 25]. In particular context of Rwanda, a family that has  
273 own child is considered a blessed family.

274 This study showed that a woman's age was negatively associated with her desire to have  
275 another child. In particular, women who were between 35 and 49 years old were associated  
276 with lesser desire of having more children than any other women. Similarly, several studies  
277 reported a negative relationship between a woman's age and her fertility desire, especially  
278 among HIV-positive women [4, 22, 23].

279 Further, the employment status of HIV-positive woman had a statistically significant  
280 association with her desire to have another child in Rwanda. Women who were employed  
281 were associated with lesser odds of desire to have another child than those who were  
282 unemployed. Some previous studies did not detect any significant effect of employment status  
283 or working time on a woman's fertility [43] while others found it [26-28]. The data at hand  
284 revealed that women who were employed were associated with low likelihood of desire to  
285 have a child in the future. A woman employment status in Rwanda is often dependent on her  
286 level of education and constitutes an important explanation of her income and living standard.

287 Thus, the link between employment status and fertility desire in Rwanda needs further  
288 investigation.

289 Finally, having a co-wife or polygamy was a statistically significant factor for women fertility  
290 desire after controlling for other factors' effect. There was a very low likelihood of desire to  
291 have another child among HIV-positive women who had at least one co-wife. This might be  
292 the result of many factors. Polygamous partners or husbands can show HIV- related stigma  
293 and hence a reduced social, economic and moral support to the affected wife. In addition, the  
294 husband can have lower desire for more children than the HIV-infected wife if he has children  
295 born to other wives. Furthermore, there has been a firm enforcement of monogamy as the only  
296 legal marriage accepted in Rwanda since more decades, which put illegal wives at  
297 disadvantages. Fertility desire among single mothers need further research attention as it is  
298 comparable to the one of women in monogamous unions.

299 In general, demographic and socio-economic factors are the most influential drivers of HIV-  
300 positive woman's fertility desire in Rwanda. The results point to an increased desire for more  
301 children among HIV-positive women that mainly led to changes in their sexual and  
302 reproductive behaviours [5, 20, 42]. Early initiation and successful scale-up of antiretroviral  
303 therapy played a potential role in many counties including Rwanda [15-19].

304 This study presents some limitations. First, this study used a cross-sectional survey data and  
305 thus it cannot establish causality between the outcome and the predictors. The data did not  
306 also have information on women's history of antiretroviral therapy. However, in the context  
307 of high coverage of HIV/AIDS related services [1, 15], these limitations cannot affect the  
308 quality of the data and methods we used to analyse them. Thus, the results remain valid and

309 contribute to evidence for policy formulation and design of optimal health programs for an  
310 improved maternal and child health services in the context of Rwanda and similar settings.

### 311 **Conclusion**

312 The present study contributes to the understanding of the ongoing changes in fertility desire  
313 among WLHA in the context of Rwanda and other countries that realized significant  
314 improvement in life expectancy of HIV/AIDS patients. The study indicated that the high  
315 fertility desire among HIV-positive women in Rwanda is largely dependent on demographic  
316 and socioeconomic factors. There is also a potential influence of the successful scale-up of  
317 early initiation of antiretroviral therapy on fertility desire among HIV-positive women in  
318 Rwanda.

319 Therefore, there is a need to devise integrated programs and services that are tailored to  
320 support HIV-positive women in planning their fertility, and controlling HIV transmission to  
321 their prospective children. Efficient policy and fertility interventions among WLHA in  
322 Rwanda should target young women, especially those living with partners and have fewer  
323 children than they prefer.

### 324 **Abbreviations**

325 AOR: Adjusted odds ratios;

326 CI: Confidence interval;

327 HIV/AIDS: Human immunodeficiency virus/ Acquired immunodeficiency syndrome

328 PLHA: People living with HIV/AIDS

329 RDHS: Rwanda demographic and health survey;

330 UNDP: United Nations Development Programme;

331 UNAIDS: Joint United Nations Programme on HIV/AIDS.

332 WLHA: Women Living with HIV/AIDS

### 333 **Declarations**

#### 334 **Ethics approval and consent to participate**

335 We obtained written permission to access and analyse the secondary data from the DHS  
336 program. The 2015 Rwanda Demographic and Health Survey protocol for data collection  
337 was reviewed and approved by the Rwanda National Ethics Committee, the Institutional  
338 Review Board of ICF International, and the Centres for Disease Control and Prevention  
339 (CDC) [8]. Thus, no additional ethics approval or consent to participate were required for  
340 this study.

#### 341 **Consent for publication**

342 Not applicable.

#### 343 **Availability of data and materials**

344 The datasets supporting the conclusions of this article (Individual Women's data and HIV  
345 test data) are available, after registering and requesting the datasets, in the DHS program  
346 repository at: [https://dhsprogram.com/data/dataset/Rwanda\\_Standard-HS\\_2015.cfm?flag=0](https://dhsprogram.com/data/dataset/Rwanda_Standard-HS_2015.cfm?flag=0)

#### 347 **Competing interests**

348 The authors declare that they have no competing interests.

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350 No funding was received for this study.

351 **Authors' contributions**

352 FN conceived and conceptualized the study, acquired and analysed the data, and prepared the  
353 draft of the manuscript. CN, MGN, DU contributed to conceptualizing the study and to the  
354 write-up of the manuscript. All authors read, proofread, and approved the final manuscript.

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## 517 Tables

518 **Table1. Distribution of woman's fertility desire and its association with potential factors**  
519 **(n=243)**

Variable	Categories	Frequency (% of sample)		P-value
		No more	Have another	
<b>Woman's age (years)</b>	15-24	7 (2.9)	31 (12.8)	< 0.001
	25-34	44 (18.1)	50 (20.6)	
	35-49	93 (38.3)	18 (7.4)	
<b>Marital status</b>	Living with partner	74 (30.5)	52 (21.4)	0.862
	Not in union	70 (28.8)	47 (19.3)	
<b>Woman has a co-wife</b>	No	61 (25.1)	47 (19.3)	< 0.001
	Other	69 (28.4)	20 (8.2)	
	Never in union	14 (5.8)	32 (13.2)	
<b>Number of sexual unions</b>	Once	86 (35.4)	55 (22.6)	<0.001
	More than once	44 (18.1)	12 (4.9)	
	Never in union	14 (5.8)	32 (13.2)	
<b>Sexually active</b>	No	77 (31.7)	46 (18.9)	0.283
	Yes	67 (27.6)	53 (21.8)	
<b>Age at first sex</b>	Below 19 years	76 (31.3)	49 (20.1)	0.615

	Other	68 (28.0)	50 (20.6)	
<b>Age at first cohabitation</b>	Below 21 years	75 (30.9)	35 (14.4)	<0.001
	21-36 years	55 (22.6)	32 (13.2)	
	Never in union	14 (5.8)	32 (13.2)	
<b>Ideal number of children</b>	At most 2	40 (16.5)	35 (14.4)	0.209
	3 or above	104 (42.8)	64 (26.3)	
<b>Religion</b>	Catholic	54 (22.2)	31 (12.8)	0.568
	Protestants	61 (25.1)	48 (19.8)	
	Other	29 (11.9)	20 (8.2)	
<b>Woman's occupation</b>	Agriculture	85 (35.0)	41 (16.9)	0.007
	Other occupation	59 (24.3)	58 (23.9)	
<b>Highest educational level</b>	No education	29 (11.9)	16 (6.6)	0.153
	At most Primary	94 (38.7)	59 (24.3)	
	Secondary or higher	21 (8.6)	24 (9.9)	
<b>Number of living children</b>	None	4 (1.6)	25 (10.3)	< 0.001
	1-2	47 (19.3)	60 (24.7)	
	3 or above	93 (38.3)	14 (5.8)	
<b>Currently employed</b>	No	19 (7.8)	28 (11.5)	0.003
	Yes	125 (51.4)	71 (29.2)	
<b>Partner's desire for children</b>	Wants the same	54(22.2)	30 (12.3)	0.197
	Wants different	20(8.2)	22 (9.1)	
	Not in Union	70(28.8)	47 (19.3)	
<b>Household's economic status</b>	Low	51 (21)	27 (11.1)	0.122
	Medium	26 (10.7)	17 (7.0)	
	High	67 (27.6)	55 (22.6)	
<b>Type of place of residence</b>	Urban	61 (25.1)	53 (21.8)	0.086
	Rural	83 (34.2)	46 (18.9)	
<b>Province of residence</b>	Kigali City	38 (15.6)	35 (14.4)	0.409
	East	25 (10.3)	20 (8.2)	
	North	17 (7.0)	11 (4.5)	
	South	35 (14.4)	16 (6.6)	
	West	29 (11.9)	17 (7.0)	
<b>Partner's occupation</b>	Agriculture	28 (11.5)	12 (5.0)	0.211
	Other occupation	46 (18.9)	40 (16.5)	
	Not in union	70 (28.8)	47 (19.3)	
<b>Partner's educational level</b>	At most primary	59 (24.3)	40 (16.5)	0.917
	Beyond primary	15 (6.2)	12 (4.9)	
	Not in union	70 (28.8)	47 (19.3)	
<b>Partner's age (years)</b>	15-30	7 (2.9)	14 (5.8)	0.034
	Above 30	67 (27.6)	38 (15.6)	
	Not in union	70 (28.8)	47 (19.3)	