

ORIGINAL RESEARCH ARTICLE

Factors associated with contraception use among reproductive age women in Rwanda: An analysis of demographic and health survey data 2019–2020

DOI: 10.29063/ajrh2026/v30i15.7

Delphine Cyuzuzo^{1*}, Valens Munyembaraga^{2,3}, Aimable Gasana⁴, and Wen-Chun Liao^{5,6}

PhD Program in Healthcare Science, China Medical University, Taichung, Taiwan¹; Institute of Translational Medicine and New Drug Development, China Medical University, Taichung, Taiwan²; Department of Pharmacy, University Teaching Hospital of Butare, Huye P.O Box 254, Rwanda³; School of Nursing, Mount Kigali University, Kigali, Rwanda⁴; School of Nursing, China Medical University, Taichung, Taiwan⁵; Department of Nursing, China Medical University Hospital, Taichung, Taiwan⁶

*For Correspondence: Email: wcl@mail.cmu.edu.tw; u113313141@cmu.edu.tw

Abstract

Contraception is essential for preventing unintended pregnancies, averting about 230 million births and saving over 272,000 mothers' lives globally each year. Although 40% of pregnancies worldwide are unintended, contraceptive use in Africa remains low, increasing only from 23.9% in 2012 to 28.5% in 2017. In contrast, Rwanda has seen a major rise in contraceptive uptake, from 17% in 2005 to 64% in 2020. This retrospective study examined factors influencing contraceptive use among Rwandan women of reproductive age using data from the 2019–2020 Demographic and Health Survey. Most participants were 35–39 years old, lived in rural areas, had primary education, were married, and had 4–6 children. Multivariate analysis showed that age, marital status, number of children ever born, education, religion, and wealth index were significantly associated with modern and current contraceptive use ($p < .001$), while residence showed no association. These findings underscore the importance of sociodemographic factors for strengthening family planning policies in Rwanda. (*Afr J Reprod Health* 2026; 30 [15]:66-79).

Keywords: Contraception use; Reproductive age women; Rwanda; Family planning; Modern methods

Résumé

La contraception constitue une stratégie majeure de santé publique pour prévenir les grossesses non intentionnelles, permettant d'éviter environ 230 million de naissances et de sauver plus de 272 000 vies maternelles chaque année dans le monde. Malgré qu'environ 40 % des grossesses soient non planifiées à l'échelle mondiale, l'utilisation des contraceptifs en Afrique demeure limitée, passant seulement de 23,9 % en 2012 à 28,5 % en 2017. À l'inverse, le Rwanda a enregistré une progression remarquable du recours à la contraception, de 17 % en 2005 à 64 % en 2020. Cette étude rétrospective, fondée sur les données de l'Enquête Démographique et de Santé 2019–2020, a analysé les déterminants de l'utilisation contraceptive chez les femmes rwandaises en âge de procréer. L'analyse multivariée a révélé que l'âge, l'état matrimonial, la parité, le niveau d'instruction, la religion et l'indice de richesse étaient significativement associés à l'utilisation actuelle et moderne des contraceptifs ($p < 0,001$), contrairement au lieu de résidence. Ces résultats soulignent l'importance des déterminants sociodémographiques dans l'orientation des politiques de planification familiale au Rwanda. (*Afr J Reprod Health* 2026; 30 [15]: 66-79).

Mots-clés: utilisation des contraceptifs ; femmes en âge de procréer ; Rwanda ; planification familiale ; contraceptifs modernes

Introduction

Contraception refers to methods used to prevent unintended pregnancy as a result of sexual intercourse. It can generally be defined as the deliberate prevention of conception or impregnation during sexual activity.¹ Failure to access or use contraception can lead to significant consequences, one of the most common being unintended pregnancies.² An unintended pregnancy is a

pregnancy that occurs when it was not expected, various factors can contribute to unintended pregnancies, such as lack of access to healthcare and unawareness of contraceptive options. Adolescents are among the groups most affected by unintended pregnancies.³ Contraception plays a pivotal role in reducing the prevalence of unintended pregnancies when accessible, affordable, and used correctly. Lack of access to contraception, particularly in low- and middle-income countries, contributes to higher

rates of unintended pregnancies.⁴ Through reducing unintended pregnancies, it helps to reduce maternal ill-health and maternal death related to pregnancies.^{2,5} It reduces also unsafe abortion and transmission of HIV from mothers to newborns as well. Using contraceptives prevents nearly 230 million births annually and saves 272,040 mothers' lives globally.⁶ If the need for modern contraceptive care were fully met in low- and middle-income countries, unintended pregnancies would decrease by more than two-thirds.⁵

Additionally, the potential impacts of not using contraception among reproductive-age women are unintended pregnancies with associated outcomes. These include negative developmental outcomes, economic outcomes, and health outcomes, such as child malnutrition, higher school dropout rates especially in adolescents, and reduced educational achievements.⁷ Worldwide, 40% of pregnancies are unintended⁸ and the number of women desiring using family planning methods are increasing from the past two decades, from 900 million in 2000 nearly to 1.1 billion in 2021. Between 2000 and 2021, the number of women using modern contraceptive has increased from 663 million to 851 million.^{2,6} In past 20 years, contraception use decreased maternal death on 40% in developing countries, only by decreasing the number of unintended pregnancies.⁹ In 2015, Sub-Saharan African countries accounted for approximately 66% of global maternal deaths. Additionally, unintended pregnancies make up over a quarter of the 40 million pregnancies that occur each year among women of reproductive age worldwide.¹⁰ If there is an adequate accessibility and all unmet need are satisfied, the number of unintended pregnancies could fall by a three quarters and maternal death by a third.¹¹

In Africa, the prevalence of contraceptive use among married women and in relationship in 2012 and 2017 was estimated to be low: at 23.9% and 28.5% respectively compared to global average approximately 65% and influencing factors are multidimensional and have been reported as knowledge of contraceptives methods and sociodemographic factors such as education, poverty, level of income, marital status, employment; parity, number of living children, fear of side effects of contraceptives methods, being

sexually active, partner communication and approval.^{12,13} This was associated with an increase in maternal and infant morbidity and mortality.⁵

Rwanda's population has grown from 4.6 million in 1978 to 13.2 million in 2022, with fertility rates declining from 8.6 to 3.6 children per woman and the majority of the population is under 30, reflecting significant demographic changes.¹⁴ The government implemented a policy granting every citizen aged 18 and older, the access to contraception, aiming to reduce unintended pregnancies and promote reproductive health among young people. This initiative also aims to further reduce the fertility rate and prevent its resurgence, aligning with the government's commitment to promoting national development and minimizing maternal and newborn mortality, along with their associated consequences.¹⁵

The prevalence rate of contraception uses among women in reproductive age in Rwanda, increased from 17 to 52% in 2005 and 2010 respectively and stayed at 53% in 2015 then increased to 64% in 2020. The fertility rate decreased from 6.1 in 2005 to 4.2 in 2015. As one of Africa's most densely populated countries, lowering the fertility rate was viewed as crucial for reducing infant and maternal mortality and fostering a vibrant, educated middle class to drive the country's development. To address this, the government initiated an extensive, multisectoral public education campaign promoting family planning as a means to reduce infant and maternal mortality, poverty and advance national development.¹⁶ As the total demand of contraceptive method is higher and research on contraception use in Rwanda is limited, this make a need of studying and identifying factors which influence the contraceptive use in Rwanda for further implementation and readjustment of the family planning program, and further insights to improve women's reproductive health by increasing awareness about preventing unintended pregnancies among women in their reproductive age.^{16,17} The study was driven by the research question: what are factors influencing the use of contraceptives among women in reproductive age in Rwanda?

This study aims to understand current status of contraception use and predisposing factors and to assess if predisposing factors influence the use of contraception methods among Rwandan women in

reproductive age who want to space their births or have no further fertility intentions, to serve as a basis to reduce unintended pregnancies and related effects, as well as overpopulation, thereby alleviating poverty and promoting national development. While the importance of contraception in middle-income countries is well recognized, research on contraception use in Rwanda is limited, this study will support further implementation and adjustment of family planning programs and provide insights to enhance women's access to sexual and reproductive health services in Rwanda. Earlier research has indicated that cultural and religious myths can affect contraceptive use.¹⁸ Other studies have shown that factors related to couples such as partner discussions, approval, and joint decision-making as well as sociodemographic characteristics (including age, education, religion etc.)¹⁹⁻²¹, parity¹⁹, exposure to various information sources,²² knowledge of contraceptive methods, and fears regarding side effects,²³ all play a role in determining contraception utilization.

Methods

Study setting and period

According to the 2022 census, Rwanda has a population of approximately 13.2 million people. It is one of the most densely populated countries in Africa. Rwanda shares borders with Uganda to the north, Tanzania to the east, Burundi to the south, and the Democratic Republic of the Congo (DRC) to the west. Rwanda Demographic and Health Survey is implemented by the National Institute of Statistics of Rwanda (NISR) in collaboration with Ministry of Health (MoH). RDHS funding is provided by the Government of Rwanda and other developmental partners. The Demographic and Health Survey (DHS) is conducted every five years in low and middle-income countries using standardized pre-tested and validated questionnaire and they follow a similar sampling data collection and coding procedure in all concerned countries. The 2019–2020 Rwanda Demographic and Health Survey (RDHS) is the fifth and most recent survey, with data collected from 9 November 2019 to 20 July 2020.

Data sources and extraction

Data for Rwanda were obtained from the DHS program's official database <https://www.dhsprogram.com>, after a permission was granted via an online request explaining the purpose of our study.

Study design and sampling

This is a retrospective study which analyzes recent data from 2019–2020 Rwanda Demographic and Health Survey (RDHS). The sampling frame consisted of a complete list of enumeration areas (EAs) covering the entire country, provided by the National Institute of Statistics, the agency responsible for implementing the RDHS. An EA, defined during the 2012 Population and Housing Census (RPHC), corresponds to a natural village or part of a village and served as the census counting unit.

The 2019–2020 RDHS used a two-stage sampling design, which allowed for the estimation of nationally representative indicators. In the first stage, sample points (clusters) were selected from the EAs identified in the 2012 Rwanda Population and Health Census (RPHC). A total of 500 clusters were chosen, including 112 from urban areas and 388 from rural areas. In the second stage, households were systematically sampled. From June to August 2019, a listing of households was carried out in all selected EAs, and 26 households were randomly drawn from each cluster, yielding a total of 13,000 households. All women aged 15–49 and men aged 15–59 who were permanent residents of the selected households or visitors who had spent the night before the survey there were eligible for interview. A total of 21,147 individuals were interviewed, including 14,634 women and 6,513 men. All eligible women aged 15–49 completed the Woman's Questionnaire, bringing the total number of female respondents to 14,634. Because the sample sizes were approximately equal across districts, the national sample is not self-weighting. To correct for this, weighting factors were applied to the data, ensuring proportional representation at the national

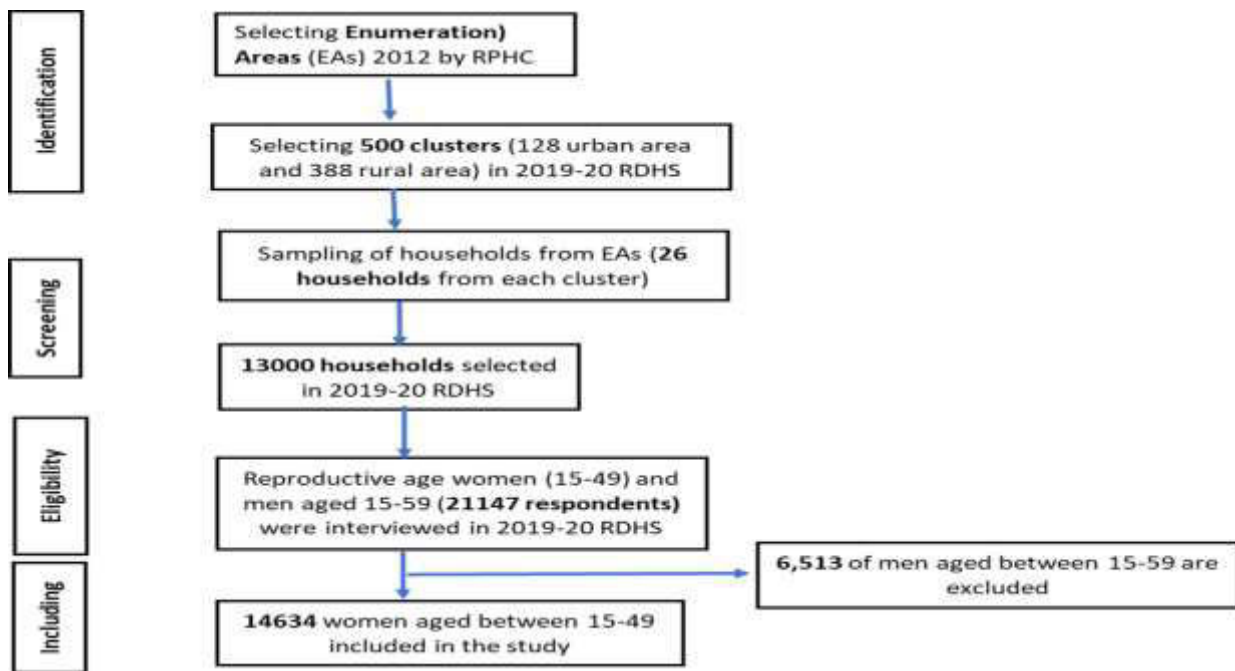


Figure 1: Flow diagram showing the sampling procedures of the DHS data.

Note: Numbers are unweighted; percentages and estimates in the analysis are based on weighted data. The weighted number is **30820**

level. This resulted to the final weighted denominator of 30,820 (Figure 1).

Study population

The study population consisted of women of reproductive age (15–49 years), including those who were pregnant or in the postpartum period at the time of the survey. All participants took part in face-to-face interviews, and all questions were answered.

Definition of variables

The outcome variables in this study include current contraceptive use by method type and patterns of use. Current use by method type refers to the specific contraceptive method a woman is using at the time of the survey. Contraceptive methods assessed are categorized into modern methods (such as hormonal contraceptives, intrauterine devices, implants, and condoms) and traditional methods (such as folkloric methods, withdrawal and periodic

abstinence). Pattern of use refers to participants who are actively using contraception at the time of data collection, regardless of the method type. This study utilized individual-level variables as independent variables. These include age, marital status, total number of children ever born, highest level of education, religion, and wealth index. The wealth index was derived by aggregating individual-level data based on the Ubudehe classification (Ubudehe refers to a national social classification system rooted in Rwandan culture), as defined in national statistical reports.²⁴

Data management and statistical analysis

Data for this study were analyzed using SPSS version 16. Descriptive statistics were used to summarize demographic characteristics and the prevalence of contraceptive use. A bivariate analysis was performed to assess the association between sociodemographic factors and the outcome variables, including contraceptive use and patterns of use. Only variables that demonstrated statistical

significance in the bivariate analysis were reported. Dummy variables were created as needed, followed by multivariate logistic regression analysis to further examine these associations. A p-value of <0.05 was considered statistically significant.

Ethical approval and consent to participate

This study did not involve the direct collection of information from participants. Therefore, respondent consent was not applicable, as the dataset used is publicly available and can be accessed for download through the provided link.: <https://dhsprogram.com/data/available-datasets.cfm>. All methods were carried out in accordance with the principles of the Helsinki Declaration. The data used in this study is de-identified, ensuring that respondents remain anonymous. Written permission was requested and granted by the MEASURE DHS/ICF international program prior data access

Results

Socio-demographic characteristics of participants

For the total of 30820 weighted number in the study, their age distribution, marital status, total children ever born in family, education level, region of residence, religion and wealth index are presented in Table 1. Most of the participants are in age between 35-39 group (24,8 %). The majority of participants (80.3%) were living in rural area. Most of participants (67,9%) attended only primary school. Regarding religion, (60.6%) are protestants; Regarding marital status, most participants were married (80.5%). In terms of family size, households with 4–6 children were the most common, accounting for 43.9% of the sample. The largest proportion of participants belonged to the poorest category (24%). (Table 1). The average children per family was 4.6 and standard deviation of 2.246.

Prevalence of contraception use

Contraception use is presented in Table 2. To evaluate contraceptive use, we analyzed current use by contraception method type and patterns

Table 1: Participants characteristics

Variable	Frequency (n)	Percentage (%)
Age in 5-year		
15-19	126	0.4
20-24	1306	4.2
25-29	2996	9.7
30-34	5343	17.3
35-39	7642	24.8
40-44	6935	22.5
45-49	6472	21
Marital status		
Never in union	1662	5.4
Married	24807	80.5
Others ¹	4351	14.1
Total children ever born		
1-3 Children	10910	35.4
4-6 Children	13540	43.9
7-9 Children	5638	18.3
10-12 Children	732	2.4
Highest educational level²		
No education	5584	18.1
Primary	20926	67.9
Secondary	3352	10.9
Higher	958	3.1
Type of place of residence		
Urban	6060	19.7
Rural	24760	80.3
Religion		
Catholic	11019	35.8
Protestant	18674	60.6
Muslim	582	1.9
Others ³	545	1.8

of contraception use. The majority, 52.8% were currently using modern method, while 6% were using traditional methods and 41.22% were not using any method. Among the participants, 58.8% were using contraception, while 19.1% had never used contraception (Table 2)

Traditional methods, Folkloric methods, Withdrawal method, fertility tracking, Lactational Amenorrhea Method, Modern methods: implants, Intra-Uterine Device (IUD), Oral contraceptive pills, Injectables, Female and Male Sterilization, Barrier methods, Emergency contraceptives.

Table 1: Participants characteristics (Continued)

Variable	Frequency (n)	Percentage (%)
Wealth index⁴		
Poorest	7399	24
Poorer	6036	19.6
Middle	6134	19.9
Richer	5937	19.3
Richest	5314	17.2

¹Others: Living with partner, Widowed, Divorced, No longer living together/separated, ²No education: Less than 6 years of education, Primary: 6 years of education, Secondary: 12 years of education, Higher: More than 12 years of education, ³Others: Traditional, Jehovah witness, Other, No religion, ⁴Poorest: About \$165 per year, Poorer: \$165-\$330 per year, Middle: \$330-\$1000 per year, Richer: \$1000-\$2500 per year, Richest: Above \$2500 per year.

Table 2: Contraception use

Variables	Frequency (n)	Percentage (%)
Current use by methods		
Traditional methods	1852	6
No method	12704	41.2
Modern methods	16264	52.8
Pattern of use		
Never used	5888	19.1
Non-using	6816	22.1
Currently using	18116	58.8

Influence of sociodemographic factors on contraception use

Personal characteristics on contraception use

The influence of sociodemographic factors on contraception use is presented in Table 3. Age showed a statistically significant association with contraceptive use. The prevalence of current use of modern methods was highest among women aged 20–24 years (67.4%) and lowest among those aged 45–49 years (27.5%), with a Chi-square value of 2.492 ($p < 0.001$). Regarding the pattern of use, the prevalence was again highest in the 20–24-year age group (69.3%) and lowest in the 45–49-year age group (36.2%), with a Chi-square value of 2.708 ($p < 0.001$). The prevalence of current use of modern contraceptive methods among married participants (58.5%) was slightly higher compared to other

marital status groups, with the lowest prevalence observed in the 'others' category (24.2%), with a Chi-square value of 2.859, $p < 0.001$. Similarly, married participants showed the highest prevalence of current contraceptive use (65.5%), while the lowest prevalence was again observed in the 'others' category (25.8%), with a Chi-square value of 3.281, $p < 0.001$. The Chi-square test revealed a statistically significant association between the number of children and contraceptive use (Chi-square value of 8.485, $p < 0.001$). The highest prevalence of modern contraceptive use was observed among participants with 1–3 children (58.8%), while the lowest was among those with 10–12 children (19.9%). Similarly, for current contraceptive use, participants with 1–3 children reported the highest prevalence (62.9%), whereas those with 10–12 children had the lowest (37.0%), with a Chi-square value of 5.266, $p < 0.001$. The Chi-square test showed a statistically significant association between education level and contraceptive use. The prevalence of current use of modern contraceptive methods was highest among participants with higher education (61.6%) and lowest among those with no education (41.4%), with a Chi-square value of 4.222, $p < 0.001$. Similarly, participants with higher education also had the highest prevalence of current contraceptive use (67.2%), while the lowest prevalence was observed among those with no education (47.3%), with a Chi-square value of 5.943, $p < 0.001$.

The prevalence of modern contraceptive use among urban residents was 52.9%, slightly higher than in rural areas, where it was 52.7%, with a Chi-square value of 19.369, $p < 0.001$. In contrast, the prevalence of current contraceptive use was higher among rural residents (59.0%), with a Chi-square value of 13.419, $p < 0.001$. The highest prevalence of modern contraceptive use was observed among Catholics (56.2%), while the lowest was among participants in the 'others' category (47.7%), with a Chi-square value of 1.239, $p < 0.001$. Muslims showed the highest prevalence of current contraceptive use (63.9%), whereas the lowest was observed in the 'others' category (51.7%), with a Chi-square value of 1.531, $p < 0.001$. According to the wealth index, the highest prevalence of modern contraceptive use was observed among participants in the middle wealth category (54.2%), while the

Table 3: Personal characteristics on contraception use

Variables	Current use by methods		Pattern of use	
	Modern method n (%)	X ² (P value)	Currently using n (%)	X ² (P value)
Age in 5-year		2.492(<.001)		2.708(<.001)
15-19	84(66.7)		85(67.5)	
20-24	880(67.4)		905(69.3)	
25-29	1957(65.3)		2053(68.5)	
30-34	3459(64.7)		3698(69.2)	
35-39	4577(59.9)		4969(65.0)	
40-44	3524(50.8)		4061(58.6)	
45-49	1783(27.5)		2345(36.2)	
Marital status		2.859(<.001)		3.281(<.001)
Never in union	701(42.2)		740(44.5)	
Married	14511(58.5)		16254(65.5)	
Others ¹	1052(24.2)		1122(25.8)	
Total children ever born		8.485(<.001)		5.266(<.001)
1-3 Children	6412(58.8)		6859(62.9)	
4-6 Children	7338(54.2)		8199(60.6)	
7-9 Children	2368(42.0)		2787(49.4)	
10-12 Children	146(19.9)		271(37.0)	
Highest educational level²		4.222(<.001)		5.943(<.001)
No education	2311(41.4)		2639(47.3)	
Primary	11462(54.8)		12783(61.1)	
Secondary	1901(56.7)		2050(61.2)	
Higher	590(61.6)		644(67.2)	

Table 3: Personal characteristics on contraception use (Continued)

Variables	Current use by methods		Pattern of use	
	Modern method n (%)	X ² (P value)	Currently using n (%)	X ² (P value)
Type of place of residence		19.369(<.001)		13.419(<.001)
Urban	3205(52.9)		34985(57.70)	
Rural	13059(52.7)		14618(59.0)	
Religion		1.239(<.001)		1.531(<.001)
Catholic	6191(56.2)		6897(62.6)	
Protestant	9473(50.7)		10565(56.6)	
Muslim	340(58.4)		372(63.9)	
Others ³	260(47.7)		282(51.7)	
Wealth index⁴		1.024(<.001)		1.629(<.001)
Poorest	3736(50.5)		4053(54.8)	
Poorer	3216(53.3)		3583(59.4)	
Middle	3326(54.2)		3744(61.0)	
Richer	3171(53.4)		3558(59.9)	
Richest	2815(53.0)		3178(59.8)	

¹Others: Living with partner, Widowed, Divorced, No longer living together/separated, ²No education: Less than 6 years of education, Primary: 6 years of education, Secondary: 12 years of education, Higher: More than 12 years of education, ³Others: Traditional, Jehovah witness, Other, No religion, ⁴Poorest: About \$165 per year, Poorer: \$165-\$330 per year, Middle: \$330-\$1000 per year, Richer: \$1000-\$2500 per year, Richest: Above \$2500 per year, Modern methods: implants, Intra-Uterine Device (IUD), Oral contraceptive pills, Injectables, Female and Male Sterilization, Barrier methods, Emergency contraceptives.

lowest was among the poorest (50.5%), with a Chi-square value of 1.024, $p < 0.001$. Similarly, the highest prevalence of current contraceptive use was

seen in the middle wealth group (61.0%), whereas the lowest was among the poorest (54.8%), with a Chi-square value of 1.629, $p < 0.001$ (Table 3).

Table 4: Logistic regression model, Personal characteristics on contraception use by method type and pattern of use

Variables	Multivariate				Pattern of use			
	OR	95% C.I.		P Value	OR	95% C.I.		P Value
Age in 5-year								
20-24	1				1			
15-19	0.779	0.521	1.166	0.225	0.803	0.533	1.208	0.292
25-29	1.274	1.102	1.473	0.001	1.23	1.06	1.429	0.006
30-34	1.5	1.305	1.725	0.000	1.406	1.218	1.623	0.000
35-39	1.952	1.694	2.249	0.000	1.835	1.586	2.122	0.000
40-44	2.616	2.261	3.028	0.000	2.229	1.919	2.589	0.000
45-49	6.71	5.768	7.805	0.000	5.252	4.504	6.123	0.000
Marital status								
Married	1				1			
Never in union	0.257	0.237	0.277	0.000	0.205	0.19	0.222	0.000
Others ¹	0.725	0.637	0.825	0.000	0.665	0.585	0.755	0.000
Total children ever born								
1-3 children	1				1			
4-6Children	0.781	0.73	0.834	0.000	1.267	1.202	1.337	0.000
7-12 children	1.047	0.961	1.141	0.293	0.639	0.542	0.755	0.000

Table 4: Logistic regression model, Personal characteristics on contraception use by method type and pattern of use (Continued)

Variables	Multivariate				Pattern of use			
	OR	95% C.I.		P Value	OR	95% C.I.		P Value
Highest educational level²								
Primary	1				1			
No education	1.334	1.2	1.482	0.000	1.43	1.338	1.529	0.000
Secondary	1.384	1.294	1.48	0.000	1.3	1.169	1.446	0.000
High	1.656	1.405	1.951	0.000	1.599	1.351	1.892	0.000
Type of place of residence								
Urban	1				1			
Rural	0.994	0.94	1.052	0.839	1.056	0.997	1.117	0.062
Religion								
Catholics	1				1			
Protestants	1.363	1.294	1.435	0.000	1.402	1.33	1.478	0.000
Muslims	0.855	0.711	1.028	0.096	0.876	0.725	1.059	0.172
Others ³	1.324	1.099	1.594	0.003	1.432	1.187	1.727	0.000
Wealth index⁴								
Middle	1				1			
Poorest	0.982	0.911	1.058	0.631	1.061	0.983	1.145	0.126
Poorer	0.956	0.885	1.033	0.259	0.969	0.896	1.049	0.441
Rich	1.023	0.947	1.105	0.562	1.038	0.96	1.123	0.348
Richest	1.165	1.069	1.271	0.001	1.146	1.049	1.251	0.003

¹Others: Living with partner, Widowed, Divorced, No longer living together/separated, ²No education: Less than 6 years of education, Primary: 6 years of education, Secondary: 12 years of education, Higher: More than 12 years of education, ³Others: Traditional, Jehovah witness, Other, No religion, ⁴Poorest: About \$165 per year, Poorer: \$165-\$330 per year, Middle: \$330-\$1000 per year, Richer: \$1000-\$2500 per year, Richest: Above \$2500 per year, Modern methods: implants, Intra-Uterine Device (IUD), Oral contraceptive pills, Injectables, Female and Male Sterilization, Barrier methods, Emergency contraceptives.

Correlation between socio-demographic factors and contraception use

Logistic regression model analysis of personal characteristics on contraception use by method type and pattern of use is presented in Table 4.

Multivariate analysis indicated that age group was significantly associated with the use of modern contraceptive methods ($p < 0.05$). Compared with the reference category, the odds of using modern contraception rose consistently with increasing age: 25–29 years (OR = 1.274, 95% CI: 1.102–1.473), 30–34 years (OR = 1.500, 95% CI: 1.305–1.725), 35–39 years (OR = 1.952, 95% CI: 1.694–2.249), 40–44 years (OR = 2.616, 95% CI: 2.261–3.028), and 45–49 years (OR = 6.710, 95% CI: 5.768–7.805).

A similar trend was observed for overall contraceptive use patterns, where age remained a significant predictor ($p < 0.05$). Relative to the reference group, the likelihood of contraceptive use increased across successive age groups: 25–29 years (OR = 1.23, 95% CI: 1.06–1.43), 30–34 years (OR = 1.406, 95% CI: 1.218–1.623), 35–39 years (OR = 1.835, 95% CI: 1.586–2.122), 40–44 years (OR = 2.229, 95% CI: 1.919–2.589), and 45–49 years (OR = 5.252, 95% CI: 4.504–6.123).

Marital status was a significant determinant of modern contraceptive use ($p < 0.05$). Multivariate results indicated that individuals who had never entered a union (OR = 0.257, 95% CI: 0.237–0.277) and those in other marital categories (OR = 0.725, 95% CI: 0.637–0.825) were less likely to use modern contraceptive methods than the reference group. This association was similarly observed for overall contraceptive use, where never-in-union individuals (OR = 0.205, 95% CI: 0.190–0.222) and those in other marital groups (OR = 0.665, 95% CI: 0.585–0.755) showed significantly lower odds.

The number of children ever born was also significantly related to contraceptive use ($p < 0.05$). Women with 4–6 children had reduced odds of using modern methods (OR = 0.781, 95% CI: 0.730–0.834). When considering overall contraceptive behavior, having 7–12 children was associated with lower odds of use (OR = 0.639, 95% CI: 0.542–0.755), while those with 4–6 children exhibited higher odds (OR = 1.267, 95% CI: 1.202–1.337).

Educational level emerged as another significant factor ($p < 0.05$). Compared with the reference category, the odds of using modern contraceptive methods increased with higher levels of education: no education (OR = 1.334, 95% CI: 1.200–1.482), secondary education (OR = 1.384, 95% CI: 1.294–1.480), and higher education (OR = 1.656, 95% CI: 1.405–1.951). A similar pattern was noted for overall contraceptive use, with increased likelihood among those with no education (OR = 1.43, 95% CI: 1.338–1.529), secondary education (OR = 1.30, 95% CI: 1.169–1.446), and higher education (OR = 1.599, 95% CI: 1.351–1.892).

Religious affiliation was likewise significantly associated with contraceptive use ($p < 0.05$). Protestants (OR = 1.363, 95% CI: 1.294–1.435) and individuals from other religious groups (OR = 1.324, 95% CI: 1.099–1.594) were more likely to use modern contraceptive methods. This trend persisted in the analysis of overall contraceptive use, where Protestants (OR = 1.402, 95% CI: 1.330–1.478) and other religious groups (OR = 1.432, 95% CI: 1.187–1.727) demonstrated higher odds of use.

The wealth index was also a significant predictor ($p < 0.05$). Respondents in the richest wealth category had higher odds of using modern contraceptive methods (OR = 1.165, 95% CI: 1.069–1.271) and were also more likely to use contraception overall (OR = 1.146, 95% CI: 1.049–1.251) (Table 4).

Discussion

This study assessed factors influencing the use of contraceptive methods among women of reproductive age in Rwanda. Our findings reveal that more than half of the participants (52.8%) were currently using modern contraceptive methods, while 58.8% reported using any form of contraception. Global estimates from 2019, where 47.7% of women of reproductive age used modern contraceptive methods and the overall contraceptive prevalence rate (for all methods combined) was 51.9%.²⁵

Rwanda stands out as one of the three countries in sub-Saharan Africa, alongside Ethiopia and Malawi, that have successfully implemented contraception programs, largely due to the

collaborative efforts of non-governmental organizations and the government's dedication to enhancing the healthcare system and improving the overall well-being of its population.²⁶ To increase contraception use and improve reproductive health outcomes, it is crucial to ensure widespread availability of contraceptives across all healthcare facilities, including community health centers particularly in rural and underserved areas²⁵, public awareness campaigns should leverage radio, television, and social media platforms to promote the benefits of contraception and to prevent a relapse.²⁶ This study identified several associated factors influencing contraception use, such as age, marital status, number of children, level of education, place of residence, religion and wealth status. Our results correlate with the findings of L. S. Bola¹⁷ and Chester *et al.*²⁷

The current study observed that age influenced the contraception used, an observation that was also made in an earlier study.⁴ Women aged 45–49 had higher odds of using modern contraceptives compared to other age groups. The reason may be that many women in the 45–49 age group are past their reproductive peak and may no longer wish to have more children and as traditional contraceptive methods are often seen as less reliable, they may prefer modern methods to prevent unplanned pregnancies and the risk of high-risk pregnancies. To improve the use of contraception in adolescents; policymakers should prioritize the implementation of comprehensive, age-appropriate sexual education in schools to equip adolescents with accurate knowledge about reproductive health, contraception, and the consequences of unintended pregnancies.²⁸ This can be achieved by training teachers and integrating culturally sensitive, evidence-based sexual health modules into the school curriculum.²⁸ To foster acceptance, parents and community leaders should be actively engaged in reducing the stigma surrounding sexual education and encouraging open discussions. Additionally, healthcare facilities must establish safe, confidential, and adolescent-friendly spaces to ensure young people can access contraceptive services without fear of judgment.²⁹ Collaborative efforts with civil society organizations and the media can amplify culturally relevant campaigns that emphasize the importance of contraception for adolescents.

Leveraging social media platforms, radio, and television will further disseminate relatable content that normalizes contraception use.³⁰ Furthermore, partnerships with local leaders, religious organizations, and cultural institutions are essential to cultivating a supportive environment for adolescent reproductive health and empowering young people to make informed decisions.³¹

Never-married women, as well as those in other categories (cohabiting women, widows, and divorcees), were less likely to use modern contraceptives compared to married women.⁴ This could be because married women are typically more sexually active and fertile, prompting a higher demand for contraceptives to prevent pregnancies. In contrast, widowed and divorced women may not be in sexual relationships, which could explain their lower use of modern contraceptives. Healthcare providers should receive regular training in nonjudgmental, client-centered counseling to ensure that all women regardless of marital status feel comfortable seeking family planning services.³²

The likelihood of contraceptive use increases among participants with a higher number of children. This positive association between family planning use and having more children has also been observed in previous studies.³³ Our findings indicate that women with 4–6 children have decreased contraception use, which may be attributed to the Rwandan cultural preference for having a boy in the family.³⁴ This cultural value leads some women to avoid using contraception while trying to conceive a baby boy. Efforts are needed through educational campaigns to change this mindset, promote equal value for all genders, and highlight the impact of having many children on family development and well-being.

The educational level is seen as significantly associated with contraception because the increase in the educational level increase also the use of contraception. Our results are consistent with other research conducted in Nigeria, where they found among women with no fertility intentions, the proportion using any contraceptive method increased as their level of education increased.³⁵ Educational and awareness interventions should be prioritized to promote contraceptive use among women with lower education levels. Health authorities could implement community-based

reproductive health education programs that provide accurate information about modern contraceptive methods through health workers, peer educators, and local media.³⁶

The likelihood of contraceptive use is higher among Protestant women and those of others (Traditional, Jehovah witness, Other, no religion) compared to Catholic women. Previous studies have also reported a positive association between Christian women and the use of family planning methods.³⁷ Our findings align with studies conducted in Ethiopia³⁸ and Nigeria³⁵, which reported that being Christian is significantly associated with contraceptive use. This may be explained by the relatively low level of religious opposition in Rwanda, where religious leaders and community campaigns actively promote more positive attitudes toward contraception among Christians. Continued collaboration with these leaders and community initiatives is essential to normalize contraceptive use and address cultural resistance, supporting family planning as a vital tool for improving health and development.³⁸

Similar to findings from studies in Sub-Saharan African countries⁴, Ethiopia³⁹, and Ghana⁴⁰, this study observed lower contraceptive use among women in the low wealth index category. In many sub-Saharan African countries, access to contraceptives is not entirely free, as health facilities often impose fees. Additionally, the distance to family planning clinics poses a challenge for many women, especially those in rural areas, with transportation costs further hindering access to these services.³⁵ Financial autonomy plays a crucial role in enabling women to afford and use modern contraceptives. While working women may be able to cover these costs, those who are not employed often face significant financial barriers.⁴¹ Although contraception services are free of charge in Rwanda, transportation barriers remain a challenge as the available options are not convenient. It would be beneficial for the government to develop mobile contraception services to help overcome these transportation challenges. The type of place of residence was not found to be correlated with contraception use. This may be because, in Rwanda, healthcare facilities are available in both urban and rural areas, making access to contraception less of a challenge. The government of Rwanda has made

significant efforts in the health sector, ensuring that contraception methods are accessible starting from community health centers. As a result, anyone in need can easily access these services nearby, and they are provided free of charge.⁴²

This study may have limitations and strengths: as RDHS 2019-20 was conducted during pandemic period (COVID-19) and it had an impact on many aspects, we cannot determine the extent to which it disrupted the family planning program in Rwanda. Furthermore, this study utilized publicly available secondary data; the analysis was limited to the variables available in the dataset, which restricted the ability to examine additional or more detailed factors of interest. Nevertheless, the survey was conducted nationwide and included participants from all reproductive age groups across all regions of the country, providing a comprehensive and nationally representative overview of family planning. In addition, the findings of this study provide robust evidence for tracking national and subpopulation trends in family planning use, assessing changes in contraceptive uptake patterns over time, and identifying emerging inequalities. This evidence is essential for guiding evidence-based public health policies, prioritizing resource allocation, and designing targeted interventions, including awareness-raising campaigns to improve knowledge and uptake of contraceptive use.

Conclusion

There is a relatively high prevalence of contraceptive use among women with no fertility intentions in Rwanda (58.8%). Predisposing factors such as women's age, marital status, number of children ever born, educational level, religion and wealth index are associated with contraceptive use. It is important for policymakers to consider these factors when designing and implementing programs or policies aimed at increasing contraceptive use among women with no intention of giving birth. collaboration with leaders in different settings to promote positive attitudes and reduce misconceptions about family planning. Expanding reproductive health education in schools, communities, and adult learning programs can empower women especially those with lower education levels to make informed decisions. Health services should be inclusive for all women,

including widowed, divorced, and unmarried individuals, by ensuring nonjudgmental, client-centered counseling. Moreover, family planning should be integrated into broader development initiatives such as women's empowerment and economic programs to prevent setbacks. Ongoing monitoring and research are essential to sustain progress and address remaining barriers.

Authors contribution

D.C., V.M., and A.G. contributed to the conceptualization, methodology, data curation, data analysis, and manuscript writing. W.C.L. contributed to the conceptualization, project administration, supervision, manuscript writing and final approval of the manuscript. All authors read and approved the final version of the manuscript.

Data availability

The data used in this study are publicly available on the DHS Program website (www.dhsprogram.com) and are available upon request to the corresponding author.

Funding

This research was funded by China Medical University (DMR-115-138) and partially supported by Taichung Hospital, Ministry of Health and Welfare, Taichung, Taiwan

Acknowledgements

We sincerely thank the dedicated team that conducted the data collection and the Government of Rwanda for its coordination and support in implementing the survey. We also extend our gratitude to ICF International for providing access to the Demographic and Health Survey data.

References

1. Jain R and Muralidhar S. *Contraceptive methods: needs, options and utilization*. J Obstet Gynaecol India, 2011. 61(6): p. 626-34.
2. Deribew K. *Assessment of knowledge on emergency contraceptives and factors associated with utilization among female students in Bonga College of Education, Southwest Region, Ethiopia: cross-sectional study*. BMC Med Educ, 2024. 24(1): p. 538.
3. Bearak J, Popinchalk A, Ganatra B, Moller AB, Tuncalp O, Beavin C, Kwok L, and Alkema L. *Unintended pregnancy and abortion by income, region, and the legal status of abortion: estimates from a comprehensive model for 1990-2019*. Lancet Glob Health, 2020. 8(9): p. e1152-e1161.
4. Ahinkorah BO, Budu E, Aboagye RG, Agbaglo E, Arthur-Holmes F, Adu C, Archer AG, Aderoju YBG, and Seidu AA. *Factors associated with modern contraceptive use among women with no fertility intention in sub-Saharan Africa: evidence from cross-sectional surveys of 29 countries*. Contracept Reprod Med, 2021. 6(1): p. 22.
5. Bahamondes L, Fernandes A, Monteiro I, and Bahamondes MV. *Long-acting reversible contraceptive (LARCs) methods*. Best Practice & Research Clinical Obstetrics & Gynaecology, 2020. 66: p. 28-40.
6. United Nations Department of Economic and Social Affairs PD. *World family planning, 2020 highlights: Accelerating action to ensure universal access to family planning*. 2020. (ST/ESA/SER.A/450).
7. Mohamed S, Chipeta MG, Kamninga T, Nthakomwa L, Chifungo C, Mzembe T, Vellema R, Chikwapulo V, Peterson M, Abdullahi L, Musau K, Wazny K, Zulu E, and Madise N. *Interventions to prevent unintended pregnancies among adolescents: a rapid overview of systematic reviews*. Syst Rev, 2023. 12(1): p. 198.
8. Sedgh G, Singh S, and Hussain R. *Intended and unintended pregnancies worldwide in 2012 and recent trends*. Stud Fam Plann, 2014. 45(3): p. 301-14.
9. Ameyaw EK, Budu E, Sambah F, Baatiema L, Appiah F, Seidu AA, and Ahinkorah BO. *Prevalence and determinants of unintended pregnancy in sub-Saharan Africa: A multi-country analysis of demographic and health surveys*. PLoS One, 2019. 14(8): p. e0220970.
10. Ikamari L, Izugbara, C. & Ochako, R. *Prevalence and determinants of unintended pregnancy among women in Nairobi, Kenya*. BMC Pregnancy and Childbirth, 2013. 13.
11. Tsui AO, McDonald-Mosley R, and Burke AE. *Family planning and the burden of unintended pregnancies*. Epidemiol Rev, 2010. 32(1): p. 152-74.
12. Apanga PA, Kumbeni MT, Ayamga EA, Ulanja MB, and Akparibo R. *Prevalence and factors associated with modern contraceptive use among women of reproductive age in 20 African countries: a large population-based study*. BMJ Open, 2020. 10(9): p. e041103.
13. Abdulai M, Kenu E, Ameme DK, Bandoh DA, Tabong PT, Lartey AA, Noora CL, Adjei EY, and Nyarko KM. *Demographic and socio-cultural factors influencing contraceptive uptake among women of reproductive age in Tamale Metropolis, Northern Region, Ghana*. Ghana Med J, 2020. 54(2 Suppl): p. 64-72.
14. Government R. *Country Office Annual Report*. 2023.
15. UNFPA. *"The Real Fertility Crisis: The pursuit of reproductive agency in a changing world."* state of world population 2025. New York, 2025. UNFPA. ISBN: 9789211542837.

16. Corey J, Schwandt H, Boulware A, Herrera A, Hudler E, Imbabazi C, King I, Linus J, Manzi I, Merrit M, Mezier L, Miller A, Morris H, Musemakweli D, Musekura U, Mutuyimana D, Ntakarutimana C, Patel N, Scanteianu A, Shemeza BE, Sterling-Donaldson G, Umutoni C, Uwera L, Zeiler M, and Feinberg S. *Family planning demand generation in Rwanda: Government efforts at the national and community level impact interpersonal communication and family norms*. PLoS One, 2022. 17(4): p. e0266520.
17. Solanke BL. *Factors influencing contraceptive use and non-use among women of advanced reproductive age in Nigeria*. J Health Popul Nutr, 2017. 36(1): p. 1.
18. Srikanthan A and Reid RL. *Religious and cultural influences on contraception*. J Obstet Gynaecol Can, 2008. 30(2): p. 129-137.
19. Negash WD, Eshetu HB, and Asmamaw DB. *Predictors of modern contraceptive use among reproductive age women in high fertility countries in sub-Saharan Africa: evidence from demographic and health surveys*. BMC Womens Health, 2022. 22(1): p. 520.
20. de Vargas Nunes Coll C, Ewerling F, Hellwig F, and de Barros AJD. *Contraception in adolescence: the influence of parity and marital status on contraceptive use in 73 low-and middle-income countries*. Reprod Health, 2019. 16(1): p. 21.
21. Woldeamanuel BT, Gessese GT, Demie TG, Handebo S, and Biratu TD. *Women's education, contraception use, and high-risk fertility behavior: A cross-sectional analysis of the demographic and health survey in Ethiopia*. Front Glob Womens Health, 2023. 4: p. 1071461.
22. Zinke-Allmang A, Hassan R, Bhatia A, Gorur K, Shipow A, Ogolla C, Shirley S, Keizer K, and Cislighi B. *Use of digital media for family planning information by women and their social networks in Kenya: A qualitative study in peri-urban Nairobi*. Front Sociol, 2022. 7: p. 886548.
23. Rattan S, Kalia M, Rohilla R, Grover PK, Dandona S, Sharma MK, Bhandari P, Dalal M, and Goel NK. *Contraceptive awareness and practices in reproductive age couples: A study from urban slums of Punjab*. J Family Med Prim Care, 2022. 11(7): p. 3654-3659.
24. Alexis H. *The Challenges and Examination of New Programme Ubudehe 2020 in Rwanda*. American Journal of Industrial and Business Management, 2023. 13(05): p. 287-311.
25. United Nations. *Department of Economic and Social Affairs, Contraceptive Use by Method 2019: Data Booklet (ST/ESA/SER.A/435)*. 2019.
26. Schwandt HM, Feinberg S, Akotiah A, Douville TY, Gardner EV, Imbabazi C, McQuin E, Mohamed M, Rugoyera A, Musemakweli D, Nichols CW, Nyangezi NU, Arizmendi JS, Welikala D, Yamuragiye B, and Zigo L. *"Family planning in Rwanda is not seen as population control, but rather as a way to empower the people": examining Rwanda's success in family planning from the perspective of public and private stakeholders*. Contracept Reprod Med, 2018. 3: p. 18.
27. Kalinda C, Phiri M, Chimpinde K, Ishimwe MCS, and Simona SJ. *Trends and socio-demographic components of modern contraceptive use among sexually active women in Rwanda: a multivariate decomposition analysis*. Reprod Health, 2022. 19(1): p. 226.
28. Albert Sekhar M, Edward S, Grace A, Pricilla SE, and G S. *Understanding Comprehensive Sexuality Education: A Worldwide Narrative Review*. Cureus, 2024. 16(11): p. e74788.
29. Corley AG, Sprockett A, Montagu D, and Chakraborty NM. *Exploring and Monitoring Privacy, Confidentiality, and Provider Bias in Sexual and Reproductive Health Service Provision to Young People: A Narrative Review*. Int J Environ Res Public Health, 2022. 19(11).
30. Yee L and Simon M. *The role of the social network in contraceptive decision-making among young, African American and Latina women*. J Adolesc Health, 2010. 47(4): p. 374-80.
31. Sidamo NB, Abebe Kerbo A, Gidebo KD, and Wado YD. *A policy brief: improving access and utilization of adolescent sexual and reproductive health services in Southern Ethiopia*. Front Public Health, 2024. 12: p. 1364058.
32. Minnis AM, Mavedzenge SN, Luecke E, and Dehlendorf C. *Provider counseling to young women seeking family planning services*. Perspect Sex Reprod Health, 2014. 46(4): p. 223-31.
33. Mahfouz MS, Elmahdy M, Ryani MA, Abdelmola AO, Kariri SAA, Alhazmi HYA, Almalki SHM, Adhabi OM, Ali Hindi SM, Muqri NM, and Towhary BA. *Contraceptive Use and the Associated Factors among Women of Reproductive Age in Jazan City, Saudi Arabia: A Cross-Sectional Survey*. Int J Environ Res Public Health, 2023. 20(1).
34. Habimana Kabano I, Broekhuis A, and Hooimeijer P. *Fertility Decline in Rwanda: Is Gender Preference in the Way?* International Journal of Population Research, 2013. 2013: p. 1-9.
35. Stephen A. Adebawale, Adeoye IA, and Palamuleni ME. *Contraceptive use among Nigerian women with no fertility intention: interaction amid potential causative factors*. African Population Studies, 2013. 27, No 2.
36. Sharma AE, Frederiksen BN, Malcolm NM, Rollison JM, and Carter MW. *Community Education and Engagement in Family Planning: Updated Systematic Review*. Am J Prev Med, 2018. 55(5): p. 747-758.
37. Hellwig F, Wado Y, and Barros AJD. *Association between women's empowerment and demand for family planning satisfied among Christians and Muslims in multireligious African countries*. BMJ Glob Health, 2024. 9(5).
38. Chekol TS and Baheru MT. *Addressing socio-cultural barriers to improve contraceptive use in Ethiopia*. F1000Res, 2025. 14: p. 442.
39. Yihunie L., Ayalu A Reda, Habtamu Tamene, Susan Benedict, and Deribe K. *Geographical variation and factors influencing modern contraceptive use among married women in Ethiopia: evidence from a national population based survey*. Reproductive Health, 2013.

40. Nyarko SH. *Spatial variations and socioeconomic determinants of modern contraceptive use in Ghana: A Bayesian multilevel analysis*. PLoS One, 2020. 15(3): p. e0230139.
41. Osborne A, Bangura C, and Ahinkorah BO. *Trends and inequalities in modern contraceptive use among women in Sierra Leone, 2008-2019*. Reprod Health, 2024. 21(1): p. 167.
42. Scanteianu A, Schwandt HM, Boulware A, Corey J, Herrera A, Hudler E, Imbabazi C, King I, Linus J, Manzi I, Merritt M, Mezier L, Miller A, Morris H, Musemakweli D, Musekura U, Mutuyimana D, Ntakarutimana C, Patel N, Shemeza BE, Sterling-Donaldson G, Umutoni C, Uwera L, Zeiler M, and Feinberg S. *"...the availability of contraceptives is everywhere": coordinated and integrated public family planning service delivery in Rwanda*. Reprod Health, 2022. 19(1): p. 22.