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MULTINOMIAL LOGISTIC REGRESSION TO STUDY THE DETERMINANTS OF CHOICES OF CONTRACEPTIVE METHODS AMONG MARRIED MUSLIM WOMEN IN INDONESIA

SIMIYU KEVIN MUKUBWA[1], GEORGE MUHUA[2*]

[1]Department of Mathematics, University of Nairobi, P.O Box 30197-00100, Nairobi, Kenya

Email: kevinmukubwa61@gmail.com

[2]Department of Mathematics, University of Nairobi, P.O Box 30197-00100, Nairobi, Kenya

*Email: gmuhua@uonbi.ac.ke

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ABSTRACT

Family planning has been a topic of major concern in the research field for years.The correspondence between sociodemographic characteristics and choice of contraceptive method of use specifically among married couples has not been sufficiently studied and thus imperfectly acknowledged in Indonesia.The intention of this study was to establish if an association exists between choices of contraceptive methods and socio-demographic factors,evaluate the consequences sociodemographic characteristics have on the use and choice of contraceptive and determine the factors that influence the choices and use of various contraceptive methods among married Muslim women in Indonesia.The data ob- tained from Demographic and Health Survey(DHS) dataset was applied in this cross- sectional study design. A total of 1252 women aged 15-49 years who were currently mar- ried at the moment of survey were included in the analysis. Descriptive and bivariate anal- ysis to ascertain difference in choices and use of contraceptive methods by sociodemo- graphic factors conducted. Multinomial logistic regression model was used to assess if an association exists between the response variable "choices of contraceptive methods" and the set of predictor factors,identify the significant determinants and fit a model for pre- dicting the choice of contraceptive methods. The estimates,adjusted odds ratio together with 95%CI of the determinants

linked with choices of contraceptive methods were eval- uated by multinomial logistic regression with 5% level of significance. This study revealed low contraceptive prevalence among married Muslim women 55.8%with 44.2%, 20.5% and 35.3% proportion of non-users, long-term and short-term contraceptive method users re- spectively. Standard of living index,respondent and partner education level,age and num- ber of births were found to be significant determinants of the choice of contraceptive methods among married Muslim women. Poor women were less likely to use any con- traceptive method compared to their richer and richest counterparts,there seems to be a larger gap in use and choice of contraceptive methods between the poor and rich women. Concerned stakeholders should target the uneducated,poor ,younger and older women and bring awareness on family planning this will translate to increased use of various contraceptive methods hence reduced unwanted and unintended pregnancies and mater- nal mortality rates. comprehension of determinants of choices of contraceptive methods could give confirmation for the concerned stakeholders to evolve policies,programs and interventions for married Muslim Indonesian women grounded on the use of the various contraceptive methods.

Key words: Multinomial logistic regression, Contraceptive Methods, bivariate analy- sis,living index, Determinants.

1 Introduction

Health care systems risk threats from maternal mortality which has proven a consequen- tial health problem globally. Complications from birth of children and during pregnancy period result to deaths among women. Earlier works have revealed the use of contracep- tives to help lower maternal mortality. According to the UN inter agency approxima- tions,a decline 38% in the maternal mortality ratio has been witnessed globally from 342 deaths per 100,000 live births to 211 from 2000 to 2017. This results to average rate re- duction of 2.9% mortality ratio annually. The rates are still low in comparison to the 6.4% required to actualize the Sustainable Development Global goal which intends to actualize 70 maternal deaths in every 100,000 live births. There have been significant progress wit- nessed globally with South Asia registering 59% overall reduction in maternal mortality ratio [Trends in Maternal Mortality,2000-2017 WHO,Geneva 2019]. Estimates for mater- nal deaths from preventable causes linked to pregnancy were 810 deaths daily round the globe in 2014. Greater number of these maternal deaths are experienced in countries with middle and low income. Indonesia is among the many parts globally that have exceed- ingly high maternal deaths. Recent approximations by the government of Indonesia has indicated a maternal mortality ratio of 305 lives in every 100,000 live births in 2015. In com- parison to the previous Millenium Development Goals target set up,the number is three times higher. According to the UN analysts,the challenge of the government of Indone- sia will be difficult as United Nations(UN) moved to the new goals. Lowering maternal deaths to 70/100,000 live births is United Nation's 2030 Sustainable Development Goals. There is unevenness in the accessible approximation of the maternal mortality ratio,all existing approximation reveal the rate of maternal mortality ratio to be way above the level it should be given the development made in the health system and Gross National Income(GNI) level of the country. This high level of maternal

deaths reveal deficiencies in the health system showing unequal access to services of health. Thus achieving the SDG's launched in 2016 will be an appreciable challenge for Indonesian government.

According to UN family planning is one of the fundamental intercessions that can be used to lower maternal mortality across the countries. According to Indonesian director of ma- ternal health,the progress on goals lowering maternal mortality the country was lagging behind with risks of 1/150 in comparison to 1/4,000 in countries that are developed. Family planning was set as a national plan to enhance the aNainment of the country's MDGs of 102 per 100,000 live births. Through family planning the number of pregnancies together with percentages of pregnancies that are considered to be of higher risk are lowered hence reducing maternal deaths.

2 Literature Review

Belfied(1998) found out that one needs to understand why and how people make their choices on the use of various contraceptive methods, in order for one to be an efficient and effective provider of contraceptives. The possibility of reducing pregnancies that are unintended depends majorly on the user;the confidence one has on a given method, the effectiveness of the method and satisfaction of the user. Its impossible to create a method which is perfect because that means having a method which is cheap, effective and 100% safe, not related to intercourse and without side-effects. Therefore having a method which is acceptable and usable by everyone becomes a big challenge. Spazer, Magnani and Hub- bard(2000) points out its common for contraceptive use to have challenges. Indonesia as a country has deficiency of resources therefore using the contraceptives effectively has the capability of beNering the lives of not only the women but also the men, children, families and communities involved. According to DOH(2001) the use of contraceptives is influ- enced by several factors;socio-economic status, area of residence, education level, knowledge about contraceptives, cultural values and beliefs and user's aNitude on contraceptive use. In an effort to determine the protective effects of contraception on maternal mortality, a study conducted to determine the interaction between use of contraceptive and maternal mortality in an effort to understand best the family planning protective effects. The high rates of maternal mortality were linked to lower contraceptive prevalence in Indonesia. Each time contraceptive prevalence rate increased by one percent, maternal mortality ratio were reduced by 7 percent (95%CI(0. 9, 14. 3)). Use of contraceptive played a significant role to lowering maternal mortality in Indonesia. There was need to increase use of various contraceptive methods to reduce maternal mortality. [Riznawaty Imma Aryanty et. al "con- traceptive use and maternal mortality in Indonesia"]. Essentially contraceptives are of ben- efits but they have related side-effects. Each and every one contraceptive method has its own side-effects. A woman who has or is making use of hormonal contraceptives is likely to encounter the following side-effects; amenorrheoa, backaches, headaches, menorrhagia, nausea, fatigue and an increase in pigmentation(Wood et al 1999;Jalo and Lewis 1996). Women who were using IUCDs gave an account of increase in vaginal discharge, repeated infections of the vagina and ectopic pregnancies(Mofokeng et al 1996). Those concerned with the provi- sion of contraceptives need be well versed with all the types of contraceptive methods keeping in mind that every contraceptive method has side-effects. Those responsible with the provision of contraceptives have to be cognizant of the fact that distinct contracep- tive methods are utilized by different categories of women, this will aid if the side-effects have to be reduced (Popis 1998).

3 Research Methodology

Study Design and Data: A secondary data was used for this cross-sectional study, sourced from the DHS. The data was accessed by requesting it online from the DHS program. The women successfully interviewed were 1252 out of a potential 1472 that were eligible for the study. Married Muslim women aged 15 − 49 years were the respondents. The study was limited to 1252 married women based on the criteria for inclusion to assess the demographic and socio- economic factors linked with the choice of contraceptive methods among married Muslim women in Indonesia after filtering out for the potential confounders.

Inclusion Criteria: The research involved a sample comprising of currently married women in the reproduc- tive age bracket (15-49) years of age. The married women had to be Muslim by religion.

Description Of Variables: The response variable in the study was "Choices of Contraceptive methods" with three categories and "Non-users" set as the reference category. The independent variables in this research comprised of three class that included the wife's sociodemographic fac- tors, partner's socio-demographic factors and house-linked factors. Three variables were under the class of wife socio-demographic factors, namely wife age in years (15-49), employment status (employed) and unemployed), education level (No schooling(reference), some primary, completed primary, secondary and higher). The category of the partner's socio- demographic factors had one variable, education level(No schooling(reference), some pri- mary, completed primary, secondary and higher). In relation to house-associated factors, it had three variables; quality of media exposure (Good, poor), number of births (0, 1, 2. . .) and standard of living index(Poorest(reference), middle, richer, richest)

Table 3. 1. List of Variables used

Variable	Type of variable	Levels of variable
Choice of contraceptive method	Numeric	Nominal(1=Non-users, 2=Long-term, 3=Short-term)
Wife	Age	(15-49)years
Number of children ever born	Discrete	0, 1, 2, 3, 4, . . .
Wife Education level	Numeric	Nominal(1=No schooling, 2=Some Primary, 3=Completed Primary, 4=Secondary and Higher)
Quality of Media Exposure	Numeric	Binary(0=Good, 1=Poor)
Wife Employment Status	Numeric	Binary(0=Yes, 1=No)
Husband's Education level	Numeric	Nominal(1=No Schooling, 2=Some Primary, 3=Completed Primary, 4=Secondary and Higher)
Standard of Living Index	Numeric	Nominal (1=Poorest, 2=Middle, 3=Richer, 4=Richest)

Data Analysis Tool

R programming statistical software was used to analyze the data obtained from the DHS dataset used in the study. The data was checked for missing and duplicate values which were removed from the variables analysis. Structure of the variables checked and trans- formed to the right format. Descriptive analysis conducted with results presented as per- centages and graphs. For the categorical variables, Chi-square test was used for purpose of describing and determining the association with the choice of contraceptive meth- ods. Bivariate analysis and Multinomial logistic regression was used

for assessing the signifcance of the independent variables. The results were reported with p values with significance of all the analyses set at P< 0. 05. Multicollinearity which is a serious assump- tion on regression models was checked using GVIF(Generalized Variance Inflation Factor) where variables with values above 10 were removed. Prevalence of contraceptive was cal- culated and choices of contraceptives methods determined. The "choice of contraceptive" methods was the primary outcome measure defined as;non-users of contraceptives, long- term contraceptive method users and short-term contraceptive method users. First the net effect of selected sociodemographic factors on the choice of contraceptive methods was assessed using a multinomial regression irrespective of the predictors significance, all the covariates were at the same time entered into the multinomial logistic regression model. A reduced multinomial logistic regression model with only the significant pre- dictors was fiNed with the estimates, (OR_s) and 95% CI. Multinomial logistic regression model was used to test for the association between the dependent and independent variables. The predictor variables in the model were Age of the woman, wife and partner education level, number of births, standard of living index, employment status, quality of media exposure. Multicollinearity is a serious assumption of multinomial logistic regres- sion model. However there is no specific method of testing multicollinearity, this study used GVIF (generalized variance inflation factor) where it's recommended for the values of $GVIF^{(1/(2\times Df))}$ to be less than 10. For prediction of choice of contraceptive method on given significant predictors, an individual was predicted to belong to the group associated with the highest probability.

4 Results and Discussion

Table 4. 1. A table showing the mean and standard deviation of the age and number of children born by a woman

	min	$1_{st}Qu$	median	mean	$3_{rd}Qu$	max	SD	variance
wife age	16	25	31	32. 06	38	49	8. 33	69. 39
number of children ever born	0	1	3	3. 34	5	16	2. 44	5. 95

Table 4. 2. Table showing the structure of the variables and missing values

variable	contraceptive method	wife Age	wife education	partner education	number of children ever born	employment status	standard of living index	media exposure
structure	categorical	continuous	categorical	categorical	continuous	categorical	categorical	categorical
missing values	0	0	0	0	0	0	0	0

Table 4. 3. Table showing the $GVIF^{(1/(2\times Df))}$ of the variables

variable	GVIF	DF	$GVIF^{(1/(2\times Df))}$
age	40. 4168	1	6. 3574
wife education	100. 0087	3	2. 1545

partner education	101. 5423	3	2. 1599
number of children ever born	7. 679	1	2. 7711
employment status	4. 7634	1	2. 1825
standard of living index	58. 2436	3	1. 9688
media exposure	1. 3352	1	1. 1555

The results indicated there is no multicollinearity.

There was a very clear relation between wife age and number of children born by a woman, it was quite linear and were not highly correlated, correlation coefficient 0. 54. There was no difference in age distribution among the three choices of contraception methods, mean and standard deviation for age in the three categories was similar 32. 1 and 8. 33 respectively.

Table 4. 4. Descriptive Analysis of the Determinants of Contraceptive Choices among Married Muslim women in Indonesia

	Choices of Contraceptive Method(Muslim)			
Sociodemographic Characteristics	Total	Non-Users	Long-Term Method	Short-Term Method
	1252	553(44. 2)	257(20. 5)	442(35. 3)
	N(%)	N(%)	N(%)	N(%)
Wife Education				
No Schooling	149(11. 9)	101(67. 8)	9(6)	39(26. 2)
Some Primary	311(24. 8)	164(52. 7)	33(10. 6)	114(36. 7)
Completed Primary	358(28. 6)	156(43. 6)	64(17. 9)	138(38. 5)
Secondary and Higher	434(34. 7)	132(30. 4)	151(34. 8)	151(34. 8)
Partner Education				
No Schooling	42(3. 4)	29(69)	10(23. 8)	3(7. 1)
Some Primary	170(13. 6)	96(56. 5)	15(8. 8)	59(34. 7)
Completed Primary	324(25. 9)	150(46. 3)	45(13. 9)	129(39. 8)
Secondary and Higher	716(57. 2)	278(38. 8)	187(26. 1)	251(35. 1)
Employment Status				
Employed	298(23. 8)	147(49. 3)	64(21. 5)	87(29. 2)
Unemployed	954(76. 2)	406(42. 6)	193(20. 2)	355(37. 2)
Quality of Media Exposure				
Good	1151(91. 9)	483(42)	248(21. 5)	420(36. 5)
Poor	101(8. 1)	70(69. 3)	9(8. 9)	22(21. 8)
Standard of Living Index				
Poorest	124(9. 9)	77(62. 1)	9(7. 3)	38(30. 6)
Middle	214(17. 1)	109(50. 9)	27(12. 6)	78(36. 4)
Richer	385(30. 8)	165(42. 9)	74(19. 2)	146(37. 9)
Richest	529(42. 3)	202(38. 2)	147(27. 8)	180(34)

Choices of Contraceptive Methods by Factors

Choice of Contraceptive Method by Education level

The chi-square test results were $\chi^2_{0.05,4}$ = 121. 76 with p-value<0. 001, the choices are not similar in all the levels of education. The findings are similar to a study conducted in zam- bia which revealed the likelihood of adolescent girls with advanced level of education i. e secondary and higher to use contraceptives was higher than the girls with lower educa- tion levels [OR=0. 556, 95% CI (0. 317, 0. 974)] (chalo et al. BMC women's health (2020). This is mainly due to their understanding of the various contraceptive methods together with the effects. The benefits of having smaller manageable families through family planning and how that impacts their productivity economically and upbringing of their children positively. Illiteracy has been identified in the previous studies as a factor which has effect on the use and knowledge of various contraception. Literate women were in all likelihood to make use of contraceptive in contrast to illiterate one. The effect of woman and partner education on the use of contraception is a direct one.

Table 4. 5. Contraceptive Choice according to Education Level

		Contraceptive Choice			
		Non-users N(%)	Long-term N(%)	Short-term N(%)	Total
Education Level	No schooling	101(67. 8)	9(6)	39(26. 2)	149
	Some Primary	164(52. 7)	33(10. 6)	114(36. 7)	311
	Completed Primary	156(43. 6)	64(17. 9)	138(38. 5)	358
	Secondary and Higher	132(30. 4)	151(34. 8)	151(34. 8)	434
	Total	553	257	442	1252

Choice of Contraceptive Method by Partner Education Level

Table 4. 6. Contraceptive Choice according to Partner Education Level

		Contraceptive Choice			
		Non-users N(%)	Long-term N(%)	Short-term N(%)	Total
Partner Education Level	No schooling	29(69)	10(23. 8)	3(7. 1)	42
	Some Primary	96(56. 5)	15(8. 8)	59(34. 7)	170
	Completed Primary	150(46. 3)	45(13. 9)	129(39. 8)	324
	Secondary and Higher	278(38. 8)	187(26. 1)	251(35. 1)	716
Total		553	257	442	1252

$\chi^2_{0.05,4}$= 57. 42 and p-value<0. 001, the methods are different at all levels of education. Similar results were found from a research in Bangladesh which revealed increase in level of partner education(p-value<0. 001) increased the probability of using contracep- tives. The effect of partner education on use of contraceptives was almost similar to that of respondent's education level. (Islam et al). This paper has shown partner education to be outstandingly identified with the use of contraceptives. Women who their partner had secondary and higher education were remarkably more justifiably to use any con- traceptive method compared to those who their partner had no education. There was an increase in the probability of choosing short-term methods as the partner education level improved

[OR=4. 8645, 95% CI(1. 3546, 17. 4688)] over not using any method compared to partners with no education, a finding similar to the study conducted in Bangladesh.

Choice of Contraceptive Method by Standard of Living

$\chi^2_{0.05,4}$= 48. 58 and p − value < 0. 001. Similar findings from a research carried out in Zambia identified standard of living to be positively associated with the use of contracep- tives. The use of contraceptives increased as the level of living standards increased mainly because of the improved ability to access and buy various contraceptive methods without bothering their partners. [standard of living middle(AOR=1. 35, p ≤0. 005);rich(AOR=2. 04, p ≤ 0. 001;richest(AOR=1. 95, p ≤ 0. 034)](lasong et al Determinants of modern contraceptives use among married women of reproductive age). This study supports findings from other previous researches that elucidate women with beNer living standards can easily access and have higher tendency to use various contraceptive methods compared with their poor counterparts. Women from richer 57. 1% and richest 61. 8% families were at a lower risk of geNing pregnant because of being in a position to access and purchase various contracep- tive methods compared to their 37. 9% poor counterparts. Findings from a study conducted in Malawi revealed the existence of a strong association between standards of living index and use of contraceptives. Results from this study have shown the same findings with the odds of married Muslim from the richest wealth index to use long-term and short-term contraceptive methods being [OR=3. 3513, 95% CI(1. 5150, 7. 4132)], [OR=1. 9067, 95% CI(1. 1636, 3. 1243)] respectively.

Table 4. 7. Contraceptive Choice according to Standard of Living

		Contraceptive Choice			
		Non-users N(%)	Long-term N(%)	Short-term N(%)	Total
Standard of Living	Poorest	77(62. 1)	9(7. 3)	38(30. 6)	124
	Middle	109(50. 9)	27(12. 6)	78(36. 4)	214
	Richer	165(42. 9)	74(19. 2)	146(37. 9)	385
	Richest	202(38. 2)	147(27. 8)	180(34)	529
Total		553	257	442	1252

Choices of Contraceptive Method by Employment Status

Table 4. 8. Contraceptive Choice according to Employment status

		Contraceptive Choice			
		Non-users N(%)	Long-term N(%)	Short-term N(%)	Total
Employment Status	Employed	147(49. 3)	64(21. 5)	87(29. 2)	298
	Unemployed	406(42. 6)	193(20. 2)	355(37. 2)	954
Total		553	257	442	1252

$\chi^2_{0.05,4}$= 6. 6628 and p − value = 0. 003574. The choices of contraceptives methods are not the same between the employed and unemployed. These findings are in line with the research carried out in Bangladesh which indicated the use of contraceptives to be 60. 9% and 67. 2% among the unemployed and employed women respectively, [AOR=1. 319, 95% CI (1. 193, 1. 458)]. The proportions among the

employed and unemployed using modern contraceptives being 56. 5% and 51. 7% respectively (Islam et al)

Choices of Contraceptive Method by Quality of Media Exposure

Table 4. 9. Contraceptive Choice according to quality of media exposure

		Contraceptive Choice			
		Non-users N(%)	Long-term N(%)	Short-term N(%)	Total
Quality of Media Exposure	Good	483(42)	248(21. 5)	420(36. 5)	1151
	Poor	70(69. 3)	9(8. 9)	22(21. 8)	101
Total		553	257	442	1252

$\chi^2_{0.05,4}$= 28. 629 and p − value < 0. 001. Choices of contraceptive methods are not the same between good and poor media exposure. Exposure to good quality media correlates positively with the use of contraceptives. With relevant information, the decisions and be- haviors of the married women are influenced in a positive, beNer manner translating to increased contraceptive use. These findings contradict a research by [Okach et al] where exposure to media and information on family planning failed to improve contraceptive use.

A study conducted in Zambia indicated age of the woman to be a significant determi- nant of contraceptive use with the odds of using any contraceptives increasing with age as the estimates showed 15. 2% in 1992 to 49% in 2014 and modern methods users 8. 9% to 44. 8%. This study has drawn findings which contradict with the earlier stud- ies conducted, indicated that at younger age women are likely to use various contra- ceptive methods because most of the women at this age haven't received the planned number of children. As opposed to younger women, older women are less likely to use any contraceptive method mainly at this particular age they experience infrequent sex coupled with menopause onset. As the age increased by one year the odds of using long- term and short-term methods were [OR=0. 9542, 95% CI(0. 9299, 0. 9791)], [OR=0. 8908, 95% CI(0. 8697, 0. 9124)] respectively. This findings are similar to the study conducted in Nigeria which revealed women at old age to have lower use of contraceptives.

Test for Significance of the predictors

Table 4. 10. Table showing the overall significance of all the predictors

predictor	p value
Age	p-value<0. 001
Wife Education	$P < 0.001$
Partner Education	0. 00297
Number of Children ever Born	p-value<0. 001
Employment Status	0. 3556
Standard of Living Index	0. 03042
Quality of Media Exposure	0. 1456

Overall, respondent and partner education level, age, number of births and standard of living index are significant predictors of the choices of contraceptives methods ??. From the bivariate analysis there existed an association between the response variable and independent variables. With multinomial logistic regression, two independent variables(employment status and quality of media exposure) were insignificant determinants as a result dropped when fiNing the reduced multinomial logistic model. This study has shown there is no significant effect of media exposure and employment status on the prevalence and choice of contraceptives methods however previous different researches have demon- strated a strong association between media exposure, employment status and use of con- traceptives. A study conducted in Bangladesh indicated employment status a signif- icant determinant of contraception use (p value<0. 001). It revealed employed women were 21% more likely to use contraception than unemployed counterparts [OR=1. 217, 95% CI(1. 083, 1. 3533)].

Married Muslim women with children are more likely to use any contraceptive method compared to women with no children. With every addition of one child, the probability of married Muslim woman to use long-term and short-term contraceptive methods increased 37% [OR=1. 3726, 95% CI(1. 2556, 1. 5004)] and 41. 83% [OR=1. 4183, 95% CI(1. 3103, 1. 5351)] times respectively. These outcomes are much the same with the discoveries of a research carried out in Ghana. As the woman continues to sire children she makes use of the vari- ous contraception to help in birth spacing as this allows enough time for the proper care and development of the child.

Significance Test for Overall Model Fit

Table 4. 11. The Reduced Multinomial Logistic regression model of the Determinants of contraceptive method among Married Muslim women in Indonesia

Response	variable	Estimates	odds ratio(OR)	95%*CI*	p value
LONG-TERM METHODS	Intercept	-2. 1564	0. 1157	(0. 0309, 0. 4328)	0. 0014
	Age	-0. 0469	0. 9542	(0. 9299, 0. 9791)	0. 07326
	Education Some Primary	1. 0787	2. 9407	(1. 2298, 7. 0321)	0. 0153
	Education Completed Primary	1. 8353	6. 2671	(2. 6083, 15. 0584)	<0. 001
	Education Secondary and Higher	2. 9626	19. 3479	(7. 8030, 47. 9742)	<0. 001
	Partner Education Some Primary	-1. 2357	0. 2906	0. 1055, 0. 8005)	0. 0168
	Partner Education Completed Primary	-1. 0706	0. 3428	(0. 1331, 0. 8828)	0. 0265
	Partner Education Secondary and Higher	-1. 0755	0. 3411	(0. 1314, 0. 8855)	0. 0271
	Number of Birth	0. 3167	1. 3726	(1. 2556, 1. 5004)	<0. 001
	Standard of Living Index Middle	0. 5783	1. 7829	(0. 7651, 4. 1549)	0. 1804

	Standard of Living Index Richer	0. 9285	2. 5307	(1. 1468, 5. 5847)	0. 0215
	Standard of Living Index Richest	1. 2093	3. 3513	(1. 5150, 7. 4132)	0. 0028
SHORT-TERM METHODS	Intercept	-0. 235	0. 7906	(0. 1912, 3. 2685)	0. 7435
	Age	-0. 1156	0. 8908	(0. 8697, 0. 9124)	<0. 001
	Education Some Primary	0. 0839	1. 0875	(0. 6578, 1. 7980)	0. 7437
	Education Completed Primary	0. 3348	1. 3976	(0. 8289, 2. 3564)	0. 2091
	Education Secondary and Higher	0. 9656	2. 6264	(1. 4916, 4. 6246)	0. 1465
	Partner Education Some Primary	1. 514	4. 5448	(1. 2705, 16. 2573)	0. 0199
	Partner Education Completed Primary	1. 748	5. 743	(1. 6173, 20. 3931)	0. 0069
	Partner Education Secondary and Higher	1. 582	4. 8645	(1. 3546, 17. 4688)	0. 0153
	Number of Birth	0. 3494	1. 4183	(1. 3103, 1. 5351)	<0. 001
	Standard of Living Index Middle	0. 3955	1. 4851	(0. 8861, 2. 4891)	0. 1333
	Standard of Living Index Richer	0. 5405	1. 7169	(1. 0530, 2. 7993)	0. 0302
	Standard of Living Index Richest	0. 6454	1. 9067	(1. 1636, 3. 1243)	0. 0104

The likelihood ratio test for the reduced multinomial logistic regression model;

Table 4. 12. Table showing Likelihood ratio test for reduced multinomial logistic regression model

Test	statistic	DF	p value
Likelihood Ratio Test	311. 6392	22	p-value=<0. 001

The test indicated the model to be statistically significant Likelihood Ratio Test Statistics equals 311. 6392 with DF=22 and p value<0. 001 ??. There is a strong evidence of statistical association between choices of contraceptive methods and woman's age, wife and partner education level, number of births and standards of living index among married Muslim women.

The multinomial logistic regression model fit for predicting the choices of contra- ceptive methods given the specific values for the significant predictors.

$$\ln pr(Long-Term\ Contraceptive\ Method)/pr(Not-Using\ Contraceptive) = -2.1564 - 0.0469Age + 1.0787Education\ some\ primary\ pr(Not-Using\ Contraceptive) + 1.8353Education\ completed\ primary$$

$$+ 2.9626Education\ secondary\ and\ higher - 1.2357partner\ education\ some\ primary$$

$$-1.0706partner\ education\ completed\ primary - 1.0755Education\ secondary\ and\ higher$$

$$+ 0.3167Number\ of\ Births + 0.5783Living\ Index\ Middle$$

$$+ 0.9285Living\ Index\ Richer + 1.2093Living\ Index\ Richest$$

$$ln\ pr(Short-Term\ Contraceptive\ Method)/\ pr(Not-Using\ Contraceptive) = -0.2350 - 0.1156Age + 0.0839Education\ some\ primary$$

$$+ 0.3348Education\ completed\ primary$$

$$+ 0.9656Education\ secondary\ and\ higher + 1.514partner\ education\ some\ primary$$

$$+ 1.748partner\ education\ completed\ primary + 1.582Education\ secondary\ and\ higher$$

$$+ 0.3494Number\ of\ Births + 0.3955Living\ Index\ Middle$$

$$+ 0.5405Living\ Index\ Richer + 0.6454Living\ Index\ Richest$$

5 Conclusion and Recommendation

The reduced multinomial logistic regression model fit was significant with p − value <0. 001 thus there existed an association between the choice of contraceptive methods and the given set of predictors. Overall, the choice of contraceptive method was signifi- cantly influenced by wife's education, partner education level, age of the woman, number of births and standard of life. Quality of media exposure and employment status were insignificant determinants. The choices of contraceptive methods varied with the levels of education standard of living, quality of media exposure and employment status. Family planning services offered by the concerned stakeholders should be fine-tuned with these significant determinants which will lead to increased utilization of various contraceptive methods as a result maternal health targets within sustainable development goals are re- alized. The findings of this study recommend that concerned stakeholders should single out certain women(Uneducated, younger and older women, and the poor) and make an awareness in regard to contraception this may have a robust impact in improving their use of contraceptives which may translate to reduced maternal mortality.

References

[1]. Ajah LO, Dim CC, Ezegwui HU, Iyoke CA, Ugwu EO(2015). Male partner involvement in female contraceptive choices in Nigeria. Journal of Obstetrics and Gynaecology; 35:pg 628–631

[2]. Akinrinola Bankole, Shawn Malarcher(2010). Removing Barriers to Adolescents' Access to Contraceptive Information and Services. Studies in Family Planning; 41:pg 117–124.

[3]. Ahmed, S. , Li, Q. , Liu, L. , and Tsui, A. O. (2012). Maternal deaths averted by contraceptive use: an analysis of 172 countries. The Lancet, 380(9837), pg 111–125

[4]. Arbab AA, Bener A, Abdulmalik M(2011). Prevalence, awareness and determinants of contraceptive use in Qatari women. East Mediterr Health J;17:pg 11–18

[5]. Ba DM, Ssentongo P, Agbese E, et al(2019). Prevalence and predictors of contracep- tive use among women of reproductive age in 17 sub-Saharan African countries: a large population-based study. Sex Reprod Healthc;21:pg 26–32

[6]. Baldwin SB, Solorio R, Washington DL, Yu H, Huang YC, et al(2008). Who is using emer- gency contraception? Awareness and use of emergency contraception among California women and teens. Women Health Issues; 18:pg 360-68.

[7]. Bankole A, Malarcher S(2010). Removing barriers to adolescents' access to contraceptive information and services Stud Family Plann. 41, 2, pg 117-124.

[8]. Barden-O'Fallon J, Speizer IS, Cálix J, Rodriguez F(2011). Contraceptive discontinuation among Honduran women who use reversible methods. Stud Fam Plann;42(1):pg 11–20.

[9]. Behrman JA, Wright KQ, Grant MJ, Soler-Hampejsek E(2018);49. Trends in Modern Con- traceptive Use among Young Adult Women in sub-Saharan Africa 1990 to 2014. Studies in Family Planning. Issue 4, pg 319–344

[10]. Blumenthal PD, Voedisch A, Gemzell-Danielsson K(2010). Strategies to prevent unin- tended pregnancy: increasing use of long-acting reversible contraception. Human Reprod Update;17(1):pg 121–37

[11]. Canning D, Schultz TP(2012). The economic consequences of reproductive health and family planning. Lancet;380(9837):pg 165–71.