

# The Use of Modern Contraceptive Methods Among Women in Union in Rwanda: Trends in Explanatory Factors between 2005 and 2020

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## Abstract

**Context:** From 4% in 2000 to 58% in 2019-2020, Rwanda is one of the African countries that have recorded strong growth in modern contraceptive use over the last two decades. **Objective:** This article examines the main changes observed in the factors associated with the use of modern contraceptives in Rwanda over the period 2005-2020. **Methodology:** The data used are from the four Rwanda Demographic and Health Surveys (RDHS) of 2005, 2010, 2014-2015 and 2019-2020. Binary stepwise logistic regression was used to identify the factors that determining the use of modern contraceptives, to rank them and to study their evolution from 2005 to 2020. **Results:** The results show that women who want fewer than 4 children, who are Catholic and who work in the modern sector have shown favorable behaviors to the use of modern contraceptives. However, the determining power of factors such as

the number of live born children, the habitation, and region of residence, the woman's education, the spouse's education and the woman's sexual activity varied greatly over the course of the different surveys. **Conclusion:** In the light of these results, raising public awareness of the advantages of having a smaller family, providing schooling for all, creating and ensuring equal access to employment for men and women, and improving the living conditions of the population appear to be Rwanda's preferred ways of achieving the objectives of its family planning program.

**Keywords:** Family planning, modern contraceptive methods, women in union, contraceptive factors, changes in factors.

## 1. Introduction

Family planning is one of the interventions that offer benefits for maternal and child health, socio- economic development and environmental sustainability [18]. Increased use of modern contraception method has enabled countries in the South and the South-East Asia to move from uncontrolled or poorly controlled fertility levels of 5-7 children per woman in the 1960s, to 1.5-3.0 children at most, and to become emerging countries [10]. Rwanda is one of the few African countries to have recorded an exceptional increase in the use of modern contraception and a reduction in fertility over the last twenty years [8, 5]. The country's 2020 vision was to reduce the total fertility rate from 5.8 in 2000 to 5.5 in 2010 and 4.5 in 2020 [22]. Its 2003 population policy aimed at increasing the contraceptive prevalence rate from 4% in 2000 to 45% in 2010 and 55% in 2020 [21]. Rwanda's modern contraceptive prevalence rate rose from 10% in 2005 to 58% in 2020 [17]. These data show that the forecasts for contraceptive use and fertility reduction have been met by far.

In view of the above, it is important to know how the factors associated with the use of modern contraception have evolved in Rwanda. The aim is therefore to identify the factors on which Rwanda has acted to increase the use of modern contraceptives.

In fact, there are several reasons why a family planning program may be successful and why the use of modern contraception may be promoted. For some authors, the increase in the rate of the modern contraceptive use in a country can be explained by improvements in the socio- cultural, demographic and economic contexts [1, 2, 4, 6, 7, 13, 14, 16, 19, 23, 24] For others, the existence of stronger family planning programs and increased commitment and advocacy by political leaders in favor of family planning as a health and development priority are the cornerstones of a successful FP program [13, 8, 4, 16, 14, 5, 4, 25, 31]. However, none of these studies has focused on the evolution of explanatory factors between 2005 and 2020 in Rwanda.

The main hypothesis is that the current level of modern contraceptive use in Rwanda is linked to changes in institutional, socio-cultural, demographic, gender and spousal

factors. It is only by improving the evolution of these factors over time that the Rwandan government has been able to increase the rate of use of the modern contraception and reduce fertility. We therefore believe that this study will help to better inform decision-makers, by showing the factors on which action needs to be taken to accelerate the use of modern contraception, taking into account the evolution of each factor.

## 2. Materials and methods

The target population is Rwandan women with the age of 15-49, in union and who accepted to express themselves about their using modern contraception status at the time of each survey. The data used are those from the four Demographic and Health Surveys (DHS) conducted in Rwanda by the National Population Office of Rwanda (ONPR) and the National Institute of Statistics of Rwanda (NISR) from 2005 to 2020. The data in question are DHSR-III from 2005, DHSR-IV from 2010, DHSR-V from 2014-2015 and DHSR-VI from 2019-2020. Two types of variable were used in this study. The explained variable is the use of the modern contraception. It is a dichotomous variable, taking the value 1 when the woman was using a modern method of contraception at the time of each survey (use) and the value 0 if she was not using a modern method of contraception.

According to the literature review, the latter is strongly associated with socio-cultural, demographic and economic factors. Following the unavailability of some variables, those retained for the study are those available for at least two successive surveys out of the four. In terms of data quality, the highest non-response rate for all the variables used in the analysis was 1.7%. Statistical analysis of the quality of the data reported on age shows Myers indices (IM) of 19.21, 23.14, 17.20 and 12.93 in 2005, 2010, 2014-2015 and 2019-2020, respectively. This shows that the aversions observed are not such as to compromise the quality of the data.

The quality of the data on children ever born shows that the A and B indices from Coale & Demeny and Brass & Rachad are not such as to compromise the results of the study (in each case, the minimum of the two indices A and B is greater than the parity achieved in the last five-year age group:  $\min(A, B) > P(7)$  (Table 1).

**Table 1: Average parity by five-year age group and A and B indices**

i	1	2	3	4	5	6	7	Indices A and B	
Age group P(i)	15-19	20-24	25-29	30-34	35-39	40-44	45-49	A	B
2005	2.91	1.65	2.87	4.15	5.64	6.84	7.62	4.99	11.36
2010	0.32	1.84	2.26	3.84	5.17	6.13	6.97	2.78	15.84
2014-2015	0.52	1.12	2.00	3.23	4.55	5.71	6.43	3.33	7.71
2019-2020	0.45	1.09	1.84	2.82	4.06	5.07	5.68	3.11	5.97

Source: Authors, using data from DHSR III, IV, V & VI

The quality of the model's fit to the data was also assessed by calculating the ROC curve and the model's Chi-square. The areas under the ROC curves were 0.695, 0.715, 0.653 and 0.717 in 2005, 2010, 2014-2015 and 2019-2020, respectively. The Wald Chi-square values for the complete models (CM) are significant at the 5% threshold (Chi2-2319.872;  $p=0.000$  in 2005, Chi2-51.851.  $p=0.000$  in 2010, Chi2-14.649;  $p=0.000$  in 2014-2015, Chi2-214.902;  $p=0.000$  in 2019-2020). Likelihood ratios show the significance of results (LR-410.083 in 2005; LR-458.168 in 2010; LR-361.100 in 2014-2015; ch2-430.490). All these results lead to the conclusion that the model made up of the variables used in this study is adequate, accurate and a good predictor of the modern contraceptive use.

For this study, it was necessary to identify the factors likely to explain the use of modern contraception. As the dependent variable is a dichotomous categorical variable, the binary stepwise logistic regression method was used to identify the independent variables determining the use of modern contraception with a significance level of no more than 5% and their 95% confidence intervals (CI-95%) were estimated.

All these analyses were performed using SPSS 25.0 software, and statistical significance was set the threshold of 5% ( $p\leq 0.05$ ).

### **3. Results**

The results show that a woman's age was a discriminating factor in three of the four surveys (Table 2). In 2005, women aged 25-34 and those aged 35 and over were, respectively, 1.59 and 1.34 times more likely to use modern contraception than those aged 15-24. In 2010, women aged 24-34 and those aged 35 and over were, respectively, 1.44 and 1.25 times more likely to use modern contraception than those aged 15-24 in 2019-2020, women aged 25-34 and those aged 35 and over were, respectively, 7.1 and 7 times more likely to use modern contraception than those aged 15-24. The number of desired children was more decisive during the four surveys, where women wanting fewer than 5 children were 2.019, 1.34, 1.23 and 1.35 times more likely to use modern contraception than those needing 5 or more children, in 2005, 2010, 2014-2015 and 2019-2020 respectively.

The place of residence was more discriminating in 2005 and 2014-2015. Compared to the urban women, the rural women were 0.47 and 0.14 times less likely to use modern contraception, respectively, in 2005 and 2014-2015. As for region of residence, women in other regions were 0.29 times less likely to use modern contraception methods in 2010. However, they were 1.38 and 1.34 times more likely to use them in 2014-2015 and 2019-2020 than those in the West. Literacy was more discriminating in 2005, 2010 and 2019-2020. Literate women were 1.80, 1.27 and 0.19 times more likely to use modern contraception, respectively in 2005, 2010 and 2019-2020, than non-literate women.

**Table 2: Odds ratios of variables associated to the use of modern contraception**

Variables	2005	2010	2014-2015	2019-2020
<b>Age of woman</b>	***	***	*	***
15-24	®	®	®	®
25-34	1.586***	1.442***	1.018ns	7.074***
35+	1.341*	1.245**	0.923ns	6.942***
<b>Living children</b>	***	***	ns	ns
4 or more children	®	®	®	®
Less than 4 children	0.662***	0.809***	ns	ns
<b>Number of desired children</b>	***	***	ns	***
4 or more children	®	®	®	®
Less than 4 children	2.019***	1.339***	1.228***	1.350***
<b>Place of residence</b>	***	ns	**	ns
Urban	®	®	®	®
Rural	0.530***	ns	0.859**	ns
<b>Region of residence</b>	ns	***	ns	***
West	®	®	®	®
Other regions	ns	0.713***	1.382***	1.340***
<b>Woman's religion</b>	***	***	**	ns
Catholic	®	®	®	®
Protestant	0.744***	0.790***	0.818***	0.803***
Other religions	1.126ns	0.937ns	1.098ns	0.857ns
<b>Female education</b>	***	ns	***	***
No education	®	®	®	®
Primary	1.063ns	ns	1.329***	1.184**
Secondary and above	2.869***	ns	1.205*	0.635***
<b>Women's activity</b>	***	***	ns	***
Modern sector	®	®	®	®
Informal sector	0.612**	0.671***	0.811ns	0.682***
Agricultural sector	0.398***	0.825ns	0.666***	0.899*
<b>Female literacy</b>	*	***	ns	***
No	®	®	®	®
Yes	1.808***	1.390***	ns	0.836***
<b>Spouse's activity</b>	***	ns	***	***
Modern sector	®	®	®	®
Informal sector	0.659***	ns	1.179*	1.260***
Agricultural sector	0.301***	ns	1.035ns	1.380***
<b>Spouse's education</b>	***	***	***	ns
No level	®	®	®	®
Primary	1.551***	1.256***	1.205***	Ns
Secondary and above	2.417***	1.322***	1.195*	ns
<b>Sexual activity</b>	ns	***	***	***
No	®	®	®	®
Yes	ns	2.495***	1.609***	1.302***

\*\*\*:  $p \leq 0.001$ ; \*\*:  $p \leq 0.01$ ; \*:  $p \leq 0.05$ ; ns :not significant at the 5% threshold

In terms of level of education, women with secondary education or higher were 1.33 and 1.18 times more likely to use modern contraception, respectively in 2014-2015 and 2019-2020 than their non-literate counterparts. Women with secondary education or higher were 2.87, 1.21 and 0.64 times more likely to use modern contraception, respectively in 2005, 2010 and 2019-2020, than their non-literate counterparts. The woman's sector of activity was a determining factor in all four surveys.

Compared with women working in the modern sector, those in the informal sector were 0.39, 0.33 and 0.32 times less likely to use modern contraception, respectively in 2005, 2014-2015 and 2019-2020 than those in modern sector. Women in the agricultural sector were 0.60, 0.33 and 0.10 times less likely to use modern contraception, respectively in 2005, 2014-2015 and 2019-2020, than those in the modern sector. The spouse's level of education was a determining factor in 2005, 2010 and 2014-2015. Women whose husbands had a primary education were 1.55, 1.26 and 1.21 times more likely to use modern contraception, respectively in 2005, 2010 and 2014-2015 than those whose husbands had no education. Women whose husbands had a secondary level of education or higher were 2.42, 1.32 and 1.20 times more likely to use modern contraception, respectively in 2005, 2010, 2014-2015, than those whose husbands had no education.

The activity of the spouse was a determining factor in 2005, 2014-2015 and 2019-2020. Compared with women whose husbands worked in the modern sector, those whose husbands worked in the informal sector were 0.34 times less likely to use modern contraception in 2005 than those whose husbands work in modern sector. But, they were 1.18 and 1.26 times more likely to use modern contraception, respectively in 2014-2015 and 2019-2020, than those whose husbands work in modern sector.

Those with spouses working in the agricultural sector were 0.70 times less likely to use modern contraception than those whose husbands work in modern sector in 2005. However, they were 1.38 times more likely in 2019-2020 to use modern contraception than their counterparts with husbands in the informal sector. Finally, compared with non-sexually active women, those who are sexually active were 2.50, 1.61, 1.30 times more likely to use modern contraception, respectively in 2010, 2014-2015 and 2019-2020.

#### **4. Discussion**

The aim of this study was to investigate changes in factors associated with the use of modern contraception in Rwanda from 2005 to 2020. The results of this study show that women wanting fewer than 4 children are more likely to use modern contraception than women wanting 4 or more children. Their chance of using the modern contraception method changed from 0.68, 0.11 and 0.13 times more likely to use modern contraception, respectively in 2010, 2014-2015 and 2019-2020.

These results coincide with those found in Burundi, where this category of women was more likely to use modern contraception than their counterparts wishing to have 4 or more children during the three surveys already conducted [12]. Thus, the current level of use of modern contraception in Rwanda is linked to the fact that Rwandan women need few offspring and start using modern contraception very early. Their ideal number of children is low (3.3 children in 2010) [17] compared with 4.3 in 2016-2017 in Burundi.

Compared to Catholic, Protestant women were less likely to use modern contraception over the four surveys. The change in the chances of using modern contraception was 0.05, 0.09 and 0.015 times more likely to use modern contraception, respectively in 2010, 2014-2015 and 2019-2020. In other words, the chances of using modern contraception for Protestant women increased from 2005 to 2014 before falling in 2019-2020. These results differ little from those found in Burundi, where they are women of other religions who were more likely to use modern contraception than Catholics and Protestants [12].

With regard to women's sector of activity, the chances of women in the informal sector increased by 0.059 times in 2010 and 0.011 times in 2019-2020. For women in the agricultural sector, their chances increased by 0.268 times in 2014-2015 and 0.233 times in 2019-2020. So whether women are in the informal or agricultural sector, the gap between their use of modern contraception and that of women in the modern sector decreases from one survey year to the next. This coincides with the results of the Muhoza study, which show that Rwanda is working hard to reduce the differences in contraceptive use according to the socio-economic and individual characteristics of users [19]

There has also been a change in the factors explaining the use of modern contraception over time, particularly changes from one survey to the next. The woman's age, literacy and the spouse's activity remained discriminating factors of the modern contraception use, except 2014-2015. The number of living children, which was a determining factor in 2005 and 2010, have lost its influence in 2014-2015 and 2019-2020. The place of residence, was not a determining factor in 2010 and 2019-2020, but have been a discriminating one so in the other two periods (2005 and 2014-2015). The region of residence, which was not a determining factor in 2005, had become more explanatory for the other years. The woman's education, which was a determining factor in 2005, lost its influence in 2010, before becoming once again a statistically explicative one for all the other years. The spouse's education, which was a determining factor in the first three surveys, was no longer so in 2019-2020. Women's sexual activity, which was not available in 2005, had become more important in explaining family planning for the last three surveys. All these changes and variations over time coincide with those found by Mouftaou in Benin [18] and by Itangishaka in Burundi [12]. In the Rwandan context, all these changes explain the upheavals in sexual and reproductive behavior among women in unions open to modernity.

## 5. Conclusion

Rwanda is one of the African countries that have made significant progress in family planning in recent years. The country's forecasts for contraceptive use and fertility reduction have been met by far. This raises the question of what factors are associated with the use of modern contraception methods and how they are changing. Our objective is therefore to identify the factors on which Rwanda has acted on to increase the use of modern contraception.

Twelve variables were identified as determining the propensity to use modern contraception in at least two surveys. Among these twelve variables, the ideal number of children, the woman's religion and the woman's sector of activity were the most important determinants during the four surveys.

The remaining nine were characterized by significant changes from one survey to the next, which could even explain the level of change in reproductive behavior in Rwanda. The main hypothesis is that the current level of modern contraceptive use in Rwanda is linked to changes in institutional, socio-cultural, demographic, gender and spousal factors. It is only by improving the evolution of these factors over time that the Rwandan government has been able to increase the rate of use of modern contraception and reduce fertility. Our research has not exhausted the entire subject, so other authors may conduct qualitative research to supplement the present study in order to understand what explains the promotion of family planning in Rwanda from 2005 to 2020.

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