

Predictors of Contraceptive Pattern in Rural Rwanda



Population Studies

KEYWORDS :

Sylvere NAHAYO

Research Scholar, Centre for Population Studies, Annamalai University.

ABSTRACT

The effectiveness of population control is vested on its existing pattern of contraceptive use. Protecting the couples with effective contraception after achieving their desired family size is one of the paramount prerequisites of population control. Non-use of contraception and use of obsolete natural and temporary contraceptive methods increase unwanted birth. Present paper analyzed the use pattern of contraception in rural Rwanda using multinomial logistic regression. The dependent variable selected is a trinomial variable representing contraceptive non-use, use of temporary method and use of permanent method. The independent variables used were average couple age and age at marriage, maximum couple education, number of children living and their attitude towards family planning.

The results showed that the selected predictors have profound effect on the process of shaping contraceptive use pattern in rural Rwanda. The changes that can be achieved by enacting control over these prominent predictors of contraceptive pattern through population policy, the efforts for poverty reduction in rural areas of Rwanda would be more effective.

INTRODUCTION

Aiming of population control by intervening in the use pattern of contraceptive methods without understanding the intrinsic mechanism behind it is like stepping at the tip of iceberg without knowing about the mass beneath. The predictors of contraceptive pattern are externally more controllable and are more viable to the Government Policies making them as the most sensitive components of rural development. Long-term contraceptive use pattern is a valid predictor of unintended pregnancy risk. A measure that addresses the pattern of method use over time may better predict the cumulative risk of unintended pregnancy. The differences in the pattern of contraceptive use reflect availability and accessibility, as well as social and cultural attitudes toward fertility control, sexuality, and the roles of women in society. Kari White and Joseph E. Potter (2013) identified the contribution of patterns of contraceptive use to the variation in fertility. Present study is an attempt to identify important predictors of contraceptive pattern which are more accessible to external corrective measures through the Government Policies in rural Rwanda in central Africa.

Rwanda is a landlocked, resource-poor country. The population is about 9.9 million, and 87 per cent of Rwandans live in rural areas. Population density in the country is the highest in Africa, with about 379 persons/km². The annual demographic growth rate is 2.7 per cent, and the population is expected to increase to about 12 million by 2015. The country is one of the poorest in Africa. Gross domestic product per capita was US\$530 in 2008, and Rwanda ranked 166th out of 187 countries in the 2011 United Nations Development Programme's Human Development Index.

The population of Rwanda is largely rural with over 80 per cent of the population residing in rural areas during the over the last decade. On the other hand, the urban population is approximately 20 per cent with a growth rate that has been falling over the years and it is currently 4.31 per cent from 14.99 per cent in 2000, whereas the rural population growth rate has been increasing over the years with an approximate growth rate of 2.5 per cent.

Multinomial Logistic Regression Model was fitted to a trinomial variable representing contraceptive pattern, namely *non-use*, use of *permanent* method and use of *temporary* method. The *couple age* and *couple age at marriage* were single variables representing average age and age at marriage of the couple respectively. *Couple maximum education* represented the variable of maximum education among the couple. Combination of age, age at marriage and education were found to be a sufficient substitute to the separate data of husband and wife. *Number of children living* was taken as a covariate. The analysis showed that the predictors of the fitted model were effective for providing information about the dynamics of the contraceptive pattern

of rural Rwanda. *Couple age at marriage* and *income* followed identical distributions and *couple age* followed the distribution opposite to it.

Data and Methods

The study was conducted in a multi-staged random sample of couples in reproductive age from rural Rwanda. As the total number of rural households was estimated to 85 per cent of 1,757,426 total household in Rwanda in 2002, the sample size had been selected as 385 with a margin error of 5 per cent, confidence level 95 per cent and response distribution 50 per cent. The mean ages of husbands and wives were 40.90±9.36, 39.71±9.71 years respectively. Respective ages at marriage were 24±4.25 and 23.14±4.13 respectively. As the ages and ages at marriage of husbands and wives were found to have significant positive correlation, their averages were taken as *couple age* and *couple age at marriage* respectively so as to reduce fluctuations due to the bias in age reporting. Similarly education of husbands and wives were combined as *maximum couple education*, representing the highest education in between husbands and wives. The rationale behind the combination is that the effect of education of husbands and wives were mutually dependent in the matter of fertility and family planning. Average monthly family income was 29146.75±29327.25 rwf. Mean of total living children for the couple was 3.41±2.21 of which 1.72±1.48 and 1.68±1.44 are boys and girls.

Before fitting the Multinomial Logistic Regression Model, the predictor variables such as age and age at marriage and education of couples are combined. Age and age at marriage of couples were combined as averages of husbands and wives. Education of couples are taken as maximum between husbands and wives. Other selected predictors are number of living children and attitude towards family planning. Age and age at marriage were classified into *Low*, *Medium* and *High* as per mean ± half standard deviation. The points of division of age were 44.97 years and 35.58 years, those of age at marriage were 25.68 years and 21.85 years. Multinomial Logistic Regression Model was fitted to a trinomial variable representing contraceptive pattern, namely *non-use*, use of *permanent* contraceptive and use of *temporary* contraceptive.

RESULTS

The results of the fitted model are presented in the following Tables.

Table 1 Case Processing Summary

Variables		N	Marginal Percentage
Method used	Not using any method	213	55.32
	Permanent	28	7.27

	Temporary	144	37.40
Couple age	Low	138	35.84
	Average	106	27.53
Couple age at marriage	High	141	36.62
	Low	130	33.77
	Average	150	38.96
Couple maximum education	High	105	27.27
	Up to Median	297	77.14
	Above Median	88	22.86
Monthly income level	Low income	163	42.34
	Medium income	146	37.92
	High income	76	19.74
Total		385	100.00

Table 2 Model Fitting Information

Model	Model Fitting Criteria	Likelihood Ratio Tests		
	-2 Log Likelihood	Chi-Square	df	Sig.
Intercept Only	534.082			
Final	448.392	85.690	16	0.000

Table 3 Pseudo R-Square of model fitted

Pseudo R-Square	
Cox and Snell	0.200
Nagelkerke	0.240
McFadden	0.126

Table 4 Parameter Estimates

Method used ^a		B	Std. Error	Wald	df	Sig.	Exp(B)	95% Confidence Interval for Exp(B)	
Not using any method	Intercept	0.690	0.494	1.950	1	0.163		Lower Bound	Upper Bound
	t_child	0.005	0.070	0.004	1	0.949	1.005	0.876	1.152
	[age_max=1.00]	-1.498	0.333	20.305	1	0.000	0.223	0.116	0.429
	[age_max=2.00]	-1.151	0.311	13.656	1	0.000	0.316	0.172	0.583
	[age_max=3.00]	0b			0				
	[amg_max=1.00]	0.965	0.323	8.948	1	0.003	2.625	1.395	4.939
	[amg_max=2.00]	0.349	0.293	1.421	1	0.233	1.418	0.799	2.518
	[amg_max=3.00]	0b			0				
	[edu_max=1.00]	-0.760	0.309	6.034	1	0.014	0.468	0.255	0.858
	[edu_max=2.00]	0b			0				
	[inc_g=1.00]	1.337	0.348	14.736	1	0.000	3.808	1.924	7.536
	[inc_g=2.00]	0.485	0.323	2.252	1	0.133	1.624	0.862	3.059
	[inc_g=3.00]	0b			0				
Permanent	Intercept	-2.951	1.029	8.230	1	0.004			
	t_child	0.298	0.113	6.976	1	0.008	1.347	1.080	1.681
	[age_max=1.00]	-0.472	0.630	0.562	1	0.453	0.623	0.181	2.144
	[age_max=2.00]	-0.152	0.520	0.086	1	0.769	0.859	0.310	2.380
	[age_max=3.00]	0b			0				
	[amg_max=1.00]	0.370	0.518	0.509	1	0.476	1.447	0.524	3.995
	[amg_max=2.00]	-0.963	0.576	2.792	1	0.095	0.382	0.123	1.181
	[amg_max=3.00]	0b			0				
	[edu_max=1.00]	0.890	0.678	1.723	1	0.189	2.436	0.645	9.201
	[edu_max=2.00]	0b			0				
	[inc_g=1.00]	-0.269	0.596	0.203	1	0.652	0.764	0.238	2.459
	[inc_g=2.00]	0.021	0.558	0.001	1	0.970	1.021	0.342	3.047
	[inc_g=3.00]	0b			0				

a. The reference category is: Temporary.

b. This parameter is set to zero because it is redundant.

Table 5 Likelihood Ratio Tests

Effect	Model Fitting Criteria	Likelihood Ratio Tests		
		Chi-Square	df	Sig.
Intercept	-2 Log Likelihood of Reduced Model	0	0	
t_child	448.392 ^a	7.960	2	0.019
age_max	456.353	26.155	4	0.000
amg_max	474.548	14.773	4	0.005
edu_max	463.165	11.393	2	0.003
inc_g	459.785	21.606	4	0.000

The chi-square statistic is the difference in -2 log-likelihoods between the final model and a reduced model. The reduced model is formed by omitting an effect from the final model. The null hypothesis is that all parameters of that effect are 0.

^a. This reduced model is equivalent to the final model because omitting the effect does not increase the degrees of freedom.

Discussion

Case Processing Summary reveals that pattern of contraceptive use was disproportional with the maximum representation of *not using any method* (55.32 per cent) and the minimum of use of *permanent contraceptive* (7.27 per cent). The marginal percentage of *method used* indicates a pattern with majority of *non-users* and minority of *permanent users*. That pattern was found to be conducive for population growth. The main objective of the study is to identify the most important predictors determining such a pattern which are capable of altering the contraceptive use pattern.

Figure 1 represents the percentage distribution of the sample couple according to the status of use of family planning. The figure showed that the contraceptive pattern of rural Rwanda was highly skewed towards non-use of family planning. Majority (55.32 per cent) of the sample was non-users of family planning, 37.40 percent users of *temporary* method and 7.27 percent users of *permanent*. That distribution of the dependent variable, *the method used*, was found to be sufficient for the representing of it in a fitted model.

Figure 2 represents the distribution of categorical predictor variables such as *couple age*, *couple age-at-marriage*, *couple maximum education* and *monthly income level*. Figure 2 showed that *couple age* had a distribution of convex down and *couple age*, *couple age-at-marriage*, and *couple maximum education* had distribution of convex up. There existed large difference in *couple maximum education* between *Up to Medium* and *Above Medium*. The multinomial logistic regression fitted to the sample truly represents the population as the significance level of Likelihood Ratio Test is less than 0.05. As per Cox and Snell, the fitted model was capable of affecting the 20.0 per cent of the variation of the pattern of contraceptive use in rural Rwanda.

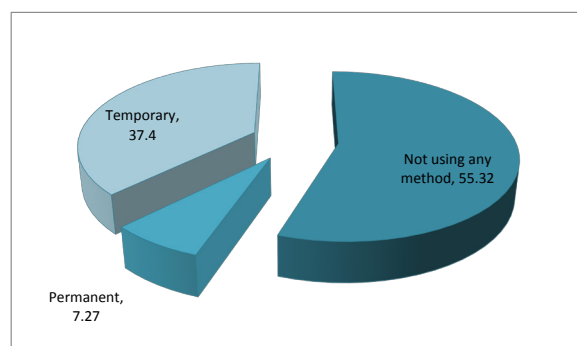


Figure 1 Distribution of sample by contraceptive pattern

The results of the multinomial logistic regression with *use of temporary contraceptive* as reference category presented in Table 1 shows that contraceptive non-use was not significantly increasing with number of children, but use of *permanent method* was significantly increasing positively with number of children. The odds ratios, $\text{Exp}(B)$, shows that contraceptive non-use was directly related with the couple age in positive direction and with the couple age at marriage in negative direction. Less educated was less likely being contraceptive non-users. Poor people were more likely to be non-users.

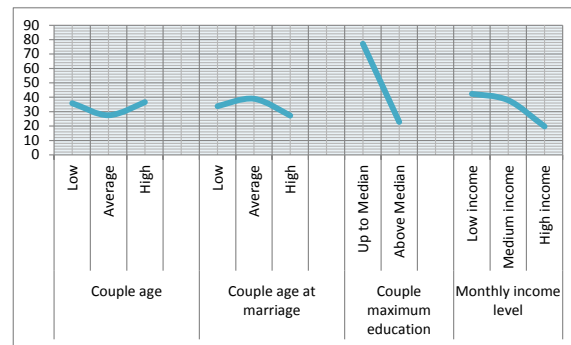


Figure 2 Distribution of sample by predictors

Aged couples were more likely to be users of *permanent* contraceptive methods. The effect of *couple age at marriage* was not found to follow direct relationship with the use of *permanent* contraceptive method. *Couple Maximum Education* and *Income* exhibited direct positive relations. Since the reference category was users of *temporary* methods, from the regression coefficient of the covariate representing total number of children it could be seen that every addition of child exert a positive effect on the reproduction of women in the rural Rwanda. The regression coefficient was found to be not significant among non-users and significant among users of permanent method. That disparity of those regression coefficients indicated that the effect of number of children was different among the three categories of *method used*. Concern over family size was found to be least among non-users and medium among users of temporary method and highest among users of permanent method.

Regression coefficients of age of non-users and users of permanent method were negative which indicated that the direct effect of age to the *method used* is highest among *non-users* and lowest among users of temporary method. The probability of retaining a specific family planning method in rural Rwanda is higher among *non-users*, medium among users of permanent method and least among users of temporary methods. Hence, as far as family planning extension is concerned, young couples were found to be the most sensitive predictor component. Converting a *non-user* to either to users of permanent method or users of temporary method was found to be much better than converting a user of temporary method to user of temporary method. Age was found to be a negative exponential distribution which exhibited the sensitivity of the young people in shaping the contraceptive pattern of the rural Rwanda. The result indicated that for controlling the *use pattern of contraceptive* to convert it into desired pattern for achieving specific goals age of the eligible couple attains significant importance.

All of the regression confidants of *Couple age-at-marriage* of *non-users* were positive in the shape of a positive exponential. In users of permanent methods the regression coefficient of the middle age group was negative. Probability of young couples remain as *non-user* was very high compare with other ages and with users of permanent and temporary methods. Couples with medium age group were found to be less probable to be as a user of permanent method. Education had a negative relation to the probability of remaining a *non-user*. The result indicated that low educated people were the most sensitive predictor components determining the *contraceptive-use-pattern* of the rural Rwanda. Income was found to have an inverse relation

with the probability of remaining as a *non-user*. For accepting any method, age and education have significant role. Couple with low age-at-marriage and low income; deserve special attention while planning the implementation of required family planning measures. Converting *users of temporary methods* into *users of permanent methods* was also found to be one of the important means having profound effect on the *contraceptive-use-pattern* of rural Rwanda.

Poverty is one of the important policy concerns of a country like Rwanda which is trying to develop from the set back of the Gen-

ocide. A multi-dimensional approach is effective and it needs lesser dissipation time. Controlling of those predator variables, after understanding their nature and strength, through Government policies, it would be easier to improve the quality of population in the rural areas of Rwanda at a remarkable speed.

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REFERENCE

- Dana A. Glei, Family Planning Perspectives, Vol. 31, No. 2 (Mar. - Apr., 1999), pp. 73-80 | Glei DA, Measuring contraceptive use patterns among teenage and adult women, National Center for Biotechnology Information, U.S. National Library of Medicine, 8600 Rockville Pike, Bethesda MD, 20894 USA, 1999. | Angela Spinelli, Irene Figà Talamanca, Laura Lauria, et.al, Patterns of Contraceptive Use in 5 European Countries, American Journal of Public Health, American Public Health Association, September 2000, Vol. 90, No. 9 | Kari White and Joseph E. Potter, Patterns of contraceptive use among Mexican-origin women, Demographic Research, VOLUME 28 - ARTICLE 41 | PAGES 1199-1212, 2013 | Enabling poor rural people to overcome poverty in Rwanda, International Fund for Agricultural Development Via Paolo di Dono, 44 00142 Rome, Italy, December 2011. | Rwanda's Social Demographics Indicators, LMIS Report, 2011